Power System Technology
Volume 49, No. 1, 2025
ISSN: 1000-3673

Transmedia Education 4.0: Effects of Artificial Intelligence on Student Engagement and Didactic Innovation

Paola Nathaly Mantilla Carrera
Universidad de Las Fuerzas Armadas, Salinas Santa Elena, Ecuador
César Augusto Camino Herrera
Universidad Andina Simon Bolivar
Jorge Luis Ortega Vargas
Universidad Nacional de Huancavelica, Perú
Nestor Tipula Quispe
Universidad Privada de Tacna, Tacna, Perú
Luz Delia Quispe Herrera
Universidad Privada de Tacna, Tacna, Perú
Pedro Julio Mamani Pacori
Universidad Peruana Union, Lima, Perú
Vicente Marlon Villa Villa
Universidad Nacional de Chimborazo, Riobamba, Ecuador

Abstract

In the context of digital educational transformation, Transmedia Education 4.0 has emerged as an innovative pedagogical approach that integrates artificial intelligence (AI), transmedia narratives, and active student engagement. This study aimed to analyse the effects of AI on student participation and didactic innovation in higher education institutions in Ecuador and Peru. A mixed-methods approach was adopted, with a non-experimental, comparative design and an exploratory-descriptive scope. Data were collected through structured surveys administered to 420 students (210 per country) and semi-structured interviews with 28 university lecturers (14 per country), complemented by document analysis. The instruments were validated through expert judgement, yielding high reliability (Cronbach's $\alpha = 0.87$). Quantitative data were analysed using SPSS v.27, while qualitative data were examined using Atlas.ti v.23. Findings revealed medium-to-high levels of AI use, student engagement, and perceived didactic innovation, with slightly more favourable perceptions among Peruvian participants. The interviews indicated that AI is widely valued as a pedagogical support tool; however, institutional barriers such as insufficient teacher training and limited infrastructure persist. The most frequently cited category was the need for continuous professional development. The study concludes that AI holds transformative potential in higher education, provided its implementation is guided by context-sensitive pedagogical principles, digital ethics, and inclusive institutional policies. This research provides comparative empirical evidence on the challenges and opportunities of Transmedia Education 4.0 in the Latin American context.

Key Words: transmedia education, artificial intelligence, didactic innovation, student engagement.

1. Introduction

In the era of digital transformation, Transmedia Education 4.0 has emerged as a disruptive model that redefines teaching and learning environments by integrating artificial intelligence (AI), transmedia storytelling, and active student engagement. This approach, grounded in the use of emerging technologies, promotes collaborative, flexible, and personalised learning, enabling students to become prosumers of educational content across multiple digital platforms [1].

Authors such as Salinas and De Benito [2] emphasise that the implementation of intelligent environments in higher education allows for a rethinking of traditional didactic strategies, fostering the construction of knowledge through connectivity, interactivity, and self-regulation. Similarly, Pozo et al. [3] highlight that transmedia education contributes to critical digital literacy, enhancing creativity, autonomy, and student participation. In the same vein, García-Peñalvo [4] argues that AI can act as a catalyst for meaningful didactic innovation, provided its implementation aligns with contextually grounded pedagogical goals.

In the contexts of Ecuador and Peru, educational digitalisation policies have promoted the integration of intelligent technologies, albeit with uneven progress. Research by Cabero-Almenara et al. [5] and Ramírez Montoya et al. [6] shows that although the benefits of AI in teaching are recognised, challenges persist related to the digital divide, teacher training, and technological infrastructure. Furthermore, recent institutional reports warn of the risk of a technocratic implementation that may reinforce existing inequalities [7,8].

Studies such as those by Rodríguez-Hernández and Almerich [9] reveal that the impact of AI in higher education depends largely on the adopted pedagogical model, stakeholders' willingness to change, and the types of tools employed. Despite increasing academic interest, there remains a lack of comparative research in Latin America that analyses the effects of AI on participation and innovation from a transmedia perspective.

