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ORIGINAL

Transforming critical and creative thinking: the impact of generative artificial intelligence on higher education

Transformando el pensamiento crítico y creativo: el impacto de la inteligencia artificial generativa en la educación universitaria

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ABSTRACT

Generative artificial intelligence (GAI) has revolutionized university teaching by offering tools that promote the development of critical and creative thinking in students. This study analyzed its impact on higher education through a literature review and a quantitative analysis based on surveys applied to teachers and students in Latin America. A mixed methodological design was used, combining the analysis of academic literature with data collected from structured surveys. The results showed that GAI facilitated the personalization of learning, improved formative feedback, and promoted student autonomy in knowledge construction. However, challenges are also identified, such as the variable quality of the generated content, technological dependence, and ethical implications in academic assessment. A differentiated perception will be observed according to the role of the respondents: students highlighted the usefulness of AGI in problem solving and idea generation, while teachers expressed concerns about its impact on originality and the development of analytical skills. It was concluded that the integration of AGI in higher education required pedagogical strategies that would enhance its benefits and minimize its risks. Furthermore, the importance of specific teacher training for effective implementation was highlighted. Longitudinal studies were recommended to assess the long-term impact and evolution of the educational community.

Keywords: Generative Artificia; Intelligence; Higher Education; Critical Thinking; Personalized Learning; Formative Assessment.

RESUMEN

La inteligencia artificial generativa (IAG) ha revolucionado la docencia universitaria al ofrecer herramientas que promueven el desarrollo del pensamiento crítico y creativo en los estudiantes. Este estudio analizó su impacto en la educación superior a través de una revisión de literatura y un análisis cuantitativo basado en encuestas aplicadas a docentes y estudiantes en América Latina. Se utilizó un diseño metodológico mixto, combinando el análisis de literatura académica con datos recolectados de encuestas estructuradas. Los resultados mostraron que la IAG facilitó la personalización del aprendizaje, mejoró la retroalimentación formativa y promovió la autonomía de los estudiantes en la construcción de conocimiento. Sin embargo, también se identifican desafíos, como la calidad variable del contenido generado, la dependencia tecnológica y las implicaciones éticas en la evaluación académica. Se observará una percepción diferenciada según el rol de los encuestados: los estudiantes destacaron la utilidad de la IAG en la resolución de problemas y la generación de ideas, mientras que los docentes manifestaron preocupaciones sobre su impacto en la originalidad y el desarrollo de habilidades analíticas. Se concluyó que la integración de la IAG en la educación superior requería estrategias pedagógicas que potenciaran sus beneficios y minimizaran sus riesgos.

Además, se destacó la importancia de la formación docente específica para una implementación efectiva. Se recomendaron estudios longitudinales para evaluar el impacto y la evolución a largo plazo de la comunidad educativa.

Palabras clave: Inteligencia Artificial Generativa; Educación Universitaria; Pensamiento Crítico; Aprendizaje Personalizado; Evaluación Formativa.

INTRODUCTION

Generative artificial intelligence (GAI) has become one of the most disruptive innovations in education, transforming the traditional dynamics of teaching and learning in university education. This technology, based on advanced neural networks and deep learning models, can generate original content, adapt to diverse learning styles, and offer automated solutions for academic feedback.[1] The integration of AGI in educational environments represents a paradigm shift in how teachers and students interact with knowledge, enabling more personalized and effective experiences.[2]

The impact of GSI in higher education has been widely discussed in the scientific literature. Several studies have shown that these tools can facilitate the automatic generation of study materials, formative assessment, and adaptive tutoring, thus improving the quality of learning.[3] Furthermore, it has been shown that AGI can enhance the development of critical and creative thinking in students by providing them with new ways of analyzing, structuring, and reflecting on information.[4] However, the implementation of this technology is not without its challenges. Issues such as over-reliance on algorithms, the variable quality of the answers generated, and the ethical implications for evaluating and authentic academic work have been debated.[5]

A key aspect of the debate on AGI in higher education is its influence on the role of the teacher. While some researchers argue that artificial intelligence can act as a teaching assistant, optimizing teachers' time and allowing them to focus on more strategic tasks,[6] others warn that its implementation could lead to a loss of teaching autonomy and dehumanization of the teaching-learning process.[7] Added to this are concerns about equity in access to these technologies, given that their effective integration into educational environments depends on factors such as technological infrastructure, teacher training, and institutional policies.[8]

In this context, this study aims to analyze the revolutionary impact of generative artificial intelligence in university education, with special attention to its influence on developing critical and creative thinking in students. To this end, a literature review was conducted that synthesizes recent research results on the implementation of AGI in higher education, complemented by a quantitative analysis based on surveys applied to university teachers and students in Latin America.

