RCA Revista de Ciências da Administração

v. 27, n. 67, p. 1-54, 2025

DOI: https://doi.org/10.5007/2175-8077.2025.e109536

A guide for the ethical and responsible use of generative artificial intelligence in academia.

Guia para o uso ético e responsável da inteligência artificial generativa no âmbito acadêmico

Una guía para el uso ético y responsable de la inteligencia artificial generativa en el ámbito académico.

Autorship

Janaína Gularte Cardoso

Universidade Federal de Santa Catarina (UFSC)
janaina.gularte.cardoso@ufsc.br
https://orcid.org/0000-0002-2017-1304

Igor de Jesus Lobato Pompeu Gammarano

Universidade do Estado do Pará (UEPA)
igor.djlp.gammarano@uepa.br
https://orcid.org/0000-0001-7769-8265

ABSTRACT

Objective: To promote a culture of scientific integrity and transparency in the use of generative technologies in academic research, providing a theoretical and practical framework for researchers, faculty, and higher education institutions. **Methodology**: The document is based on ethical, epistemological, and legal principles, structured according to international guidelines and the editorial policies of major scientific publications (Elsevier, Springer Nature, Taylor & Francis, SAGE, and Emerald Publishing). It establishes criteria for acceptable, sensitive, and unacceptable use of GenIA, clearly defining boundaries between technical assistance and intellectual authorship. **Originality/Relevance**: The guide stands out by balancing technological innovation and epistemic responsibility, encouraging the use of GenIA as a tool to support research and not as a substitute for human reflection. Its relevance lies in addressing a critical gap in the contemporary academic context: the need for clear ethical guidelines in the face of the growing adoption of generative technologies. **Results**: Proposes pedagogical and formative practices for teachers and students focused on critical digital literacy and the development of ethical and cognitive competencies. Offers institutional transparency protocols, digital maturity indicators, and guidelines for reviewers and evaluators. **Theoretical Contributions**: Consolidates an ethical governance model for the use of AI in science, guided by integrity, shared responsibility, and the valuing of human authorship as the non-negotiable core of academic production.

Keywords: Generative Artificial Intelligence; Research Ethics; Scientific Integrity; Human Authorship; Academic Governance.

RESUMO

Objetivo: Promover uma cultura de integridade científica e transparência na utilização de tecnologias generativas em pesquisas acadêmicas, fornecendo um referencial teórico e prático destinado a pesquisadores, docentes e instituições de ensino superior. **Metodologia:** O documento fundamenta-se em princípios éticos, epistemológicos e legais, estruturando-se a partir de diretrizes internacionais e nas políticas editoriais de grandes publicações científicas (Elsevier, Springer Nature, Taylor & Francis, SAGE e Emerald Publishing). Estabelece critérios de uso aceitável, sensível e inaceitável da GenIA, delimitando fronteiras claras entre assistência técnica e autoria intelectual. **Originalidade/Relevância:** O guia diferencia-se por equilibrar inovação tecnológica e responsabilidade epistêmica, incentivando o uso da GenIA como instrumento de apoio à pesquisa e não como substituto da reflexão humana. Sua relevância reside na resposta a uma lacuna crítica no contexto acadêmico contemporâneo: a necessidade de orientações éticas claras frente à adoção crescente de tecnologias generativas. **Resultados:** Propõe práticas pedagógicas e formativas para docentes e discentes voltadas à alfabetização digital crítica e à construção de competências éticas e cognitivas. Oferece protocolos institucionais de transparência, indicadores de maturidade digital e orientações para revisores e avaliadores. **Contribuições Teóricas:** Consolida um modelo de governança ética para o uso da IA na ciência, orientado pela integridade, responsabilidade compartilhada e valorização da autoria humana como núcleo inegociável da produção acadêmica.

Palavras-chave: Inteligência Artificial Generativa; Ética em Pesquisa; Integridade Científica; Autoria Humana; Governança Acadêmica.

RESUMEM

Objetivo: Promover una cultura de integridad científica y transparencia en el uso de tecnologías generativas en la investigación académica, proporcionando un marco teórico y práctico para investigadores, profesorado e instituciones de educación superior. **Metodología**: El documento se basa en principios éticos, epistemológicos y legales, y se estructura según las directrices internacionales y las políticas editoriales de las principales publicaciones científicas (Elsevier, Springer Nature, Taylor & Francis, SAGE y Emerald Publishing). Establece criterios para el uso aceptable, sensible e inaceptable de GenIA, definiendo claramente los límites entre la asistencia técnica y la autoría intelectual. **Originalidad/Relevancia**: La guía destaca por equilibrar la innovación tecnológica y la responsabilidad epistémica, fomentando el uso de GenIA como herramienta de apoyo a la investigación y no como sustituto de la reflexión humana. Su relevancia radica en abordar una brecha crítica en el contexto académico contemporáneo: la necesidad de directrices éticas claras ante la creciente adopción de tecnologías generativas. **Resultados**: Propone prácticas pedagógicas y formativas para docentes y estudiantes centradas en la alfabetización digital crítica y el desarrollo de competencias éticas y cognitivas. Ofrece protocolos de transparencia institucional, indicadores de madurez digital y directrices para revisores y evaluadores. **Contribuciones teóricas**: Consolida un modelo de gobernanza ética para el uso de la IA en la cie ncia, guiado por la integridad, la responsabilidad compartida y la valoración de la autoría humana como eje fundamental de la producción académica.

Palabras clave: Inteligencia Artificial Generativa. Ética en la Investigación. Integridad Científica. Autoría Humana. Gobernanza Académica.

INTRODUCTION

The advancement of Generative Artificial Intelligence (GenAI) in the academic field has led to significant transformations in the production, dissemination, and validation of scientific knowledge, requiring ethical and epistemological reflection that transcends the instrumental use of these technologies. This guide aims to provide a formative and practical reference for the ethical, responsible, and transparent use of GenIA in all stages of the scientific research process,from theoretical conception to the final drafting of papers, articles, and institutional reports. Inspired by international guidelines (Elsevier, 2024a; UNESCO, 2025a) and Brazilian codes of scientific integrity (ANPAD, 2023; UFSC, 2024), the document aims to guide teachers, students, and researchers on the limits and possibilities of AI use, promoting a culture of integrity, human authorship, and cognitive responsibility.

The guide is structured as a pedagogical and normative tool, aimed at ethical and reflective training in the use of GenIA. Its content integrates technical, philosophical, and regulatory aspects, organized into five complementary axes: (1) conceptual and epistemological foundations of AI ethics; (2) systematic analysis of recent scientific production on the topic; (3) comparative mapping of international editorial policies and institutional guidelines; (4) systematization of ethical and operational criteria for the academic use of GenIA; and (5) training recommendations for teaching and research institutions. This structure seeks not only to regulate the use of technology, but also to stimulate critical reflection on its role in the construction of scientific knowledge (Floridi, 2022; Feenberg, 2017).

The document was developed through documentary analysis and systematic review of recent scientific publications (Arar et al., 2025; Hanafi et al., 2025), complemented by theoretical validation based on principles of information ethics (Floridi & Cowls, 2022) and technological reason (Feenberg, 2017). The methodological steps included thematic coding of ethical principles, triangulation between editorial standards and institutional recommendations, and participatory construction of guidelines, ensuring legitimacy and pedagogical applicability. As a result, the guide is a guiding framework capable of harmonizing technological innovation and scientific integrity, promoting responsible research practices in digital environments (Tang, Cooper & Nielsen, 2024; Resnik & Hosseini, 2025).

In addition to offering normative guidelines, the guide aims to empower the academic community to use GenIA consciously and critically, emphasizing that humans continue to play a leading role in the production of knowledge. As Delios, Tung, and van Witteloostuijn (2025) and Sampaio, Sabbatini, and Limongi (2025) point out, GenIA should be understood as a heuristic support tool, not as an agent of authorship. In this sense, the document calls for the construction of a new ethical pact between researchers, institutions, and technologies, in which full authorship and epistemic responsibility remain non-transferably human. Thus, this guide can be used as a formative, normative, and evaluative reference, serving both to guide teaching practice and research supervision and to inform institutional policies of scientific integrity in the contemporary digital context.

METHODOLOGY FOR CONSTRUCTING THE GUIDE

The construction of this Guide for the Ethical and Responsible Use of Generative Artificial Intelligence (GenIA) in the Academic Environment was conducted through a systematic, comparative, and participatory methodological process, aimed at consolidating guidelines that combine scientific rigor, ethical integrity, and practical applicability. The guide was structured to offer normative recommendations and epistemological foundations to guide researchers in the prudent use of GenIA in the production of knowledge. This approach was inspired by Floridi's (2020) conception, according to which information ethics should be understood as a rational architecture aimed at preserving cognitive dignity, and by Feenberg's (2017) view, which understands technology as a social system of reason that redefines the boundaries between subject and knowledge.

Initially, an extensive survey and documentary analysis was developed, based on the content analysis technique (Bardin, 2016), covering both institutional references and contemporary scientific literature on the ethical use of GenIA in academic research. The main national and international guidelines were examined,UFRGS (2023), UFMG (2023), UNICAMP (2023), and UNESCO (2023; 2025a; 2025b),as well as editorial standards and public policies on scientific integrity (CNE/CES, 2018; CNS, 2016). The objective of this stage was to identify converging principles and regulatory gaps, allowing for the formulation of guidelines adapted to the Brazilian context but compatible with international standards of ethics and algorithmic governance established by the OECD (2023).

In addition to institutional documentation, a systematic analysis was conducted of scientific articles that address, both theoretically and empirically, the challenges and ethical implications of using GenIA in academic contexts. The corpus analyzed included studies by Arar et al. (2025), Hanafi, Al-Mansi & Al-Sharif (2025), Llerena-Izquierdo & Ayala-Carabajo (2025), and Zaki et al. (2025), which discuss everything from epistemological responsibility and research integrity to the opportunities and risks inherent in integrating GenIA into the stages of scientific writing, review, and dissemination. The contributions of Delios, Tung & van Witteloostuijn (2025) and Ganguly et al. (2025) have also been incorporated, highlighting the role of universities and publishers in formulating ethical use policies.

Complementarily, studies such as those by Lund et al. (2023) and Bender et al. (2021) were essential for understanding the risks associated with "algorithmic authorship" and automated textual production, pointing to the need to preserve the centrality of the human researcher as a moral and interpretive agent. The analyses by Francis, Jones & Smith (2025) and Chinoracky & Stalmasekova (2025) contributed to the understanding of emerging ethical dilemmas in higher education and teacher training, while Schlagwein & Willcocks (2023) and Resnik & Hosseini (2025) offered solid references on the shared responsibility between researchers, reviewers, and institutions in the use of GenIA. These works were examined with a critical and comparative approach, allowing us to construct an integrated overview of ethics, technology, and scientific epistemology.

Next, a comparative analysis was conducted of editorial guidelines and codes of scientific conduct issued by major international publishers, such as Elsevier (2024a; 2024b; 2024c), Emerald Publishing (2023a; 2023b), SAGE Publishing (2023a; 2023b), Springer Nature (2024), Taylor & Francis (n.d.), and Wiley (n.d.). This comparison sought to identify how leading international journals address issues such as authorship, transparency, traceability of outputs, and the use of GenIA in scientific publications. The result of this analysis was the definition of objective criteria for transparency and accountability, inspired by initiatives such as GAIT 2024 Guidance (Linder et al., 2025) and studies on editorial governance and ethical review practices (Ebadi et al., 2025; BaHammam, 2025).

The following process comprised the final validation of the document, which was conducted through successive revisions focused on clarity, coherence, and consistency between principles and recommendations, in accordance with ANPAD guidelines (2023) and Steneck's principles of ethical conduct (2003). This review resulted in the creation of a pedagogical framework that guides researchers in differentiating between ethical and unethical uses of GenIA,such as textual review, bibliographic synthesis, or secondary data analysis (ethical uses) versus fabrication of results or concealment of co-authorship (unethical uses),as suggested by Tang et al. (2024) and Sampaio, Sabbatini & Limongi (2025).

In addition, a system for continuously updating the guide was established, based on the idea that technological ethics is a dynamic and evolving process (Floridi, 2022). This periodic update provides for revisions every year, based on new research, editorial standards, and practices observed in universities, ensuring that the document remains relevant in the face of the rapid transformation of GenIAs.

Table 1 – Methodological Structure for the Construction of the Guide is presented below, summarizing the main elements of the process, highlighting the objectives, sources, methods, analytical criteria, and results of each stage. This table seeks to serve as a methodological reference for the construction of future normative instruments on the ethical use of GenIA in academic research, ensuring traceability, comparability, and epistemic validity.

Table 1

Methodological Structure for the Construction of the Guide for the Ethical and Responsible Use of GenIA in the Academic Environment

Methodological Phase	Main Objective	Sources and References Used	Procedures and Techniques	Analytical and Epistemological Criteria	Results and Contributions
1. Documentary Survey and Literature Review	Identify convergent ethical and normative principles on the use of GenIA in scientific research.	Institutional guidelines: UFRGS (2023), UFMG (2023), UNICAMP (2023), UNESCO (2023; 2025a; 2025b); CNE/CES (2018), CNS (2016) standards; OECD (2023).	Document review and content analysis (Bardin, 2016), with thematic coding of ethical and normative principles.	Theoretical validation through convergence between information ethics (Floridi, 2020) and technological reason (Feenberg, 2017).	Mapping of normative gaps and preliminary formulation of ethical guidelines adapted to the Brazilian context.
2. Systematic Analysis of Scientific Production	Examine recent academic contributions on ethics, integrity, and risks of using GenIA in research contexts.	Articles by Arar et al. (2025); Hanafi et al. (2025); Llerena-Izquierdo & Ayala-Carabajo (2025); Zaki et al. (2025); Lund et al. (2023); Bender et al. (2021) and others	Comparative systematic review based on a mixed approach (qualitative and interpretive).	Critical evaluation of the epistemic and moral dimensions of AI use, prioritizing cognitive responsibility and human authorship.	Definition of theoretical foundations to distinguish ethical uses (review, synthesis) and unethical uses (generation of results, concealment of authorship).
3. Comparative Analysis of Editorial Guidelines and Codes of Conduct	Establish parameters for transparency and traceability in the use of AI in scientific publications.	Editorial policies of Elsevier (2024a–c), Emerald (2023a–b), SAGE (2023a–b), Springer (2024), Taylor & Francis (n.d.), Wiley (n.d.); GAIT 2024 Guidance (Linder et al., 2025).	Comparative analysis and convergence matrix of editorial standards.	Assessment of consistency between editorial practices and principles of scientific integrity (Steneck, 2003).	Identification of international best practices and formulation of objective criteria for transparency, declaration of use, and accountability.
4. Participatory Validation and Ethical-Pedagogical Review	Ensuring clarity, consistency, and legitimacy of the final document within the academic community.	ANPAD guidelines (2023); ethical principles of Steneck (2003); studies by Sampaio, Sabbatini & Limongi (2025) and Tang et al. (2024).	Successive revisions, with validation workshops among faculty, researchers, and institutional reviewers.	Criteria of cognitive integrity and formative validity, based on the distinction between human authorship and cognitive automation.	Consolidation of the guide as a pedagogical and normative instrument of ethics applied to research with GenIA.
5. Systematization of Ethical and Operational Criteria	Structure guidelines applicable to the different stages of academic research.	Studies by Francis, Jones & Smith (2025); Chinoracky & Stalmasekova (2025); Schlagwein & Willcocks (2023); Resnik & Hosseini (2025).	Integration of analyzed data into a practice-oriented conceptual matrix.	Application of the principles of shared responsibility and ethical governance (Ryan & Stahl, 2021; Floridi & Cowls, 2022).	Creation of a practical framework of "ethical and unethical uses of GenIA" in different academic contexts.
6. Continuous updating and evolutionary evaluation	Ensuring the relevance and adaptability of the guide in the face of technological and regulatory developments.	Floridi (2022); OECD (2023); new institutional research and editorial guidelines.	Annual reviews based on monitoring of practices and empirical evidence.	Evolutionary and reflective perspective of ethics applied to technology.	Implementation of a dynamic system for continuous updating and improvement of the Guide.

Source: The Authors (2025)

Epistemologically, the methodological process adopted reflects a relational view of ethics applied to science, according to which knowledge production is understood as a collaborative process between humans and intelligent systems, but always guided by principles of responsibility, transparency, and reflexivity (Ryan & Stahl, 2021; Floridi & Cowls, 2022). The guide therefore recognizes that the ethical and effective use of GenIA in scientific research does not consist exclusively of following rules, but of developing critical awareness of the limits of cognitive automation and the role of the researcher as guardian of scientific truth. Thus, this document constitutes formative and epistemological content that seeks to inspire the prudent, innovative, and morally responsible use of GenIA in contemporary science.

GUIDING PRINCIPLES

Human Authorship as an Epistemological Foundation

The discussion of human authorship in the context of GenIA goes beyond the moral and normative sphere and enters the epistemological domain, where the very essence of knowledge production is outlined. In hybrid human-machine cognition environments, authorship ceases to be solely an individual act and becomes a relational practice involving technological mediation and cognitive responsibility. As Foucault (1969) argues, the notion of author is not a fixed entity, but a discursive function that organizes the production and circulation of knowledge. Similarly, Barthes (2004) emphasizes that the "death of the author" represents the displacement of the subject as the absolute origin of the text, revealing that creation is always traversed by pre-existing cultural and linguistic systems. When this conception is transposed to the context of GenIA, an ontological challenge emerges: understanding what conscious authorship means when textual generation occurs in collaboration with algorithmic systems that simulate human reasoning (Floridi, 2020; Haraway, 2013).