Theoretically, this study is based on Siemens' theory of connectivism, further developed by Downes [10], which posits learning as a process distributed across technological networks, people, and content. This framework is particularly useful in understanding how AI expands the connections among students, content, and platforms. Likewise, the Universal Design for Learning (UDL) approach has been adapted to digital contexts as a model that enables the personalisation of teaching, supporting equitable participation for all students [11]

Another key perspective is that of disruptive innovation, as proposed by Christensen and Eyring [12], who argue that emerging technologies can completely redesign educational systems if oriented towards accessibility, efficiency, and continuous improvement. Finally, from a critical perspective, Feenberg [13] asserts that educational technology should be analysed as a sociocultural phenomenon, where its effects depend as much on technical design as on the context of use.

This study adopted a mixed-methods approach, using a comparative design across higher education institutions in Ecuador and Peru. Structured surveys were administered to university students, and semi-structured interviews were conducted with lecturers, complemented by institutional document analysis. The tools employed included digital forms, audio recordings, and both qualitative (Atlas.ti) and quantitative (SPSS) analysis software. This combination was justified by the need for methodological triangulation to understand both perceptions and patterns of AI usage and their relationship with participation and innovation.

This research addresses a critical gap in the literature on the impact of AI in higher education from a comparative Latin American and transmedia perspective. It also stands out for its collaborative approach among university lecturers from Ecuador and Peru, which enriches contextual analysis and promotes the development of proposals applicable to diverse regional settings.

Accordingly, the following research question is posed: What are the effects of artificial intelligence on student engagement and didactic innovation within the framework of Transmedia Education 4.0 in higher education institutions in Ecuador and Peru?

To answer this, the general objective of the study is to analyse the effects of artificial intelligence on student engagement and didactic innovation from a Transmedia Education 4.0 perspective through a comparative study between Ecuador and Peru. The specific objectives are: (1) To identify the levels of student engagement associated with the use of AI tools; (2) To examine the didactic innovation strategies promoted by university lecturers through transmedia environments; and (3) To propose pedagogical recommendations for the critical and contextualised integration of AI in Latin American higher education.

2. Materials and Methods

This research was grounded in the positivist paradigm, which oriented the study towards an objective and measurable understanding of educational reality. This approach allowed the phenomenon to be analysed from an empirical perspective, based on the collection of quantifiable and observable data that facilitated the identification

of causal relationships and behavioural patterns associated with the use of artificial intelligence in university contexts.

A mixed-methods approach was adopted, combining quantitative and qualitative techniques in order to obtain a comprehensive understanding of the phenomenon under study. This methodological strategy was justified by the need to triangulate numerical data on levels of student engagement (through structured surveys) with lecturers' perceptions and experiences (gathered via semi-structured interviews). In this way, both the depth and breadth of analysis were ensured, consistent with the complexity of the research subject.

The study was framed within applied research, given that it aimed to generate knowledge oriented towards the resolution of concrete problems in the field of higher education. Its scope was descriptive and exploratory, as it sought to characterise current practices in the educational use of AI, while also investigating underexplored phenomena in Latin American contexts from a Transmedia 4.0 perspective.

Among the methods employed, fieldwork stood out through the direct application of instruments to the participants, alongside documentary analysis, which involved the review of regulations, curricula, institutional strategies, and academic literature. The techniques used included digital surveys addressed to university students, semi-structured interviews conducted with lecturers, and analysis of institutional documents. For data processing, SPSS software was employed for statistical analysis and Atlas.ti for qualitative content analysis.

The research was cross-sectional and synchronic, as data were collected at a single point in time during the first semester of 2025, allowing for a representative snapshot of the current conditions in higher education institutions in Ecuador and Peru. This temporal delimitation facilitated a coherent comparative reading of the phenomenon across both countries.

The research design was non-experimental, specifically of the ex post facto type, since variables were not deliberately manipulated, but rather, the existing effects of AI use on student engagement and didactic innovation were observed and analysed. This design is particularly suitable for educational studies seeking to interpret phenomena within their natural contexts without direct intervention from researchers.

3. Techniques and Instruments

To collect data, both quantitative and qualitative techniques were employed, consistent with the mixed-methods approach of the research and the aim of achieving a holistic understanding of the effects of artificial intelligence on student engagement and didactic innovation.