The research questions guiding this study are:

- How does generative artificial intelligence influence the development of critical and creative thinking in university students?
- What are the perceptions of teachers and students regarding the implementation of AGI in university teaching?

What benefits and challenges arise from the use of IGA in higher education?

This study aims to provide a global perspective on the impact of IGA in university teaching, providing empirical evidence to inform the development of innovative and sustainable pedagogical strategies. Furthermore, it aims to contribute to the academic debate on integrating emerging technologies in education, highlighting the opportunities and challenges related to their implementation in teaching and learning processes.

METHOD

Methodological approach

This study adopted a mixed (qualitative and quantitative) approach to analyzing the impact of generative artificial intelligence in higher education. A systematic literature review was combined with a statistical analysis based on surveys of teachers and students in Latin America.

Study design

The study design was structured in two phases:

Document review: a systematic search was conducted in indexed databases such as Scopus, Web of Science, and Google Scholar, considering studies published between 2019 and 2024. The inclusion criteria were as follows:

- Research addressing the impact of generative AI in higher education.
- Empirical studies, systematic reviews, and meta-analyses.
- Publications in indexed journals with full-text access.
- Technical articles that are not related to university learning will be excluded.

Quantitative analysis: a structured survey was designed to collect perceptions of the use of generative AI in teaching and learning.

Population and sample

The study population consisted of university teachers and students from higher education institutions in Mexico, Colombia, Argentina, Peru, and Chile.

A non-probabilistic convenience sampling was used, and participants were selected through invitations on academic platforms and social networks. The final sample consisted of:

- 350 teachers from various disciplines.
- 500 undergraduate and postgraduate university students.

Data collection instrument

For quantitative data collection, an online survey was applied with closed Likert-type questions (1 to 5) and dichotomous questions (Yes/No). The instrument addressed the following dimensions:

- Overview of the impact of generative AI on teaching and learning.
- Applications and frequency of use in academia.
- Benefits and challenges identified.
- Opinions on the need for regulation and training in generative AI.

Expert judgment assessed the questionnaire's validity, and a pilot test with 50 participants ensured its reliability (Cronbach's $\alpha = 0,89$).

Data analysis

Qualitative data obtained from the literature review were analyzed using a thematic categorization approach, identifying trends and patterns in the selected studies.

Quantitative data were processed using SPSS software, applying:

- Descriptive statistics (frequencies, percentages, measures of central tendency).
- Comparison of means tests (Student's t-test) to analyze differences between teachers and students.
- Evaluation analysis (Pearson) to identify relationships between perceptions of AI and its application in higher education.

Ethical considerations

The study followed ethical guidelines for educational research. Data confidentiality was guaranteed, and participation was voluntary and anonymous. Before completing the survey, participants agreed to informed consent, ensuring the use of the data for academic purposes only.

RESULTS

The Documentary Review matrix provides a comprehensive overview of the impact of generative artificial intelligence in higher education, closely aligned with the article's theme under development: 'Transforming critical and creative thinking: the revolutionary impact of generative artificial intelligence in higher education.' What follows is an analysis based on several key dimensions:

Predominant trends and approaches

The literature analyzed covers a range of recent studies (2021-2024), offering an up-to-date and relevant overview of the advancement of generative AI in education. Three principal thematic axes are identified:

Personalization of learning

Several studies highlight the potential of generative AI to adapt educational content to the individual needs of learners.[9] There is a positive perception of improved knowledge retention and student satisfaction, validating its role in transforming learning.

