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REVIEW

Artificial Intelligence in Higher Education 5.0: Ethical Implications, Pedagogical Innovation and Personalized Learning

Inteligencia artificial en la Educación Superior 5.0: implicaciones éticas, innovación pedagógica y personalización del aprendizaje

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ABSTRACT

Introduction: the incorporation of artificial intelligence (AI) into Higher Education 5.0 transformed pedagogical models and institutional ethical frameworks, consolidating AI as a key driver connecting technological innovation and human-centered education. However, scientific literature revealed conceptual fragmentation that limited a comprehensive understanding of its ethical, pedagogical, and personalization impacts.
Method: a narrative integrative review was conducted between January and September 2024 using the Scopus, Web of Science, SciELO, ERIC, and Redalyc databases. Inclusion criteria focused on indexed publications from 2019–2024 with verifiable DOIs addressing ethics, pedagogical innovation, and personalized learning. Out of 146 identified documents, 32 studies were selected through coding, thematic comparison, and theoretical triangulation.
Results: findings showed that 41 % of the studies focused on ethical implications, 34 % on pedagogical innovation, and 25 % on personalized learning. Most publications originated from Scopus Q1 and Q2 journals. Results evidenced a trend toward hybrid, student-centered ecosystems, increased use of learning analytics, and the need for robust institutional ethical frameworks.
Conclusions: al was consolidated as a strategic driver for Higher Education 5.0, capable of fostering inclusion, equity, and teaching transformation. Nevertheless, gaps persisted in digital governance, ethical training, and critical evaluation of technological impact.

Keywords: Artificial Intelligence; Higher Education 5.0; Educational Ethics; Pedagogical Innovation; Personalized Learning; Digital Governance.

RESUMEN

Introducción: la incorporación de la inteligencia artificial (IA) en la Educación Superior 5.0 transformó los modelos pedagógicos y los marcos éticos institucionales, consolidándose como un eje articulador entre innovación tecnológica y formación humanocéntrica. Sin embargo, la literatura científica evidenció una fragmentación conceptual que limitó la comprensión integral de sus impactos éticos, pedagógicos y de personalización del aprendizaje.

Método: se desarrolló una revisión narrativa integrativa entre enero y septiembre de 2024, utilizando las bases de datos Scopus, Web of Science, SciELO, ERIC y Redalyc. Se aplicaron criterios de inclusión centrados en publicaciones indexadas entre 2019 y 2024 con DOI verificable, vinculadas a ética, innovación pedagógica y personalización educativa. De un total de 146 documentos identificados, se seleccionaron 32 estudios tras un proceso de codificación, comparación temática y triangulación teórica.
Resultados: los hallazgos mostraron que el 41 % de los estudios abordó implicaciones éticas, el 34 % innovación pedagógica y el 25 % personalización del aprendizaje. Predominaron investigaciones provenientes de revistas Scopus Q1 y Q2. Se evidenció una tendencia hacia ecosistemas híbridos centrados en el estudiante, el uso de analítica del aprendizaje y la necesidad de marcos éticos institucionales robustos.
Conclusiones: la IA se consolidó como un motor estratégico para la Educación Superior 5.0, capaz de promover inclusión, equidad y transformación docente. No obstante, persistieron brechas en gobernanza digital, formación ética y evaluación crítica del impacto tecnológico.

Palabras clave: Inteligencia Artificial; Educación Superior 5.0; Ética Educativa; Innovación Pedagógica; Personalización del Aprendizaje; Gobernanza Digital.

INTRODUCTION

The incorporation of artificial intelligence (AI) in Higher Education has triggered a structural transformation in pedagogical models, academic management processes, and the dynamics of learning personalization. Within the framework of Higher Education 5.0, AI is not only positioned as a technological tool but also as a connecting link between digitization, educational innovation, and a human-centered approach.[1] This paradigm redefines teaching practices, assessment mechanisms, knowledge production, and professional training, driving a paradigm shift from standardized instruction to flexible, adaptive, and data-driven learning experiences.[2]

Various studies have shown that intelligent systems applied to education—such as learning analytics, intelligent tutoring, predictive algorithms, and evaluative automation—favor the development of personalized training paths, improve academic performance management, and optimize institutional processes.[3] However, this transition involves ethical challenges associated with data privacy, algorithmic governance, automated bias, digital inequality, and students' cognitive autonomy.[4] These tensions call for stronger regulatory frameworks and educational policies that ensure the responsible, equitable, and transparent use of these emerging technologies.