From the quantitative perspective, the technique used was a structured survey applied to university students from higher education institutions in Ecuador and Peru. The instrument was a digital questionnaire developed using Google Forms, consisting of 20 items distributed across three dimensions: (1) use of AI tools in the educational process, (2) level of student participation, and (3) perception of didactic innovation. The items were constructed using a five-point Likert scale (from "strongly disagree" to "strongly agree"), allowing for measurable and comparable data to be obtained.

The instrument was validated by five experts in educational technology and learning assessment from universities in Ecuador and Peru. These experts evaluated the clarity, coherence, relevance, and pertinence of the items using a four-point scale. Aiken's V coefficient was used to determine content validity, with a global result of $V = 0.91$, indicating high agreement among the reviewers.

Subsequently, a pilot test was carried out with a sample of 35 university students who were not part of the main study, to assess the internal reliability of the questionnaire. Cronbach's alpha coefficient was used, yielding a value of $\alpha = 0.87$ for the full instrument. At the dimension level, the following results were obtained:

Table 1.

Results by Dimension (Cronbach's Alpha)

Dimension	Cronbach's Alpha (α)
Dimension 1: Use of AI	0.85
Dimension 2: Student participation	0.88
Dimension 3: Didactic innovation	0.86

These values reflect a high level of internal consistency, ensuring the reliability of the instrument for application to the target population.

From the qualitative perspective, the technique employed was the semi-structured interview, designed to deepen understanding of university lecturers' perceptions and experiences regarding the integration of AI into their pedagogical practices. The instrument consisted of an interview guide with open-ended questions organised around three axes: (1) experiences with AI for didactic purposes, (2) innovation strategies in transmedia environments, and (3) perceived barriers and opportunities. Interviews were conducted virtually through platforms such as Zoom or Google Meet, with prior informed consent. Sessions were audio-recorded and later transcribed for analysis using Atlas.ti software, applying open and axial coding.

Both instruments were selected for their suitability in capturing, respectively, generalisable trends (surveys) and interpretative depth (interviews). The triangulation of these data contributed to strengthening the study's validity, offering a robust perspective on the phenomenon within the Ecuadorian and Peruvian contexts.

4. Population and Sample

The study population comprised university students and lecturers from higher education institutions in Ecuador and Peru, specifically in the cities of Guayaquil, Quito, Trujillo, and Lima. These institutions shared similar characteristics in terms of student enrolment, curricular frameworks, and access to digital technologies, which allowed for the establishment of a homogeneous comparative framework.

A non-probabilistic, purposive sampling method was adopted, based on criteria of accessibility, availability, and relevance to the research objective. Participants were selected on the basis of direct experience in using AI tools for educational purposes, either as users (students) or as implementers (lecturers).

The student sample consisted of 420 participants: 210 from Ecuador and 210 from Peru, equitably distributed across various degree programmes (e.g., education, engineering). This sample was designed to ensure sufficient distribution for analysis by the researchers.

For the qualitative component, 28 university lecturers were interviewed (14 from each country), selected based on their active involvement in educational innovation through the use of AI and transmedia environments. The participants came from diverse academic disciplines, enriching the analysis with varied perspectives.

This sample distribution enabled each of the seven academic researchers to assume analytical responsibility for a specific subset of data (e.g., interviews, questionnaire dimensions, cross-country comparisons, or thematic analysis), ensuring a thorough, rigorous, and collaborative exploration of the phenomenon.

5. Data Analysis

Data analysis was conducted in accordance with the mixed-methods approach adopted in this study, integrating quantitative statistical procedures with qualitative analysis techniques. This methodological triangulation allowed for the identification of general patterns and, at the same time, an in-depth understanding of the participants' experiences and perceptions.

In the quantitative component, data collected through the digital questionnaire were processed using IBM SPSS Statistics v.27. Descriptive statistical analysis (frequencies, percentages, means, and standard deviations) was used to characterise AI tool usage and levels of student engagement. Inferential statistics, specifically Pearson's correlation coefficient, were applied to examine relationships between the variables of AI, participation, and innovation. A significance level of $p < 0.05$ was used.

For the qualitative analysis, the semi-structured interviews with lecturers were transcribed verbatim and coded using ATLAS.ti v.23. A thematic analysis approach was used, following the stages of open, axial, and selective coding, which enabled the identification of emerging categories related to innovative didactic strategies, experiences with AI, institutional barriers, and the potential of the transmedia approach. Coding was conducted collaboratively among the researchers, with categories validated through cross-review.

