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Rethinking Learning in the Age of Artificial Intelligence: Cognitive Challenges and the Transformation of Critical Thinking in Higher Education

Repensar el aprendizaje en la era de la inteligencia artificial: desafíos cognitivos y la transformación del pensamiento crítico en la educación superior

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ABSTRACT

This study examines the transformation of learning processes in higher education within contexts mediated by artificial intelligence (AI), focusing on how students evaluate the quality and reliability of knowledge in algorithmic environments. Using a qualitative approach, 20 semi-structured interviews were conducted with undergraduate students in the final two semesters of their program who use AI tools in their academic activities. The analysis identified differentiated patterns in verification practices, levels of cognitive autonomy, and criteria for evaluating information. The findings suggest that students combine active validation strategies with judgments based on the coherence and immediacy of responses. Uneven bias detection was also observed, revealing limitations in the critical evaluation of AI-generated content. The study concludes that the quality of learning in AI-mediated environments depends in part on situated practices of verification, evaluation, and trust regulation. In this regard, the study proposes the incorporation of "epistemic hygiene," understood as the systematic development of competencies in critical judgment, comparison, and validation of knowledge generated by algorithmic systems.

Keywords: Artificial intelligence, Critical thinking, Bias detection, Higher education

RESUMEN

This study examines the transformation of learning processes in higher education within contexts El estudio examina la transformación de los procesos de aprendizaje en la educación superior en contextos mediados por inteligencia artificial (IA), centrándose en cómo los estudiantes evalúan la calidad y fiabilidad del conocimiento en entornos algorítmicos. Desde un enfoque cualitativo, se realizaron 20 entrevistas semiestructuradas a estudiantes universitarios de los dos últimos semestres que utilizan herramientas de inteligencia artificial en sus actividades académicas. El análisis permitió identificar patrones diferenciados en las prácticas de verificación, los niveles de autonomía cognitiva y los criterios de evaluación de la información. Los resultados sugieren que los estudiantes combinan estrategias activas de validación con juicios basados en la coherencia y la inmediatez de las respuestas. Asimismo, se observa una detección desigual de sesgos, lo que evidencia limitaciones en la evaluación crítica de los contenidos generados por IA. Se concluye que la calidad del aprendizaje en entornos

mediados por herramientas inteligentes depende en parte de prácticas situadas de verificación, evaluación y regulación de la confianza. En este sentido, el estudio propone la incorporación de una "higiene epistémica", entendida como el desarrollo sistemático de competencias de juicio crítico, contraste y validación del conocimiento generado por sistemas algorítmicos.

Palavras clave: Inteligencia artificial, Pensamiento crítico, Detección de sesgos, Educación superior

1. Introduction

In recent years, artificial intelligence (AI) has established itself as a key factor in the transformation of higher education, rethinking not only access to information but also educational objectives and the very purpose of the university in the 21st century (Abramowitz et al., 2024). Its incorporation into academic tasks has altered learning processes, progressively shifting the emphasis from forms of direct engagement with knowledge—based on research, interpretation, and one's own cognitive effort—toward interaction with systems capable of generating immediate and seemingly coherent responses. In this context, generative artificial intelligence tools are redefining academic practices and modes of research, reshaping the dynamics of dependency, agency, and decision-making among students and scholars (Al-Zahrani, 2024; Daneshfar & Zhang, 2026; Zhao et al., 2025).

Despite their rapid adoption, there remains a limited understanding of how students assess the quality and reliability of knowledge in AI-mediated environments. Recent research has tended to focus on the use of these tools, on the perceptions of students and teachers, or on their implications for academic assessment (Nelson et al., 2025; Keuning et al., 2024; Alghamdi, 2025). However, these approaches often prioritize an instrumental perspective on educational technology, centered on its use and functionality, while relegating to the background the analysis of the specific practices through which students manage knowledge in algorithmic contexts (Selwyn, 2022).

There is limited empirical evidence on how students operationalize information verification, bias detection, and the regulation of trust in content generated by intelligent systems. Although recent studies have begun to explore the cognitive processes involved in interacting with these tools (Liu, 2024; Qi et al., 2026), as well as their impact on higher-order skills and creativity (Deng et al., 2026), gaps remain in our understanding of how these practices are shaped and articulated in real-world learning contexts. These gaps take on particular relevance in advanced stages of university education, where students are expected to develop higher levels of autonomy, judgment, and responsibility in the search for, critical evaluation of, and validation of knowledge (Lim et al., 2025; Vasco-Delgado et al., 2025).