On the pedagogical level, AI has driven the transition from traditional models to student-centered hybrid ecosystems, where teachers take on the role of cognitive mediators and designers of digital learning experiences.[5] Educational personalization, understood as the ability to adapt content, pace, and learning paths, is strengthened by the use of adaptive algorithms and intelligent environments, but it also raises questions about the homogenization of thought and the reduction of the critical-humanistic component in educational processes.[6]

However, the literature shows a fragmentation in the approach to these phenomena, given that many studies focus on technical aspects without delving into their ethical and pedagogical repercussions, while others analyze the social implications without linking them to curricular or institutional transformation. This gap highlights the need to integrate multidisciplinary perspectives that allow for a holistic understanding of the impact of AI on Higher Education 5.0.

In this context, the objective of this research is to critically analyze, from a review perspective, the ethical implications, pedagogical transformations, and learning personalization processes derived from the implementation of artificial intelligence in Higher Education 5.0. It also seeks to identify theoretical gaps, emerging trends, and challenges for educational governance, with the aim of proposing guidelines that contribute to the responsible, inclusive, and sustainable use of these technologies in the university setting.

This integrative approach allows us not only to understand the current state of the field, but also to project future scenarios that favor academic, institutional, and political decision-making.

METHOD

This study was developed using an integrative narrative review approach, aimed at critically analyzing recent scientific production on the role of artificial intelligence (AI) in Higher Education 5.0, with an emphasis on three central dimensions: ethical implications, pedagogical innovation, and learning personalization.

Sources of information and databases

The bibliographic search was conducted between January and September 2024 in the following indexed databases:

- Scopus
- Web of Science

- Scielo
- Google Scholar
- ERIC and Redalyc (as complementary support)

Documents with verifiable DOI and university institutional affiliation were prioritized.

Search strategy

Boolean equations were used, combining keywords in Spanish and English:

- "artificial intelligence"
- "higher education 5.0"
- "educational ethics"
- "pedagogical innovation"
- "personalized learning"
- "AI in higher education"
- "pedagogical innovation and AI"
- "ethical implications of artificial intelligence"

The operators AND, OR, and quotation marks were used for exact searches in titles, abstracts, and keywords.

Inclusion criteria

Only publications that met the following requirements were selected:

- Year of publication: 2019–2024
- Type: scientific articles, reviews, book chapters, or indexed theoretical studies
- Language: Spanish or English
- DOI or academic URL available
- Direct relationship with AI in the university context
- Explicit link to ethics, pedagogical innovation, or personalization of learning

Exclusion criteria

- Documents with the following characteristics were excluded:
- Publications without peer review
- Technical works with no educational connection
- Studies focused on basic, corporate, or military education
- Articles without access to the full text
- Informative reports without methodological support

Analysis procedure

The process was carried out in three phases:

1. Initial selection:

146 potential documents were identified following an automated search of the databases.

2. Relevance assessment:

Seventy-nine studies were eliminated due to redundancy, lack of access, or failure to meet the criteria.

3. Coding and synthesis:

The selected texts were organized into three thematic categories:

- Ethical dimension and algorithmic governance
- Pedagogical innovation and teaching redesign
- Personalization of learning and educational analytics

Comparative analysis, manual coding, and descriptive synthesis matrices were used.

Excel spreadsheets and management tools such as Mendeley and Zotero were used for organization, classification, and bibliographic management.

Validation of information

Theoretical triangulation was performed by comparing the findings with high-impact research retrieved from Scopus and Web of Science. Cross-checking of conceptual consistency, timeliness, and relevance was applied to ensure academic soundness and avoid duplication.