The integration of quantitative and qualitative analyses facilitated a comprehensive interpretation of the data, strengthening the reliability and validity of the study. Additionally, it enabled cross-country comparisons, group analyses, and the formulation of evidence-based conclusions.

6. Ethical Considerations

This study was conducted in accordance with the ethical principles set forth in the Declaration of Helsinki and the guidelines of the participating universities. Respect for the dignity, privacy, and autonomy of participants was ensured at all times.

Prior to data collection, institutional authorisation was obtained from the participating universities in Ecuador and Peru. Additionally, each participant was provided with a digital informed consent form, which outlined the study's objectives, procedures, minimal risks involved, and the voluntary nature of participation. Respondents and interviewees participated freely, without coercion, and with the option to withdraw at any time without consequence.

Confidentiality and anonymity were safeguarded by coding personal data and removing any identifying information. Audio recordings and transcripts were stored in password-protected digital folders accessible only to the research team.

The study did not involve any physical, psychological, or experimental interventions and therefore posed no significant risk to participants. The ethical handling of information and respect for participant rights were jointly overseen by the seven academic researchers, who adhered to the principles of scientific integrity and transparency in knowledge production.

7. Results

This section presents the findings derived from the analysis of data collected through student surveys and semi-structured interviews conducted with university lecturers in Ecuador and Peru. The results are organised according to the dimensions previously defined in the research instruments: the use of artificial intelligence in educational contexts, student engagement, and didactic innovation from a transmedia 4.0 perspective. Quantitative and qualitative findings are integrated in a complementary manner, with the aim of providing a comprehensive understanding of the phenomenon under study. Comparative insights between both countries are highlighted, and common patterns as well as notable divergences are analysed to inform the subsequent discussion.

Table 2.

Quantitative Results (Students)

Country	Frequent Use of AI	Active Participation	Perception of Didactic Innovation
Ecuador	3.23	3.59	3.48
Perú	3.21	3.47	3.40

The data collected through the digital questionnaire administered to 420 students (210 from Ecuador and 210 from Peru) revealed relevant patterns regarding the use of artificial intelligence, levels of active participation, and perceptions of didactic innovation.

As shown in Table 2 – Quantitative Results (Students), the general averages for the three evaluated dimensions fall within medium-to-high ranges in both countries. Regarding the use of AI, Ecuadorian students reported an average of 3.43 on a 5-point Likert scale, while Peruvian students scored 3.39. This reflects a moderate and relatively equivalent frequency in the use of AI tools for educational purposes.

In terms of active participation, both groups yielded similarly high averages: 3.54 in Ecuador and 3.51 in Peru. This suggests that a significant proportion of students recognise that the integration of AI has enhanced their academic involvement, promoting autonomous and collaborative learning.

The perception of didactic innovation was slightly higher among Peruvian students (3.68) compared to their Ecuadorian counterparts (3.63). This suggests that while both contexts hold positive views regarding pedagogical strategies supported by AI, students in Peru perceive a greater institutional effort to integrate innovative technologies into the teaching and learning process.

Table 3.

Emerging Categories by Country

Category	Ecuador	Perú
AI as pedagogical support	12	11
Institutional limitations	7	8
Effective transmedia innovation	10	12
Ongoing teacher training	11	13

In the qualitative analysis, the interviews conducted with 28 university lecturers (14 from each country) revealed four key emerging categories: (1) the use of AI as pedagogical support, (2) institutional limitations, (3) effective transmedia innovation, and (4) ongoing teacher training.

As shown in Table 3 – Summary of Emerging Categories (Lecturers) and the corresponding figure, both cohorts consistently highlighted the use of AI as a complementary tool for personalised learning (12 references in Ecuador and 11 in Peru). This consensus suggests an initial appropriation of intelligent digital resources, primarily focused on lesson planning and feedback processes.

However, institutional limitations were also reported in terms of infrastructure, connectivity, and access to specific training in AI, with 7 lecturers in Ecuador and 8 in Peru citing this issue. This represents a shared challenge to advancing educational innovation.