In this sense, human authorship should be understood not as material exclusivity, but as epistemic primacy,that is, as the reflective ability to interpret, contextualize, and attribute meaning to machine-generated information. Floridi (2022) proposes that AI ethics should be based on "informational rationality," according to which humans maintain the role of conceptual designer and ensure consistency between values and data. Thus, the researcher is the moral agent who transforms algorithmic outputs and data into scientific knowledge, while IA acts as a cognitive support tool, not as a co-author. This distinction is essential to prevent what Bender et al. (2021) call "stochastic parroting," the statistical reproduction of linguistic patterns without semantic understanding, which threatens the epistemic integrity of academic text. Recognizing this boundary is therefore an ethical and cognitive condition for maintaining human authorship in the scientific process (Birhane, 2021; Crawford, 2021).

The issue of algorithmic co-authorship, often debated in international editorial policies, requires operational criteria that avoid both the denial of technological mediation and the undue attribution of moral agency to the machine. According to Elsevier (2024a) and Emerald Publishing (2023b), generative systems can be used to improve textual clarity, structure ideas, or support preliminary analyses, provided that their use is explicitly stated and supervised by a responsible human author. The principle of transparency, advocated by Tang et al. (2024) and reinforced by Yin et al. (2025), establishes that the use of GenIA must be accompanied by a clear mention in the methodological sections, ensuring traceability and scientific integrity. This avoids confusion between authorship and mediation, since moral and intellectual responsibility remains exclusively human (Ryan & Stahl, 2021; Resnik & Hosseini, 2025).

The ethical use of GenIA, therefore, must follow three fundamental criteria. First, the criterion of purpose, which limits the use of AI to instrumental functions, such as language review, secondary data organization, and preliminary hypothesis generation, as suggested by Cheng, Calhoun, and Reedy (2025) and Sampaio, Sabbatini, and Limongi (2025). Second, the criterion of critical autonomy, which requires researchers to review, validate, and interpret the results generated, preserving the analytical judgment that distinguishes human authorship from automation (Delios, Tung & van Witteloostuijn, 2025; Arar et al., 2025). Third, the criterion of epistemic transparency, which requires the declaration of GenIA use and the explanation of its contribution to the writing or analysis process, according to the parameters of international publishers (Elsevier, 2024b; Taylor & Francis, n.d.). These criteria ensure the integrity and reliability of knowledge produced in digital environments.

Table 2 below presents the Methodological Elements of the Fundamental Ethical Criteria for the Use of GenIA, summarizing, in an integrated manner, the conceptual dimensions, purposes, epistemological implications, and good practices associated with each criterion. This structure systematizes parameters that allow the operationalization of ethics applied to GenIA research, functioning as an interpretive and formative guide for researchers, advisors, and evaluators.

Table 2

Methodological Elements of the Fundamental Ethical Criteria for the Use of GenIA

Ethical-Philosophical Criterion	Conceptual Definition	Methodological Purpose	Epistemological Implications	Good Practices and Permitted Uses	Risks, Limits, and Prohibited Conduct
1. Purpose Criteria	Defines the functional and legitimate scope of GenIA in scientific research, limiting its use to instrumental and auxiliary tasks.	Ensures that AI acts as a support tool and not as a producer of original content or scientific conclusions.	Reinforces the distinction between *technological instrumentality and human cognitive authorship*, maintaining the researcher's rational control over the knowledge process (Cheng, Calhoun & Reedy, 2025).	Linguistic review, textual consistency verification, generation of exploratory hypotheses, organization of secondary data, and formatting of references (Sampaio, Sabbatini & Limongi, 2025).	Complete writing of sections, generation of automated empirical analyses, creation of non-existent citations, and replacement of scientific reasoning with AI outputs.
2. Critical Autonomy Criterion	Establishes the researcher's obligation to critically review, validate, and reinterpret all material generated by GenIA.	Preserve cognitive sovereignty and human critical judgment in the face of algorithmic responses, avoiding automated dependence.	It supports reflective epistemology, in which knowledge is the result of human interpretation, not simple algorithmic reproduction (Delios, Tung & van Witteloostuijn, 2025; Arar et al., 2025).	Interpretive review of generated outputs; validation with reliable scientific sources; recording of prompts used; verification of biases and semantic errors.	Uncritical acceptance of results, use of AI as a substitute for the process of reflection or replication of information without verification.
3. Epistemic Transparency Criterion	Requires explicit declaration of the use of GenIA, describing its purpose and impact on the research process.	Ensures traceability, academic honesty, and alignment with international standards of scientific integrity.	Promotes epistemic trust and public verifiability of the knowledge production process (Elsevier, 2024b; Taylor & Francis, n.d.).	Insertion of a specific section in the work detailing the tool used, its version, purpose, and degree of intervention; mention in integrity statements.	Omission of the use of GenIA, manipulation of evidence, lack of traceability, and concealment of automated co-authorship.

Source: The Authors (2025)

The simultaneous application of these three criteria, purpose**,** critical autonomy, and epistemic transparency, ensures the preservation of scientific authorship and epistemological credibility in the age of GenIA.

On the other hand, from a philosophical point of view, the symbiosis between humans and machines redefines the nature of authorship as a cyborg practice , a term coined by Haraway (2013) to describe the intertwining of organic bodies and technological systems. This hybrid condition, far from nullifying human authorship, broadens its ethical and cognitive scope. The author becomes a conscious mediator between human reasoning and automated calculation, capable of discerning between information and knowledge, between reproduction and creation. This perspective is aligned with the concept of "relational ethics" proposed by Birhane (2021), according to which the interaction between humans and intelligent systems must be governed by cognitive empathy, shared responsibility, and respect for the cultural and scientific contexts in which knowledge is produced.

Crawford (2021) reinforces this view by demonstrating that artificial intelligence is not a neutral agent, but a technology embedded in networks of power, infrastructure, and political economy. Thus, the defense of human authorship is not limited to the protection of individual creativity, but to the safeguarding of the epistemic value of science as a public good. Pasquale (2020) adds that human autonomy in relations with intelligent systems must be preserved through "laws of social robotics," capable of balancing technological innovation and moral responsibility. Based on the incorporation of these dimensions, this guide proposes a broader understanding of authorship,one that recognizes the inevitable technological mediation but reaffirms humans as the deliberative and ethical center of the scientific creation process.

The goal is not to prohibit the use of technology, but to promote its conscious, transparent, and reflective use, in line with the guidelines of UNESCO (2023) and ANPAD (2023). Thus, human authorship, more than a formality, becomes a continuous exercise in epistemological responsibility,a commitment to think, interpret, and produce science with ethical prudence and critical lucidity in the age of shared cognition.

The consolidation of human authorship as an epistemological foundation also requires the implementation of pedagogical and formative practices that transcend mere technical instruction on the use of GenIA tools and promote a culture of ethical and cognitive reflection. The integration of GenIA into teaching and research environments requires institutions to train epistemic subjects capable of critically understanding the impacts of this technology on ways of knowing, writing, and teaching (Floridi, 2020; Feenberg, 2017). Thus, ethical training in AI should be treated as a cross-cutting competence, connecting the philosophy of technology, digital epistemology, and scientific governance.

A first pedagogical axis consists of creating interdisciplinary training modules that address the ethical, epistemological, and legal foundations of AI by exploring practical cases and real dilemmas faced by researchers and teachers. As Floridi and Cowls (2022) argue, AI education should align with five principles,beneficence, non-maleficence, autonomy, justice, and explainability,so that students learn to evaluate the technical utility and moral implications of each use. In line with this, Birhane (2021) proposes a relational approach to algorithmic ethics, in which learning involves recognizing the social consequences of automation and the importance of human discernment in the face of the opacity of generative systems.

A second formative axis concerns critical scientific and digital literacy, centered on the analysis and interpretation of GenIA outputs. According to Batista, Mesquita, and Carnaz (2024) and Jin et al. (2025), training in academic environments should include the development of skills for reading and validating texts produced by GenIA, distinguishing between heuristic results and epistemic errors (such as hallucinations or algorithmic biases). This type of literacy, far from being merely instrumental, stimulates intellectual autonomy and strengthens the capacity for verification and conscious authorship,a necessary antidote to technological dependence.

The third axis proposes the incorporation of applied ethics laboratories in research, where teachers and students can simulate academic situations involving the use of GenIA,such as manuscript review, hypothesis generation, or data interpretation,and collectively debate the ethical and cognitive limits of each practice. These formative experiences are based on the idea of "reflective learning" (Ryan & Stahl, 2021), in which the use of technology is accompanied by a process of self-criticism and explanation of methodological decisions.

The fourth axis involves the creation of institutional protocols for transparency and traceability, in which researchers are trained to record and declare in detail the use of GenIA at all stages of the academic process. This practice, advocated by Tang et al. (2024) and adopted in the guidelines of publishers such as Elsevier (2024a), Taylor & Francis (n.d.), and Wiley (n.d.), strengthens the culture of scientific integrity and makes the relationship between humans and machines auditable and verifiable. In addition, it contributes to GenIA being used as a tool for enhancing scientific quality, rather than as a substitute for authorship.

The fifth pedagogical axis refers to the continuing education of teachers and scientific reviewers, ensuring that knowledge mediators master both the technical and philosophical aspects of the ethical use of GenIA. As highlighted by Arar et al. (2025) and Resnik and Hosseini (2025), institutional responsibility is not limited to the creation of norms, but involves the cultivation of a collective epistemic ethic. This requires training policies that update professionals on changes in international editorial standards and encourage critical reflection on the cognitive transformations brought about by the symbiosis between humans and machines.

Table 3 – Methodological Structure of the Pedagogical Axes for the Ethical Use of GenIA below indicates the objectives, theoretical foundations, methods, and expected results of each of these axes, forming a guiding framework for curricular and institutional development.

Table 3

Methodological Structure of the Pedagogical Axes for the Ethical Use of GenIA

Pedagogical Axis	Central Objective	Theoretical and Ethical Foundations	Formative Strategies and Methods	Skills Developed	Expected Results and Impacts
1. Interdisciplinary Modules on Ethics, Epistemology, and AI Law	Integrate ethical, legal, and cognitive foundations into scientific training, promoting critical reflection on real dilemmas in the use of AI.	Floridi & Cowls (2022) – five principles of AI ethics (beneficence, non-maleficence, autonomy, justice, and explainability); Birhane (2021) – relational ethics and recognition of the social consequences of automation.	Theoretical-practical classes with case studies; analysis of real ethical dilemmas; interdisciplinary debates involving philosophy, technology, and law.	Ethical and legal reasoning; applied moral judgment; understanding AI as a socio-technical phenomenon; human discernment in the face of algorithmic opacity.	Training of critical and conscious researchers on the impacts of GenAI on science and society; strengthening of collective moral responsibility.
2. Critical Scientific and Digital Literacy	Developing the ability to read, validate, and critically analyze outputs produced by GenIA.	Batista, Mesquita & Carnaz (2024) – digital literacy as a tool for intellectual autonomy; Jin et al. (2025) – distinction between heuristic results and epistemic errors.	Workshops on analyzing AI-generated texts; comparison between human and algorithmic productions; exercises in detecting biases and semantic inconsistencies.	Critical digital literacy; epistemic verification; cognitive autonomy; differentiation between human reasoning and heuristic automation.	Reduced technological dependence; increased academic reliability; strengthening of conscious authorship and reflective thinking.
3. Applied Research Ethics Laboratories	Encourage reflective practices and ethical simulations in academic contexts involving GenIA.	Ryan & Stahl (2021) – reflective learning and ethics applied to technology; Floridi (2022) – informational ethics as rational practice.	Creation of experimental laboratories; simulations of AI-assisted reviews, analyses, and interpretations; reflective recording of decisions made.	Applied ethical awareness; capacity for self-criticism; mastery of reflective methodologies; integration between technique and morality.	Internalization of ethical and epistemological values; strengthening of collective moral judgment; practical understanding of the ethical limits of AI in research.
4. Institutional Protocols for Transparency and Traceability	Promote a culture of integrity and traceability in the use of GenAI at all stages of research.	Tang et al. (2024) – importance of explicit declaration of GenIA use; Elsevier (2024a), Taylor & Francis (n.d.), Wiley (n.d.) – editorial transparency policies.	Development of usage registration protocols; creation of ethical declaration forms; inclusion of a mandatory section on GenIA in reports and final course projects.	Institutional responsibility; information traceability; commitment to scientific integrity.	Strengthening public confidence in research; ethical standardization of practices; transparency as the cornerstone of scientific governance.
5. Continuing Education for Teachers and Scientific Reviewers	Train knowledge mediators to provide ethical and critical guidance on the use of GenIA.	Arar et al. (2025) – collective epistemic ethics; Resnik & Hosseini (2025) – institutional co-responsibility in scientific integrity.	Teacher refresher programs; ethical review workshops; communities of practice among reviewers and researchers.	Ethical and technical updating; mastery of international editorial standards; pedagogical competence for technological mediation.	Dissemination of institutional epistemic ethics; consolidation of a culture of shared responsibility between humans and intelligent systems.

Source: The Authors (2025)

The implementation of the pedagogical axes described above represents a structural advance in 21st-century scientific education, promoting integrated learning between technique, ethics, and epistemology. This approach recognizes that the use of GenIA is not only linked to a technological challenge, but also a cultural and cognitive phenomenon that requires moral and critical education.

Based on the development of the principles of autonomy, justice, beneficence, and explainability with practical teaching methodologies, higher education institutions consolidate a new educational paradigm,one in which AI ceases to be a mere automated tool and comes to be understood as an object of ethical, epistemological, and pedagogical reflection, essential to the moral sustainability of contemporary science.

Thus, the pedagogical practices proposed here seek to consolidate human authorship as an epistemological principle, in addition to building a formative ecology focused on scientific responsibility, intellectual autonomy, and the conscious use of technology. The goal is to train a generation of conscious researchers capable of coexisting ethically with intelligent systems, preserving, at the heart of science, what makes it truly human: the ability to think, question, and create meaningfully.

Epistemological Transparency and Statement of Use

Transparency, in the context of GenIA-mediated research, should be understood as an epistemological principle that ensures the validity, reliability, and verifiability of scientific knowledge. Unlike the traditional concept of transparency, associated with the description of the methods and sources used, the use of GenIA requires an expanded model that includes both technical traceability and cognitive explicitness of the mediating processes of knowledge generation. This distinction is fundamental in the era of "algorithmic cognition," in which part of textual and analytical production is carried out by opaque systems,a phenomenon known as the "*black* box" of AI (Crawford, 2021; Floridi, 2020). In this new cognitive ecology, researchers use tools in a process of coexistence with automated reasoning systems, which makes transparency an ontological condition of science itself.

Floridi (2022) proposes that AI ethics should be guided by "proportional responsibility," a principle that recognizes the limits of predictability and human control over complex systems. Thus, scientific transparency needs to be reinterpreted as a process of reflective and continuous mediation and not exclusively as the recording of the use of a tool. This perspective aligns with Birhane's (2021) notion of "relational ethics," which emphasizes that the interaction between humans and algorithms should be understood in terms of mutual influence and cognitive co-authorship, requiring researchers to reveal how technology has affected their reasoning, method, and interpretation of results. Thus, the principle of transparency is not reduced to an administrative duty, but becomes an act of epistemic integrity,an active commitment to the rational and public reconstruction of the cognitive path that led to scientific discovery.

To operationalize this vision, this guide adopts a three-dimensional methodological model of transparency. The first level is instrumental transparency, which requires a description of the GenIA tools and versions used, their configurations, and any plugins, in accordance with the editorial guidelines of Elsevier (2024a) and SAGE Publishing (2023a). This step ensures minimum technical traceability, which is essential for reproducibility. The second level is procedural transparency, which details the mode of use, the extent of human intervention, and the types of tasks in which AI was employed (e.g., support for textual revision, literature summarization, or argument structuring), according to the recommendations of Tang et al. (2024) and Yin et al. (2025). The third level, interpretive transparency, is the highest level, requiring the researcher to explain how the use of AI influenced their methodological decisions, inferences, and construction of meaning. This layer, advocated by Crawford (2021) and Floridi (2020), is essential to distinguish reflective human thinking from the algorithmic generation of patterns, preserving the critical and autonomous character of science.

Next, Table 4 – Methodological Structure of the Three-Dimensional Transparency Model presents the three levels that make up the proposed framework: instrumental transparency, procedural transparency, and interpretative. Each level is described in its theoretical, operational, and ethical dimensions, allowing for its practical application in scientific research and academic publications.

Table 4

Methodological Structure of the Three-Dimensional Transparency Model

Level of Transparency	Conceptual Definition	Methodological Objective	Implementation Procedures	Ethical and Epistemological Criteria	Expected Results
1. Instrumental Transparency	This consists of a detailed explanation of the technical aspects of GenIA used: tool, version, configurations, prompts, and plugins.	Ensure technical traceability and methodological reproducibility of the results produced with GenIA support.	Insertion of a specific section in reports or articles informing the platform used, the date of interaction, parameters, and technical limitations of the system (Elsevier, 2024a; SAGE Publishing, 2023a).	Ethics of traceability and verifiability: ensures that scientific production is auditable and faithful to the declared practice.	Complete technical transparency; institutional standardization of records; increased trust between researchers, reviewers, and readers.
2. Procedural transparency	Reports on how GenIA is used, detailing the type of task performed, the nature of human intervention, and the proportion of algorithmic contribution.	Explains how AI was integrated into the research process, distinguishing instrumental support from analytical interference.	Describe the stages in which GenIA was applied (textual review, summarization, organization of arguments, etc.); state the extent of use and the degree of human supervision (Tang et al., 2024; Yin et al., 2025).	Ethics of shared responsibility: the researcher assumes the role of curator of the process, not merely an operator of AI.	Reinforcement of human autonomy and methodological clarity; objective delimitation between human authorship and automated contribution.
3. Interpretive transparency	Represents the most advanced level: requires critical reflection on the impact of GenAI on the researcher's methodological, analytical, and interpretive decisions.	Preserving reflective judgment and human cognitive authorship in the face of algorithmic automation.	Include a reflective section in reports, describing how AI influenced data interpretation, theoretical reasoning, and the construction of meaning (Crawford, 2021; Floridi, 2020).	Ethics of authorship and reflexivity: recognizes AI as an instrument of cognitive mediation, but reaffirms the researcher as an autonomous epistemic subject.	Development of critical awareness about the role of AI; strengthening of intellectual authorship and autonomous scientific thinking.