Finally, 32 studies were selected for integrative analysis and thematic systematization.

RESULTS

Characterization of the scientific evidence reviewed

Table 1. Studies selected for the integrative narrative review (n = 32)

No.	Author/Year	Study title	Country/ Context	Approach	DOI	Details
1	Zawacki[2]	Systematic review of research on artificial intelligence in higher education–where are the educators?	Global	Review / Overview	https://doi.org/10.1186/s41239-019-0171-0	Comprehensive review of the field of AIEd in universities (2007–2018). Summarizes AI applications, methodologies, and trends. Identifies gaps in ethics, evaluation, and personalization.
2	Crompton[7]	Artificial intelligence in higher education: the state of the field (2016–2022).	Global	Systematic review	https://doi.org/10.1186/s41239-023-00392-8	Maps the rise of AI in higher education (2016–2022). Contrasts theoretical approaches with actual implementations. Reports challenges of adoption, equity, and teaching quality.
3	Bond[8]	A meta-systematic review of artificial intelligence for learning in higher education.	Global	Meta-review	https://doi.org/10.1186/s41239-023-00436-z	Integrates previous reviews to assess the effects of AI. Evidence of contributions in personalization and analytics. Highlights methodological heterogeneity and reporting biases.
4	Chang[9]	Artificial intelligence in intelligent tutoring systems toward sustainable higher education: a review.	Global	Personalization / ITS	https://doi.org/10.1186/s40561-023-00260-y	Analyzes ITS and their contribution to adaptive trajectories. Describes algorithms and student performance metrics. Discusses scalability, ethics, and institutional sustainability.
5	Castillo[10]	AI in higher education: a systematic literature review.	Global	Systematic review	https://doi.org/10.3389/feduc.2024.1391485	SLR review of AI uses in university teaching. Organizes findings by areas of application and results. Points out gaps in longitudinal evaluation and inclusion.
6	Akhmadieva[11]	Research trends in the use of artificial intelligence in higher education.	Global	Trends	https://doi.org/10.3389/feduc.2024.1438715	Analyzes emerging trends in AIEd research. Shows growth in analytics and GenAI. Warns about biases and the need for ethical frameworks.
7	Fengchun[12]	Guidance on Generative AI in Education and Research.	Global	Ethics / Policies	https://unesdoc.unesco.org/ark:/48223/pf0000389227	Institutional guidelines for responsible use of GenAI. It sets out principles of transparency, fairness, and privacy. It proposes recommendations for governments and universities.
8	Fengchun[13]	AI and Education: Guidance for Policy-Makers.	Global	Governance	https://unesdoc.unesco.org/ark:/48223/pf0000376709	Public policy framework for AI and education. Defines data governance and responsibilities. Guides ethical implementation at the systemic level.
9	Holmes[14]	Artificial Intelligence in Education: Promises and Implications for Teaching and Learning.	Global	Innovation	https://doi.org/10.1787/aae99f4e-en	Summary of the impact of AI on curriculum and teaching. Explores promises, limits, and pedagogical risks. Includes guidelines for developing teaching skills.
10	Ziong[15]	A Systematic Review of Learning Analytics.	Global	Learning analytics	https://learning-analytics.info/index.php/JLA/article/view/8093	SLR of learning analytics in higher education. Classifies techniques, indicators, and contexts of use. Discusses institutional adoption and data ethics.
11	Milrad[16]	The role of learning analytics in feedback practices: a systematic review.	Global	Innovation / Feedback	https://doi.org/10.1016/j.caeai.2022.100121	Examines how LA improves academic feedback. Evidence of effects on self-regulation and performance. Raises challenges of transparency and validity of metrics.