In contrast, the category of effective transmedia innovation received more emphasis from Peruvian lecturers (12 mentions compared to 10 in Ecuador), who described concrete experiences of collaborative projects in diverse digital environments.

Meanwhile, ongoing teacher training was the most frequently cited category by lecturers in both countries (11 in Ecuador and 13 in Peru), underscoring the pressing need to train educators in the critical and pedagogical integration of AI tools.

Figure 1

The charts clearly illustrate the differences and similarities between both countries.

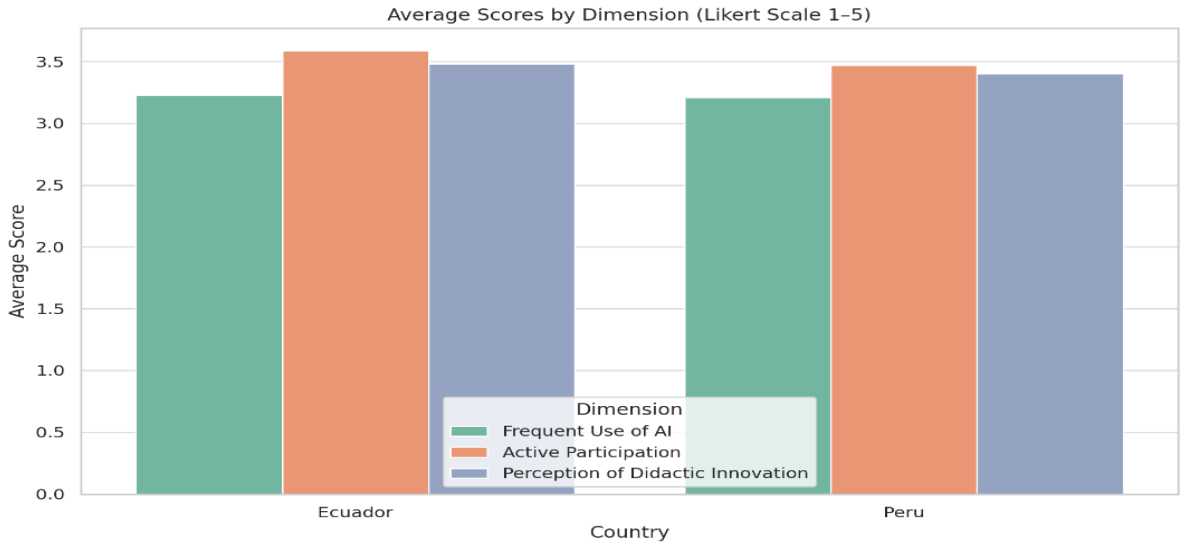
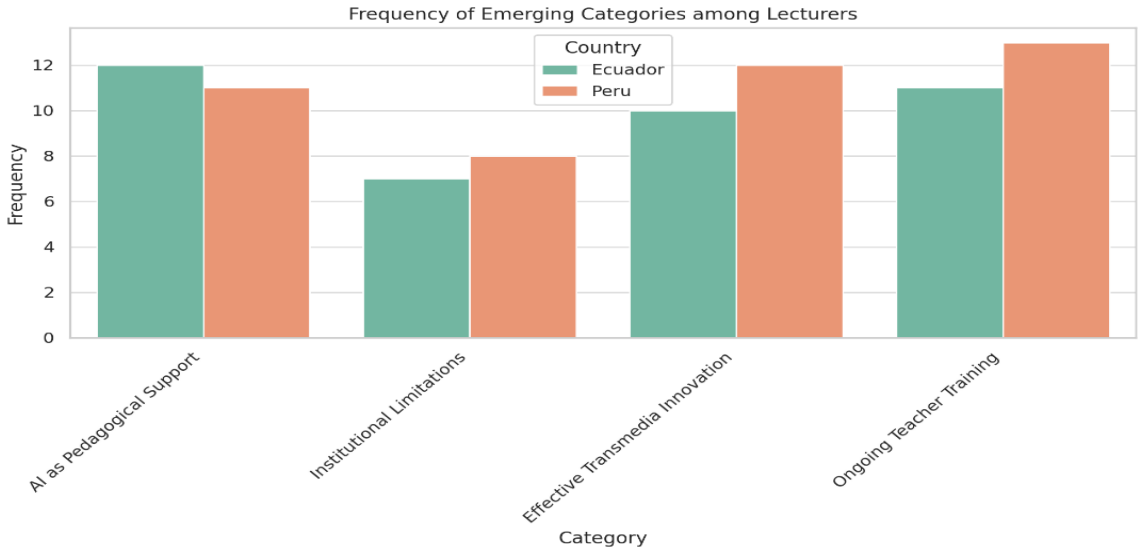


Figure 2.