Against this backdrop, the present study poses the following research question: How are the practices of verification, bias detection, and trust regulation configured and articulated among university students when evaluating the quality and reliability of knowledge in AI-mediated environments? To answer this, a qualitative approach is adopted based on semi-structured interviews with students in the final two semesters of their programs who use these tools in their academic activities. The main contribution of this work lies in shifting the focus from the use of technology to the cognitive and operational practices that shape learning in AI-mediated contexts.

2. Framework

2.1. AI and the Reconfiguration of Learning in Higher Education

The incorporation of artificial intelligence into higher education has generated a substantive and transformation of learning processes, shifting from a merely instrumental use to playing an increasingly relevant role in mediating academic practices and in the interaction with knowledge (Moorhouse & Wong, 2025). In this context, AI not only facilitates access to information but also influences how students interpret, organize, and use content, redefining the cognitive dynamics involved in learning (Al-Zahrani, 2024; Lim et al., 2025). This shift represents a transition from models centered on autonomous knowledge management toward environments in which students interact with systems capable of generating complex responses in real time, thereby transforming learning practices and the ways in which knowledge is engaged (Ruano-Borbalan, 2025; UNESCO, 2025). This process reconfigures the student's role, shifting from being exclusively an agent in the relationship with knowledge to becoming an active evaluator of the results generated by algorithmic systems. In this vein, Zhao et al. (2025) argues that the emergence of AI compels a rethinking of academic and research practices, in which decision-making and knowledge management take on unprecedented centrality. In turn, Abramowitz et al. (2024) emphasize that these changes impact the university's mission, which must adapt to an environment where knowledge generation is no longer the exclusive domain of the human subject.

2.2. Use of AI in Education: Dominant Approach and Limitations

Recent literature on artificial intelligence in higher education has grown significantly, focusing primarily on the analysis of the use of generative tools, the perceptions of students and faculty, and the implications for academic assessment. Studies such as that by Kasneci et al. (2023) highlight both the opportunities and challenges of language models in the educational setting, emphasizing their potential to support learning, but also the limitations associated with their uncritical use. Along these same lines, Jin et al. (2025) offer a global perspective on the adoption of AI in higher education, highlighting its rapid integration into various academic practices and its impact on educational experience. On the empirical level, various studies have analyzed how students perceive and use these tools in academic contexts. Blahopoulou & Ortiz-Bonnin (2025) note that students view ChatGPT positively in terms of efficiency and support for learning, though they also acknowledge risks associated with its use, such as dependency or the loss of critical thinking skills. Complementarily, Sousa & Cardoso (2025) show that the use of artificial intelligence has become commonplace in academic tasks, establishing itself as a recurring resource in student work.

Likewise, the impact of AI on academic assessment has been widely discussed. Cotton et al. (2024) address the challenges posed by the use of generative tools in terms of academic integrity, while Rudolph et al. (2023) question the future of traditional forms of assessment in light of these systems' ability to produce complex texts. These perspectives highlight a growing concern regarding the implications of intelligent systems for learning assessment mechanisms.

However, despite the relevance of these contributions, the dominant approach has significant limitations. Most studies prioritize an approach centered on use, adoption, and perceptions, leading to an instrumental view of educational technology. This approach tends to sideline the analysis of the cognitive practices through which students interact with knowledge in algorithm-mediated environments. In this regard, although progress has been made in understanding the effects of AI on educational performance and outcomes (Dong, 2026), there remains a lack of evidence regarding how students evaluate, validate, and manage the information generated by these systems in real-world learning situations.

Consequently, a gap in literature has been identified regarding the understanding of the specific practices that shape the relationship between students and knowledge in algorithmic environments. This gap justifies the need to move toward approaches that transcend the instrumental perspective and allow for a deeper analysis of the cognitive and operational processes involved in the use of AI in higher education.

2.3. Interaction with AI Systems

Students' interaction with intelligent systems can be understood as a form of collaboration in which AI is perceived as a "teammate" within the academic process, integrating into task completion, idea generation, and decision-making, under a logic of co-production in which the student maintains control and ultimate responsibility (Marrone et al., 2025). This process is configured as an iterative dynamic in which queries are formulated, responses are interpreted, and progressively adjusted through new instructions, which foster engagement and participation in digital environments through the personalization of learning (Zhou, 2026; Hassan, 2026).