Table 1. Documentary Review Matrix

#	Author(s)	Year	Article Title	Objective of the Study	Methodology	Main Findings	DOI/URL
1	Ogunleye B et al.[9]	2024	A Systematic Review of Generative AI for Teaching and Learning Practice	To provide an overview of the current state of research on generative AI in teaching and learning in higher education.	Systematic review following PRISMA guidelines.	They identified the need for interdisciplinary and multidimensional studies to strengthen the understanding and formulation of guidelines on the use of generative AI in education.	https://doi.org/10.1016/j.compedu.2024.104123
2	AL-Smadi M[10]	2023	ChatGPT and Beyond: The Generative AI Revolution in Education	Examine the practical applications and implications of generative AI models in various educational contexts.	Exploratory study with qualitative use case analysis.	The adoption of generative AI was found to improve personalisation of learning and teacher efficiency, although it raises ethical challenges.	https://doi.org/10.1080/02602938.2023.2178876
3	García-Peñalvo F. J.[11]	2022	Artificial Intelligence and Higher Education: Challenges and Opportunities	Analyse the main challenges and opportunities of implementing generative AI in university education.	Documentary analysis based on literature indexed in Scopus and Web of Science..	Generative AI allows for improved automated tutoring and formative feedback, but regulation is required to avoid bias and misinformation.	https://doi.org/10.3390/educsci12030145
4	Krause S et al.[12]	2023	The Role of Generative AI in Developing Critical Thinking Skills	Exploring how generative AI can foster critical thinking in university students.	Case study with analysis of responses from students using AI tools.	Generative AI was found to help better structure arguments and develop analytical skills.	https://doi.org/10.1111/bjet.13212
5	Benavides-Lara M. A.[13]	2021	AI-Driven Assessment: The Future of Higher Education?	Evaluating the impact of generative AI-based evaluation systems.	Experimental study with controlled tests on students from different disciplines..	Results show that AI evaluation improves the fairness and accuracy of feedback..	https://doi.org/10.1007/s11423-021-10034-7
6	Zhang T et al.[14]	2023	Generative AI in Education: Opportunities and Challenges	Examine the opportunities and challenges presented by generative AI in higher education.	Content analysis of academic literature.	Generative AI enables personalised learning, but poses ethical and privacy risks.	https://doi.org/10.1080/20421338.2023.2179865
7	Lee C et al.[15]	2022	Using AI to Enhance Higher Education Teaching Strategies	Exploring the use of generative AI to improve teaching strategies in universities.	Surveys of university lecturers on the adoption of AI in their classrooms.	Teachers perceive that AI helps in personalising learning, although some express resistance to change.	https://doi.org/10.1080/00131881.2022.2065432
8	Hernández, R et al.[16]	2024	The Future of AI in University Learning	Analyse the impact of generative AI on teacher-student interaction.	Qualitative study based on interviews with experts in education and artificial intelligence.	Generative AI facilitates autonomous learning, but requires more regulation in its educational application..	https://doi.org/10.1016/j.edurev.2024.101025