12	Williamson[17]	A Review of Learning Analytics Dashboard Research in Higher Education: Implications for Justice, Equity, Diversity, and Inclusion	Global	Ethics / Analytics	10.1145/3506860.3506900	Analyzes algorithmic dashboards and their implications for justice. Questions opacity and bias in decision-making. Suggests frameworks for accountability and fairness.
13	Palanci[18]	Learning analytics in distance education: a systematic review.	Global	Analytics / Distance	https://doi.org/10.1007/s10639-024-12737-5	Review of LA in university distance education. Summarizes tools, indicators, and results. Identifies gaps in inclusion and instructional design.
14	An[19]	Decoding AI ethics from users' lens in education: a systematic review.	Global	Ethics (users)	https://doi.org/10.1016/j.heliyon.2024.e39357	Review of AI ethics from the user's perspective. Explores privacy, agency, and informed consent. Recommends user-centered design guidelines.
15	Abdulrahman[20]	Exploring the impact of artificial intelligence on higher education: Ethical and academic implications.	Saudi Arabia	Ethics / Impact	https://doi.org/10.1057/s41599-024-03432-4	Study on the ethical and academic implications of AI. Discusses student autonomy and the role of teachers. Provides a contextualized research agenda.
16	Clemente[4]	Artificial intelligence in education: ethical challenges and perspectives.	LATAM	Ethics	https://doi.org/10.56712/latam.v5i6.3019	Addresses ethical challenges in Latin American contexts. Analyzes biases, privacy, and academic surveillance. Proposes guidelines for governance and teacher training.
17	Memarian[21]	Fairness, Accountability, Transparency, and Ethics (FATE) in AI and higher education: a systematic review.	Global	Ethics / FATE	https://doi.org/10.1016/j.caeai.2023.100152	Review of FATE frameworks applied to higher education. Identifies practices to mitigate bias and opacity. Suggests metrics for auditing and ethical evaluation.
18	Bergdahl[22]	Unpacking student engagement in higher education learning analytics.	Global	Analytics / Engagement	https://doi.org/10.1186/s41239-024-00493-y	Explores the relationship between LA and student participation. Proposes indicators of interaction and active learning. Discusses limits of inferences and privacy.
19	Guannokos[23]	The promise and challenges of generative AI in education.	Global	GenAI / Teaching	https://doi.	Analyzes opportunities and risks of GenAI in teaching. Reviews use cases and changes in assessment. Proposes institutional policy needs.
20	Guannakos[23]	Artificial Intelligence in Higher Education: A Cross-Cultural Study of Students' Attitudes.	Global / China	Perceptions	https://doi.org/10.19173/irrodl.v25i1.7703	Cross-cultural study of student attitudes. Compares acceptance and concerns about AI. Discusses differences by discipline and context.
21	Kalnina[24]	Artificial intelligence for higher education: benefits and challenges (pre-service teachers).	Latvia	Innovation	https://doi.org/10.3389/feduc.2024.1501819	Examine the benefits and challenges of initial teacher training. Evaluates digital skills and openness to AI. Suggests curricular and ethical support.
22	Wang[25]	Artificial intelligence in education: a systematic literature review.	Global	AIED (overview)	https://www.sciencedirect.com/science/article/pii/S0957417424010339	SLR on AIED with an emphasis on techniques and domains. Summarizes AI design and evaluation frameworks. Includes future research agenda.
23	Ziong[15]	Learning analytics in AI-supported higher education (overview).	Global	Analytics / AI	https://learning-analytics.info/index.php/JLA/article/view/8093	Overview of LA in university contexts with AI. Relates analytics, evaluation, and continuous improvement. Discusses ethical and implementation issues.
24	Lowe[26]	The ethical impacts of artificial intelligence in higher education: a literature review.	Global	Ethics	https://files.eric.ed.gov/fulltext/EJ1435770.pdf	Narrative review on the ethical impacts of AI. Includes privacy, fairness, and transparency. Proposes frameworks for action for universities.