Source: The Authors (2025)

This three-dimensional model consolidates a gradual and evolutionary view of transparency, allowing researchers, reviewers, and institutions to identify, document, and interpret the role of GenAI accurately and responsibly. By combining technical traceability, procedural accountability, and interpretive reflection, the guide proposes an expanded information ethic, in which the use of AI becomes a conscious cognitive practice and an epistemic commitment to scientific truth.

Recognizing the impossibility of total transparency in the face of proprietary models and closed databases,such as ChatGPT, Gemini, Claude, Grok, Mistral, Lhama, Manus, Deepseek, or Copilot,we seek to adopt the concept of mitigated transparency, inspired by Floridi (2020) and Radanliev (2025). This approach recognizes that technical opacity does not eliminate responsibility, but shifts it to the field of contextual explanation and epistemological responsibility. Instead of demanding impossible access to the code or training bases, researchers are required to honestly explain the limits of traceability and justify their methodological decisions in light of these limitations. This practice avoids what Crawford (2021) calls the "illusion of transparency",the formal appearance of documentary completeness without cognitive correspondence. Thus, epistemic honesty becomes the ethical core of scientific transparency, replacing the ideal of total control with the ideal of proportional accountability.

The proposed methodological design also integrates transparency with international AI ethics and governance frameworks, in particular the recommendations of UNESCO (2025b), the OECD Principles (2023), and the good practice guidelines of ANPAD (2023) and UFRGS (2023). These frameworks converge on a vision in which transparency, justice, and responsibility form a triangle of scientific integrity. According t nd Cowls (2022), transparency only makes sense when coupled with explainability,the ability of researchers to make the algorithmic processes and decisions that influenced their work understandable. Thus, rather than opening the "black box," it is about building bridges between human reasoning and the technical functioning of generative systems, promoting an epistemology of co-responsibility.

In practical terms, we propose the creation of a reference framework entitled "Levels of Transparency in Research with GENIA," containing definitions and examples for each of the three levels mentioned. For example: in instrumental transparency, the use of ChatGPT 4.0, April 2025 version, with specified temperature and context parameters, should be recorded; in procedural transparency, the researcher must indicate that the model was used to review textual coherence and suggest argumentation structures; and in interpretive transparency, they must explain how the model's suggestions influenced the final formulation of the argument or the selection of references. This methodological standardization, as recommended by Linder et al. (2025) and Resnik and Hosseini (2025), strengthens cognitive traceability and creates conditions for consistent academic audits.

However, responsibility for transparency cannot be placed solely on the author. Inspired by corporate governance practices (IBGC, 2023) and UFSC (2024) recommendations on scientific integrity, this guide introduces the concept of Institutional Governance of Transparency. It is proposed that universities maintain official repositories of GenIA usage statements, auditable by ethics committees and graduate programs, ensuring consistency between declared use and the final product. Advisors and evaluators should verify the adherence of declared practices to editorial policies (Emerald Publishing, 2023b; Springer Nature, 2024), and institutional committees should act preventively in training and monitoring the ethical use of AI. Thus, transparency ceases to be a private obligation and becomes a shared responsibility, integrating authors, institutions, journals, and regulatory bodies.

Epistemologically, this model reformulates the principle of transparency as a reflective practice, situated between technique and morality, which aims to restore the intelligibility of science in a context of increasing automation. Floridi (2020) and Feenberg (2017) remind us that technology is never neutral, but carries human and corporate values and decisions embedded in its architecture. Recognizing this is the first step in transforming transparency from a bureaucratic ritual into a pedagogy of reason: a way of teaching and practicing science with lucidity in the face of algorithmic opacity. In this way, we seek to establish a model of epistemological transparency adapted to the age of AI, in which researchers reveal,in an honest, critical, and verifiable manner,how the dialogue between humans and machines is inscribed in the genesis of scientific knowledge.

Scientific Integrity and Individual Responsibility

Scientific integrity, in the context of GenIA-mediated research, should be understood as an epistemological principle that articulates honesty, traceability, methodological consistency, and communicative responsibility (Bouter et al., 2022; Resnik & Hosseini, 2025). These four elements constitute the basis that sustains trust in science and guarantees the verifiability of knowledge. When applied to AI-assisted research, they transcend the moral dimension and become a structure of cognitive and ethical control, ensuring that the use of technology preserves the rigor of the scientific method and the authenticity of human interpretations. Thus, integrity is defined not only as an individual virtue, but as a pillar of contemporary epistemology, essential for validating knowledge production in an era characterized by algorithmic intermediation (Floridi, 2022; Arar et al., 2025).

In this scenario, the concept of critical curation emerges, understood as a hermeneutic and reflective process of ethical and epistemological validation of the content generated by GenIA. Critical curation involves examining the conceptual coherence of the material produced with the state of the art, checking the origin and legitimacy of the data used, and assessing the ethical and interpretive implications of algorithmic reasoning (Birhane, 2021; Sampaio et al., 2025). This practice is not limited to a textual or technical review: it is an act of scientific responsibility in which the researcher acts as a mediator between human rationality and automated reasoning, exercising a critical reading capable of identifying biases, inconsistencies, and possible "hallucinations" produced by the models (Förster & Skop, 2025; Bender et al., 2021). Critical curation, therefore, must be recognized as an integral part of the scientific method in the era of assisted cognition, ensuring that the machine complements,rather than replaces,human interpretation and judgment.

Scientific integrity, however, cannot be guaranteed solely by the individual actions of researchers. It requires a structure of institutional and collective responsibility, in which universities, journals, and ethics committees share the duty of ensuring the traceability and compliance of scientific practices with established ethical standards. As advocated by the IBGC (2023) and UNESCO (2025b), ethical governance must involve oversight and audit mechanisms that certify the veracity of AI use statements, consistency between the method and the final content, and compliance with institutional guidelines (UFMG, 2023; UFSC, 2024). Advisors should validate the consistency of the declared use of GenIA, while ethics committees need to monitor the adherence of procedures to codes of scientific integrity. This model reinforces the concept that integrity is a public and collective good, dependent on a culture of trust and co-responsibility (Floridi & Cowls, 2022; Arar et al., 2025).

To reduce ambiguities and prevent inappropriate conduct, the guide proposes the creation of a parameter entitled "Ethical and Epistemological Risk Zones in the Use of GENIA," consisting of three levels of classification: acceptable use, focused on auxiliary tasks such as grammatical review, formatting, and reference checking; sensitive use, related to data synthesis, summary writing, or formulation of secondary arguments; and unacceptable use, corresponding to the generation of empirical results, hypotheses, analyses, or methodological sections. This gradation allows researchers, reviewers, and institutions to recognize the limits of cognitive autonomy delegated to the machine, preventing risks of misappropriation of authorship and epistemological distortion (Cheng et al., 2025; Hanafi et al., 2025). By categorizing the different degrees of sensitivity in the use of AI, the guide transforms ethics into a practical tool for scientific guidance and decision-making.

Table 5 - Ethical and Epistemological Risk Zones in the Use of GenAI is presented below, structured to serve as a pedagogical, normative, and reflective tool in the context of scientific research. It offers clear criteria for acceptable, sensitive, and unacceptable use, aligned with the recommendations of Cheng et al. (2025), Hanafi et al. (2025), Floridi (2022), Resnik & Hosseini (2025), and Sampaio et al. (2025), aiming to guide researchers, reviewers, and institutions on the ethical and epistemologically legitimate application of GenIA in scientific research, writing, review, and publication processes.

Table 5

Ethical and Epistemological Risk Areas in the Use of GENIA in Scientific Research

Risk Level	General Description	Examples of Use	Conditions of Ethical and Epistemological Legitimacy	Associated Risks	Recommendations and Mitigation Measures
1. Acceptable Use (Low Risk)	Refers to the application of GENIA in purely instrumental and non-cognitive tasks, in which technology supports scientific communication without interfering with the researcher's reasoning, results, or interpretations.	■ Spelling and grammar review; ■ Standardization of citations and references; ■ Literal or technical translation of excerpts; ■ Reformulation of textual structure without changing meaning; ■ Suggestions for clarity and linguistic cohesion.	■ The researcher retains full authorship and discretion over the content. ■ The tool acts as technical support, without introducing new ideas, data, or arguments. ■ There must be an explicit statement of use, indicating the nature and purpose of the intervention (Elsevier, 2024a; Springer Nature, 2024).	■ Excessive technological dependence in writing. ■ Subtle translation or standardization errors.	■ Monitor the degree of automation and ensure final human review. ■ Declare use in the methodology or acknowledgments sections.
2. Sensitive Use (Moderate Risk)	Refers to the use of GENIA in auxiliary cognitive stages, in which the machine participates in the process of textual or argumentative construction, but without replacing human scientific reasoning.	■ Synthesis of previously published secondary data; ■ Generation of literature summaries; ■ Formulation of argumentative structures or exploratory questions; ■ Support in constructing titles, abstracts, and keywords; ■ Suggestions for the logical organization of sections.	■ The researcher must exercise active critical curation, validating each piece of information produced. ■ Requires verification of consistency with the state of the art, traceability of sources, and conceptual adequacy (Birhane, 2021; Bouter et al., 2022). ■ A detailed statement on the type and extent of use is mandatory, in accordance with UNESCO (2025a) and ANPAD (2023) guidelines.	■ Risk of data hallucination, reproduction of biases, or interference with intellectual originality. ■ Possibility of interpretive distortion of scientific concepts.	■ Implement protocols for cross-checking sources and recording interactions with GENIA. ■ Maintain auditable records (logs, prompts) for traceability purposes. ■ Mandatory critical review by advisor or co-author.
3. Unacceptable Use (High Risk)	Involves the use of GENIA in intellectually autonomous or empirical activities, in which technology replaces the role of the researcher in the generation, interpretation, or validation of knowledge.	■ Generation of non-existent empirical results ("synthetic data" with no real basis); ■ Creation of hypotheses, statistical analyses, or automatic inferences; ■ Preparation of discussions or conclusions without human bibliographic basis; ■ Complete writing of methodological or results sections; ■ Simulation of authors or falsification of citations.	■ Prohibited under any circumstances. ■ Violates the principles of human authorship, traceability, and scientific reliability (Floridi, 2020; Lund et al., 2023). ■ No mitigation is possible through subsequent declaration, as it constitutes epistemological distortion and scientific misconduct.	■ Scientific fraud, algorithmic plagiarism, violation of data integrity. ■ Risk of invalidation of results and retraction of publications.	■ Application of institutional and disciplinary sanctions (UFSC, 2024). ■ Mandatory ethical review and blocking of submissions with evidence of automated content generation. ■ Implementation of AI detection systems in journals (Resnik & Hosseini, 2025; Elsevier, 2024b).

Source: The Authors (2025)

Table 5 proposes an operational ethical scale, which transforms abstract principles of integrity into practical evaluation criteria. The acceptable level represents the interaction between humans and machines under conscious control and epistemic supervision; the sensitive level demands critical judgment and traceability; and the unacceptable level marks the boundary of human authorship and scientific legitimacy.

This classification should be incorporated into teaching plans, graduate programs, and ethics committees, guiding researchers on the boundary between legitimate cognitive assistance and undue delegation of authorship and reasoning. As indicated by Floridi (2022) and Sampaio et al. (2025), ethical education on AI is a practice of intellectual self-governance that ensures normative compliance and strengthens epistemological awareness in scientific work.

Integrity must also encompass the ethical review process supported by GenIA, in which reviewers are invited to adopt good practices of transparency and intellectual responsibility. In this context, AI can be used in an auxiliary manner,for example, to structure feedback or verify textual consistency,as long as there is explicit record of its use and full accountability of the reviewer for the final content (BaHammam, 2025; Ebadi et al., 2025). This practice promotes a culture of integrity that avoids algorithmic biases and preserves the human and independent character of peer review. Thus, ethical review with GenIA must follow three principles: limited and contextualized use, declarative transparency, and personal responsibility, as reinforced by the policies of publishers such as Elsevier (2024b) and Springer Nature (2024).

It is essential to recognize and anticipate inappropriate conduct and disciplinary measures in cases of misuse of GenIA. Failure to declare use, falsification of authorship, creation of non-existent results, or lack of critical curation constitute scientific misconduct, subject to institutional sanctions under ANPAD guidelines (2023). The existence of accountability mechanisms reinforces the consistency between the principles and practice of scientific ethics, reaffirming public trust in science. From an epistemological perspective, this accountability should not be seen as mere punishment, but as part of the rational self-regulation of the scientific field, which seeks to balance technological innovation, moral prudence, and commitment to the truth (Floridi, 2020; Steneck, 2003). Thus, scientific integrity in the GenIA era becomes a cognitive and institutional practice of preserving the rationality and credibility of science, guiding researchers and institutions toward an ethical, effective, and epistemologically responsible use of artificial intelligence in scientific research.

Privacy, Research Ethics, and Legal Compliance

The protection of personal data and the privacy of research subjects are fundamental pillars of scientific integrity in the GenIA era. The General Personal Data Protection Law (Law No. 13,709/2018 – LGPD) establishes structural principles that should guide all forms of data processing in academic research. Among them, the following stand out: purpose, necessity, security, and transparency, which form the ethical and legal core of data governance in Brazil. The principle of purpose requires that data processing occur for legitimate, explicit, and informed purposes, in a manner compatible with the research context; the principle of necessity requires that use be restricted to the minimum necessary to achieve scientific objectives; the principle of security requires the adoption of technical and administrative measures to prevent unauthorized access, leaks, and improper manipulation; and the principle of transparency requires clear and accessible communication about the manner and extent of data processing (LGPD, 2018; Radanliev, 2025). Compliance with these principles must permeate all stages of the research cycle,from collection and processing to analysis and archiving,especially when mediated by AI systems, whose algorithmic architecture often involves opaque and massive flows of information (Floridi, 2022; Crawford, 2021).

Table 6 – Methodological Framework for Data Protection and Privacy in GenIA Research systematizes each principle of the LGPD into six analytical dimensions,conceptual definition, methodological objective, practical applications, ethical-epistemological criteria, risks, and best practices,to guide researchers, ethics committees, and academic institutions.

Table 6

Methodological Framework for Data Protection and Privacy in Research with GenIA

LGPD Principle	Conceptual Definition	Methodological Objective	Practical Applications in Research with GenIA	Ethical-Epistemological Criteria	Risks, Challenges, and Recommended Best Practices
1. Purpose	Data processing must be carried out for legitimate, specific, and informed purposes that are compatible with the stated scientific objectives.	Ensure consistency between the purpose of the research and the use of personal data, avoiding deviations from the purpose.	Formulate clear terms of consent; indicate, in projects and reports, the exact purpose of each stage of data use; define the scientific justification for collection.	Ethics of intentionality and transparency: the researcher must declare the scientific function of each piece of data processed, respecting the autonomy of the data subject.	Risks: misuse or secondary use of data; improper re-identification. Good practices: validation of ethical protocols; supervision by Research Ethics Committees (RECs).
2. Necessity	Determines that only data strictly necessary for the fulfillment of scientific objectives should be processed.	Minimize the collection and storage of personal data, reducing vulnerabilities and unnecessary exposure.	Apply data minimization techniques; anonymize or pseudonymize information; delete superfluous data after use.	Ethics of proportionality and respect for the subject: the researcher must assess the ethical cost-benefit ratio between the amount of data and scientific necessity.	Risks: excessive collection; widespread use without a defined purpose. Good practices: periodic review of databases; internal audits of adequacy.
3. Security	Requires technical and administrative measures to protect data against unauthorized access, leaks, destruction, or improper alteration.	Prevent technological vulnerabilities and ensure the confidentiality of data processed by GenIA systems.	Implement encryption, multi-factor authentication, access control, and secure storage; monitor AI usage logs.	Ethics of technological precaution: security is part of scientific integrity, not merely a technical requirement.	Risks: leaks, cyberattacks, loss of sensitive data. Best practices: use of secure institutional servers; compliance with ISO 27001 standards; regular cybersecurity audits.
4. Transparency	The data subject must be informed, in a clear and accessible manner, about the manner, timing, and purpose of the processing of their data.	Ensure traceability and ethical communication with participants and scientific peers.	Include sections on "transparency and use of GenIA" in reports, articles, and informed consent forms; explain algorithms, data flows, and tools used.	Ethics of accountability and public trust: open communication strengthens the legitimacy of research and social control of science.	Risks: algorithmic opacity, misinformation, and manipulation of consent. Good practices: public transparency reports, records in institutional repositories, and communication accessible to the lay public.

Source: The Authors (2025)

The systematic adoption of these principles strengthens ethical data governance in GenIA-mediated contexts, where the boundary between personal information and inferred information tends to blur. Each principle of the LGPD acts as a balancing vector between technological innovation and the protection of human dignity, ensuring that cognitive automation does not compromise the moral and legal value of the research subject.

Thus, contemporary scientific practice must recognize that the ethical integrity of research depends as much on methodological accuracy as on information protection. The implementation of mechanisms for informed consent, access control, and algorithm auditing not only complies with legal requirements but also reaffirms the academic community's commitment to open, safe, and socially responsible science.

