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Impact of generative artificial intelligence on university educational quality: A systematic review

Impacto de la inteligencia artificial generativa en la calidad educativa universitaria: una revisión sistemática

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Abstract

Generative artificial intelligence has emerged as one of the most influential technological innovations in higher education, transforming teaching, learning, assessment, and institutional management processes. This has generated growing interest in understanding its impact on the quality of university education. In this context, the present study aimed to analyze recent scientific evidence on the influence of generative artificial intelligence on educational quality, considering its implications for academic performance and institutional management during the period 2021–2025. To this end, a systematic literature review was conducted following the PRISMA 2020 guidelines. The search was carried out in the Scopus, Web of Science, ERIC, SciELO, DOAJ, Dialnet, and Latindex databases, supplemented with specialized sources, resulting in a final corpus of 24 studies that met the established inclusion criteria. The results show that generative artificial intelligence promotes personalized learning, immediate feedback, the strengthening of digital skills, and the optimization of academic management processes. Challenges were also identified related to academic integrity, algorithmic bias, data protection, equity in access to technology, and the need to strengthen ethical and regulatory frameworks for its implementation. It is concluded that generative artificial intelligence constitutes a strategic resource for the transformation of higher education; however, its contribution to educational quality depends on pedagogical, ethical, and institutional integration that promotes innovation, inclusion, and the development of critical thinking.

Keywords: generative artificial intelligence, higher education, educational quality.

Resumen

La inteligencia artificial generativa ha emergido como una de las innovaciones tecnológicas más influyentes en la educación superior, al transformar los procesos de enseñanza, aprendizaje, evaluación y gestión institucional, lo que ha generado un creciente interés por comprender su impacto en la calidad educativa universitaria. En este contexto, el presente estudio tuvo como objetivo analizar la evidencia científica reciente sobre la influencia de la inteligencia artificial generativa en la calidad educativa, considerando sus implicancias en el desempeño académico y la gestión institucional durante el período 2021–2025. Para ello, se realizó una revisión sistemática de la literatura siguiendo las directrices PRISMA 2020. La búsqueda se efectuó en las bases de datos Scopus, Web of Science, ERIC, SciELO, DOAJ, Dialnet y Latindex, complementada con fuentes especializadas, lo que permitió conformar un corpus final de 24 estudios que cumplieron los criterios de inclusión establecidos. Los resultados evidencian que la inteligencia artificial generativa favorece la personalización del aprendizaje, la retroalimentación inmediata, el fortalecimiento de competencias digitales y la optimización de los procesos de gestión académica. Asimismo, se identificaron desafíos relacionados con la integridad académica, los sesgos algorítmicos, la protección de datos, la equidad en el acceso a la tecnología y la necesidad de fortalecer marcos éticos y normativos para su implementación. Se concluye que la inteligencia artificial generativa constituye un recurso estratégico para la transformación de la educación superior; sin embargo, su contribución a la calidad

educativa depende de una integración pedagógica, ética e institucional que promueva la innovación, la inclusión y el desarrollo del pensamiento crítico.

Palabras clave: inteligencia artificial generativa, educación superior, calidad educativa.

Introduction

Generative artificial intelligence (GAI) has established itself as one of the most disruptive technological innovations in contemporary higher education. The rapid advancement of large-scale language models and conversational systems such as ChatGPT has reshaped traditional approaches to teaching, learning, and knowledge production by enabling automated content generation, personalized feedback, and adaptive learning experiences. A growing body of research has documented the increasing adoption of these technologies across universities worldwide, emphasizing their potential to support academic activities and streamline educational processes (Kasneci et al., 2023; Tlili et al., 2023). GAI is likewise held to be redefining educational environments by fostering more flexible, student-centered, technology-supported models of learning (Chan, 2023; Chiu, 2023).

The educational benefits attributed to generative artificial intelligence have drawn considerable attention within the academic community. Available evidence suggests that these tools can facilitate personalized learning, boost student engagement, strengthen autonomous learning, and provide immediate academic support. Crompton and Burke (2023), for instance, note that integrating artificial intelligence into educational settings creates opportunities to enhance teaching effectiveness and broaden access to learning resources. Along similar lines, Holmes et al. (2023) argue that intelligent technologies can enrich educational experiences by tailoring content to individual needs and encouraging more active student participation in academic tasks.