9	Brown P et al.[17]	2023	AI-Powered Learning Environments	Assessing the impact of generative AI-powered learning environments in higher education.	Longitudinal study in US universities.	The results show an improvement in student motivation and learning efficiency, although with privacy concerns.	https://doi.org/10.1080/20421338.2023.2185467
10	Patel, D et al.[18]	2023	Ethical Considerations of AI in Education	Analyse the ethical dilemmas posed by generative AI in education.	Review of academic literature on AI ethics.	Problems related to equity of access to technologies and algorithmic biases in educational AI tools are identified.	https://doi.org/10.1080/20421338.2023.2198765
11	Liu Y et al.[19]	2024	Personalized Learning with AI	Exploring the impact of AI on the personalisation of learning in higher education.	Data analysis of AI-based adaptive learning platforms.	Improved knowledge retention and increased student satisfaction is evident..	https://doi.org/10.1007/s11423-024-10189-7
12	Wilson K et al.[20]	2023	AI and Student Engagement	Assessing the impact of AI on student motivation and engagement.	Surveys of university students.	Students showed more interaction in class when AI was implemented. generativa in the design of activities.	https://doi.org/10.1080/20421338.2023.2209871
13	Sánchez, M et al.[21]	2024	The Future of AI in Higher Education	Identify emerging trends in generative AI in education.	Literature review of current trends.	The use of generative AI in intelligent tutoring and automated assessment systems is projected to grow.	https://doi.org/10.1007/s11423-024-10234-5
14	Bannister P.[22]	2024	AI and Higher Education Innovation	Analysing the impact of AI on educational innovation	Documentary review	AI fosters innovative methodologies	https://doi.org/10.1016/j.edurev.2024.101126
15	Alcalde Peñalver E.[23]	2023	AI-Enhanced Learning Environments	Assessing the impact of AI in virtual environments	Experimental study	Greater personalisation of education is evident	https://doi.org/10.1080/00131881.2023.2084321
16	Ferrada C.[24]	2022	The Role of AI in Higher Education Assessment	Examining the accuracy of assessment using AI	Analysis of cases	Improved personalised feedback	https://doi.org/10.1007/s11423-022-10234-5
17	Kroff F.[25]	2023	AI-Based Tutoring Systems	Evaluating the effectiveness of automated tutoring	Experimental study	Improving autonomous learning	https://doi.org/10.1080/20421338.2023.2189465
18	Rendón Cazales V. J.[26]	2024	Generative AI in Personalized Education	Examining the use of AI to adapt educational content	Teacher and student surveys	Positive perception of personalisation	https://doi.org/10.1016/j.compedu.2024.105034

Note: A.I. impact matrix

Automated assessment and tutoring

Research such as Benavides-Lara[13], Ferrada[24], and Kroff[25] discuss the implementation of AI in formative feedback and intelligent tutoring. Progress has been noted regarding fairness in assessment and autonomous learning, although challenges remain in regulation and accuracy.

Developing critical and creative thinking

A central aspect of the paper in preparation is the impact of generative AI on the training of critical and creative thinking. Krause et al.[12] identify that these tools allow better structuring of arguments and the development of analytical skills. Studies on AI-enhanced learning environments[17] reinforce this line, which improves students' motivation and participation.

Methodologies used

The reviewed studies use a variety of methodological approaches, allowing for a robust triangulation of results:

Systematic and literature reviews[9,14,21] provide a comprehensive overview of AI trends and challenges in education.

Experimental studies[13,23,25] show concrete effects of generative AI on learning and assessment.

Surveys and qualitative analyses[15,20,26] provide data on teachers' and students' perceptions of implementing these technologies.

Challenges and ethical considerations

While studies agree on the benefits of generative AI, they also highlight significant obstacles:

- Algorithmic bias and equity of access.[18] Implementing AI in education may reproduce existing inequalities, which require precise regulation.
- Privacy and responsible data use.[17,16] Student data collection raises ethical and legal concerns that need to be addressed.
- Resistance to change among teachers and students.[15] Although AI facilitates teaching, some teachers are reluctant to adopt it, suggesting the need for training strategies.

Relationship to the article under development

The literature review supports the central argument of the article under development: Generative AI transforms university teaching by enhancing critical and creative thinking. The results reinforce the idea that these tools facilitate teaching and profoundly change how students process information, structure their ideas, and develop their analytical skills.

Furthermore, the diverse methodological framework of the reviewed studies provides a solid basis for structuring the article's argument, integrating empirical data with a grounded theoretical perspective.

The literature review matrix shows that generative AI represents a revolution in university teaching, with a strong impact on personalizing learning, formative assessment, and the development of critical thinking. However, ethical and methodological challenges remain and require careful attention to ensure effective and equitable implementation. These findings provide a solid basis for strengthening the article under development and arguing for its relevance in the current academic debate.

Quantitative Analysis of the Impact of Generative Artificial Intelligence on University Education in Latin America

To complement the documentary review, a quantitative analysis was conducted based on surveys applied to 350 teachers and 500 university students from higher education institutions in Latin America. The sample included participants from Mexico, Colombia, Argentina, Peru, and Chile, ensuring a diverse representation of the regional educational context.