At the same time, this interaction transforms the student's cognitive effort, as they use AI as support for tasks such as synthesizing information, generating ideas, or solving exercises, which requires critically interpreting and evaluating the results obtained (Sustaningrum & Haldaka, 2025). In contexts such as programming education, this relationship can take on characteristics similar to those of a tutor, insofar as students pose problems, receive suggestions, and test solutions, facilitating the understanding of complex content, though with the risk of limiting the depth of learning if they do not question the generated responses (Güner & Er, 2025).

Finally, interaction with artificial intelligence incorporates a dimension of academic judgment and self-regulation, as students must decide when to use these tools, how to integrate their contributions into their work, and to what extent to trust the results, which introduces a metacognitive component into learning (Walton et al., 2025). Consequently, AI does not replace the educational process, but rather reconfigures it by requiring competencies such as critical evaluation, informed decision-making, and the ethical use of information in environments mediated by intelligent technologies.

2.4. Algorithmic Opacity and the Limits of Knowledge

Algorithmic opacity is a significant factor in understanding the limits of knowledge in AI-mediated environments, particularly in systems that operate as "black boxes," whose internal processes are inaccessible to users (Chung, 2023; Nakashima et al., 2024). This lack of transparency hinders the traceability of knowledge—that is, the ability to identify the origin and criteria for generating responses—which reshapes the dynamics of information production and circulation in digital environments (Cetina Presuel & Martínez Sierra, 2019; Zhai et al., 2020).

From an epistemological and ethical perspective, this opacity introduces tensions regarding trust and the validation of knowledge, as users tend to evaluate responses based on their coherence or efficiency rather than their verifiability (Lin & Chen, 2023; Afroogh et al., 2024). In this sense, trust in "black box" systems is shaped as a process conditioned by subjective perceptions, which can lead to a delegation of judgment without sufficient evidence to assess its reliability (Nakashima et al., 2024). Furthermore, algorithmic systems incorporate implicit assumptions that are not always visible, influencing decision-making without users being fully aware of it (Lamers et al., 2024).

Thus, it is evident that the detection of biases is limited by both the structure of the systems and the cognitive conditions of the users. The literature shows that algorithms can reproduce and amplify biases, while the mechanisms for identifying them require technical and critical

skills that are not always present (Santos et al., 2020; Puttick et al., 2025). Added to this is the tendency of individuals to underestimate their own exposure to biases, which further reduces their ability to detect them (Gadow & Bonefeld, 2025). In this context, algorithmic opacity and a lack of traceability explain why students face difficulties in identifying biases in AI-generated content.

3. METHODOLOGY

The study is situated within the interpretive paradigm with a constructivist orientation, as it seeks to understand how students construct and evaluate knowledge in AI-mediated environments. This approach is consistent with qualitative methodologies focused on the analysis of situated meanings and practices, particularly in contexts where human-algorithm interactions require frameworks that integrate social and contextual dimensions (Vasilachis, 2006; Creswell & Poth, 2018; Denzin & Lincoln, 2018; Kimmons, 2020). In this sense, the qualitative approach allows us to examine how students interpret, validate, and regulate information generated by AI systems.

The study design is an interpretive qualitative study based on semi-structured interviews, suitable for in-depth exploration of usage practices and evaluation criteria in academic contexts (Flick, 2018). The sample consisted of 20 undergraduate students in their final two semesters (ninth and tenth) of a Communications program (10 women and 10 men), selected through purposive sampling. The inclusion criterion was the active use of artificial intelligence tools in academic activities. Data collection was conducted through semi-structured interviews organized around four dimensions: use of AI, verification practices, trust criteria, and information evaluation.

Data analysis was conducted using a thematic analysis approach, aimed at identifying recurring patterns in the discourse. The process included the coding of units of meaning and their grouping into analytical categories linked to the study's objectives. To ensure methodological rigor, criteria such as credibility, consistency, and theoretical saturation were considered, ensuring coherence between the data and the interpretations (Denzin & Lincoln, 2018). The analysis was conducted manually, prioritizing a reflective approach consistent with the adopted methodology.

Table 1 — Classification of participants based on AI-assisted information use and verification.