The alignment between the LGPD and complementary ethical standards is essential to ensure consistency between technological innovation and social responsibility. CNS Resolution No. 510/2016 regulates ethics in humanities and social sciences research, determining that the use of personal data, including in digital environments, must respect the autonomy of participants, the confidentiality of information, and free and informed consent. Resolution CNE/CES No. 7/2018 reinforces the dimension of social responsibility and the ethical extension of research, requiring that all scientific practice consider its impact on the community and the environment. Complementarily, the Brazilian Civil Rights Framework for the Internet (Law No. 12,965/2014) introduces the principles of net neutrality, privacy, and personal data protection, consolidating a legal framework that should guide the ethical conduct of researchers and institutions in the digital environment. Thus, compliance with these standards is not strictly a formal requirement, but rather an epistemological commitment to responsible and transparent knowledge production (UNESCO, 2025b; OECD, 2023).

Table 7 – Ethical-Normative Integration between LGPD and Research Guidelines: Applied Methodological Structure summarizes the main regulatory instruments, their objectives, guiding principles, methodological implications, and good practices associated with responsible scientific research.

Table 7

Ethical-Normative Integration between LGPD and Research Guidelines: Applied Methodological Structure

Regulatory Instrument	Definition and Legal Scope	Guiding Principles	Methodological Objectives and Practical Applications	Ethical-Epistemological Criteria	Compliance Challenges and Best Practices
Law No. 13,709/2018 – LGPD	Federal law regulating the processing of personal data in physical and digital media, also applicable to scientific research.	Purpose, necessity, security, transparency, and prevention (LGPD, 2018).	Ensure the ethical and responsible processing of personal data; develop data management plans and impact reports; adopt anonymization and informed consent.	Ethics of information protection and cognitive traceability: the researcher is jointly responsible for data integrity and algorithmic security.	Challenges: opacity of data flows and re-identification; Good practices: explicit consent, use of secure repositories, data processing records.
CNS Resolution No. 510/2016	Regulates ethics in humanities and social sciences research, including in digital environments.	Autonomy, dignity, confidentiality, free and informed consent.	Ensure respect for participants; review collection and storage methodologies; document the consent and anonymization process.	Ethics of autonomy and confidentiality: ensure that participants maintain control and clarity over the use of their information.	Challenges: defining what is public vs. sensitive information; Good practices: ethical review by committees (CEP/CONEP), training in digital bioethics.
CNE/CES Resolution No. 7/2018	Defines guidelines for university extension and for the ethical and social commitment of research.	Social responsibility, collective impact, sustainability, and citizen training.	Promote research that contributes to the public good; assess the social and environmental risks and benefits of applied technologies.	Ethics of social and ecological responsibility: knowledge must generate human, social, and environmental value.	Challenges: measuring the indirect social impacts of AI; Good practices: ethical and social impact reports and integration with sustainability policies.
Law No. 12,965/2014 – Brazilian Civil Rights Framework for the Internet	Establishes principles, guarantees, rights, and duties for internet use in Brazil.	Privacy, personal data protection, net neutrality, freedom of expression.	Regulates the use of information in digital searches; defines the obligations of providers and researchers regarding transparency in the use of platforms and algorithms.	Ethics of information governance: ensures that digital research respects fundamental rights and cognitive freedom.	Challenges: dependence on private platforms and algorithmic opacity; Good practices: use of free software, open protocols, and independent auditing.
UNESCO (2025b) – Recommendation on AI Ethics	Global framework for the ethical use of AI, recognized by the UN.	Beneficence, justice, transparency, accountability, and explainability.	Guide institutional policies and ethical protocols in the use of GenIA in research.	Global AI ethics: balance between innovation and protection of human rights.	Challenges: international harmonization; Good practices: adherence to institutional codes of ethics and continuous monitoring.
OECD (2023) – Principles of Responsible AI	International guidelines for AI policies and governance in research and innovation.	Transparency, robustness, accountability, and data security.	Promoting good practices for the development and responsible use of AI in scientific contexts.	Ethics of technological reliability: AI must be auditable, fair, and explainable.	Challenges: interoperability between legislations; Good practices: ethical certification of projects, integration with institutional compliance.

Source: The Authors (2025)

The articulation between these normative instruments allows for the creation of an ethical digital research ecosystem, in which technological innovation is subject to principles of justice, responsibility, and explainability. This normative coherence strengthens public trust in science by ensuring that the advances promoted by GenIA are guided by universal human values.

Therefore, more than a bureaucratic requirement, compliance with the LGPD, CNS, CNE, and the Brazilian Civil Rights Framework for the Internet is an epistemological and moral imperative, in which transparency, responsibility, and data protection become essential conditions for the legitimacy of scientific knowledge in the era of cognitive automation.

In the context of GenIA-mediated research, the use of generative tools should be treated as an integral part of the scientific method and, therefore, declared in the submission process to the Research Ethics Committees (CEPs). Research that uses AI to manipulate, store, or interpret data must specify in the ethical protocol: the tool used, the type of data processed, the nature of the processing, and the associated risk mitigation measures. It is mandatory to present an expanded informed consent form, in which participants are alerted to the potential risks of using AI, including the possibility of automated inference of sensitive data and the risk of re-identification, even in anonymized databases (CNS, 2016; ANPAD, 2023). In addition, researchers must demonstrate technical and cognitive mastery of the tools employed, ensuring that the use of AI does not replace human judgment in the analysis and interpretation of results (Hanafi et al., 2025; Arar et al., 2025).

The ethical submission of projects with GenIA must include a data governance plan, covering protocols for secure storage, encryption, anonymization, and traceability. Anonymization, as defined by the LGPD, refers to the transformation of data so that the data subject cannot be identified directly or indirectly, constituting an essential safeguard for privacy. However, when GenIA is used to reprocess or cross-reference data, anonymization can be reversed by algorithmic inference, requiring complementary risk minimization and institutional control measures (Floridi & Cowls, 2022; Radanliev, 2025). The principle of minimization should guide all collection and use decisions, avoiding the accumulation of unnecessary data or the use of AI models whose opacity prevents adequate audits. This ethical conduct, based on traceability and restraint, reduces the likelihood of violations and reinforces public confidence in digital science (Resnik & Hosseini, 2025; Sampaio et al., 2025).

Institutional Ethics and Integrity Committees play a central role in this process, reviewing and evaluating projects involving GenIA based on broad criteria for ethical assessment and social impact. In addition to verifying legal compliance, these committees are responsible for analyzing the epistemological appropriateness of AI use, considering whether automated data processing respects the nature and limits of scientific research. It is recommended that universities and research centers maintain internal technological compliance protocols that provide for periodic training of researchers and advisors on privacy risks, data governance, and the responsible use of generative technologies. Thus, research ethics expands into a logical t of collective and co-responsible cognition, in which privacy and data protection are constitutive dimensions of the very act of knowing (Feenberg, 2017; Lévy, 2010).

Privacy, in this context, comes to represent a guarantee of epistemological autonomy, preserving the space for human reflection and interpretation in the face of increasingly predictive and intrusive systems. The development of a precise articulation between the principles of the LGPD and national and international ethical standards can ensure the development of a scientific governance structure that combines innovation, security, and responsibility,indispensable foundations for the ethical, effective, and transparent use of GenIA in academic research.

Critical Digital Literacy and Teacher Training

Critical digital literacy is a core competency for the ethical, reflective, and emancipatory use of GenIA in academic and scientific contexts. Unlike simple technical mastery, it constitutes an interdisciplinary epistemological field that articulates three complementary dimensions: cognitive, critical, and emancipatory (UNESCO, 2023; Batista, Mesquita & Carnaz, 2024). The cognitive dimension refers to the mastery of languages, tools, and operations involved in interacting with AI systems, allowing teachers and students to understand their mechanisms and limitations. The critical dimension stimulates the ability to question the biases, exclusions, and ideologies embedded in algorithms, understanding that all algorithmic production carries human values and socio-technical intentionalities (Bender et al., 2021; Birhane, 2021). The emancipatory dimension recognizes technology as a means of expanding intellectual autonomy and strengthening cognitive justice, proposing the conscious use of AI to democratize access to knowledge and reduce informational power asymmetries (Floridi, 2022; Feenberg, 2017).

Building this literacy requires understanding that the use of GenAI in teaching and research is not neutral, as it involves epistemological and political choices that shape how knowledge is produced and legitimized. As Crawford (2021) argues, AI systems reproduce power structures and depend on invisible chains of data and labor, making it essential to develop a critical awareness of their operating conditions and social impacts. In this sense, critical digital literacy requires researchers to master the technique and question the origins, limits, and consequences of cognitive automation, cultivating an attitude of ethical and epistemic vigilance. This perspective is reinforced by UNESCO (2025a), which proposes ethical and reflective training as an inseparable component of digital education, so that technological innovation becomes an instrument of equity rather than exclusion.

From an operational point of view, the promotion of critical digital literacy must be institutionally structured around three complementary axes, forming a Proactive Framework for Training in Critical Digital Literacy. Axis 1 – Interdisciplinary teacher training proposes to integrate ethics, epistemology, and critical pedagogical practices, enabling teachers to interpret, mediate, and guide the responsible use of AI in the classroom. This training should combine theoretical activities on ethical-epistemological foundations with practical workshops that explore generative tools from pedagogical and regulatory perspectives (Chinoracky & Stalmasekova, 2025; Mikroyannidis et al., 2025). Axis 2 – Student training integrated into the curriculum suggests the inclusion of ethical and critical AI modules in curricular components, encouraging reflection on authorship, source reliability, and data manipulation, in accordance with guidelines from institutions such as Elsevier (2024b) and UFMG (2023). Axis 3 – Continuous institutional assessment recommends the creation of critical digital maturity indicators, measuring the ability of teachers and students to apply ethical, epistemological, and social principles in the use of emerging technologies (UNESCO, 2023; OECD, 2023).

Table 8 – Proposed Structure for Training in Critical Digital Literacy: Axes, Competencies, and Methodological Guidelines summarizes the structural and applicable components of this proposal for teaching and research institutions.

Table 8

Proposed Structure for Training in Critical Digital Literacy: Axes, Competencies, and Methodological Guidelines

Training Axis	Central Objective	Contents and Implementation Strategies	Skills Developed	Ethical-Epistemological Criteria	Examples and Institutional Best Practices
Axis 1 – Interdisciplinary Teacher Training	Train teachers to understand, interpret, and guide the ethical and pedagogical use of GenIA.	Integration of practical workshops on ethics, epistemology, and AI; courses on the technical fundamentals of GenIA; discussion of ethical dilemmas in real cases.	Technique: understanding prediction and generation mechanisms; Criticism: analysis of cognitive biases and limitations; Ethics: responsible mediation and reflection on authorship.	Ethics of mediation and pedagogical responsibility: the teacher acts as a critical curator of the technological process.	Good practices: interdisciplinary continuing education programs; creation of ethical innovation centers; integration between departments (e.g., UFMG, 2023).
Axis 2 – Student Training Integrated into the Curriculum	Develop students' critical and ethical skills in the use of AI as a cognitive and scientific tool.	Inclusion of modules on digital ethics, information reliability, and academic authorship; supervised practical activities with GenIA; debates on privacy and bias.	Technique: conscious use of AI tools; Criticism: identification of epistemic errors and "hallucinations"; Ethics: discernment about legitimate use and transparency.	Ethics of authorship and cognitive autonomy: students are responsible for validating and reinterpreting AI-mediated knowledge.	Best practices: cross-disciplinary courses on ethical AI; use of assessment rubrics with digital integrity criteria (Elsevier, 2024b; UFMG, 2023).
Axis 3 – Continuous Institutional Assessment	Monitor the development of critical and ethical skills in teachers and students, promoting continuous improvement.	Creation of critical digital maturity indicators; application of questionnaires, self-assessments, and observation of academic practices; periodic ethical audits.	Technique: safe use of systems; Criticism: reflective assessment of cognitive impacts; Ethics: self-regulation and institutional responsibility.	Ethics of transparency and accountability: the institution becomes jointly responsible for the integrity of the educational process.	Good practices: preparation of digital maturity reports; institutional policies for responsible AI (UNESCO, 2023; OECD, 2023).

Source: The Authors (2025)

The consolidation of this structure requires the development of essential skills, which include: (i) technical competence, related to understanding GenIA's language operations, prediction, and content generation; (ii) critical competence, focused on identifying biases, hallucinations, and epistemological distortions; and (iii) ethical competence, which involves discernment about authorship, integrity, and transparency in knowledge production (Hanafi et al., 2025; Ganguly et al., 2025). Training should be based on principles of continuous and collaborative learning, through workshops, study groups, and experimentation labs, in which participants develop technical skills and moral and reflective sensitivity in the face of the challenges of cognitive automation (Sampaio, Sabbatini & Limongi, 2025; Francis, Jones & Smith, 2025).

As Delios, Tung, and van Witteloostuijn (2025) point out, the ethical integration of GenIA must preserve human protagonism in the formulation of hypotheses, analysis of results, and attribution of meaning, avoiding the complete delegation of scientific rationality to machines. This epistemic stance converges with Floridi's (2020) reflections on the "logic of information," according to which technology should be understood as an extension of human cognition, not as a substitute for critical judgment. Thus, critical digital literacy is also a process of cognitive self-defense, allowing researchers to maintain intellectual authorship and moral responsibility for the knowledge produced.

In addition, the effective implementation of critical digital literacy requires institutional policies and permanent evaluation mechanisms, with objective indicators to monitor its formative impact. Universities should establish interdisciplinary centers for ethics and technology, responsible for monitoring the use of AI in research, publications, and pedagogical practices, ensuring adherence to guidelines for scientific integrity and social responsibility (ANPAD, 2023). The evaluation process should include teacher-student self-assessment tools, measurements of reflective engagement, and indicators of ethical digital competence. In this way, critical digital literacy ceases to be an abstract concept and becomes a practical tool for intellectual emancipation and ethical AI governance, consolidating a teaching and research model capable of combining technological innovation, epistemic justice, and social responsibility.

Risks of Hallucination and Reproduction of Biases

Understanding the risks of hallucination and bias reproduction in GenIA is essential to ensure the ethical, reliable, and epistemologically sound use of these tools in scientific research contexts. The term hallucination in AI does not refer to the intentional invention of data, but to a statistical mechanism of autonomous inference, inherent to the probabilistic nature of language models. These systems do not operate with direct reference to the real world, but based on statistical correlations between words and contexts, generating plausible, though not necessarily true, texts (Bender et al., 2021; Förster & Skop, 2025). This non-referential nature challenges the classic criteria of truthfulness, authorship, and scientific validation, requiring researchers to develop human cognitive and heuristic filters capable of distinguishing linguistic coherence from factual accuracy. The absence of this human mediation can result in serious epistemological errors, distorting interpretations, conclusions, and even scientific policies derived from artificial data (Floridi, 2020; Hanafi et al., 2025).

GenIA hallucinations thus emerge as the product of a linguistic prediction model disconnected from empirical reality, in which the machine "fills in gaps" based on probability patterns. As Förster and Skop (2025) point out, this process is not a moral defect, but a consequence of GenIA's statistical architecture itself. When applied to scientific research, this probabilistic logic can induce confusion between appearance and truth, creating coherent and structured texts that are epistemically empty,which threatens the integrity of the knowledge produced (Bender et al., 2021; Delios, Tung & van Witteloostuijn, 2025). From this perspective, researchers must act as critical mediators, aware that GenIA does not understand the content it produces, operating as an instrumental extension of human language rather than as an autonomous epistemic subject (Floridi, 2022; Feenberg, 2017).

Alongside hallucinations, algorithmic biases represent another central source of epistemic and ethical risk in the use of GenIA. These biases are not isolated h l failures, but sociotechnical reproductions of structural inequalities that permeate data, training logics, and user interactions (Crawford, 2021; Birhane, 2021). It is possible to distinguish at least four main types of bias: data bias, when the model is trained on incomplete, outdated, or demographically skewed samples; representation bias, related to the exclusion of specific social, cultural, and epistemological groups; algorithmic bias, resulting from weightings and parameter adjustments that reinforce preexisting inequalities; and interaction bias, which stems from the influence of instructions and the cognitive profile of the user themselves (Jones, 2025; Narayan, 2025). This typology allows us to understand that bias is not just a technical problem, but a form of epistemic and social injustice, insofar as certain knowledge, identities, and perspectives are systematically marginalized in the text generation process (Birhane, 2021; Crawford, 2021).

Table 9 – Typology of Algorithmic Biases and Mitigation Strategies in Research with GenIA, which organizes and explains the four main types of biases, their causes, effects, implications, and good institutional practices for addressing them, is presented below.

Table 9

Typology of Algorithmic Biases and Mitigation Strategies in Research with GenIA

Type of Algorithmic Bias	Conceptual Definition	Structural Causes	Epistemic and Ethical Implications	Mitigation and Monitoring Criteria	Practical Examples and Institutional Best Practices
1. Data Bias	This occurs when the model is trained with incomplete or outdated databases, or databases that do not adequately represent population and contextual diversity.	Selective data collection; lack of timely updates; geographical or demographic limitations; exclusion of minority languages and cultural contexts.	This generates distortions in the results and compromises scientific validity by reproducing inequalities and rendering certain groups invisible.	Actions: periodic auditing of databases; integration of multilingual and multicultural sources; ethical and inclusive curation.	Example: AI models that underrepresent Amazonian or African contexts; Good practices: open databases with diversity in gender, race, and territory.
2. Representation bias	Refers to the way in which certain identities, cultures, or epistemologies are underrepresented, distorted, or stereotyped in AI outputs.	Hegemonic cultural patterns incorporated into training data; predominance of Eurocentric or technocentric content.	Affects cognitive justice and the plurality of knowledge, reinforcing symbolic hierarchies and epistemic exclusions.	Actions: inclusion of diverse cultural representations; interdisciplinary validation of outputs; use of neutrality and equity parameters.	Example: texts generated with gender or class stereotypes; Good practices: ethical and inclusive language review prior to publication.
3. Algorithmic Bias	This stems from internal considerations and mathematical adjustments made by developers, which can amplify or reproduce pre-existing inequalities.	Biased weight and parameter configurations; prioritization of majority patterns; lack of human supervision in model refinement.	Distorts scientific inferences, compromising objectivity and reinforcing cognitive and social asymmetries.	Actions: continuous human supervision; publication of logs and calibration reports; algorithmic audit protocols.	Example: prioritization of Western or male sources in automatic summaries; Best practices: use of auditable and verifiable models.
4. Interaction Bias	Arises from the instructions provided by the user and their own cognitive, ideological, and cultural profile, which guide the responses generated by AI.	Biased formulation of prompts; unconscious use of cultural assumptions; lack of critical review of the responses generated.	May reinforce interpretive bubbles and reduce the researcher's critical capacity, compromising scientific reflexivity.	Actions: training in critical digital literacy; use of cross-review protocols; encouragement of plurality of perspectives.	Example: prompts that reproduce confirmation biases or political opinions; Good practices: ethical training workshops and collaborative review of results.