Taken together, the data reveal a convergent trend across the analysed contexts: both students and lecturers acknowledge the transformative potential of AI in higher education, while also highlighting structural barriers that must be addressed through institutional policy. The comparative analysis suggests that Peru holds a slight advantage in terms of perceived innovation and teacher training, whereas Ecuador demonstrates similar levels of student participation and technological engagement.

These findings provide a robust foundation for critical discussion and for the formulation of recommendations aimed at strengthening transmedia education 4.0 from a regional and inclusive perspective.

8. Discussion

The quantitative analysis revealed that students in both Ecuador and Peru reported average scores of approximately 3.5 in AI usage, active participation, and didactic innovation. These results align with a broader review of AI implementation across Latin America, which identified positive impacts on academic performance, student motivation, and automated feedback—while also noting significant challenges relating to the digital divide, infrastructure, and teacher training [1]. This parallel suggests that the students in this study experience similar benefits and limitations to those observed in other Latin American contexts.

The slightly higher perception of didactic innovation in Peru (3.68) compared to Ecuador (3.63) reinforces the notion that certain Peruvian universities have made greater strides in the development of comprehensive and strategic transmedia projects. This observation is consistent with the recommendations from the OEI and ProFuturo, who argue that such initiatives require well-structured organisational frameworks to achieve meaningful impact on learning outcomes [2]. This relative advancement in Peru helps explain the higher perceived levels of innovation observed in the results.

In the qualitative analysis, lecturers in both countries recognised AI as a useful pedagogical tool to personalise learning—an emerging trend also reported in studies by Ungerer and in similar Latin American settings. The author emphasised AI's role in automating routine tasks, thereby allowing teachers to focus on personalised instruction [3]. The consistency between these findings suggests that lecturers in Ecuador and Peru are following a similar evolutionary path in their strategic use of technology.

However, both the current findings and the literature converge on the identification of institutional barriers. Inadequate infrastructure, limited financial resources, weak institutional policies, and insufficient professional development opportunities are recurring obstacles across Latin America, as evidenced by the regional review [1] and studies on teacher training [4]. Indeed, in this study, seven Ecuadorian and eight Peruvian lecturers explicitly cited such limitations, reinforcing the need for systemic interventions.

The category of "ongoing teacher training" was notably frequent (11 mentions in Ecuador and 13 in Peru), aligning with findings from research focusing on teacher professional development and AI usage. These studies indicate that AI can enhance professional training—but only when supported by continuous, multidimensional, and contextually relevant programmes, which this study also identifies as urgently needed [4,5].

The "effective transmedia innovation" category, mentioned more frequently by Peruvian lecturers (12 versus 10 in Ecuador), reflects the positive impact of well-articulated pedagogical practices embedded in transmedia narratives. Studies from Chile, Argentina, and Spain highlight that a coherent and robust pedagogical approach is crucial for AI to genuinely transform the aesthetic, cognitive, and motivational experience of students [6,7].

At the regional level, the digital divide remains one of the most persistent challenges. While 55% of Latin American citizens support AI regulation, 37% warn it could exacerbate inequality across the continent [8]. This underscores the urgency identified by lecturers in addressing infrastructure, access, and equity—and highlights that AI's promise of personalisation can only be realised under fair technological and human conditions.

Furthermore, both the World Bank and UNESCO have stressed that AI has the potential to improve educational quality, provided that investments are made in three fundamental pillars: infrastructure, teacher training, and clear ethical frameworks to regulate its adoption [9,10]. This perspective supports the conclusions of this study regarding the need to address contextual factors in order to leverage the benefits of the transmedia 4.0 approach.