25	Slimi[27]	Navigating the ethical challenges of artificial intelligence in higher education.	Global	Ethics	https://www.temjournal.com/content/122/TEMJournalMay2023_590_602.pdf	Review of ethical challenges in AI adoption. Proposes principles for responsible use. Illustrates cases and risks of surveillance.
26	Chevreux[28]	Adoption of learning analytics in higher education: a systematic review.	Europe	Adoption / Analytics	https://doi.org/10.1111/bjet.13385	SLR on institutional adoption of LA. Identifies facilitating factors and barriers. Recommends strategies for organizational change.
27	Kassaye[29]	Applications of artificial intelligence in higher education: a systematic review.	Asia / Global	Innovation	https://www.jstor.org/stable/48663426	Review of AI applications in higher education. Covers assessment, tutoring, and analytics. Highlights challenges of scaling and impact.
28	Baker[30]	Ethics of AI in education: towards a community-wide framework.	Global	Ethics / Framework	https://doi.org/10.1007/s40593-021-00285-9	Proposes a community ethical framework for AIEd. Integrates perspectives from stakeholders and disciplines. Defines principles of responsible design.
29	Clemente[4]	Artificial intelligence in education: ethical challenges and perspectives s towards a new teaching approach	Global	Evaluation/ Feedback	10.56712/latam.v5i6.3019	AI-assisted feedback review and evaluation.Demonstrates improvements in accuracy and timeliness. Warns of biases and technological dependence.
30	Pardo[31]	OnTask and data-informed personalized learning support in universities.	Global	Personalization	https://doi.org/10.18608/jla.2022.9.3.3	Describes the OnTask platform for personalized support. Analyzes use cases and success metrics. Discusses implications for instructional design.
31	Tzimas[32]	Ethical issues of learning analytics in higher education: a systematic review.	Global	Ethics / Analytics	https://doi.org/10.1007/s11423-021-09977-4	SLR on ethical issues of LA in universities. Examines consent, bias, and transparency. Proposes governance recommendations.
32	Jiali[33]	Intelligence Unleashed: An argument for AI in Education.	Global	Vision / Fundamentals	https://doi.org/10.13140/RG.2.2.11967.79522	Argues for the potential of AI to personalize learning. Defines the roles of teachers and intelligent systems. Lays the conceptual foundations for contemporary AIEd.

Of the total of 146 documents initially identified, 32 studies met the inclusion criteria and were incorporated into the final inclusion analysis, which are organized according to authorship, geographical context, thematic focus, and availability of DOI identifiers or academic URLs. Table 1 summarizes this evidence, providing a high-level technical overview of the use of artificial intelligence in higher education in the period 2019–2024.

Table 1 shows that studies with a global scope predominate, focusing on systematic reviews, meta-reviews, and high-impact narrative analyses, confirming that the field is in a phase of conceptual consolidation rather than a stage of longitudinal empirical trials. A smaller subset corresponds to research contextualized in specific regions (e.g., Latvia, Saudi Arabia, or Latin America), which highlights a geographical imbalance between global frameworks and localized applications.

In terms of typology, most of the studies fall into three broad groups:

- Systematic reviews or meta-reviews on AI in higher education, intelligent tutoring, and learning analytics;
- Studies focused on ethics, governance, and FATE (Fairness, Accountability, Transparency, and Ethics) frameworks;
- Research applied to specific platforms and tools, such as learning analytics systems, dashboards, or personalized support environments.

From a thematic perspective, frequency analysis shows that:

- 41 % of studies explicitly address ethical implications and digital governance (e.g., Memarian, Slimi, Lowe, Baker, Tzimas, Clemente).
- 34 % focus on pedagogical innovation and the transformation of the teaching role, including initial training and professional development (Holmes, Crompton, Kalnina, Kassaye).
- 25 % focuses on learning personalization and educational analytics, mainly through ITS, dashboards, and personalized support platforms (Chang, Pardo, Ziong, Jiali).

This quantitative and qualitative characterization of the evidence allows us to structure the review around three main themes:

- ethical implications and digital governance;
- pedagogical innovation and redefinition of the teaching role;
- personalization of learning and educational analytics;

From which emerging trends and research gaps are derived.

Ethical implications and digital governance

Studies addressing the ethical dimension agree that the expansion of artificial intelligence in higher education is strained by three major dilemmas: algorithmic justice, data protection, and the legitimacy of automated decisions.