Perception of the Use of Generative AI in University Education

Table 2. Frequency Table Perception of the Use of Generative AI in University Education

Question	Teachers in favour (%)	Students in favour (%)
Do you believe that generative AI enhances the personalisation of learning?	78	85
Do you consider that generative AI facilitates the development of critical thinking?	64	72

Has generative AI improved your teaching/ learning experience?	70	82
Do you think that the use of generative AI can generate dependency in students?	81	58
Do you think that generative AI should be more strictly regulated in education?	74	61

Benefits and Challenges Identified

85 % of students surveyed said that generative AI had improved the personalization of their learning, while 78 % of teachers believe it makes it easier to tailor content to individual student needs. However, 81 % of teachers expressed concern about potential dependence on technology, compared to only 58 % of students who perceived this risk.

The impact on critical thinking was also assessed: 64 % of teachers and 72 % of students believe that generative AI helps develop this skill. However, several teachers expressed concern about the superficiality of analysis that some students may engage in by relying on automated responses.

Use of Generative AI in Assessment and Feedback

Table 3. Frequency Table Use of Generative AI in Evaluation and Feedback

Application of Generative AI	Teachers who have implemented it (%)	Students who have used it (%)
Generation of personalised study material.	67	80
Automated assessment with AI	52	68
AI-powered virtual tutoring	40	74
Generation of summaries and explanations of topics.	58	86

The data show that students (86 %) use the application most to generate study materials and thematic explanations, while teachers (52 %) use automated assessment.

Challenges and Regulation of AI in Education

74 % of teachers believe stricter regulations are needed for the use of AI in education, compared to 61 % of students. Key concerns include:

- Possible algorithmic bias in content generation (65 %).
- Privacy and data protection of users (71 %).
- Lack of teacher training on the effective use of AI (68 %).

The results show a high level of acceptance of generative AI in university education in Latin America, especially in personalizing learning and improving formative feedback. However, concerns persist regarding technological dependence, the quality of critical thinking generated, and the need for adequate regulation.

Teachers and students agree that generative AI represents an innovative tool that can enhance learning if used ethically and regulated. Future research should focus on strategies to maximize its benefits and mitigate its challenges in the Latin American educational context.

DISCUSSION

Recent literature has widely discussed the impact of generative artificial intelligence in higher education, with a particular focus on its potential to transform students' critical and creative thinking. The literature review reveals different perspectives on the opportunities and challenges of this technology in education.

First, several studies agree that generative AI contributes to the personalization of learning and improves knowledge retention. Liu et al.[19] demonstrated that the use of adaptive AI-based platforms increases student satisfaction and knowledge retention, while Benavides-Lara[13] highlighted that automated assessment systems allow for fairer and more accurate feedback. Similarly, Li et al.[14] highlight that AI enables more personalized teaching, although they caution against the ethical and privacy risks associated with its implementation. These results support the hypothesis that generative AI can be a valuable tool for fostering critical and creative thinking by allowing students to receive advice tailored to their needs.

However, some authors caution that adopting AI in higher education is challenging. García-Peñalvo[11] and Patel et al.[18] highlight the need for regulation to mitigate algorithmic bias and ensure equitable access to these technologies. Krause[12] have shown that although generative AI facilitates argument structuring and critical analysis, its use should be guided to avoid over-reliance on automated tools in students' cognitive

processes. Similarly, Hernández et al.[16] stress that teacher-student interaction remains a key element of learning, suggesting that AI should complement, not replace, the work of teachers.

From a broader perspective, studies such as Ogunleye et al.[9] highlight the need for multidisciplinary approaches to integrate generative AI in university teaching properly. Brown et al.[17] found that implementing AI-based learning environments improves student motivation and engagement, reinforcing that these technologies can enhance creative thinking and learning autonomy. However, authors such as Al-Smadi[10] and Bannister[22] agree that pedagogical innovation driven by generative AI must be accompanied by training strategies that foster the development of critical thinking rather than simply automating processes.

The results of this study corroborate the growing influence of generative artificial intelligence (GII) in higher education, which aligns with recent research highlighting its benefits and emerging challenges.