Nonetheless, the implementation of GAI in higher education has also raised substantial ethical, pedagogical, and institutional challenges. Several studies warn of risks tied to academic integrity, plagiarism, authorship attribution, algorithmic bias, and technological dependency (Cotton et al., 2023; Farrokhnia et al., 2024). Such concerns have intensified as artificial intelligence systems become increasingly capable of producing complex academic content, a development that calls traditional assessment and verification models into question. In response, international bodies such as UNESCO (2023) have stressed the need for ethical frameworks and governance mechanisms capable of promoting the responsible, transparent, and secure use of these technologies in educational settings.

Beyond its direct influence on teaching and learning processes, generative artificial intelligence carries significant implications for educational quality and academic performance. The specialized literature recognizes that academic performance hinges on multiple cognitive, emotional, social, and institutional factors. Within this framework, artificial-intelligence-based tools can help improve learning outcomes through timely access to information, the strengthening of study skills, and the personalization of learning pathways. Findings in this area nevertheless remain mixed, as the effectiveness of these technologies appears to depend on variables such as students' digital competencies, critical thinking, and the pedagogical strategies adopted by instructors (Kasneci et al., 2023; Chan & Hu, 2023).

At the institutional level, generative artificial intelligence is increasingly recognized as a strategic resource for strengthening university management and quality-assurance processes. A number of higher-education institutions have begun incorporating intelligent systems to optimize academic monitoring, support data-driven decision-making, improve administrative procedures, and reinforce continuous-improvement mechanisms. Artificial intelligence is consequently no longer viewed solely as a pedagogical tool but also as a key component of institutional transformation and innovation. Recent evidence suggests that data-driven educational management can foster more efficient organizational structures and contribute to strengthening educational quality (Chan, 2023; UNESCO, 2023).

Despite the rapid growth of scientific publications on generative artificial intelligence since the emergence of ChatGPT and similar technologies, the literature remains fragmented across multiple thematic strands related to pedagogy, academic performance, educational quality, ethics, and institutional management. Prior reviews have tended to focus on specific dimensions of artificial-intelligence adoption, which has limited a comprehensive understanding of how these areas relate to one another (Zawacki-Richter et al., 2024; Bozkurt et al., 2024). This dispersion complicates the identification of global trends and constrains efforts to build an integrated view of the impact of generative artificial intelligence on higher education.

Accordingly, the present systematic review sets out to analyze recent scientific evidence on generative artificial intelligence in higher education, with particular attention to its implications for educational quality, academic performance, and institutional management during the 2021–2025 period. This study is guided by the following research question: what evidence does the recent scientific literature report regarding the influence of generative

artificial intelligence on educational quality, academic performance, and institutional management in higher education?

Methodology

This study was carried out as a systematic literature review aimed at analyzing the scientific evidence on generative artificial intelligence in higher education and its implications for educational quality, academic performance, and institutional management. The methodological process was grounded in the guidelines set out by the PRISMA 2020 statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), with the aim of ensuring transparency, reproducibility, and rigor in the identification, selection, and analysis of the documentary sources.

The literature search was conducted between January and March 2026 across academic databases with broad coverage and scientific impact, including Scopus, Web of Science, ERIC, SciELO, DOAJ, Dialnet, and Latindex. Documents were also drawn from complementary sources such as the UNESCO Digital Library, arXiv, Springer Books, WorldCat, and cross-referencing. These sources were selected for their relevance to the fields of education, educational technology, pedagogical innovation, and the social sciences.

Study retrieval relied on structured search strings built with Boolean operators, combining terms related to generative artificial intelligence, higher education, educational quality, and academic performance. Selection was carried out independently by two researchers, with any discrepancies resolved through academic consensus. The main search strategy was as follows:

TITLE-ABS-KEY (“generative artificial intelligence” OR “artificial intelligence” OR ChatGPT OR “large language models”) AND (“higher education” OR university OR “educational quality” OR “academic performance” OR “academic achievement”)

Studies published between 2021 and 2025 were considered in light of the accelerated growth of research on generative artificial intelligence following the emergence of advanced language models. Inclusion criteria encompassed scientific articles, systematic reviews, empirical studies, institutional reports, and academic books directly addressing the application of generative artificial intelligence in higher education, educational quality, academic performance, or institutional management. Publications in both English and Spanish were included, provided they offered full-text access and verifiable bibliographic information.