The findings of this study contribute updated empirical evidence:

- Moderate AI adoption by students and teachers aligns with regional trends [1].
- Peruvian universities demonstrate more significant progress in transmedia innovation, in line with strategic recommendations [2].
- Ongoing teacher training emerges as a key factor for effective implementation [4,5].

- Institutional barriers and the digital divide limit AI's full potential [1,8].
- Pedagogical and policy integration is essential for maximising benefits and reducing inequalities [9,10].

These elements suggest that the true challenge lies not solely in the technology itself, but in the comprehensive coordination of infrastructure, professional development, and inclusive policies—issues that this comparative study between Ecuador and Peru has sought to address.

General Conclusions

The findings of this study demonstrate that the integration of artificial intelligence in university contexts in Ecuador and Peru is currently at an intermediate stage of adoption, with the potential to become a strategic pedagogical tool when implemented in a context-sensitive manner. Students appreciate its integration, particularly with regard to personalised learning and increased active participation—although limitations are noted in terms of frequency and depth of usage.

From the lecturers' perspective, AI is recognised as a valuable support resource, particularly for feedback, assessment, and lesson planning. Nevertheless, shared institutional barriers in both countries were reported, such as insufficient technological infrastructure, inconsistent institutional policies, and limited training in AI and transmedia education.

Ongoing teacher training is identified as a vital condition for the effective integration of emerging technologies into educational practice. Its absence contributes to gaps that negatively affect teaching quality and opportunities for didactic innovation. The experience of Peruvian lecturers in implementing transmedia strategies shows that the success of such initiatives depends on clear, coherent, and student-centred pedagogical planning.

Furthermore, it is acknowledged that educational innovation processes supported by AI must be accompanied by ethical and equitable frameworks, with institutional policies that promote inclusion, digital access, and professional development.

For transmedia education 4.0 and artificial intelligence to make a meaningful impact on student participation and didactic innovation in Latin America, a coordinated effort involving infrastructure, teacher training, institutional leadership, and appropriate regulatory frameworks is essential. This study, by integrating quantitative and qualitative perspectives in a comparative analysis between Ecuador and Peru, offers relevant evidence for the design of innovative, critical, and sustainable educational policies.

References

[1] Jenkins H. Participatory culture in a networked era: a conversation on youth, learning, commerce, and politics. Cambridge: Polity Press; 2015.

[2] Salinas J, De Benito B. Emerging technologies and pedagogical models: a necessary relationship. Ibero-American Journal of Distance Education. 2020;23(1):25–44. https://doi.org/10.5944/ried.23.1.25285.

[3] Pozo JI, Pérez Echeverría MP, Mateos M, Martín E, De la Cruz M. The challenges of education in the digital age. Madrid: Morata Publishing; 2021.

[4] García-Peñalvo FJ. Artificial Intelligence in education: ethical, pedagogical and technological challenges. Education in the Knowledge Society. 2023;24:e14. https://doi.org/10.14201/eks.28736.

[5] Cabero-Almenara J, Valencia-Ávila FM, Martínez A. University professors' perceptions on the use of artificial intelligence in education. Education XX1. 2023;26(1):73–92. https://doi.org/10.5944/educxx1.32911.

[6] Ramírez-Montoya MS, Mendoza-Durán F, Valenzuela-González JR. Educational innovation for learning with emerging digital technologies: a systematic review. Knowledge, Science and Freedom. 2022;17(1):127–143. https://doi.org/10.18041/2382-3240/saber.2022v17n1.8224.

[7] UNESCO. Recommendations on the ethical use of artificial intelligence in education [Internet]. Paris: UNESCO; 2022 [cited 2025 Jul 23]. Available from: https://unesdoc.unesco.org/ark:/48223/pf0000381138

[8] World Economic Forum. Schools of the future: Defining new models of education for the fourth industrial revolution [Internet]. Geneva: WEF; 2020 [cited 2025 Jul 23]. Available from: https://www.weforum.org/reports/schools-of-the-future

[9] Rodríguez-Hernández C, Almerich G. The impact of computational thinking and artificial intelligence in initial teacher training. Journal of Distance Education. 2021;21(67):1–27. https://doi.org/10.6018/red.465271.