Code	Cycle	By use	Level of verification
E1-COM9	9	Instrumental	High
E2-COM10	10	Strategic	High
E3-COM10	10	Strategic	Senior
E4-COM9	9	Exploratory	Medium
E5-COM10	10	Strategic	High
E6-COM9	9	Instrumental	Medium
E7-COM10	10	Strategic	High
E8-COM9	9	Exploratory	Low
E9-COM9	9	Instrumental	Low
E10-COM10	10	Strategic	High
E11-COM9	9	Exploratory	Medium
E12-COM9	9	Instrumental	Low
E13-COM10	10	Strategic	High

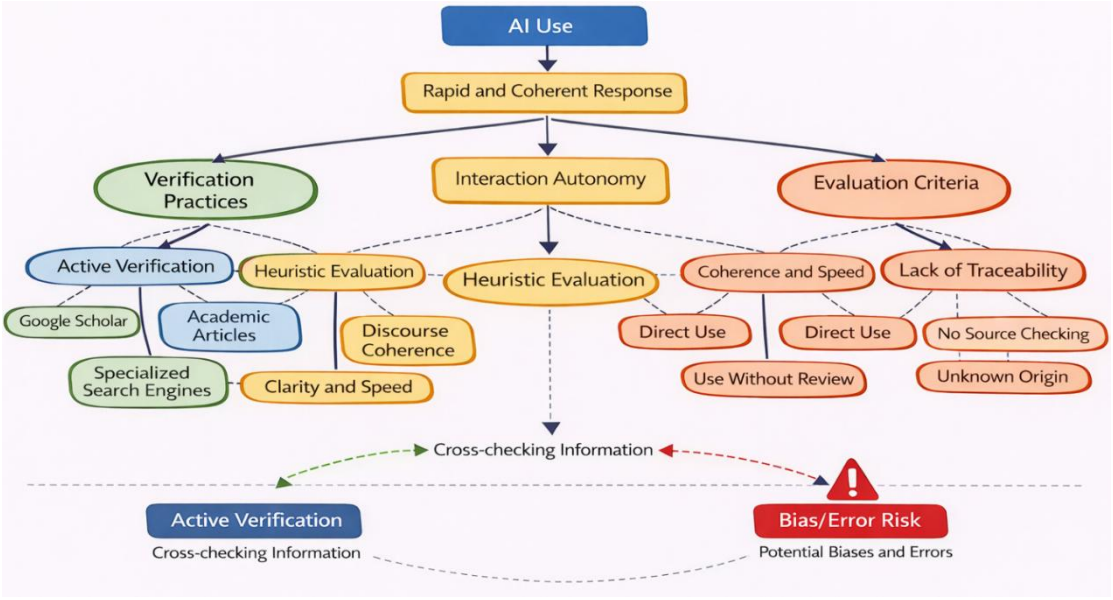
E14-COM9	9	Exploratory	Medium
E15-COM9	9	Delegative	Low
E16-COM10	10	Strategic	High
E17-COM10	10	Strategic	Senior
E18-COM10	10	Instrumental	Medium
E19-COM9	9	Exploratory	Medium
E20-COM10	10	Strategic	High

Author's own elaboration.

RESULTS

The results are organized around three analytical themes that address the study's objectives: (1) knowledge verification practices; (2) levels of autonomy in interacting with AI systems; and (3) evaluation criteria for the information generated. Based on the analysis of the interviews, consistent patterns were identified in the ways in which college students in the final year of their Communications degree programs interact with artificial intelligence tools in academic contexts.

Figure 1 — Interpretive model of AI-mediated knowledge assessment.



Author's own elaboration.

The first axis, verification practices, shows that students combine different strategies to validate the information provided by AI. Active verification practices were identified, in which participants cross-check responses with external sources—primarily academic articles and specialized search engines—especially for more demanding tasks: "when it's for an important assignment, I do check it on Google Scholar or in articles" (E7-COM10). However, heuristic validation practices also emerge, based on indicators such as textual coherence or the clarity of the response: "if it sounds right and is well-written, I trust it" (E12-COM9). This coexistence reflects a tension between rigorous verification and rapid evaluation, where the tool's efficiency influences a reduction in systematic cross-checking.