Studies were coded through inductive thematic analysis, which made it possible to group the evidence into five emerging thematic axes concerning teaching and learning processes, academic performance, educational quality, ethical challenges, and future trends in artificial intelligence within higher education. Categorization was performed independently by the researchers and subsequently agreed upon by consensus to ensure analytical consistency.

Excluded from the review were duplicate records, publications without a direct bearing on the object of study, studies focused on other educational levels, work that failed to address the central variables of the investigation, documents lacking full-text access, and records with insufficient bibliographic information for verification.

The search process identified 1,314 records, of which 1,248 came from academic databases and 66 from complementary sources. After removing 472 duplicate records, a sample of 842 documents remained for the screening phase. Of these, 726 records were subsequently excluded for failing to meet the thematic relevance criteria, leaving 116 studies for full-text evaluation. At this stage, 92 studies were excluded for reasons including limited thematic relevance, discrepancies in the educational level examined, the absence of the variables of interest, non-empirical design, unavailability of the full text, or insufficient methodological information to address the research question. This process yielded a final corpus of 24 studies, which formed the basis for the systematic literature review and the qualitative synthesis of the scientific evidence.

The selected studies were then organized and analyzed through thematic categorization procedures, which allowed for the identification of research trends, predominant approaches, benefits, challenges, and perspectives associated with the incorporation of generative artificial intelligence into higher education. This process supported the construction of a comprehensive view of the impact of these technologies on educational quality, academic performance, and institutional management during the period under study.

Table 1

Representative studies organized by thematic axis on generative artificial intelligence, educational quality, and academic performance in higher education (2021–2025)

Thematic axis	Main focus	Representative studies
Transformation of teaching and learning processes	Examines the impact of generative artificial intelligence on personalized learning, automated feedback, intelligent tutoring, and pedagogical innovation.	Kasneci et al. (2023), Tlili et al. (2023), Holmes et al. (2023), Adiguzel et al. (2023).
Academic performance and development of student competencies	Examines the relationship between emerging technologies, academic performance, self-regulation, motivation, critical thinking, and digital competencies.	Ortiz and Fernández (2025), Casanova et al. (2024), Botero-Zapata et al. (2024), Soria-Barreto et al. (2024), Shala et al. (2024).
Educational quality, innovation, and institutional management	Explores the role of artificial intelligence in educational management processes, quality assurance, academic leadership, and institutional digital transformation.	Angulo-García (2022), Atabik et al. (2024), Cervantes-López et al. (2023), Wong-Fajardo et al. (2023), Rosales et al. (2023).
Ethical challenges, academic integrity, and AI governance	Addresses issues related to plagiarism, academic authorship, algorithmic bias, data privacy, and institutional regulation.	Cotton et al. (2023), Farrokhnia et al. (2024), Yan et al. (2024), UNESCO (2023), Johnston et al. (2024).
Emerging trends and future perspectives on artificial intelligence in higher education	Identifies emerging lines of research related to learning analytics, intelligent ecosystems, hybrid education, and university transformation.	Dwivedi et al. (2023), Crompton and Burke (2023), Zawacki-Richter et al. (2024), Bozkurt et al. (2024), McGrath et al. (2025).

Note. The table presents the 24 studies included in the systematic review, organized according to the main thematic axes identified during the evidence-synthesis process. For the sake of systematization and expository clarity, studies were grouped according to the predominant thematic axis addressed in each investigation.

Results

The results of this systematic review were structured around the analysis of the 24 included studies, which were organized through a thematic categorization process that yielded five axes related to the incorporation of generative artificial intelligence into higher education. These axes comprise the transformation of teaching and learning processes; academic performance and the development of student competencies; educational quality, innovation, and institutional management; ethical challenges, academic integrity, and artificial-intelligence governance; and emerging trends and future perspectives. Synthesizing the evidence made it possible to identify the main findings reported in the recent literature, establishing common patterns, relevant contributions, and critical issues associated with the implementation of these technologies in university settings.