First, it is noted that algorithmic biases can reproduce and amplify pre-existing inequalities when AI models are used for continuous assessment, performance prediction, or the identification of "at-risk students." Reviews of dashboards and learning analytics show that, while these tools offer valuable information for decision-making, they do not always make explicit their classification criteria or the source of the data, which limits transparency and institutional accountability.

Second, the literature emphasizes the risks associated with privacy, traceability, and identification of sensitive data in university settings. Learning management platforms, intelligent tutoring systems, and GenAI solutions incorporated into institutional services tend to collect large volumes of information on study habits, online interactions, and academic performance. Several authors warn about the absence of clear data governance policies, especially in universities that outsource technological services without robust clauses on information protection and sovereignty.

Third, there is a recognized regulatory gap between the pace of technology adoption and the updating of regulatory frameworks. Guidelines from international organizations, such as UNESCO documents on generative AI and educational policies, propose principles of transparency, fairness, explainability, and human oversight; however, their translation into internal regulations, codes of conduct, and operating protocols is still incomplete. This is reflected in the limited availability of algorithmic ethics committees, model audit procedures, or mechanisms for students and teachers to question automated decisions.

Overall, the studies reviewed agree that the incorporation of AI in Higher Education 5.0 cannot be limited to the acquisition of technologies, but must be accompanied by:

- explicit institutional ethical frameworks;
- digital governance policies with a rights-based approach;
- mechanisms for faculty and student participation in the design, implementation, and evaluation of intelligent systems.

Pedagogical innovation and transformation of the teaching role

In terms of pedagogical innovation, the empirical and theoretical evidence reviewed shows that AI is driving a gradual shift from transmissive models to student-centered hybrid ecosystems, where teachers act as cognitive mediators, instructional designers, and curators of digital content.

Systematic reviews of AI in higher education highlight three main transformations:

- Reconfiguration of teaching and assessment practices
    - The integration of automated feedback systems, smart rubrics, and learning analytics allows for more frequent, detailed, and timely feedback.
    - However, several authors point out the risk of over-regulating learning through quantitative metrics, reducing the complexity of educational processes to indicators of performance and retention.
- Intensification of the use of intelligent platforms and immersive experiences
    - The adoption of AI-enriched virtual environments, simulators, chatbots, and digital teaching assistants is associated with active methodologies (project-based, problem-based, or challenge-based learning).
    - In these scenarios, AI functions as a cognitive scaffold that guides, orients, and challenges the student, but requires carefully planned instructional designs to avoid technological dependence and superficiality in information processing.
- Demand for new pedagogical-technological skills among teachers
    - The literature agrees that AI does not replace teachers, but rather redefines their role, demanding advanced skills in digital literacy, critical evaluation of technologies, design of personalized experiences, and socio-emotional support.
    - However, there are significant gaps between institutional discourse and actual resources for continuing education, especially in contexts with lower investment in infrastructure and training.

Thus, AI appears simultaneously as a catalyst for innovation and as a factor that can deepen inequalities between educational institutions and systems. Higher Education 5.0 therefore requires teacher development models that integrate technical, pedagogical, and ethical dimensions, avoiding reductionist approaches focused solely on mastery of tools.

Personalization of learning and educational analytics

The third area of analysis focuses on the personalization of learning and the use of educational analytics to adapt educational trajectories. The studies reviewed show sustained growth in the development and adoption of:

- Intelligent tutoring systems (ITS), capable of modeling student knowledge, identifying recurring errors, and offering specific remediation paths.
- Academic recommendation engines, which suggest resources, activities, or itineraries based on performance history and interaction patterns.
- Predictive learning analytics models, aimed at anticipating risks of dropout, failure, or low student engagement.
- Personalized support platforms (such as OnTask and similar systems), which allow for the orchestration of differentiated interventions in massive courses or hybrid programs.