Source: The Authors (2025)

To mitigate these risks, it is necessary to adopt practical and pedagogical measures that combine algorithmic literacy, ethical governance, and technical verification. Researchers and students should employ triangulation of sources and cross-validation with indexed databases (Scopus, Web of Science, SciELO), manually checking the references generated by GenIA via DOI, ORCID, and institutional portals (Sampaio, Sabbatini & Limongi, 2025; Rahman et al., 2023). Traceability and hallucination detection tools, such as citation validators, should also be used (Elsevier, 2024c; Yin et al., 2025). Such strategies should be accompanied by a critical review of the discourse generated by GenIA, ensuring that it remains consistent with the scientific method and empirical data of the study (Arar et al., 2025; Francis, Jones & Smith, 2025).

Educational and research institutions, in turn, have a strategic role in preventing these risks and should promote ongoing training in algorithmic literacy and establish internal protocols for auditing AI use. This training should include technical dimensions (understanding prediction and correlation mechanisms), critical dimensions (identifying biases and epistemic limits), and ethical dimensions (self-responsibility in verifying the information generated) (UNESCO, 2023; OECD, 2023). Universities can create digital scientific integrity centers focused on training teachers, students, and reviewers and creating institutional manuals of good practices in GenIA, aligned with international guidelines (UFRGS, 2023; ANPAD, 2023).

From an epistemological point of view, the mitigation of biases and hallucinations should be understood as a process of regaining human cognitive autonomy in the face of language automation. GenIA, as an instrument of symbolic mediation, expands the capacity to process and synthesize information, but does not replace the interpretation, judgment, and moral responsibility of the researcher (Floridi, 2020; Feenberg, 2017). Thus, scientific validation must remain a human act, anchored in empirical confrontation and critical reasoning, and not in mere algorithmic plausibility.

Table 10 – Methodological Framework for Mitigating Hallucinations and Biases in Research with GenIA is presented below, which expands on the initial practical framework, detailing the dimensions of risk, methodological control mechanisms, validation criteria, and institutional roles. This systematization aims to guide researchers, advisors, reviewers, and institutions in the construction of consistent ethical and scientific protocols for the responsible use of GenIA.

Table 10

Methodological Structure for Mitigating Hallucinations and Biases in Research with GenIA

Dimension	Associated Risk	Structural and Epistemic Causes	Practical Mitigation Measures	Validation Criteria and Ethical Monitoring	Institutional and Operational Responsibilities
1. Data (Input and Training)	Sampling bias, exclusion of groups, and contextual distortion.	Homogeneous, outdated, or geographically restricted databases; lack of ethical review in data collection.	Diversify and update training databases; apply ethical and multicultural curation; cross-reference data from multiple sources and historical periods.	Periodic data quality audits; verification of representativeness and demographic balance.	Researchers and ethics reviewers: responsible for validating sources and documenting data selection criteria.
2. Generated Text (Cognitive Output)	Hallucinations, false citations, and fabrication of references.	Predictive generation without factual checking; absence of human validation; excessive dependence on closed models.	Implement double validation of sources; check citations via DOI/ORCID; manually review content based on indexed databases (Scopus, Web of Science).	Use traceability tools (CrossRef, Retraction Watch); include a section declaring the use of AI in the final work.	Students and advisors: responsible for critical review of textual content and verification of sources.
3. Algorithmic Model (Infrastructure)	Reinforcement of structural inequalities and systemic biases.	Non-auditable proprietary algorithms; lack of diversity in training and testing parameters.	Preference for open source and auditable models; consultation of AI ethical policies (Elsevier, SAGE, Springer Nature); recording of versions and configurations used.	Require technical and ethical documentation of models; institutional assessment of the risks of each tool before adoption.	Research institutions and ethics committees: responsible for approving tools and supervising governance standards.
4. Human Interaction (Prompt and Context)	Induction of cognitive, ideological, and cultural biases by the user.	Formulation of prompts with biased assumptions; lack of neutrality and contextualization in interaction.	Develop neutral, culturally sensitive prompts with human review; test multiple interaction scenarios to detect distortions.	Record prompts and responses in a methodological appendix; cross-check among peers to identify formulation biases.	Researchers and scientific editors: responsible for documenting, reviewing, and contextualizing the use of prompts.
5. Training and Algorithmic Literacy	Lack of critical awareness and technical understanding of the risks of AI.	Insufficient training in digital ethics and technology epistemology; absence of pedagogical guidelines on responsible AI.	Create training programs in digital ethics and algorithmic literacy; offer workshops and refresher courses for teachers and students.	Annual assessment of digital maturity; institutional certification of good practices in the ethical use of AI.	Universities, ethics committees, and funding agencies: responsible for promoting continuing education programs.

Source: The Authors (2025)

The implementation of this methodological structure promotes transparency, traceability, and scientific integrity in the use of GenIA, converting ethics into an operational dimension of academic practice. In addition, the adoption of these practices contributes to the construction of an institutional culture of epistemic responsibility**,** in which the use of GenIA does not replace human reasoning, ensuring that the knowledge produced remains true, verifiable, and socially legitimate (Bender et al., 2021; Crawford, 2021).

APPLICATIONS, PERMITTED AND PROHIBITED USES

Responsible Applications in Research

Although GenIA represents an unprecedented advance in supporting academic production, its role needs to be delimited into clear levels of intervention, as suggested by reviewers and supported by recent literature (Delios, Tung & van Witteloostuijn, 2025; Arar et al., 2025). To systematize this delimitation, we propose the following conceptual table, composed of three progressive levels of use, which reflect different degrees of algorithmic autonomy and require different levels of human supervision.

Level 1 – Technical Assistance covers mechanical and non-interpretive tasks, such as grammatical review, spell checking, textual translation, reference formatting, and simple code generation. These applications are ethically acceptable and widely recognized by major scientific publishers (Elsevier, 2024c; Springer Nature, 2024). At this level, GENIA acts as an instrumental support tool, without interfering in the formulation of hypotheses, interpretation of data, or theoretical construction,thus preserving the researcher's epistemological autonomy (Floridi, 2022; Francis, Jones & Smith, 2025).

Level 2 – Heuristic Assistance involves the use of GENIA in processes of idea generation, brainstorming, argument organization, and identification of thematic gaps or emerging topics. Although this form of support can boost creativity and the mapping of scientific trends, it requires critical and reflective use, as GENIA has no semantic awareness, operating only on probabilistic language patterns (Bender et al., 2021; Crawford, 2021). The researcher, therefore, must maintain control over the cognitive decision-making process and ensure that all conceptual or interpretive formulations are the result of informed human judgment, avoiding epistemic dependence on algorithmic suggestions (Feenberg, 2017; Floridi, 2020).

Level 3 – Cognitive Assistance corresponds to the use of GENIA in tasks of theoretical synthesis, hypothesis formulation, data analysis, and interpretation of results. This level requires strict supervision, explicit declaration of use, and full human validation, as guided by UNESCO (2025b) and ANPAD (2023). The use of this type of support is only permissible when the researcher maintains complete control over the methodological process, recognizing GENIA as an auxiliary tool and not as a co-author. The ethical boundary here is tenuous: any delegation of theoretical decision-making to the machine constitutes a violation of scientific integrity and compromises the epistemological validity of the knowledge produced (Tang, Cooper & Nielsen, 2024; Resnik & Hosseini, 2025).

Next, Table 11 – Methodological Structure of GenIA Assistance Levels in Scientific Research details each level according to six methodological dimensions: conceptual definition, purpose and scope, examples of applications, ethical risks and limits, human supervision mechanisms, and recommended methodological approaches (qualitative, quantitative, and mixed). This structure aims to guide researchers, advisors, and institutions in the ethical, transparent, and responsible implementation of GenIA in academic production.

Table 11

Methodological Structure of GenIA Assistance Levels in Scientific Research

Level of Assistance	Conceptual Definition	Purpose and Scope of Use	Examples of Practical Applications	Risks and Ethical Limits	Human Oversight and Recommended Methodological Approaches
Level 1 – Technical Assistance	Use of GenIA as an instrumental tool for mechanical, non-interpretive tasks with no epistemic impact.	Support operational efficiency without interfering with scientific reasoning or theoretical formulation.	Spelling and grammar review; textual translation; formatting of references; style standardization; generation of simple codes.	Low ethical risk: use widely permitted by publishers; residual risks of omission in the declaration of use.	Light supervision: final manual review to avoid technical errors; applicable to any type of research (qualitative, quantitative, or mixed). Sources: Elsevier (2024c); Springer Nature (2024); Floridi (2022).
Level 2 – Heuristic Assistance	Use of GenIA to support scientific ideation, argument structuring, and identification of gaps or thematic trends.	Stimulate creative thinking and mapping of emerging topics without replacing human interpretation.	Brainstorming hypotheses; organizing ideas; preliminary synthesis of reviews; assistance in defining research problems.	Moderate risk: cognitive dependence and possible loss of interpretive authorship.	Active supervision: critical review of generated suggestions; reflection on conceptual coherence. Applications: qualitative (theoretical exploration) and mixed (conceptual triangulation). Sources: Bender et al. (2021); Crawford (2021); Feenberg (2017); Floridi (2020).
Level 3 – Cognitive Assistance	Use of GenIA in processes of theoretical synthesis, hypothesis formulation, statistical analysis, and interpretation of results.	Support the preparation and interpretation of data, provided that it is under full human control and with explicit declaration.	Generation of descriptive analyses; assistance in complex bibliographic synthesis; support in exploratory statistical models.	High risk: undue delegation of intellectual authorship; inferential error; production of unverifiable results.	Strict supervision and full human validation; requirement for formal declaration of use in the article. Applicable with caution in quantitative and mixed approaches. Sources: UNESCO (2025b); ANPAD (2023); Tang, Cooper & Nielsen (2024); Resnik & Hosseini (2025).

Source: The Authors (2025)

The articulation between these levels and methodological approaches is essential to ensure the practical applicability of the guide. In qualitative research, GenIA can support initial data coding and category grouping, provided that the final interpretation remains hermeneutic and human, ensuring theoretical consistency and respect for the subjectivity of participants (Hanafi, Al-Mansi & Al-Sharif, 2025). In quantitative research, its use may include the generation of descriptive analyses and auxiliary calculations, but always with subsequent manual verification, avoiding inferential errors or biased statistical interpretations (Leong et al., 2025; Rahman et al., 2023). In mixed approaches, GenIA can contribute to data triangulation and the visualization of complex patterns, provided that the researcher explicitly states the nature of the algorithmic intervention and validates the results with independent empirical evidence (Tingelhoff, Brugger & Leimeister, 2025; Ganguly et al., 2025).

The ethical application of GenIA in research also requires the incorporation of good editorial practices and transparency, as guided by major publishing houses and international organizations. Policies such as those of

Elsevier (2024a), SAGE (2023a), and Taylor & Francis (n.d.) reinforce that the use of GenIA must always be declared in methodological or acknowledgment sections, ensuring traceability and academic honesty. Failure to declare its use may constitute ethical misconduct and compromise the credibility of scientific work (BaHammam, 2025; Linder, Nepogodiev & GAIT 2024 Collaborative Group, 2025). This transparency is therefore an institutional requirement, as well as an epistemological principle that protects the integrity of authorship and the legitimacy of the knowledge produced (Barthes, 2004; Foucault, 1969).

From an epistemological perspective, the responsible integration of GenIA into scientific research redefines the role of the researcher as a cognitive curator,a subject who mediates the dialogue between machine and knowledge, filtering, interpreting, and attributing meaning to the material generated. This relationship requires ontological discernment: GenIA operates through linguistic prediction, while the researcher operates through understanding. Thus, GenIA does not replace critical thinking, but rather expands it when used responsibly and with methodological awareness (Floridi, 2020; Feenberg, 2017). The real challenge, therefore, is not to limit technology, but to educate the cognizant subject to use it ethically, preserving the reflective, interpretive, and human character of science.

Prohibited or Disadvised Uses

The misuse of GenIA in scientific research compromises the essence of knowledge production and breaks the epistemic link between the subject and the object of investigation. Delegating the creation, analysis, or interpretation entirely to GenIA implies renouncing cognitive authorship and compromising the epistemic reliability of the results, reducing research to an automated product devoid of reflection (Floridi, 2022; Feenberg, 2017). Thus, prohibitions on the use of GenIA do not stem from a technophobic stance, but from the need to preserve the intellectual integrity and human character of scientific construction.

The severity of violations associated with the misuse of GenIA can be classified into hierarchical levels, considering the intentionality and impact on scientific integrity. Serious violations include data falsification, the generation of complete texts by GenIA without human supervision, the creation of non-existent references, and the complete delegation of authorship. Such practices constitute scientific misconduct and violate fundamental principles of honesty, transparency, and responsibility, and are subject to severe institutional sanctions (Bouter et al., 2022; Resnik & Hosseini, 2025). Moderate infractions, such as the partial use of GenIA in analytical sections without explicit declaration, the absence of institutional authorization, or the omission of tools used, compromise traceability and confidence in the results (Elsevier, 2024a; UFRGS, 2023). Minor violations, usually associated with unintentional or pedagogical use of GenIA due to initial ignorance, should be addressed in an educational manner, through guidance and training, reinforcing the formative role of ethics in research (UNESCO, 2023; ANPAD, 2023).

The distinction between prohibited and discouraged uses is essential to guide appropriate conduct. Prohibited uses are those that directly violate scientific integrity, confidentiality, or human authorship,such as generating false empirical results, submitting texts produced entirely by GenIA, or delegating the writing of reviews and critical analyses to automated systems

(Dergaa et al., 2023; Mijwil et al., 2023). These practices constitute fraud or misconduct and should be treated as serious offenses. Discouraged uses, on the other hand, refer to practices that, although not constituting direct violations, compromise methodological quality and interpretive reliability, such as using GenIA to synthesize results without critical review, translating technical texts without expert supervision, or writing automatic abstracts without human validation (Cheng, Calhoun & Reedy, 2025; Francis, Jones & Smith, 2025). This differentiation makes the guide more applicable and fair by offering proportional parameters for evaluation and correction.

Table 12 – Classification Structure for Ethical and Epistemic Violations in the Misuse of GenIA is presented below**,** organizing the levels of severity, types of infractions, scientific and institutional impacts, response measures, and agents responsible for preventing and handling cases.

Table 12

Classification Structure for Ethical and Epistemic Violations in the Misuse of GenIA

Level of Severity	Type of Infraction	Examples of Associated Conduct	Scientific and Epistemic Impacts	Response Measures and Sanctions	Responsible Agents and Preventive Strategies
Serious	Scientific misconduct and intellectual fraud.	Falsification or fabrication of data; generation of complete texts by GenIA without human review; creation of non-existent references; submission of articles produced entirely by AI; delegation of authorship.	Compromises scientific integrity; destroys the reliability of research; violates principles of honesty, traceability, and authorship.	Opening of an ethical investigation; annulment of publications; suspension of academic rights; communication to the institution and funding agencies.	Ethics committees and educational institutions should adopt explicit prohibition policies, detection systems, and training programs in scientific integrity (Bouter et al., 2022; Resnik & Hosseini, 2025).
Moderate	Undeclared use or omission of GenIA tools.	Use of GenIA in analyses or partial writing without declaration; absence of institutional authorization; omission of the tool used or the version of the model.	Reduces traceability and methodological transparency; creates uncertainty about the origin of results; weakens institutional trust.	Issuance of a formal warning; request for retraction or correction; supervised review of the work; mandatory registration of a declaration of use.	Advisors, reviewers, and editorial committees should require explicit declarations of use and promote workshops on epistemic transparency (Elsevier, 2024a; UFRGS, 2023).
Minor	Unintentional misuse of a pedagogical nature.	Use of GenIA for translation or summarization without supervision; use of AI in teaching activities without declaration; error due to ignorance of the rules.	Impact limited to form and textual coherence; does not imply fraud, but reveals a deficit in ethical and digital literacy.	Educational action: formal guidance, participation in ethical training, and corrective statement in an attached document.	Teachers and course coordinators must include mandatory training in digital ethics and ethical use of AI policy (UNESCO, 2023; ANPAD, 2023).
Prohibited Uses	Direct violation of scientific integrity.	Generation of false empirical results; submission of fully automated articles and research; writing of opinions or critical analyses by AI; use for manipulation of confidential data.	Fraud and misinformation; breach of human and journal authorship and confidentiality; damage to institutional reputation.	Disciplinary sanctions; exclusion from research databases; reporting to national integrity committees.	Research institutions and publishers should provide for explicit penalties and automated tracking systems (Dergaa et al., 2023; Mijwil et al., 2023).
Discouraged Uses	Compromise of methodological and interpretative quality.	Use of GenIA for automatic synthesis of results; translation of technical texts without review; preparation of abstracts or conclusions without human validation.	Reduced conceptual consistency and accuracy; increased risk of errors and biased interpretations.	Mandatory review and manual validation; recommendation for supervised rewriting; ethical review annotation in the final report.	Advisors and evaluators must ensure that GenIA is used only as a support, with explicit mention of the human role in the process (Cheng, Calhoun & Reedy, 2025; Francis, Jones & Smith, 2025).