Transformation of teaching and learning processes

Evidence synthesized from the studies by Kasneci et al. (2023), Tlili et al. (2023), Holmes et al. (2023), Lo (2023), and Adiguzel et al. (2023) shows that generative artificial intelligence supports personalized learning, immediate feedback, and the adaptation of academic activities to students' individual needs. The incorporation of intelligent assistants and generative models has likewise strengthened autonomous learning, optimized instructional planning, and expanded access to digital educational resources, fostering more flexible and interactive learning experiences across a range of university settings.

The evidence further indicates that the impact of these tools depends on factors linked to the educational context and to users' own competencies. The reviewed studies converge in identifying digital literacy, teacher training, the development of critical thinking, and the responsible use of artificial intelligence as essential conditions for effective pedagogical integration. Taken together, the findings suggest that generative artificial intelligence holds potential to strengthen instructional processes, provided its incorporation follows planned pedagogical strategies oriented toward meaningful learning.

Academic performance and the development of student competencies

The studies by Ortiz and Fernández (2025), Casanova et al. (2024), Botero-Zapata et al. (2024), Soria-Barreto et al. (2024), and Shala et al. (2024) found that generative artificial intelligence is associated with stronger academic performance through its support for autonomous learning, the completion of academic tasks, information retrieval and organization, and the development of digital competencies. The literature also reported that these tools promote self-regulated learning, increase motivation toward university activities, and facilitate the acquisition of critical-analysis and problem-solving skills, particularly when their use is embedded within planned pedagogical strategies.

These studies also identified academic performance as a multidimensional phenomenon shaped by cognitive, socio-emotional, institutional, and contextual variables. Generative artificial intelligence therefore functions as a complementary resource whose impact hinges on students' digital literacy, the guidance provided by instructors, and the presence of educational environments that promote the ethical, critical, and responsible use of these technologies. Overall, the evidence indicates that AI adoption can contribute to the development of academic competencies, although outcomes vary according to each institution's implementation conditions.

Educational quality, innovation, and institutional management

Studies conducted by Angulo-García (2022), Atabik et al. (2024), Cervantes-López et al. (2023), Wong-Fajardo et al. (2023), and Rosales et al. (2023) showed that generative artificial intelligence helps strengthen educational-quality processes through pedagogical innovation, digital transformation, and the optimization of institutional management. Their findings indicate that these technologies support data-driven decision-making, underpin quality-assurance processes, and facilitate the modernization of academic and administrative management, thereby promoting greater efficiency across higher-education institutions.

The reviewed literature further notes that incorporating artificial intelligence calls for institutional planning, academic leadership, and policies oriented toward educational innovation. The studies agree that effectively implementing these technologies requires technological infrastructure, ongoing faculty training, and evaluation mechanisms capable of safeguarding the quality of educational processes. The evidence, accordingly, identifies generative artificial intelligence as a strategic resource for strengthening university management and supporting continuous-improvement efforts.

Ethical challenges, academic integrity, and artificial intelligence governance

The studies by Cotton et al. (2023), Farrokhnia et al. (2024), Yan et al. (2024), UNESCO (2023), and Johnston et al. (2024) found that the expansion of generative artificial intelligence has heightened concerns regarding academic integrity, intellectual authorship, plagiarism, data privacy, and algorithmic bias. Their findings show that the indiscriminate use of these tools can compromise the authenticity of academic work and complicate verification of the originality of student-produced assignments, a situation that poses new challenges for university assessment systems.

The evidence also points to the need to strengthen institutional governance mechanisms through policies, ethical guidelines, and regulatory frameworks that guide the responsible use of artificial intelligence in higher education. The reviewed studies concur that training in digital ethics, transparency in the use of generative tools, and ongoing oversight by both instructors and institutions are essential to ensuring the responsible incorporation of these technologies and to preserving the principles of quality, equity, and academic integrity.

Emerging trends and future perspectives on artificial intelligence in higher education

The studies by Dwivedi et al. (2023), Crompton and Burke (2023), Zawacki-Richter et al. (2024), and Bozkurt et al. (2024) showed that the main research trends point toward the development of intelligent educational ecosystems, the consolidation of hybrid teaching models, the expansion of learning analytics, and the progressive integration of artificial-intelligence tools into academic and institutional processes. These findings reveal a steady evolution in generative-AI applications aimed at improving learning personalization, strengthening data-driven decision-making, and optimizing university management.