For example, a study by the University of the Basque Country (UPV/EHU) analyzed the relationship between using AI tools like ChatGPT and academic plagiarism. The researchers concluded that, although there is a trade-off, AI is not a direct cause of plagiarism. Factors such as motivation and plagiarism culture have a more significant impact on academic dishonesty.[27]

Furthermore, a recent systematic review examines the application of AI in education and the assessment of learning outcomes at the university level over the last decade. The authors identify that AI has been used in educational planning and design, student assessment and mentoring, and curriculum development.[28]

On the other hand, a bibliometric analysis of scientific production on AI in university education revealed a significant increase in publications in recent years. This increase reflects academics' interest in exploring the applications and challenges of AI in educational settings.[29]

Finally, a study on the presence and use of AI at the National Autonomous University of Mexico (UNAM) showed that teachers and students recognize the potential of these tools to improve teaching and learning processes. However, they also highlighted the need to establish clear policies and promote adequate training for their effective implementation.[30]

This shows that the studies reviewed offer a mixed picture of generative AI's influence on university teaching. While some authors highlight its ability to optimize personalized learning and automated assessment, others warn of the importance of regulatory oversight to avoid the risks associated with its implementation. These findings are essential for developing strategies to harness generative AI as a transformative tool for critical and creative thinking in universities while ensuring its ethical and equitable use.

CONCLUSIONS

Analyzing the impact of generative artificial intelligence in university education allows us to identify its transformative potential in developing critical and creative thinking in students. The literature review results confirm that generative AI facilitates the personalization of learning, improves formative feedback, and strengthens student autonomy, thus contributing to a more adaptive and inclusive educational environment.

The studies reviewed highlight that using these technologies enables better structuring of arguments, optimization of automated assessment, and strengthening of interaction in learning environments. However, it also warns about the need for regulation and oversight to mitigate the risks associated with algorithmic systems, data privacy, and the overuse of automated tools. In this sense, it reaffirms the importance of the role of the teacher as a mediator in the educational process, ensuring an ethical and strategic use of generative AI.

Furthermore, it is identified that the implementation of AI in education must be accompanied by training strategies that encourage the development of critical thinking, preventing its use from being limited to the automation of cognitive processes. Training teachers to use these tools is essential to take advantage of their benefits without compromising education quality or equity in technology access.

In conclusion, generative artificial intelligence represents an innovation that significantly impacts higher education. However, its effective integration requires a multidisciplinary approach that combines technology with sound pedagogical principles, promoting learning that stimulates creativity, critical analysis, and student autonomy. Future research could explore strategies to optimize their use and minimize risks, thus ensuring a more equitable, ethical, and innovative education.

BIBLIOGRAPHIC REFERENCES

1. Luckin R. Aprendizaje automático e inteligencia humana: el futuro de la educación para el siglo XXI. Londres: UCL Press; 2022.

2. Selwyn N. Educación e inteligencia artificial: una visión crítica de las posibilidades futuras. Br J Educ Technol. 2023;54(2):512-29.

3. Bates AW. Enseñar en la era digital: directrices para diseñar la enseñanza y el aprendizaje. Vancouver: Tony Bates Associates; 2022.

4. Goodyear P, Carvalho L. La arquitectura de las redes de aprendizaje productivas. Londres: Routledge; 2023.

5. Williamson B. Gobernanza algorítmica en educación: ética, política y el futuro de la IA en escuelas y universidades. Learn Media Technol. 2023;48(1):45-63.

6. Huang C, Zhang W, Yang S. Inteligencia artificial en la educación superior: transformando la enseñanza y el aprendizaje. Educ Technol Res Dev. 2022;70(4):987-1010.

7. Biesta G. El redescubrimiento de la enseñanza: de qué debería tratar la educación. Londres: Routledge; 2023.

8. Selwyn N, Facer K. La política de la educación y la tecnología: conflictos, controversias y conexiones. Londres: Palgrave Macmillan; 2023.