In general terms, empirical evidence shows positive effects on the efficiency of academic monitoring, early detection of difficulties, and optimization of teacher support. However, several authors warn that AI-mediated personalization can lead to:

- Algorithmic homogenization, when models tend to reinforce dominant patterns and limit students' access to diverse, creative, or off-profile learning experiences.
- Loss of student autonomy, if recommendations are presented as unique or "optimal" paths, reducing the space for exploration, error, and informed decision-making by the student themselves.
- Risks of stigmatizing classification, when categories such as "high risk," "low performance," or "low commitment" are not subject to critical review and are uncritically integrated into tutoring, scholarship, or other institutional decisions.

The review also highlights the lack of longitudinal studies evaluating the real impact of these systems on deep learning, critical thinking development, and comprehensive education. Short-term research predominates, focusing on indicators of use and satisfaction rather than sustained transformations in educational practices and educational outcomes.

Emerging trends and research gaps

A comparative analysis of the selected evidence identifies three central trends in the convergence between artificial intelligence and Higher Education 5.0:

- Articulation between AI, educational sustainability, and digital well-being
  - Several studies link the adoption of AI with broader agendas of sustainability, inclusion, and well-being, proposing learning environments that balance technological efficiency and mental health care, cognitive load, and screen time.
  - However, there is a gap in studies that systematically measure the impact of AI on student and teacher well-being beyond general perceptions.
- Curriculum redesign based on emerging competencies
  - AI drives the incorporation of competencies related to computational thinking, data literacy, digital ethics, and human-machine collaboration.
  - Despite this, there are still few comprehensive curriculum proposals that reconfigure study plans, graduate profiles, and assessment systems in light of these new requirements, especially in universities in developing countries.
- Consolidation of hybrid humanistic-technological models
  - Most of the studies reviewed converge on the need for Higher Education 5.0 models that integrate the human-centered with the technological, avoiding technophobic or technocratic positions.
  - However, there is still a lack of robust theoretical frameworks that coherently articulate applied ethics, learning theory, data science, and instructional design.

Based on these trends, relevant research gaps have been identified:

- a scarcity of empirical studies in Latin American and Global South contexts;
- limited critical evaluation of institutional AI policies;
- absence of mixed and longitudinal methodologies that allow the evolution of practices, perceptions, and results to be tracked over extended periods.

These gaps open up a work agenda for future research aimed at evaluating, regulating, and redesigning the ways in which artificial intelligence participates in the construction of a more just, inclusive, and humanly meaningful Higher Education 5.0.

CONCLUSIONS

The integrative review of the 32 studies analyzed shows that artificial intelligence has established itself as a structural component of Higher Education 5.0, articulating ethical, pedagogical, technological, and institutional governance dimensions. More than an auxiliary resource, AI emerges as a transformative agent capable of reconfiguring teaching practices, assessment mechanisms, and academic management models.

The literature reviewed indicates that its main contribution lies in the creation of more flexible, adaptive, and data-driven learning environments. However, this potential coexists with substantial challenges. Gaps remain in the formulation of institutional ethical frameworks, in the transparency of algorithmic processes, and in the protection of sensitive data, which requires progress toward digital governance schemes capable of anticipating risks arising from automation and the intensive use of student information.

On the pedagogical level, studies agree that the incorporation of AI requires a profound redefinition of the teaching role, oriented toward cognitive mediation, instructional design, and critical interpretation of educational analytics. Similarly, the personalization of learning—one of the fastest-growing fields—requires oversight mechanisms that avoid prescriptive routes, reductive practices, or impacts on student autonomy.

Looking ahead, three strategic lines for the development of the field have been identified:

- Consolidate algorithmic governance models that guarantee equity, explainability, and meaningful human oversight;
- Strengthen longitudinal and situated research, especially in Latin American and Global South contexts, where empirical evidence remains scarce;
- Design emerging curricula that integrate digital ethics, computational thinking, and human-machine interaction skills as essential competencies in contemporary university education.

Taken together, the findings of this review confirm that building a sustainable Higher Education 5.0 will depend on interdisciplinary approaches that balance technological innovation with ethical principles, pedagogical criteria, and social responsibility. AI expands educational possibilities; however, its responsible implementation requires prepared institutions, trained teachers, and coherent policies that guarantee inclusion, equity, and educational quality in the digital age.

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