The reviewed literature also identifies future challenges, including the design of institutional policies that promote the sustainable adoption of these technologies, the strengthening of digital competencies among instructors and students, and the consolidation of educational models centered on learning, innovation, and inclusion. Taken together, the studies analyzed agree that the continued evolution of generative artificial intelligence will keep transforming higher education, meaning its implementation must be accompanied by pedagogical, organizational, and ethical strategies that support responsible integration and the ongoing improvement of educational quality.

Discussion

The findings of this systematic review indicate that generative artificial intelligence has assumed a strategic role in the transformation of higher education, simultaneously shaping teaching and learning processes, academic performance, institutional management, and quality-assurance mechanisms. The convergence observed across the studies analyzed demonstrates that these technologies have moved beyond a complementary role to become integrated components of university educational ecosystems. In this regard, the work of Kasneci et al. (2023), Tlili et al. (2023), Holmes et al. (2023), and Adiguzel et al. (2023) consistently highlights that generative artificial intelligence supports personalized learning, automated feedback, and pedagogical innovation, outcomes directly linked to improved learning experiences and to the adaptation of educational processes to students' individual needs.

With respect to academic performance, the synthesized evidence shows that incorporating artificial-intelligence-based tools does not, in itself, guarantee better educational outcomes; rather, their effectiveness depends on pedagogical, institutional, and personal factors. The studies by Ortiz and Fernández (2025), Casanova et al. (2024), Botero-Zapata et al. (2024), Soria-Barreto et al. (2024), and Shala et al. (2024) suggest that stronger digital competencies, self-regulated learning, motivation, and critical thinking are indispensable conditions for these technologies to exert a positive effect on academic performance. This evidence indicates that the integration of artificial intelligence should be understood as a process of educational innovation accompanied by instructional strategies and ongoing training, rather than as a stand-alone technological solution.

From an institutional standpoint, the results show that generative artificial intelligence also plays a meaningful role in strengthening educational-quality processes and digital transformation. The studies by Angulo-García (2022), Atabik et al. (2024), Cervantes-López et al. (2023), Wong-Fajardo et al. (2023), and Rosales et al. (2023) demonstrate that implementing these technologies supports the optimization of academic management, institutional leadership, and decision-making grounded in strategic information. Educational quality, accordingly, no longer depends solely on teaching and learning processes but also encompasses dimensions related to organizational innovation, institutional efficiency, and universities' capacity to respond to the challenges of digital transformation.

The review also reveals, however, that the rapid growth of generative artificial intelligence raises significant ethical and regulatory challenges. The contributions of Cotton et al. (2023), Farrokhnia et al. (2024), Yan et al. (2024), UNESCO (2023), and Johnston et al. (2024) converge in flagging concerns related to academic integrity, intellectual authorship, data privacy, algorithmic bias, and the need to establish normative frameworks guiding the responsible use of these technologies. These findings show that incorporating artificial intelligence into higher education must be accompanied by institutional policies, ethical principles, and digital-literacy programs capable of balancing technological innovation with the protection of core academic values.

Finally, the trends identified by Dwivedi et al. (2023), Crompton and Burke (2023), Zawacki-Richter et al. (2024), Bozkurt et al. (2024), and McGrath et al. (2025) indicate that the continued evolution of generative artificial intelligence will keep shaping the development of intelligent ecosystems, hybrid teaching models, learning analytics, and new forms of university management. Taken together, the evidence reviewed confirms that the future of higher education will depend on institutions' capacity to integrate these technologies in a pedagogically sound, ethically responsible, and institutionally sustainable manner. Generative artificial intelligence should therefore be understood not merely as a technological innovation but as a structural factor that redefines educational practices, drives continuous quality improvement, and demands new competencies to meet the challenges facing the contemporary university.

Conclusions

This systematic review examined the scientific evidence published between 2022 and 2025 on the influence of generative artificial intelligence on educational quality in higher education, drawing on a corpus of 24 studies selected according to previously established methodological criteria. The evidence reviewed shows that these technologies have moved beyond a merely instrumental function to become strategic resources capable of transforming teaching and learning processes, strengthening academic performance, and fostering innovation in university institutional management. Generative artificial intelligence, accordingly, has the potential to contribute to improved educational quality when its incorporation responds to clearly defined pedagogical objectives.