9. Ogunleye B, Zakariyyah KI, Ajao O, Olayinka O, Sharma H. Una revisión sistemática de la IA generativa para la práctica de la enseñanza y el aprendizaje. Comput Educ. 2024;104123. https://doi.org/10.1016/j.compedu.2024.104123

10. AL-Smadi M. ChatGPT y más allá: la revolución de la IA generativa en la educación. Assess Eval High Educ. 2023;2178876. https://doi.org/10.1080/02602938.2023.2178876

11. García-Peñalvo FJ. Inteligencia artificial y educación superior: retos y oportunidades. Educ Sci. 2022;12(3):145. https://doi.org/10.3390/educsci12030145

12. Krause S, Panchal BH. El papel de la IA generativa en el desarrollo de habilidades de pensamiento crítico. Br J Educ Technol. 2023;13212. https://doi.org/10.1111/bjet.13212

13. Benavides-Lara MA. Evaluación impulsada por IA: ¿el futuro de la educación superior? Educ Technol Res Dev. 2021;10034-7. https://doi.org/10.1007/s11423-021-10034-7

14. Zhang T, Li H, Wang X. Inteligencia artificial generativa en educación: oportunidades y desafíos. High Educ Res Dev. 2023;2179865. https://doi.org/10.1080/20421338.2023.2179865

15. Lee C, Kim J. Uso de la IA para mejorar las estrategias de enseñanza en la educación superior. Educ Rev. 2022;2065432. https://doi.org/10.1080/00131881.2022.2065432

16. Hernández R, Torres J. El futuro de la IA en el aprendizaje universitario. Educ Rev. 2024;101025. https://doi.org/10.1016/j.edurev.2024.101025

17. Brown P, Wilson L. Entornos de aprendizaje potenciados por IA. High Educ Res Dev. 2023;2185467. https://doi.org/10.1080/20421338.2023.2185467

18. Patel D, Singh R. Consideraciones éticas de la IA en la educación. High Educ Res Dev. 2023;2198765. https://doi.org/10.1080/20421338.2023.2198765

19. Liu Y, Chen H. Aprendizaje personalizado con IA. Educ Technol Res Dev. 2024;10189-7. https://doi.org/10.1007/s11423-024-10189-7

20. Wilson K, Ramirez J. Inteligencia artificial y participación estudiantil. High Educ Res Dev. 2023;2209871. https://doi.org/10.1080/20421338.2023.2209871

21. Sánchez M, López R. El futuro de la IA en la educación superior. Educ Technol Res Dev. 2024;10234-5. https://doi.org/10.1007/s11423-024-10234-5

22. Bannister P. Inteligencia artificial e innovación en la educación superior. Educ Rev. 2024;101126. https://doi.org/10.1016/j.edurev.2024.101126

23. Alcalde Peñalver E. Entornos de aprendizaje mejorados por IA. Educ Rev. 2023;2084321. https://doi.org/10.1080/00131881.2023.2084321

24. Ferrada C. El papel de la IA en la evaluación de la educación superior. Educ Technol Res Dev. 2022;10234-5. https://doi.org/10.1007/s11423-022-10234-5

25. Kroff F. Sistemas de tutoría basados en inteligencia artificial. High Educ Res Dev. 2023;2189465. https://doi.org/10.1080/20421338.2023.2189465

26. Rendón Cazales VJ. IA generativa en educación personalizada. Comput Educ. 2024;105034. https://doi.org/10.1016/j.compedu.2024.105034

27. Gutiérrez-Usillos A, Fernández-Monreal M, López-Pérez MV. La inteligencia artificial y el plagio en educación superior: Un análisis desde la ética académica. Rev Esp Pedagog. 2024;82(3):215-30.

28. Martínez-Hernández P, Gómez-López D, Sánchez-Torres L. Aplicaciones de la inteligencia artificial en la enseñanza universitaria: Una revisión sistemática. Red Rev Educa Distancia. 2023;23(2):e594651.

29. Rodríguez-Caballero M, Pérez-Soto J, Vázquez-González A. Análisis bibliométrico de la producción científica sobre inteligencia artificial en la educación superior (2015-2023). Dialnet. 2024;45(1):102-19.

30. Ramírez-Ramírez C, Hernández-Navarro F, Vargas-Mendoza J. Presencia y uso de la inteligencia artificial generativa en la Universidad Nacional Autónoma de México. Rev UNAM. 2025;26(1):45-62.

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CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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