The second axis, autonomy in interacting with AI, shows variability in how students manage its use. Some demonstrate active and reflective use, employing AI as a support to expand and verify information: "I use it as a first step, but then I develop it myself" (E3-COM10). Along these lines, other students reinforce this practice by stating that "it helps me organize my

thoughts, but I always check before using it" (E1-COM9), "I take it as a guide, not as the final answer" (E6-COM9), and "I use it to compare what I've already researched" (E13-COM10). Likewise, more elaborate usage strategies are identified, where AI is integrated as part of a broader process: "I ask it several questions until I understand the topic better" (E17-COM10) and "it helps me see different ways to explain something" (E5-COM10). In contrast, other participants tend to delegate decisions to the system, demonstrating a less reflective use: "sometimes I copy the idea and adapt it without reviewing it much" (E15-COM9). This logic is reinforced in statements such as the following: "if I understand it quickly, I just leave it at that" (E8-COM9), "when I'm short on time, I trust what it gives me" (E12-COM9), "I use it directly and then just change the words" (E9-COM9), and "it makes things so easy for me that I don't always stop to analyze it" (E18-COM10). These practices show a tendency toward partial or total delegation of the academic writing process.

The third axis, evaluation criteria and trust, reveals that students prioritize discursive coherence and logical structure as indicators of quality. The speed and fluency of the responses influence the perception of reliability: "it responds so quickly that I assume it's correct" (E9-COM9). Along the same lines, other participants reinforce this logic of evaluation based on the form of discourse: "if it's well-organized and sounds logical, I don't question it much" (E4-COM9) and "when it explains things clearly, I tend to think it is correct" (E11-COM9). Likewise, response efficiency emerges as a relevant criterion: "it saves me time, so I trust what it gives me more" (E2-COM10), and "since it responds immediately, I feel it has already been processed and is reliable" (E10-COM10). However, difficulties in detecting biases or errors are evident: "I wouldn't know if it is biased, because I don't know where it gets its information from" (E18-COM10). This is reinforced by similar perceptions such as: "I don't see the sources, so I don't know whether it is correct or not" (E14-COM9), and "it might be wrong, but I don't always notice" (E16-COM10). This limitation is related to the lack of traceability of AI-generated responses, which constrains the ability to assess their origin and rigor. Finally, the findings show that the evaluation of knowledge in AI-mediated environments is configured as a situated and dynamic process, in which students articulate verification strategies, levels of autonomy, and evaluative criteria. Nevertheless, the predominance of evaluations based on coherence and speed, together with difficulties in identifying biases, highlights the need to strengthen critical practices in the academic use of these technologies.

Discussion

The results pinpoint the problem as the reconfiguration of criteria for knowledge validity in AI-mediated environments. The evidence shows a shift from source-based verification toward assessments grounded in coherence and efficiency. This shift raises a problem: when discursive coherence replaces verification, traditional error-control mechanisms are weakened. Recent literature warns that the adoption of AI in education enhances productivity and engagement but also introduces new vulnerabilities in critical evaluation (Zhou, 2026; Hassan, 2026; Kasneci et al., 2023). In this study, these vulnerabilities manifest in a preference for heuristics of speed and clarity, suggesting a shift in the thresholds for knowledge validation criteria.

A second core issue is the redistribution of agency in the interaction between students and intelligent systems. Far from eliminating autonomy, AI transforms it into a situated practice of management, where the student must decide when to use the tool, how to integrate its responses, and to what extent to trust them. This form of managed autonomy aligns with the findings of Walton et al. (2025), who highlight that the use of AI involves contextualized judgment processes. The results reveal divergent trajectories, ranging from reflective uses

that expand analysis to delegative practices that shift decisions to the system. This variability aligns with research identifying tensions between capacity building and functional dependence in AI-mediated contexts (Daneshfar & Zhang, 2026; Keuning et al., 2024).

Finally, a third critical axis relates to algorithmic opacity and its effects on knowledge assessment. The difficulty in identifying sources and understanding the internal processes of systems limits the traceability of information, reducing the capacity for verification. This condition has been widely discussed in the literature, which highlights how "black box" systems restrict understanding of the mechanisms behind response generation (Chung, 2023; Nakashima et al., 2024). Consequently, trust tends to be built on perceptions of coherence or efficiency rather than on verifiable evidence (Afroogh et al., 2024). In turn, algorithms incorporate implicit assumptions that influence knowledge production without being visible to users, which complicates the detection of biases (Lamers et al., 2024; Lin & Chen, 2023).