Source: The Authors (2025)

In addition to the conceptual distinction, it is essential to establish preventive and protective mechanisms to safeguard the integrity of the research. The submission of confidential texts, unpublished research data, or opinions to GenIA systems should be expressly prohibited, given the possibility of improper storage and use of such content for model training, which constitutes a violation of confidentiality and the General Data Protection Law (LGPD, 2018; Law No. 12,965/2014). The use of GenIA, when permitted, should be restricted to minor linguistic functions, such as textual revision, translation, or standardization of references, and always with confidential registration and an explicit statement of use (Elsevier, 2024b; SAGE Publishing, 2023a).

This approach protects scientific integrity and reinforces the pedagogical dimension of ethics in the training of researchers. Integrity, in this context, transcends compliance with norms and takes on epistemological value: it preserves authorship as a space for reflection and responsibility (Floridi & Cowls, 2022; Foucault, 1969). Thus, the use of GenIA must be constantly mediated by critical awareness and institutional supervision, articulating technological development with ethical prudence (Ryan & Stahl, 2021; UNESCO, 2025b). Researchers are therefore called upon to exercise active vigilance over their practices, understanding that ethics is not only an external limitation but also the very guarantee of the legitimacy of scientific knowledge.

Thus, it is proposed that each teaching and research institution adopt an ethical and pedagogical matrix of scientific integrity, which includes the hierarchical classification of infractions, the distinction between prohibited and inadvisable uses, and the creation of proportional prevention, recording, and sanctioning mechanisms. This framework should be accompanied by educational and training activities focused on digital literacy, the epistemology of authorship, and algorithmic responsibility (Sampaio, Sabbatini & Limongi, 2025; Mikroyannidis et al., 2025).

GUIDELINES FOR CURRICULUM COMPONENTS AND FINAL COURSE PROJECTS (TCC)

In the Classroom

For the use of AI in the classroom to be formative and ethical, we propose the adoption of three pedagogical levels of integration, aligned with international guidelines for good practice (UNESCO, 2025a; Mikroyannidis et al., 2025). At Level 1 – Informative Use, AI is treated as an object of study: students critically analyze the responses generated, discuss errors, biases, and ethical implications, exercising critical thinking and discernment skills. At Level 2 – Instrumental Use, AI is used as a controlled support tool,for example, for linguistic review, translation, structuring ideas, or organizing references,always under teacher supervision and with the requirement of an explicit declaration of use (Elsevier, 2024a; ANPAD, 2023). Level 3 – Integrative Use allows for active interaction between the student and AI in practical activities, such as simulations, problem solving, and supervised ethical experiments. This level is only permissible when there is continuous monitoring by the teacher and clearly defined educational objectives (UNESCO, 2023; Francis, Jones & Smith, 2025).

In this context, Table 13 – Methodological Structure of Pedagogical Levels of AI Integration in the Educational Context, is an essential methodological tool that allows for the grading of the degree of technological autonomy, the type of interaction with students, and the level of teacher responsibility. Table 13 below systematizes these levels, articulating dimensions such as pedagogical purpose, practical examples, ethical risks, and forms of supervision.

Table 13

Methodological Structure of Pedagogical Levels of AI Integration in the Educational Context

Level of Integration	Definition and Pedagogical Purpose	Examples of Classroom Applications	Skills Developed	Risks and Ethical Considerations	Forms of Teacher Supervision and Evaluation
Level 1 – Informative Use	AI is an object of study and not an active tool. The focus is on understanding how AI generates responses, recognizing biases, errors, and ethical implications.	Critical discussion of AI responses; analysis of algorithmic biases; exercises comparing human and AI outputs; debates on social impacts.	Critical thinking; digital ethics; epistemic discernment; capacity for analysis and argumentation.	Risk of uncritical interpretation of responses; reproduction of hidden biases; unreflective informational dependence.	The teacher acts as a reflective mediator, conducting critical analyses and assessing the student's ability to argue based on evidence (UNESCO, 2025a; Mikroyannidis et al., 2025).
Level 2 – Instrumental Use	AI is a controlled support tool, used in technical tasks under teacher supervision, with mandatory explicit declaration of use.	Grammar and spelling review; text translation; reference formatting; generation of initial ideas or concept maps.	Digital literacy; operational autonomy; research ethics; transparency in technological use.	Risk of misuse or undeclared use; excessive dependence on AI for basic tasks; partial loss of authorship.	The teacher reviews all outputs produced, requires a declaration of use, and provides guidance on ethical and technical limits (Elsevier, 2024a; ANPAD, 2023).
Level 3 – Integrative Use	AI is a supervised cognitive partner, used in practical activities, simulations, or ethical experiments involving critical dialogue and decision-making.	Scientific simulations; analysis of ethical cases; complex problem solving; reflective co-authoring experiments with supervised AI.	Applied creativity; ethical and systemic thinking; problem solving; human-machine collaboration.	Risk of excessive delegation of decisions to AI; dilution of intellectual authorship; confusion between algorithmic suggestion and human reasoning.	The teacher continuously supervises interactions, defines formative criteria, and applies reflective assessments on the use of AI (UNESCO, 2023; Francis, Jones & Smith, 2025).

Source: The Authors (2025)

Thus, the three pedagogical levels described here delimit the acceptable and ethical use of AI in the classroom and promote an education focused on digital responsibility, transparency, and the integral development of critical thinking, preparing students to consciously deal with emerging technologies in the academic and professional environment.

To ensure institutional consistency, it is recommended that each teaching plan explicitly state the permitted level of GenIA use, the type of task in which it can be employed, and the forms of monitoring provided for. The document must be reviewed and approved by the course committee, ensuring alignment with the university's ethical policies and codes of scientific integrity (UFSC, 2024; UFMG, 2023). This formalization transforms the responsible use of GenIA from an individual decision into an institutionalized and auditable practice, reinforcing pedagogical security and equity among students (McDonald et al., 2025; Rana, 2025).

The permitted use of AI in the classroom should be restricted to activities that stimulate critical learning and maintain human authorship. Examples of good practices include using AI to review one's own texts, organize initial project ideas, compare theoretical approaches, identify gaps in literature reviews, or simulate qualitative research interviews. These practices promote digital literacy and contribute to the development of cognitive and communication skills (Hanafi, Al-Mansi & Al-Sharif, 2025; Chinoracky & Stalmasekova, 2025). On the other hand, the following behaviors are discouraged or not allowed: using AI to write complete papers, generate automatic responses in assessments, fabricate research data, produce abstracts without critical reading, or translate technical texts without human supervision. Such practices violate the principles of authorship and academic integrity and may constitute automated plagiarism, subject to institutional sanctions (Dergaa et al., 2023; Mijwil et al., 2023).

According to Hanafi, Al-Mansi & Al-Sharif (2025) **and** Chinoracky & Stalmasekova (2025), the ethical use of AI in the classroom should encourage reflection, creativity, and analytical skills, functioning as an extension of human cognitive abilities,not as a replacement for them. However, when used improperly, AI can lead to passive cognitive automation**,** content fabrication, and copyright infringement, constituting conduct incompatible with academic ethics (Dergaa et al., 2023; Mijwil et al., 2023).

To distinguish legitimate practices from inappropriate ones, Table 14 – Methodological Structure for the Ethical and Educational Use of Artificial Intelligence in the Classroom summarizes, in a methodological way, the boundaries between permitted, discouraged, and prohibited uses of AI in the classroom, integrating pedagogical purposes, practical examples, developed skills, ethical risks, and teacher supervision strategies.

Table 14

Methodological Structure for the Ethical and Formative Use of Artificial Intelligence in the Classroom

Category of Use	Definition and Pedagogical Purpose	Examples of Practical Applications	Skills Developed	Risks and Discouraged Conduct	Forms of Supervision and Teacher Responsibility
Permitted Use (Ethical and Educational)	AI is used as a complementary tool, intended to improve academic production, the organization of ideas, and critical analysis, without replacing human reasoning.	Revision and improvement of one's own texts; organization of project ideas; comparison of theories; identification of gaps in reviews; simulations of qualitative interviews.	Critical digital literacy; analytical skills; scientific communication; cognitive autonomy; reflective ethics.	Low ethical risk,requires transparency of use and continuous human review.	Active supervision: the teacher guides the process, requests a record of use, and promotes critical reflection on the role of AI in learning (Hanafi, Al-Mansi & Al-Sharif, 2025; Chinoracky & Stalmasekova, 2025).
Use Not Recommended (Moderate Risk)	AI is used to partially automate learning tasks, compromising reflection and conceptual mastery, although without constituting direct fraud.	Translation of technical texts without supervision; automatic summarization; organization of work without critical reading; generation of answers to discursive questions without validation.	Instrumental literacy; assisted reasoning, but with increasing cognitive dependence.	Risk of superficiality and epistemic distortion; weakening of authorship and theoretical understanding.	Corrective supervision: teachers should warn about the risks and require critical reformulation of the content produced (Elsevier, 2024a; ANPAD, 2023).
Prohibited Use (Unethical Conduct)	AI is used to completely replace human authorship , generate false content, or automate assessments, constituting plagiarism and academic misconduct.	Writing complete papers; generating non-existent data; automatic translation of specialized texts; automatic answers on tests; submission of texts generated entirely by AI.	No legitimate skills are developed; total loss of authorship and autonomy.	Academic fraud, automated plagiarism, breach of scientific integrity, and violation of the principles of intellectual honesty.	Disciplinary action: failure of the activity, opening of an ethical investigation, and referral to the coordination or integrity committee (Dergaa et al., 2023; Mijwil et al., 2023).

Source: The Authors (2025)

Table 14 proposes a pedagogical model for ethical governance of AI use, based on gradual criteria of responsibility and intentionality. Permitted use reinforces student leadership and promotes the development of cognitive and communication skills, while discouraged use requires teacher supervision and critical training. Prohibited use, on the other hand, represents a serious ethical violation, the prevention of which should be an institutional priority.

In academic assessments, the use of GenIA must be transparent and declared. All work involving GenIA must include a section acknowledging the type and extent of use, as guided by international editorial policies (Tang et al., 2024; Elsevier, 2024b). Faculty members, in turn, must specify in the evaluation criteria which stages of the process,such as bibliographic research, textual revision, or argument structuring,can rely on AI assistance and which require full authorship. Failure to comply with these rules constitutes a violation of academic integrity and may result in penalties in accordance with institutional codes (UNESCO, 2025b; UFSC, 2024).

Ethical and critical training in AI requires more than just rules: it requires reflective experience. In this sense, teachers should incorporate pedagogical strategies into their practice, such as mediated debates on real ethical dilemmas, case studies on automated plagiarism and algorithmic biases, and digital ethics laboratories, in which students can simulate decisions in complex situations of shared authorship and source verification (Sampaio, Sabbatini & Limongi, 2025; Floridi & Cowls, 2022). These methodologies transform learning about GenIA into an ethical and epistemological experience, helping students understand the cognitive and moral impact of technology on scientific and social knowledge (Birhane, 2021; Ryan & Stahl, 2021).

Thus, the responsible use of GenIA in the classroom should be directly linked to the development of skills for Education 5.0 and the Sustainable Development Goals (SDGs 4 and 9), which aim at quality education and ethical innovation (OECD, 2023; UNESCO, 2025a). Students are expected to develop the following fundamental skills: critical and ethical thinking in relation to technology; digital and algorithmic literacy for responsible decision-making; human-machine collaboration in research and innovation contexts; and socio-environmental awareness of technological impact. In this way, teachers become not only transmitters of content, but also epistemological curators, responsible for ensuring that GenIA is used as a tool for expanding human thought,and not as a substitute for the critical intelligence that underpins the essence of education and science.

In the Final Course Project (TCC)

In times of algorithmic mediation, academic authorship should be understood not as simple textual writing, but as a cognitive and interpretive process in which students demonstrate critical judgment, independent reflection, and epistemological responsibility for the knowledge they produce. According to Becher and Trowler (2001), authorship stems from the subject's immersion in "academic tribes" and their own ways of producing and validating knowledge. Steneck (2003) emphasizes that the research y is the ethical and intellectual guarantor of scientific integrity, and not strictly an executor of techniques. From this perspective, GenIA can act as instrumental support, but never as a co-author or substitute for human deliberation. UNESCO (2025b) reinforces this principle by emphasizing that the ethical use of AI in education and research must always preserve the agency and moral responsibility of the human author. Thus, the student remains the cognitive and ethical center of the process, with GenIA being only a tool for amplifying, and never replacing, authorial reasoning.

To operationalize the concept of full authorship, we propose classifying the permitted uses of GenIA into three levels of auxiliary support in course completion work, each with different degrees of ethical risk and supervision requirements (Delios, Tung & van Witteloostuijn, 2025; Sampaio, Sabbatini & Limongi, 2025). Technical support refers to the use of GenIA for mechanical tasks, such as grammatical correction, preliminary translation, and formatting of references according to ABNT or APA standards,always with an explicit statement of use and subsequent human review (Elsevier, 2024a; ANPAD, 2023). Methodological support covers suggestions for textual structure, analysis scripts, or chapter organization, which should be discussed and validated with the advisor to ensure theoretical and methodological consistency (Tingelhoff, Brugger & Leimeister, 2025; Rahman et al., 2023). Heuristic support includes the use of GenIA in the initial phase of the project for brainstorming ideas, exploratory search for references, and development of research questions, provided that the sources are verified in reliable scientific databases (Hanafi, Al-Mansi & Al-Sharif, 2025; Ganguly et al., 2025). These three levels allow students to use AI as a complementary and legitimate resource, provided that it is done transparently, ethically, and validated by academic guidance.

On the other hand, uses that involve the replacement of intellectual authorship or cognitive falsification, such as the complete writing of chapters, automatic generation of empirical results, interpretation of data, or formulation of hypotheses and conclusions, are prohibited. These practices violate the principle of human authorship and scientific integrity, constituting academic misconduct (Lund et al., 2023; Bouter et al., 2022). Similarly, it is not permitted to use AI to create non-existent citations, simulate statistical analyses, or produce content without critical reading and methodological validation (Dergaa et al., 2023; Mijwil et al., 2023). Thus, the ethical use of AI must be delimited by clear boundaries between linguistic assistance and intellectual authorship, the latter being irreducibly human (Floridi, 2022; Foucault, 1969).

Transparency is a pillar of scientific integrity and should guide the process of advising and evaluating the final course project. We recommend implementing an Ethical Monitoring Protocol, consisting of three successive steps: (1) an initial statement of intended use, signed by the student and advisor, detailing the type of tool and its purpose; (2) a periodic record of actual use, incorporated into the guidance reports, containing evidence of the prompts and versions used; and (3) a final statement of use, attached to the final project, clearly stating the tools applied and the extent of their use (Tang et al., 2024; Springer Nature, 2024). This protocol, inspired by international editorial practices, promotes traceability, auditability, and reinforces institutional trust in the research process (Yin et al., 2025; Ganjavi et al., 2024).

According to Tang et al. (2024) and Springer Nature (2024**)**, the absence of formal documentation on the use of AI in the research stages compromises institutional trust and authorial authenticity. To address this challenge, Table 16 – Methodological Structure of the Ethical Monitoring Protocol (PAE) for the Use of GenIA in TCC is proposed, consisting of three coordinated stages , initial declaration of intended use**,** periodic record of actual use, and final declaration of use. This model, inspired by international editorial and scientific integrity practices (Yin et al., 2025; Ganjavi et al., 2024), aims to strengthen academic responsibility and epistemic transparency**,** allowing for subsequent auditing without compromising pedagogical autonomy.

Table 15

Methodological Structure of the Ethical Monitoring Protocol (PAE) for the Use of GenIA in TCC

Protocol Stage	Description and Ethical Objective	Required Content and Information	Directly Responsible Parties	Ethical Risks and Prevention Mechanisms	Recording and Verification Tools
1. Initial Statement of Intended Use	Formalizes the intention to use GenIA, specifying tools, purposes, and ethical limits. Ensures that the student and advisor understand the boundaries between technical support and authorship.	Identification of the tool (e.g., ChatGPT, Copilot, Gemini); version and technical parameters; purpose (linguistic, methodological, or heuristic support); planned level of supervision; joint responsibility signature.	Student and advisor (with approval from the course coordinator).	Risk of misuse or undeclared use; mitigated by the requirement for formal prior authorization and clarity about pedagogical purposes.	Declaration of Intended Use (DIU), digitally recorded and filed in the student's folder.
2. Periodic Record of Actual Use	Documents the actual use of GenIA throughout the development of the final course project, promoting continuous traceability and avoiding discrepancies between plan and execution.	Bimonthly or semiannual reports containing a description of activities performed with GenIA, examples of prompts used, tool versions, time of use, and validation by the advisor.	Student (responsible for recording) and advisor (responsible for validation).	Risk of underreporting or manipulation of records; mitigated by monitoring in formal meetings and consistency checks in reports.	Ethical Monitoring Report (RAE) incorporated into the guidance documents and filed with the course secretariat.
3. Final Declaration of Use	Consolidates the ethical history of GenIA use, transparently reporting the type and extent of use. Must be attached to the final course project and signed by both parties involved.	Final summary of tools and functions used; pedagogical justification for use; description of AI contributions; declaration of full human review and validation; evidence attachments (when applicable).	Student and advisor (with the knowledge of the evaluation committee and coordination).	Risk of inconsistency between report and practice; mitigated by cross-analysis between final project, reports, and version metadata.	Final Declaration of Use (DFU), attached to the final project and recorded in the defense minutes.