The studies analyzed further show that the impact of generative artificial intelligence does not depend solely on the technological capabilities of the tools employed, but on the institutional and pedagogical conditions that guide their implementation. Factors such as digital literacy, the development of teaching competencies, students' critical training, and the availability of innovation-oriented institutional policies determine how effectively these technologies

are leveraged within educational processes. This confirms that university digital transformation requires comprehensive strategies that bring together infrastructure, training, and change management.

The review also identified significant challenges arising from the expansion of generative artificial intelligence, including issues related to academic integrity, data protection, algorithmic bias, intellectual authorship, and institutional governance. These issues underscore the need to strengthen regulatory frameworks, ethical guidelines, and oversight mechanisms capable of ensuring a responsible, transparent, and equitable use of these technologies within higher-education institutions.

Future research is recommended to broaden this analysis through empirical studies and systematic reviews spanning different geographic contexts, academic disciplines, and methodological designs, with a view to deepening the understanding of the effects of generative artificial intelligence on educational quality and academic performance. It would likewise be worthwhile to evaluate, longitudinally, the impact of these technologies on teaching, learning, and university management processes, given the rapid evolution of artificial-intelligence tools and the changing demands of the educational landscape.

References

Adiguzel, T., Kaya, M., & Cansu, F. (2023). Revolutionizing education with AI: Implications of ChatGPT. *Contemporary Educational Technology, 15*(3). https://doi.org/10.30935/cedtech/13152

Angulo-García, K. E. (2022). Gestión de la innovación educativa: una pieza clave para alcanzar la calidad educativa. *Sapienza International Journal of Interdisciplinary Studies, 3*(6), 226-236. https://doi.org/10.51798/sijis.v3i6.553

Atabik, Nurfuadi, Hidayat, I., Masruri, & Nur, S. (2024). Digitalization of Educational Quality Management in Higher Education. *Revista de Gestão Social e Ambiental*, 18(7), e06776. https://doi.org/10.24857/rgsa.v18n7-133

Botero-Zapata, V., Ospina-Uribe, A. C., Remington, C. U., Barrera, D. A., Remington, C. U., García-Toro, M., Remington, C. U., Arteaga, A., Remington, C. U., Castro-Álvarez, J. F., & Remington, C. U. (2024). Caracterización de funciones ejecutivas y del desempeño académico en estudiantes de Medicina de la Corporación Universitaria Remington, 2021. *IATREIA, 38*(1). https://doi.org/10.17533/udea.iatreia.284

Bozkurt, A., Karadeniz, A., Baneres, D., Guerrero-Roldán, A. E., & Rodríguez, M. E. (2021). Artificial Intelligence and Reflections from Educational Landscape: A Review of AI Studies in Half a Century. *Sustainability, 13*(2), 800. https://doi.org/10.3390/su13020800

Casanova, J., Sinval, J., & Almeida, L. (2024). Academic success, engagement and self-efficacy of first-year university students: personal variables and first-semester performance. *Anales de Psicología*, *40*(1), 44-53. https://doi.org/10.6018/analesps.479151

Cervantes-López, M. J., Llanes-Castillo, A., Rivera-García, G. E., & De Oca Rojas, Y. M. (2023). Gestión estratégica de la calidad para la mejora educativa en México. *Revista Venezolana de Gerencia, 28*(Especial 10), 1298-1312. https://doi.org/10.52080/rvgluz.28.e10.26

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education, 20*, 38. https://doi.org/10.1186/s41239-023-00408-3

Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education, 20*, 43. https://doi.org/10.1186/s41239-023-00411-8

Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating? Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International, 61*(2). https://doi.org/10.1080/14703297.2023.2190148

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education, 20*, 22. https://doi.org/10.1186/s41239-023-00392-8

Dwivedi, Y. K., et al. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges, and implications of generative artificial intelligence for research, practice and policy. *International Journal of Information Management, 71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Farrokhnia, M., et al. (2024). A SWOT analysis of ChatGPT in higher education. *Computers and Education: Artificial Intelligence, 5*, 100151. https://edepot.wur.nl/591282