These findings engage with contemporary debates in higher education regarding academic integrity, the redesign of assessment, and institutional policies regarding artificial intelligence. The expansion of generative tools has challenged traditional assessment models, particularly regarding the authorship and originality of academic work (Cotton et al., 2024; Rudolph et al., 2023). At the same time, progress is being made in the formulation of institutional policies to regulate their use, albeit with varied approaches (Jin et al., 2025). In this context, the challenge lies not in restricting the use of AI, but in designing pedagogical strategies that foster verification, critical analysis, and accountability in the production of knowledge. Within this framework, the debate on artificial intelligence literacy and the need to strengthen competencies aimed at the critical evaluation of information takes on relevance. Evidence suggests that the effective use of these tools requires not only technical skills but also the ability to interpret, compare, and validate the generated content. In line with Selwyn (2022) and UNESCO (2025), the integration of AI into higher education must be accompanied by critical training that enables students to understand its epistemological and ethical implications. Likewise, recent proposals underscore the need to redefine educational objectives considering these transformations, prioritizing the development of critical judgment and informed decision-making in technology-mediated environments (Lim et al., 2025; Abramowitz et al., 2024).

CONCLUSIONS

This study suggests that the incorporation of artificial intelligence systems into higher education is not merely an instrumental innovation, but a transformation in the criteria for validating knowledge. The findings reveal a shift from source-based verification models toward forms of assessment grounded in discursive coherence, clarity, and efficiency, which allows us to identify the emergence of a heuristic assessment logic in AI-mediated academic contexts. This shift not only redefines how students use information but also the criteria by which they deem it valid, introducing a structural tension between efficiency and rigor in learning processes.

In this context, student autonomy is reconfigured as a situated practice of management, in which interaction with AI entails ongoing decisions regarding use, verification, and delegation. Far from representing a loss of control, these dynamic reveals new forms of mediated agency, though it also exposes risks associated with delegation and the reduction of critical analysis. In this sense, the quality of learning depends increasingly on the ability to regulate the use of these tools, rather than on access to information per se.

Likewise, algorithmic opacity introduces structural limits to the assessment of knowledge by restricting the traceability of information and hindering the identification of biases. This finding shifts the discussion from individual competencies to the socio-technical conditions in which knowledge is produced, implying a rethinking of academic education beyond the development of instrumental skills.

In terms of contribution, this study proposes understanding interaction with artificial intelligence as a process of epistemic reconfiguration, in which new forms of validation, trust, and decision-making emerge. Unlike approaches focused on the adoption or perception of technology, this work provides evidence on the concrete practices through which students evaluate knowledge in AI-mediated contexts. Consequently, it is argued that the challenge for higher education does not lie in incorporating these technologies, but in training individuals capable of upholding rigorous validation criteria in environments characterized by immediacy, opacity, and an overabundance of information.

This study has some limitations that should be acknowledged. First, the relatively small sample size, consisting of 20 final-year Communication students from a single higher education institution, limits the transferability of the findings to other academic disciplines and educational contexts. Second, the findings are based on interview data and therefore reflect participants' reported experiences and perceptions rather than direct observations of their interactions with AI tools.

Future research could address these limitations by including larger and more diverse samples across disciplines and institutions, combining interviews with observational or experimental methods, and examining how verification practices and trust in AI evolve over time. Comparative and cross-cultural studies would also contribute to a better understanding of how institutional and educational contexts shape students' critical engagement with AI-generated knowledge.

REFERENCES

Abramowitz, K., Fischman, W., & Gardner, H. (2024). Higher education in the twenty-first century: What's the mission? *Daedalus, 153*(2), 301–315. https://doi.org/10.1162/daed_a_02082

Afroogh, S., Akbari, A., Malone, E., Kargar, M., & Alambeigi, H. (2024). Trust in AI: Progress, challenges, and future directions. *Humanities and Social Sciences Communications, 11*, 1568. https://doi.org/10.1057/s41599-024-04044-8

Alghamdi, A. A. (2025). University students' perceptions of generative AI for critical thinking and creativity: The influence of self-efficacy and disciplinary differences. *Innovations in Education and Teaching International*, 1–15. https://doi.org/10.1080/14703297.2025.2600476

Al-Zahrani, A. M. (2024). The impact of generative AI tools on researchers and research: Implications for academia in higher education. *Innovations in Education and Teaching International, 61*(5), 1029–1043. https://doi.org/10.1080/14703297.2023.2271445

Blahopoulou, J., & Ortiz-Bonnin, S. (2025). Student perceptions of ChatGPT: Benefits, costs, and attitudinal differences between users and non-users toward AI integration in higher education. *Education and Information Technologies, 30*, 19741–19764. https://doi.org/10.1007/s10639-025-13575-9

Cetina Presuel, R., & Martínez Sierra, J. M. (2019). Algorithms and the news: Social media platforms as news publishers and distributors. *Revista de Comunicación, 18*(2), 261–285. https://doi.org/10.26441/RC18.2-2019-A13

Chung, M. (2023). What's in the black box? How algorithmic knowledge promotes corrective and restrictive actions to counter misinformation in the USA, the UK, South Korea, and Mexico. *Internet Research, 33*(5), 1971–1989. https://doi.org/10.1108/INTR-07-2022-0578

Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2024). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International, 61*(2), 228–239. https://doi.org/10.1080/14703297.2023.2190148

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE.