Source: The Authors (2025)

The implementation of this protocol ensures standardization, ethics, and verifiability in the use of GenIA during the production of final course projects, allowing the guidance process to evolve into a transparent, auditable, and pedagogical practice. In addition to formal statements, the guidance process should include moments of ethical and epistemological reflection on the use of GenIA.

The final course project should be conceived as a space for critical training, in which students recognize the implications of using generative systems for the production of knowledge. It is suggested that each paper include a subitem entitled "Ethical Reflections on the Use of GenIA," in which the student describes the limits of their interaction with the technology, evaluates the reliability of the information obtained, and discusses the role of GenIA in the construction of scientific reasoning (UNESCO, 2025a; Francis, Jones & Smith, 2025). This practice shifts the focus from punishment to an educational and formative approach, promoting the development of ethical awareness and intellectual autonomy (Birhane, 2021; Ryan & Stahl, 2021).

In order to ensure uniformity and evaluative fairness, it is recommended that Table 17 – Methodological Structure of the Ethical Compliance Checklist for the Use of GenIA in Course Completion Papers be adopted as an Ethical Compliance Checklist by examination boards and advisors. This instrument should verify: (1) the existence of a declaration of use of GenIA; (2) consistency between the reported use and the scope of the work; (3) evidence of human reasoning and personal interpretation; and (4) textual originality and authenticity, as measured by institutional verification tools (SemeAd, 2025; UFSC, 2024). This checklist can prevent arbitrariness and strengthen a culture of integrity and scientific responsibility (Radanliev, 2025; Resnik & Hosseini, 2025).

Table 16

Methodological Structure of the Ethical Compliance Checklist for the Use of GenIA in Final Course Projects

Dimension Evaluated	Description and Ethical-Academic Objective	Specific Verification Criteria	Expected Evidence	Identified Ethical Risks	Corrective Actions and Forms of Supervision
1. GenIA Use Statement	Ensures transparency and traceability, certifying that the student has formally declared the use of GenIA and specified its purpose.	Existence of initial and final declaration forms; specification of the tool, version, parameters, and purpose of use.	Documents attached to the final project; signatures of the student and advisor; institutional record.	Omission or generic declaration of use; absence of detailed technical information.	Request for additional documentation; record in the minutes; reassessment of the declaration before the defense.
2. Consistency between reported use and scope of work	Assesses whether the use of AI is proportional and relevant to the objectives of the study, without interfering with scientific authorship.	Compatibility between GenIA's functions and the stages of the final course project (technical, methodological, or heuristic support).	Consistency between the methodology described and the practices declared; explicit mention in the methodology section.	Excessive or improper use of AI in interpretive stages; distortion of the original scope.	Review by the advisor; issuance of a methodological compliance opinion; recommendation of adjustments to the final report.
3. Evidence of Human Reasoning and Interpretation	Ensures that the text demonstrates cognitive autonomy, critical thinking, and human judgment, preserving full authorship.	Presence of own argumentation, data interpretation, theoretical reflection, and analytical consistency.	Sections of analysis and discussion with evident authorship; logical and semantic consistency that is not automated.	Risk of cognitive passivity or dependence on AI for argumentative formulation.	Review by the board; feedback with requirement for rewriting; complementary guidance on ethics and authorship.
4. Originality and Textual Authenticity	Verifies that the work maintains authenticity and originality, respecting copyright and avoiding automated plagiarism.	Use of institutional software (Turnitin, CopySpider, GPTZero, among others); qualitative analysis of sections.	Institutional similarity report; textual authenticity attachment; advisor and panel opinion.	Risk of plagiarized, fabricated, or entirely AI-generated content; falsification of citations.	Opening of an ethical investigation; rejection of the work; additional training on academic integrity.

Source: The Authors (2025)

The adoption of this Ethical Compliance Checklist ensures that the TCC evaluation process transcends simple formal verification, incorporating ethical, epistemic, and formative dimensions**.** By allowing advisors and evaluators to identify indicators of integrity, authenticity, and cognitive authorship, the tool strengthens institutional trust and promotes a culture of ethics applied to research**.**

The ethical use of GenIA in the preparation of the TCC must balance technological innovation and epistemological responsibility. Students can use GenIA to improve linguistic clarity, organize ideas, or optimize technical tasks, but they must maintain complete control over their thinking, argumentation, and interpretation. Conscious use of GenIA transforms the final course project into an exercise in cognitive maturity, in which technology does not replace reasoning but expands the human capacity to reflect, create, and learn. Thus, as proposed by Floridi and Cowls (2022) and UNESCO (2025b), ethics in the use of artificial intelligence is not limited to a rule of conduct, but a practice of academic citizenship,which recognizes human authorship as the true foundation of scientific knowledge.

POSITIONING OF SCIENTIFIC PUBLISHERS ON THE USE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN SCIENTIFIC RESEARCH

The adoption of GenAI tools by scientific publishers has led to a profound reconfiguration of editorial practices, requiring a balance between technological innovation and the preservation of the epistemic integrity of science. Major international publishers,Elsevier, Emerald Publishing, Springer Nature, Taylor & Francis, SAGE Publishing, Wiley, Oxford University Press, and Yale University Press,have developed convergent policies that recognize the instrumental potential of GenAI, but also impose strict limits on authorship, transparency, and the ethical responsibility of researchers. These guidelines are based on the principle that GenIA can be used as an auxiliary tool,never as an author,and that its use must be explicitly declared, ensuring traceability and compliance with ethical publishing standards (Elsevier, 2024; SAGE Publishing, 2023).

Elsevier (2024) has established one of the most structured policies, defining that GenIA can be used for linguistic review, translation, and support in organizing ideas, provided that the author clearly declares the tool, version, and type of use in the manuscript. The publisher expressly prohibits AI from producing original scientific content, analyzing data, or generating empirical results, reinforcing that authorship is exclusively human. In addition, Elsevier instructs reviewers and editors to identify traces of textual automation in order to protect the integrity and originality of scientific knowledge. This policy reflects a commitment to the Responsible AI Principles, which promote transparency, accountability, and ethical governance in editorial processes (Elsevier, 2024).

Emerald Publishing (2023), in turn, takes a similar position, emphasizing that AI can be used to improve the style and clarity of writing, but should not interfere with theoretical construction, hypothesis formulation, or interpretation of results. The publisher recommends that any use of GenIA be accompanied by an explicit statement in the text or acknowledgments, informing how the tool contributed to the process. In addition, Emerald warns that misuse,such as generating text excerpts without critical review or omitting the tool used,may constitute ethical misconduct. This position is anchored in a relational ethic that considers AI as a support tool and not as an epistemic subject, reaffirming the need for human autonomy and discernment in the research process (Emerald Publishing, 2023; Oxford University Press, n.d.).

Springer Nature (2024) sets particularly strict guidelines, stating that GenIA cannot be listed as a co-author and that the author is fully responsible for any content produced with its assistance. The publisher authorizes the use of AI only for technical support tasks,such as grammar correction, generation of non-substantive illustrative images, or translation of excerpts,and prohibits its use in analytical, methodological, or interpretive parts of the text. Springer also requires a formal and detailed statement of AI use, including the name of the tool and its exact function, as well as ethical consent from the advisor or institution when applicable. This policy reaffirms the publisher's commitment to scientific traceability and methodolog y of knowledge (Springer Nature, 2024; Taylor & Francis, n.d.).

Taylor & Francis (n.d.) takes a conciliatory stance, allowing the use of AI for linguistic support and formatting, provided that the researcher maintains full control over the review and interpretation of the content. The publisher emphasizes that authors must transparently disclose any use of AI, whether in writing, translation, or image generation, and that misuse may result in article retraction or disciplinary action. In addition, Taylor & Francis' policy introduces the concept of "accountable authorship," in which the author must ensure that every part of the manuscript has been verified and understood by a human, ensuring shared responsibility and epistemological authenticity (Taylor & Francis, n.d.; Wiley, n.d.).

SAGE Publishing (2023) emphasizes that AI cannot be used to replace human judgment, critical analysis, or academic creativity. Its use is permitted only to improve the clarity and coherence of the text, and always under the condition of explicit declaration and human validation. The publisher prohibits the use of AI to generate data, references, or sections of analysis, recognizing that such practices compromise scientific integrity and violate the principle of human authorship. In addition, SAGE encourages the development of local institutional policies that promote ethical education about AI, in order to enable researchers and reviewers to identify and manage algorithmic risks in the scientific process (SAGE Publishing, 2023; Wiley, n.d.).

Wiley (n.d.) and Oxford University Press (n.d.) share a similar position, determining that GenIA can be employed in instrumental functions, but that full responsibility for published content remains with the human author. Both publishers require public disclosure of use and recommend storing logs or histories of interaction with AI for auditing and traceability purposes. Oxford, in particular, warns that the use of AI should not alter the argumentative style, theoretical coherence, or substantive content of the research, reiterating that scientific writing is, above all, an interpretive and moral act (Oxford University Press, n.d.; Yale University Press, 2024).

Finally, Yale University Press (2024) takes a normative and pedagogical approach, encouraging ethical reflection on the use of AI in the research and writing stages. Its guideline recognizes that AI can facilitate efficiency and technical review, but reinforces that any application must be properly documented and critically interpreted. Yale points out that undeclared or irresponsible use of AI may constitute a breach of integrity, and universities and editorial committees should establish clear protocols for recording, monitoring, and auditing the use of generative technologies (Yale University Press, 2024; Elsevier, 2024).

The consolidation of editorial guidelines on the ethical and responsible use of GenIA represents a milestone for global scientific governance. Major international publishers,Elsevier, Emerald Publishing, Springer Nature, Taylor & Francis, SAGE Publishing, Wiley, Oxford University Press, and Yale University Press,have been working to formulate policies that balance technological advancement with the preservation of academic integrity. These policies not only regulate the use of AI in writing, reviewing, and publishing processes, but also reinforce principles of human authorship, transparency, traceability, and moral responsibility, transforming editorial ethics into an epistemological axis of contemporary science.

Table 18

International Comparison of GenAI Use Policies in Scientific Publishers

Scientific Publisher	Permitted Uses of GenAI	Prohibited or Restricted Uses	Transparency and Disclosure Requirements	Ethical and Epistemological Basis	Implications for Scientific Practice
Elsevier (2024)	Linguistic review, translation of excerpts, preliminary organization of ideas, and suggestions for textual structure.	Production of original content, data analysis, generation of empirical results, and complete texts.	Mandatory declaration of the tool, version, and type of use in the manuscript; full responsibility of the author.	Based on the *Responsible AI Principles*: transparency, traceability, and integrity.	Promotes ethical governance and defines the role of AI as technical support, preserving human authorship.
Emerald Publishing (2023)	Improvement of clarity and writing style; limited technical support.	Theoretical construction, hypothesis formulation, and interpretation of results; omission of use constitutes misconduct.	Textual statement or acknowledgments, specifying the purpose and type of GenIA contribution.	Relational ethics: AI is seen as an instrument, not as an epistemic subject.	Encourages reflective use of AI and reinforces the autonomy of the researcher as a moral agent.
Springer Nature (2024)	Grammatical review, translation, and non-substantive illustrative images.	Use in analysis, methods, results, or conclusions; AI cannot be a co-author.	Detailed statement of tool, version, and function; institutional ethical consent when applicable.	Emphasis on traceability and methodological integrity.	Strengthens public trust in science and formalizes the author's cognitive responsibility.
Taylor & Francis (n.d.)	Language support and formatting; assisted revision with human supervision.	Creation of substantive content, interpretive figures, or machine translations without review.	Full transparency on any use of AI; ethical compliance report.	Concept of *accountable authorship*: the author is morally responsible for the entire text.	Establishes ethical co-responsibility and ensures epistemological authenticity.
SAGE Publishing (2023)	Correction of style, grammar, and textual coherence.	Generation of data, references, analyses, and interpretive sections; prohibition of shared authorship with AI.	Explicit statement of use and mandatory human validation.	Principle of non-replacement of human judgment and promotion of ethical training.	Strengthens the institutional culture of integrity and trains evaluators and reviewers in AI ethics.
Wiley (n.d.)	Instrumental support: textual review, translation, and organization of ideas.	Analytical intervention, interpretive writing, or creation of false data.	Mandatory public statement; recommendation to keep logs for auditing purposes.	Principle of full responsibility of the human author.	Creates conditions for traceability and ethical auditing of interactions with AI.
Oxford University Press (n.d.)	Instrumental functions, such as technical review and linguistic support.	Change in argumentative style, theoretical coherence, or substantive content.	Formal statement of use, with description of purpose and impact.	Scientific writing as an interpretive and moral act.	Reinforces the ethical dimension of authorship and the critical role of the researcher.
Yale University Press (2024)	Technical review and organizational support; ethical reflection on pedagogical uses.	Generation of undeclared text; use in central parts without validation.	Requires detailed documentation, recording, and institutional auditing.	Emphasizes social responsibility and educational transparency.	Promotes a culture of integrity and reflective ethics in research practices.

The comparative analysis shows that all publishers converge on an ethical consensus: GenIA can only be used as an auxiliary tool, never as an agent of authorship or scientific interpretation. The guidelines of Elsevier (2024), Springer Nature (2024), and Taylor & Francis (n.d.) emphasize document traceability and shared responsibility, while Emerald Publishing (2023) and SAGE Publishing (2023) introduce pedagogical and reflective dimensions, guiding authors and reviewers to understand AI as an extension of human thought, not as a cognitive substitute.

These policies reaffirm the epistemology of human authorship, based on the researcher's interpretive responsibility and critical awareness. As demonstrated by the practices of Wiley (n.d.) and Oxford University Press (n.d.), AI must be understood within an information ethic, in which scientific knowledge remains a morally situated and cognitively responsible production. In summary, the group of publishers establishes a new standard of editorial integrity, in which authorship, transparency, and responsibility are inseparable, ensuring that technological innovation remains subordinate to ethics and human rationality in scientific endeavor.

The main scientific publishers converge on the same normative axis: AI can be used as a technical and linguistic support tool, but its use is prohibited in the production of original scientific content, formulation of hypotheses, data analysis, or drawing conclusions. In addition, all publishers require transparency, explicit declaration, and full human review, recognizing that authorship, as an act of epistemic and moral responsibility, remains exclusively human. These policies consolidate a new editorial paradigm in which technology must serve science without replacing it, preserving the critical, interpretive, and ethical essence of knowledge production.

FINAL CONSIDERATIONS

This guide represents a collective and interdisciplinary effort to understand, systematize, and guide the ethical, efficient, and responsible use of GenIA in the field of scientific research. Its development was based on a critical analysis of international guidelines, editorial policies, and principles of academic integrity that have been redefining the boundaries between technology, authorship, and knowledge production. Throughout the document, we sought not only to describe good practices, but above all to propose a new ethical pact between researchers and technologies, based on transparency, epistemic responsibility, and the valorization of human authorship.

The guide demonstrated that GenIA, when used consciously and reflectively, can contribute to improving clarity, accuracy, and scientific productivity by supporting processes of textual revision, organization of ideas, and structuring of arguments. However, it was emphasized that the ethical use of AI depends on constant human supervision, the explanation of the tools used, and the critical validation of the results generated. By recognizing the importance of these principles, the guide reaffirms that technology must remain subordinate to human reason, ensuring that judgment, creativity, and interpretation remain essentially human dimensions of science.

The results systematized here reveal that the ethical use of GenIA requires more than technical rules: it requires a cultural transformation in the way academia understands authorship, rigor, and scientific integrity. This transformation implies strengthening ethical and digital education, in which teachers, students, and researchers are trained to identify epistemic risks, such as algorithmic biases and content hallucinations, and to apply verification and traceability criteria in their research practices. Thus, the guide is not limited to standardizing behaviors, but proposes educational paths that integrate information ethics, cognitive responsibility, and critical awareness into everyday academic life.

The expectation is that this guide will serve as a practical, pedagogical, and normative tool capable of guiding institutional policies, evaluation processes, and editorial practices in the context of the digital transformation of science. It aims to inspire a culture of responsible innovation, in which GenIA acts as an instrument for expanding human capabilities,not as a substitute for them. Thus, it reaffirms the conviction that integrity, transparency, and human authorship remain the non-negotiable pillars of scientific production, sustaining the collective commitment to ethical, reliable, and socially relevant science.

REFERENCES

Ajiye, O. T., & Omokhabi, A. A. (2025). The potential and ethical issues of artificial intelligence in improving academic writing. ShodhAI: Journal of Artificial Intelligence, 2(1), 1-9. https://doi.org/10.29121/shodhai.v2.i1.2025.24

ANPAD. (2023). Diretrizes para o uso ético de inteligência artificial em publicações científicas. Associação Nacional de Pós-Graduação e Pesquisa em Administração. https://doi.org/10.24883/eaglesustainable.v14i.409

Arar, K. H., Özen, H., Polat, G., & Turan, S. (2025). Artificial intelligence, generative artificial intelligence and research integrity: a hybrid systemic review. Smart Learning Environments, 12(1), 44. https://doi.org/10.1186/s40561-025-00403-3

BaHammam, A. S. (2025). Peer review in the artificial intelligence era: A call for developing responsible integration guidelines. Nature and Science of Sleep, 159-164. https://doi.org/10.2147/nss.s513872

Bardin, L. (2016). Análise de conteúdo. Edições 70.

Barthes, R. (2004). A morte do autor. O rumor da língua, 2(1), 57-64.

Batista, J., Mesquita, A., & Carnaz, G. (2024). Generative AI and higher education: Trends, challenges, and future directions from a systematic literature review. Information, 15(11), 676. https://doi.org/10.20944/preprints202409.1496.v1

Becher, T., & Trowler, P. (2001). Academic tribes and territories: Intellectual enquiry and the culture of disciplines (2nd ed.). Open University Press. https://doi.org/10.48059/uod.v15i3.838

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency (FAccT), 610–623. https://doi.org/10.1145/3442188.3445922

Birhane, A. (2021). Algorithmic injustice: a relational ethics approach. Patterns, 2(2).