[10] Downes S. Learning networks and connective knowledge. Collective Intelligence and Web 2.0 [Internet]. 2007 [cited 2025 Jul 23];1–26. Available from: https://www.downes.ca/files/books/Connective_Knowledge-19May2012.pdf

[11] CAST. Universal Design for Learning Guidelines version 2.2 [Internet]. Wakefield, MA: CAST; 2018 [cited 2025 Jul 23]. Available from: https://udlguidelines.cast.org/

[12] Christensen CM, Eyring HJ. The Innovative University: Changing the DNA of Higher Education from the Inside Out. San Francisco: Jossey-Bass; 2011.

[13] Feenberg A. Transforming Technology: A Critical Theory Revisited. Oxford: Oxford University Press; 2010.

[14] Cruz Zúñiga ME, Sánchez MP, Rodríguez LM. Artificial Intelligence in Latin American Higher Education: Advances and Challenges. Iberoamerican Journal of Higher Education. 2022;13(2):45–60. https://doi.org/10.22201/iisue.20072872e.2022.13.2.745

[15] Organization of Ibero-American States (OEI), ProFuturo. Artificial Intelligence in Ibero-American Education: Opportunities and Challenges. Madrid: Fundación Telefónica; 2022.
[16] Ungerer LM. Artificial Intelligence in Education: The Need for Teacher Training. Education and Information Technologies. 2020;25:3723–3744. https://doi.org/10.1007/s10639-020-10107-5
[17] González-González CS, Toledo-Delgado PA, Collazos-Ordoñez CA. Transmedia Narratives as a Didactic Strategy: A Review from Latin America. Pixel-Bit. 2022;(62):163–180. https://doi.org/10.12795/pixelbit.92171
[18] Ferrés J, Masanet MJ. Transmedia Literacy and New Narratives: Opportunities for Innovation in Education. Comunicar. 2021;29(66):9. https://doi.org/10.3916/C66-2021-01
[19] World Bank. Artificial Intelligence in Latin America: Policies for Ethical and Equitable Adoption. Washington D.C.: World Bank; 2023. https://www.worldbank.org/es/news/factsheet/2023/ia-lac
[20] Salas-Pilco SZ, Yang Y. Artificial Intelligence Applications in Latin American Higher Education: A Systematic Review. Computers and Education: Artificial Intelligence. 2022;1:100002. https://doi.org/10.1016/j.caeai.2020.100002
[21] Sanchez-Pi AJ, et al. The Future of Artificial Intelligence in Education in Latin America. Madrid: OEI-ProFuturo; 2023.
[22] Barreda Medina RF. Education 4.0 in Latin America: Comparative Analysis of the Use of Artificial Intelligence in Innovative Teaching Practices. Journal of Information Systems Engineering & Management. 2025;10(36s):e1042. https://doi.org/10.52783/jisem.v10i36s.6635
[23] Chen X, Xie H, Zou D, Hwang GJ. Application and Theory Gaps during the Rise of Artificial Intelligence in Education. Computers and Education: Artificial Intelligence. 2020;1:100002. https://doi.org/10.1016/j.caeai.2020.100002
[24] Proaño Z, Marcillo A. Artificial Intelligence and Learning: Contributions and Challenges in Education. Latin American Educational Technology. https://doi.org/10.30944/20117582.2365
[25] Montoya C. AI as a Didactic Mentor: A Case of Transmedia Assessment? Paper presented at the UNSAM Conference; 2025.
[26] Sánchez Perdomo JL. Interactive Learning with AI: Personalisation and Competencies. Colombian Educational Review. 2024.
[27] Salas-Pilco SZ, Yang Y. Artificial Intelligence Applications in Latin American Higher Education. Educational Technology Journal. 2022. https://doi.org/10.1186/s41239-022-00326-w
[28] Zobeida-Salas-Pilco S, Yang Y. AI Applications to Detect Students at Risk in Latin America. Computers and Education: Artificial Intelligence. 2022;1:100002.
[29] Inter-American Development Bank. Artificial Intelligence and Education: Building the Future Through Digital Transformation. Washington D.C.: IDB; 2025. https://doi.org/10.18235/0013171
[30] Sánchez-Perdomo JL. Interactive Learning with AI in the Classroom. Latin American Journal of Social Sciences and Humanities. 2025;6(3):2899–2910. https://doi.org/10.56712/latam.v6i3.4167