Daneshfar, S., & Zhang, G. (2026). Navigating the artificial intelligence jungle: Perspectives and agency of early-career researchers in education. *Culture and Education, 38*(2), 392–420. https://doi.org/10.1177/11356405261435355

Deng, Y., Guo, H., & Dai, Y. (2026). Examining the impact of higher-order thinking and GAI chatbots on engineering creativity in higher education. *Scientific Reports*. https://doi.org/10.1038/s41598-026-48753-3

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2018). *The SAGE handbook of qualitative research* (5th ed.). SAGE.

Dong, Y. (2026). Generative AI technologies and educational outcomes: A comprehensive meta-analysis comparing traditional and AI-driven approaches. *Humanities and Social Sciences Communications, 13*, 559. https://doi.org/10.1057/s41599-026-06903-y

Flick, U. (2018). *An introduction to qualitative research* (6th ed.). SAGE.

Gadow, N., & Bonefeld, M. (2025). The better-than-average effect in education: Student teachers believe others are more biased than themselves. *Zeitschrift für Erziehungswissenschaft, 28*, 1171–1206. https://doi.org/10.1007/s11618-025-01349-5

Güner, H., & Er, E. (2025). AI in the classroom: Exploring students' interaction with ChatGPT in programming learning. *Education and Information Technologies, 30*, 12681–12707. https://doi.org/10.1007/s10639-025-13337-7

Hassan, A. (2026). Leveraging artificial intelligence (AI) to enhance student engagement and academic performance in higher education. *Education and Information Technologies*, 1–27. https://doi.org/10.1007/s10639-026-13946-w

Jin, Y., Yan, L., Echeverria, V., Gašević, D., & Martinez-Maldonado, R. (2025). Generative AI in higher education: A global perspective of institutional adoption policies and guidelines. *Computers and Education: Artificial Intelligence, 8*, 100348. https://doi.org/10.1016/j.caeai.2024.100348

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., & 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

Keuning, H., Alpizar-Chacon, I., Lykourentzou, I., Beehler, L., Köppe, C., de Jong, I., & Sosnovsky, S. (2024). Students' perceptions and use of generative AI tools for programming across different computing courses. In *Proceedings of the 24th Koli Calling International Conference on Computing Education Research* (Article 14). Association for Computing Machinery. https://doi.org/10.1145/3699538.3699546

Kimmons, R. (2020). Current trends (and missing links) in educational technology research and practice. *TechTrends, 64*, 803–809. https://doi.org/10.1007/s11528-020-00549-6

Lamers, L., Meijerink, J., & Rettagliata, G. (2024). Blinded by "algo economicus": Reflecting on the assumptions of algorithmic management research to move forward. *Human Resource Management, 63*(3), 413–426. https://doi.org/10.1002/hrm.22204

Lim, W. M., Gunasekaran, A., Pallant, J. I., & Kaur, S. (2025). Generative AI and the future of education: A research agenda. *Computers & Education, 210*, 104987. https://doi.org/10.1016/j.compedu.2025.104987

Lin, J., & Chen, C. (2023). The epistemic ethical concerns involving algorithms in intelligent communication. *Teknokultura: Journal of Digital Culture and Social Movements, 20*(Special Issue), 23–36. https://doi.org/10.5209/tekn.87552

Liu, M. (2024). Investigating students' cognitive processes in generative AI-assisted writing. *Computers & Education, 198*, 104742. https://doi.org/10.1016/j.compedu.2023.104742

Marrone, R., Zamecnik, A., Joksimovic, S., Johnson, J., & De Laat, M. (2025). Understanding student perceptions of artificial intelligence as a teammate. *Technology, Knowledge and Learning, 30*, 1847–1869. https://doi.org/10.1007/s10758-024-09780-z

Moorhouse, B. L., & Wong, K. M. (2025). *Generative artificial intelligence and language teaching*. Cambridge University Press.