Bouter, L. M., Tijdink, J., Axelsen, N., Martinson, B. C., & ter Riet, G. (2022). Ranking major and minor research misbehaviors: Results from a survey among participants of four World Conferences on Research Integrity. Research Integrity and Peer Review, 7(4). https://doi.org/10.1186/s41073-016-0024-5

Cheng, A., Calhoun, A., & Reedy, G. (2025). Artificial intelligence-assisted academic writing: recommendations for ethical use. Advances in Simulation, 10(1), 22. https://doi.org/10.1186/s41077-025-00350-6

Chinoracky, R., & Stalmasekova, N. (2025). Ethical Problems in the Use of Artificial Intelligence by University Educators. Education Sciences, 15(10), 1322. https://doi.org/10.3390/educsci15101322

CNE/CES. (2018). Resolução nº 7, de 18 de dezembro de 2018. Ministério da Educação – Conselho Nacional de Educação. https://doi.org/10.56238/coneduca-095

CNS. (2016). Resolução nº 510, de 7 de abril de 2016. Conselho Nacional de Saúde.

Crawford, K. (2021). Atlas of AI: Power, politics, and the planetary costs of artificial intelligence. Yale University Press. https://doi.org/10.1080/23738871.2023.2237981

Delios, A., Tung, R. L., & van Witteloostuijn, A. (2025). How to intelligently embrace generative AI: The first guardrails for the use of GenAI in IB research. Journal of International Business Studies, 56(4), 451-460. https://doi.org/10.1057/s41267-024-00736-0

Dergaa, I., Chamari, K., Zmijewski, P., & Saad, H. B. (2023). From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing. Biology of sport, 40(2), 615-622. https://doi.org/10.5114/biolsport.2023.125623

Ebadi, S., Nejadghanbar, H., Salman, A. R., & Khosravi, H. (2025). Exploring the impact of generative AI on peer review: Insights from journal reviewers. Journal of Academic Ethics, 1-15. https://doi.org/10.1007/s10805-025-09604-4

Elsevier. (2024a). Generative AI policies for journals. Elsevier. Retrieved October 26, 2025, from https://www.elsevier.com/about/policies-and-standards/generative-ai-policies-for-journals

Elsevier. (2024b). Responsible AI principles. Elsevier. Retrieved October 26, 2025, from https://www.elsevier.com/about/policies-and-standards/responsible-ai-principles

Elsevier. (2024c). The use of generative AI and AI-assisted technologies in writing for Elsevier. Elsevier. Retrieved October 26, 2025. https://doi.org/10.2139/ssrn.5509960

Emerald Publishing. (2023a). AI in action: Behind the scenes at Emerald Publishing. Emerald Group Publishing. Retrieved October 26, 2025. https://doi.org/10.1108/oxan-db292033

Emerald Publishing. (2023b). Emerald Publishing's stance on AI tools and authorship. Emerald Group Publishing. Retrieved October 26, 2025. https://doi.org/10.1108/oxan-es201170

Emerald Publishing. (n.d.). Research and publishing ethics: Artificial intelligence (AI). Emerald Group Publishing. Retrieved October 26, 2025. https://doi.org/10.1016/b978-1-84334-669-2.50014-7

Feenberg, A. (2017). Technosystem: The social life of reason. Harvard University Press.

Floridi, L. (2020). The logic of information: A theory of philosophy as conceptual design. Oxford University Press.

Floridi, L. (2022). The ethics of artificial intelligence: Principles, challenges, and opportunities. Oxford University Press. https://doi.org/10.21555/top.v710.3275

Floridi, L., & Cowls, J. (2022). A unified framework of five principles for AI in society. Harvard Data Science Review, 2(1). https://doi.org/10.1162/99608f92.8cd550d1

Förster, S., & Skop, Y. (2025). Between fact and fairy: tracing the hallucination metaphor in AI discourse. AI & SOCIETY, 1-14. https://doi.org/10.1007/s00146-025-02392-w

Foucault, M. (1969). O que é um autor? In M. Foucault, Ditos e escritos (Vol. I). Gallimard.

Francis, N. J., Jones, S., & Smith, D. P. (2025). Generative AI in higher education: Balancing innovation and integrity. British Journal of Biomedical Science, 81, 14048. https://doi.org/10.3389/bjbs.2024.14048

Ganguly, A., Johri, A., Ali, A., & McDonald, N. (2025). Generative artificial intelligence for academic research: evidence from guidance issued for researchers by higher education institutions in the United States. AI and Ethics, 1-17. https://doi.org/10.1007/s43681-025-00688-7

Ganjavi, C., Eppler, M. B., Pekcan, A., Biedermann, B., Abreu, A., Collins, G. S., ... & Cacciamani, G. E. (2024). Publishers' and journals' instructions to authors on use of generative artificial intelligence in academic and scientific publishing: bibliometric analysis. bmj, 384. https://doi.org/10.1136/bmj-2023-077192

Hanafi, A. M., Al-mansi, M. M., & Al-Sharif, O. A. (2025). Generative AI in Academia: A Comprehensive Review of Applications and Implications for the Research Process. International Journal of Engineering and Applied Sciences-October 6 University, 2(1), 91-110. https://doi.org/10.21608/ijeasou.2025.349520.1041

Hanafi, A. M., Al-mansi, M. M., & Al-Sharif, O. A. (2025). Generative AI in Academia: A Comprehensive Review of Applications and Implications for the Research Process. International Journal of Engineering and Applied Sciences-October 6 University, 2(1), 91-110. https://doi.org/10.21608/ijeasou.2025.349520.1041

Hanafi, A. M., Al-mansi, M. M., & Al-Sharif, O. A. (2025). Generative AI in Academia: A Comprehensive Review of Applications and Implications for the Research Process. International Journal of Engineering and Applied Sciences-October 6 University, 2(1), 91-110. https://doi.org/10.21608/ijeasou.2025.349520.1041

Haraway, D. (2013). A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. In The transgender studies reader (pp. 103-118). Routledge. https://doi.org/10.1007/978-1-137-05194-3_10

Hosseini, M., & Resnik, D. B. (2025). Guidance needed for using artificial intelligence to screen journal submissions for misconduct. Research ethics, 21(1), 1-8. https://doi.org/10.1177/17470161241254052

IBGC. (2023). Código das melhores práticas de governança corporativa. Instituto Brasileiro de Governança Corporativa. https://doi.org/10.11606/issn.2178-2075.v14i2p157-174

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

Jones, M. S. (2025). Review of Algorithms of Oppression: How Search Engines Reinforce Racism, by Safiya Umoja Noble. Education Review, 32. https://doi.org/10.14507/er.v32.4117

Kamila, M. K., & Jasrotia, S. S. (2025). Ethical issues in the development of artificial intelligence: recognizing the risks. International Journal of Ethics and Systems, 41(1), 45-63. https://doi.org/10.1108/ijoes-05-2023-0107

Kundavaram, V. N. K. (2025). Optimizing Data Pipelines for Generative AI Workflows: Challenges and Best Practices. IJSAT-International Journal on Science and Technology, 16(1). https://doi.org/10.71097/ijsat.v16.i1.1527

Lei nº 12.965, de 23 de abril de 2014. Marco Civil da Internet.

Leong, L. Y., Hew, T. S., Ooi, K. B., Tan, G. W. H., & Koohang, A. (2025). Generative AI: Current status and future directions. Journal of Computer Information Systems, 1-34. https://doi.org/10.1080/08874417.2025.2482571

Lévy, P. (2010). Inteligência coletiva: Por uma antropologia do ciberespaço. Loyola. https://doi.org/10.59616/cehd.v1i7.1940

LGPD – Lei nº 13.709, de 14 de agosto de 2018. Lei Geral de Proteção de Dados Pessoais. https://doi.org/10.47573/aya.5379.2.464.1

Linder, C., Nepogodiev, D., & GAIT 2024 Collaborative Group. (2025). Generative Artificial Intelligence Transparency in scientific writing: the GAIT 2024 guidance. Impact Surgery, 2(1), 6-11. https://doi.org/10.62463/surgery.134

Llerena-Izquierdo, J., & Ayala-Carabajo, R. (2025, October). Ethics of the Use of Artificial Intelligence in Academia and Research: The Most Relevant Approaches, Challenges and Topics. In Informatics (Vol. 12, No. 4, p. 111). MDPI. https://doi.org/10.3390/informatics12040111

Lund, B. D., Wang, T., Mannuru, N. R., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial Intelligence-written research papers and the ethics of the large language models in scholarly publishing. Journal of the Association for Information Science and Technology, 74(5), 570-581. https://doi.org/10.1002/asi.24750

McDonald, N., Johri, A., Ali, A., & Collier, A. H. (2025). Generative artificial intelligence in higher education: Evidence from an analysis of institutional policies and guidelines. Computers in Human Behavior: Artificial Humans, 3, 100121. https://doi.org/10.1016/j.chbah.2025.100121

Mijwil, M. M., Hiran, K. K., Doshi, R., Dadhich, M., Al-Mistarehi, A. H., & Bala, I. (2023). ChatGPT and the future of academic integrity in the artificial intelligence era: A new frontier. Al-Salam Journal for Engineering and Technology, 2(2), 116-127. https://doi.org/10.55145/ajest.2023.02.02.015

Mikroyannidis, A., Ekuban, A., Kwarteng, J., & Domingue, J. (2025, March). Best Practices for the Responsible Adoption of Generative AI in Higher Education. In Proceedings (Vol. 114, No. 1, p. 6). MDPI. https://doi.org/10.3390/proceedings2025114006

Mohammadi, E., Thelwall, M., Cai, Y., Collier, T., Tahamtan, I., & Eftekhar, A. (2026). Is generative AI reshaping academic practices worldwide? A survey of adoption, benefits, and concerns. Information Processing & Management, 63(1), 104350. https://doi.org/10.1016/j.ipm.2025.104350

Narayan, S. (2025). The Bridgerton Paradox in Artificial Intelligence: Balancing Diversity, Authenticity, and Responsible Innovation. Springer Nature. https://doi.org/10.1007/978-3-031-99493-7

OECD. (2023). AI principles and policy guidelines. Organisation for Economic Co-operation and Development. Oxford University Press. (n.d.). Author use of artificial intelligence. Oxford Academic. Retrieved October 26, 2025, from https://academic.oup.com/pages/for-authors/books/author-use-of-artificial-intelligence

Pasquale, F. (2020). New laws of robotics: Defending human expertise in the age of AI. Harvard University Press. https://doi.org/10.1007/s00146-021-01226-9

Radanliev, P. (2025). AI ethics: Integrating transparency, fairness, and privacy in AI development. Applied Artificial Intelligence, 39(1), 2463722. https://doi.org/10.1080/08839514.2025.2463722

Rahman, M. M., Terano, H. J., Rahman, M. N., Salamzadeh, A., & Rahaman, M. S. (2023). ChatGPT and academic research: A review and recommendations based on practical examples. Rahman, M., Terano, HJR, Rahman, N., Salamzadeh, A., Rahaman, S.(2023). ChatGPT and Academic Research: A Review and Recommendations Based on Practical Examples. Journal of Education, Management and Development Studies, 3(1), 1-12. https://doi.org/10.52631/jemds.v3i1.175

Rana, N. K. (2025). Generative AI and academic research: A review of the policies from selected HEIs. Higher Education for the Future, 12(1), 97-113. https://doi.org/10.1177/23476311241303800

Resnik, D. B., & Hosseini, M. (2025). The ethics of using artificial intelligence in scientific research: new guidance needed for a new tool. AI and Ethics, 5(2), 1499-1521. https://doi.org/10.1007/s43681-024-00493-8

Ryan, M., & Stahl, B. C. (2021). Artificial intelligence ethics guidelines for developers and users: clarifying their content and normative implications. Journal of Information, Communication and Ethics in Society, 19(1), 61-86. https://doi.org/10.1108/jices-12-2019-0138

SAGE Publishing. (2023a). AI author guidelines. SAGE Publications. Retrieved October 26, 2025, from https://www.sagepub.com/about/sage-policies/corporate-policies/ai-author-guidelines

SAGE Publishing. (2023b). Artificial intelligence policy. SAGE Publications. Retrieved October 26, 2025, from https://www.sagepub.com/journals/publication-ethics-policies/artificial-intelligence-policy

Sampaio, R. C., Sabbatini, M., & Limongi, R. (2025). Diretrizes para o uso ético e responsável da inteligência artificial generativa: um guia prático para pesquisadores. Boletim Técnico do PPEC, 10, e025003-e025003. https://doi.org/10.64628/ade.pfth4r4kt

Schlagwein, D., & Willcocks, L. (2023). 'ChatGPT et al.': The ethics of using (generative) artificial intelligence in research and science. Journal of Information Technology, 38(3), 232-238. https://doi.org/10.1177/02683962231200411

SemeAd. (2025). Diretrizes éticas para o uso de IA em submissões acadêmicas. Seminários em Administração da USP.

Springer Nature. (2024). Artificial Intelligence (AI) editorial policies. Springer Nature. Retrieved October 26, 2025, from https://www.springer.com/in/editorial-policies/artificial-intelligence--ai-/25428500

Steneck, N. H. (2003). ORI introduction to the responsible conduct of research. Department of Health and Human Services, Office of the Secretary, Office of Public Health and Science, Office of Research Integrity.

Tang, A., Li, K. K., Kwok, K. O., Cao, L., Luong, S., & Tam, W. (2024). The importance of transparency: Declaring the use of generative artificial intelligence (AI) in academic writing. Journal of nursing scholarship, 56(2), 314-318. https://doi.org/10.1111/jnu.12938

Tang, K. S., Cooper, G., & Nielsen, W. (2024). Philosophical, legal, ethical, and practical considerations in the emerging use of generative AI in academic journals: Guidelines for research in science education (RISE). Research in Science Education, 54(5), 797-807. https://doi.org/10.1007/s11165-024-10192-3

Tang, K. S., Cooper, G., & Nielsen, W. (2024). Philosophical, legal, ethical, and practical considerations in the emerging use of generative AI in academic journals: Guidelines for research in science education (RISE). Research in Science Education, 54(5), 797-807. https://doi.org/10.1007/s11165-024-10192-3

Taylor & Francis. (n.d.). Artificial Intelligence (AI) policy. Taylor & Francis Group. Retrieved October 26, 2025, from https://taylorandfrancis.com/our-policies/ai-policy/

Tingelhoff, F., Brugger, M., & Leimeister, J. M. (2025). A guide for structured literature reviews in business research: The state-of-the-art and how to integrate generative artificial intelligence. Journal of Information Technology, 40(1), 77-99. https://doi.org/10.1177/02683962241304105

UFMG. (2023). Diretrizes para o uso ético de ferramentas de IA em contextos acadêmicos. Universidade Federal de Minas Gerais. https://doi.org/10.14295/2596-2221.xviceel.2018.241

UFRGS. (2023). Guia institucional para uso responsável da inteligência artificial. Universidade Federal do Rio Grande do Sul. https://doi.org/10.21011/apn.2023.3208

UFSC. (2024). Código de conduta ética e integridade científica. Universidade Federal de Santa Catarina. https://doi.org/10.29183/2596-237x.ensus2023.v11.n4.p272-284

UNESCO. (2023). Ethical framework for generative AI in education. UNESCO. Disponível em: https://www.unesco.org/en/articles/guidance-generative-ai-education-and-research. https://doi.org/10.2139/ssrn.5181859

UNESCO. (2025a). AI and education: Guidance for policy makers and institutions. UNESCO. Disponível em: https://www.unesco.org/en/articles/ai-and-education-guidance-policy-makers. https://doi.org/10.54675/pcsp7350

UNESCO. (2025b). Ethics of Artificial Intelligence. UNESCO. https://doi.org/10.54678/bgiv6160

UNICAMP. (2023). Normas éticas sobre o uso de IA em atividades acadêmicas. Universidade Estadual de Campinas.

Wang, H., Dang, A., Wu, Z., & Mac, S. (2024). Generative AI in higher education: Seeing ChatGPT through universities' policies, resources, and guidelines. Computers and Education: Artificial Intelligence, 7, 100326. https://doi.org/10.1016/j.caeai.2024.100326

Wiley. (n.d.). AI guidelines for authors. Wiley. Retrieved October 26, 2025, from https://www.wiley.com/en-us/publish/book/resources/ai-guidelines/

Yale University Press. (2024, September 18). Using and disclosing artificial intelligence (AI) tools. Yale University Press. Retrieved October 26, 2025. https://doi.org/10.18699/bgrs2024-1.2-05

Yin, S., Huang, S., Xue, P., Xu, Z., Lian, Z., Ye, C., ... & Li, C. (2025). Generative artificial intelligence (GAI) usage guidelines for scholarly publishing: a cross-sectional study of medical journals. BMC medicine, 23(1), 77. https://doi.org/10.1186/s12916-025-03899-1

Zaki, E. L., Karroum, J., Elouadi, A., & Moumen, A. (2025). Artificial intelligence in academic research: Benefits, challenges, and ethical dimensions in doctoral studies. Moroccan Journal of Quantitative and Qualitative Research, 7(2).

NOTES

Usage License

Publisher

Universidade Federal de Santa Catarina. Departamento de Ciências da Administração. Published on the **Portal de Periódicos UFSC**. The ideas expressed in this article are the responsibility of the authors and do not necessarily represent the opinions of the editors or the university.

Publishers

- Rosalia Aldraci Barbosa Lavarda
- Leandro Dorneles dos Santos

History

Recieved:	28-10-2025
Approved:	03-12-2025
Published:	15-12-2025