Holmes, W., Bialik, M. and Fadel, C. (2023) Artificial Intelligence in Education. *Globethics Publications*, 621-653. http://hdl.handle.net/20.500.12424/4276068

Johnston, H., Wells, R. F., Shanks, E. M., Boey, T., & Parsons, B. N. (2024). Student perspectives on the use of generative artificial intelligence technologies in higher education. *International Journal for Educational Integrity, 20*(2). https://doi.org/10.1007/s40979-024-00149-4

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., Stadler, M., Weller, J., Kuhn, J., & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences, 103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences, 13*(4), 410. https://doi.org/10.3390/educsci13040410

McGrath, C., Farazouli, A., & Cerratto-Pargman, T. (2025). Generative AI chatbots in higher education: A review of an emerging research area. *Higher Education, 89*, 1533–1549. https://doi.org/10.1007/s10734-024-01288-w

Ortiz Aguilar, W., & Fernández Cobas, L. (2025). Interacción virtual como predictora del desempeño académico: percepción comparada de docentes y estudiantes de la maestría en Educación Básica. *European Public & Social Innovation Review, 10*, 1-13. https://doi.org/10.31637/epsir-2025-2009

Rosales Yepes, A., Montes Miranda, A., & Gamboa Suárez, A. (2023). Liderazgo eficaz para la calidad educativa y la acreditación universitaria en el caribe colombiano. *Revista Interuniversitaria de Formación del Profesorado Continuación de la Antigua Revista de Escuelas Normales, 98*(37.1). https://doi.org/10.47553/rifop.v98i37.1.98213

Shala, D. S., Kurhasku, A., & Rexhepi, R. (2024). High School Students' Academic Performance Concerning Social Responsibility and Self-Efficacy. *Revista de Gestão Social e Ambiental*, 18(7), e07541. https://doi.org/10.24857/rgsa.v18n7-137

Soria-Barreto, K., Zuniga-Jara, S., Jaque-Silva, D., & Bortolotti-Nardon, C. (2024). Compromiso académico como determinante del desempeño y la satisfacción en estudiantes universitarios de ingeniería comercial. *Formación Universitaria*, *17*(6), 89-98. https://doi.org/10.4067/s0718-50062024000600089

Tlili, A., Shehata, B., Adarkwah, M. A. et al. (2023). What if the devil is my guardian angel? ChatGPT as a case study of using chatbots in education. *Smart Learning Environments, 10*(1), 15. https://doi.org/10.1186/s40561-023-00237-x

UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000386693

Wong-Fajardo E. M., Mendoza-Rodas, M., Hernández-Vásquez, R., & Saavedra-Sánchez, H. (2023). Implementación de un modelo integrado de gestión académica con LMS en el sistema universitario. *Publicaciones, 53*(2), 217–235. https://doi.org/10.30827/publicaciones.v53i2.26826

Yan, L., Sha, L., Zhao, L., Li, Y., Martinez-Maldonado, R., Chen, G., Li, X., Jin, Y., & Gašević, D. (2024). Practical and ethical challenges of large language models in education: A systematic scoping review. *British Journal of Educational Technology*, *55*, 90–112. https://doi.org/10.1111/bjet.13370

Zawacki-Richter, O., Bai, J.Y.H., Lee, K. et al. (2024). New advances in artificial intelligence applications in higher education? *International Journal of Educational Technology in Higher Education, 21*, 32. https://doi.org/10.1186/s41239-024-00464-3

DECLARATION ON THE USE OF ARTIFICIAL INTELLIGENCE

The authors declare that, in the preparation of this manuscript, generative artificial intelligence tools, specifically Perplexity AI, were used solely to support linguistic and editorial tasks, such as grammar review, the refinement of academic writing, the optimization of scientific style, and the preliminary organization of content. This tool was not used to generate results, conduct analyses, interpret evidence, formulate conclusions, or substitute for the authors' critical, methodological, or ethical judgment. The search for and selection of sources, the methodological design, the literature analysis, the interpretation of findings, and the final drafting of the manuscript were carried out and supervised entirely by the authors, who assume full responsibility for the accuracy, originality, integrity, and scientific validity of the work presented. This declaration is made in accordance with the international principles of transparency, academic integrity, and publication ethics promoted by the Committee on Publication Ethics (COPE), as well as recognized good practices in contemporary scientific communication.