Nakashima, H. H., Mantovani, D., & Machado Junior, C. (2024). Users' trust in black-box machine learning algorithms. *Revista de Gestão, 31*(2), 237–250. https://doi.org/10.1108/REGE-06-2022-0100

Nelson, A. S., Santamaría, P. V., Javens, J. S., & Ricaurte, M. (2025). Students' perceptions of generative artificial intelligence (GenAI) use in academic writing in English as a foreign language. *Education Sciences, 15*(5), 611. https://doi.org/10.3390/educsci15050611

Puttick, A., Ikae, C., Rigotti, C., Fosch-Villaronga, E., Kharas, M. W., Søraa, R. A., & Kurpicz-Briki, M. (2025). A systematic review of bias detection methods for non-English word embeddings and language models. *Artificial Intelligence Review, 58*, 370. https://doi.org/10.1007/s10462-025-11375-8

Qi, J., Zhao, H., Xiang, R., Zhang, Y., Zhang, X., Wang, C., Liu, J., & Ji, F. (2026). Understanding the interaction between generative AI and factual knowledge in supporting students' problem-solving. *Journal of Research on Technology in Education*, 1–23. https://doi.org/10.1080/15391523.2025.2601067

Ruano-Borbalan, J.-C. (2025). The transformative impact of artificial intelligence on higher education: A critical reflection on current trends and future directions. *International Journal of Chinese Education, 14*(1). https://doi.org/10.1177/2212585X251319364

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning & Teaching, 6*(1), 1–22. https://doi.org/10.37074/jalt.2023.6.1.9

Santos, P. B., Bhowmik, C. V., & Gurevych, I. (2020). Avoiding bias in students' intrinsic motivation detection. In V. Kumar & C. Troussas (Eds.), *Intelligent tutoring systems* (Lecture Notes in Computer Science, Vol. 12149, pp. 89–94). Springer. https://doi.org/10.1007/978-3-030-49663-0_12

Selwyn, N. (2022). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury Academic.

Sousa, A. E., & Cardoso, P. (2025). Use of generative AI by higher education students. *Electronics, 14*(7), 1258. https://doi.org/10.3390/electronics14071258

Sustaningrum, R., & Haldaka, M. (2025). Student utilization and perceptions of AI technology for academic purposes: A mixed-method analysis. *Cogent Education, 12*(1). https://doi.org/10.1080/2331186X.2025.2553835

UNESCO. (2025). *AI and the future of education: Disruptions, dilemmas, and directions*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000395236

Vasco-Delgado, J. C., Lima-Quinde, M. A., Macas-Padilla, B. A., & Vasco-Delgado, L. A. (2025). Ethics in the implementation of emerging technologies in educational settings. *Multidisciplinary Latin American Journal (MLAJ), 3*(2), 130–156. https://doi.org/10.62131/MLAJ-V3-N2-010

Vasilachis de Gialdino, I. (2006). *Estrategias de investigación cualitativa (Qualitative research strategies).* Gedisa.

Walton, J., Bearman, M., Crawford, N., Tai, J., & Boud, D. (2025). How university students work on assessment tasks with generative artificial intelligence: Matters of judgement. *Assessment & Evaluation in Higher Education*, 1–17. https://doi.org/10.1080/02602938.2025.2570328

Zhai, Y., Yan, J., Zhang, H., & Lu, W. (2020). Tracing the evolution of AI: Conceptualization of artificial intelligence in mass media discourse. *Information Discovery and Delivery, 48*(3), 137–149. https://doi.org/10.1108/IDD-01-2020-0007

Zhao, Y., Kingston, N., & Ginsberg, R. (2025). The death and rebirth of research in education in the age of AI: Problems and promises. *ECNU Review of Education, 9*(1), 1–24. https://doi.org/10.1177/20965311251367053

Zhou, Z. (2026). Artificial intelligence and student engagement in online learning: A literature review. *American Journal of Distance Education, 40*(1), 8–30. https://doi.org/10.1080/08923647.2025.2594282

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Conceptualization, PPF; methodology, PPF, OPF, OCF; investigation, PPF; data curation, PPF, OPF; writing—original draft preparation, PPF, OPF, OCF; writing—review and editing, KBB; supervision, PPF. All authors have read and agreed to the published version of the manuscript.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available upon reasonable request.

ETHICS STATEMENT

All participants were informed about the purpose of the study and provided informed consent before taking part in the interviews. Participation was voluntary, and all data were anonymized to ensure participants' privacy and confidentiality.

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