

Anarosa Alves Franco Brandão^a 
Leila Posenato Garcia^{b*} 
Luísa Veras de Sandes-Guimarães^c 

^a Universidade de São Paulo, Escola Politécnica, Departamento de Engenharia de Computação e Sistemas Digitais. São Paulo, SP, Brazil.

^b Fundação Jorge Duprat Figueiredo de Segurança e Medicina do Trabalho, Escritório Avançado em Santa Catarina. Florianópolis, SC, Brazil.

^c Universidade Federal de São Paulo, Escola Paulista de Política, Economia e Negócios. Osasco, SP, Brazil.

* Editor-in-chief RBSO

Contact:

Leila Posenato Garcia

Email:

leila.garcia@fundacentro.gov.br

How to cite (Vancouver):

Brandão AAF, Garcia LP, Sandes-Guimarães LV. Artificial intelligence in the preparation of scientific articles: uses, limits, and best practices. Rev Bras Saude Ocup [Internet]. 2026;51:e29. Available from: <https://doi.org/10.1590/2317-6369/nt126en2026v51e29>



Artificial intelligence in the preparation of scientific articles: uses, limits, and best practices

Inteligência artificial na elaboração de artigos científicos: usos, limites e boas práticas

Abstract

The use of artificial intelligence (AI) tools is transforming how research is planned, conducted, written, and reviewed, offering opportunities but also imposing limitations, particularly regarding scientific integrity. This editorial note addresses the uses and limitations of AI tools in the preparation of scientific articles. Key possibilities include support for writing and editing, translation, journal selection, literature review, citation and reference management, and the production of summaries and visualizations. Conversely, the limitations relate to a lack of creativity, the perpetuation of biases and inequalities, the risk of hallucinations (false information), issues of originality and intellectual property, and authorial responsibility. It advocates for the adoption of best practices in the use of AI tools in the preparation of scientific articles. Such use must be guided by transparency, human supervision, and accountability; it must be disclosed to editors at the time of article submission and, when relevant, mentioned in the article itself. Although AI tools are useful assistants in the preparation of scientific articles, they should not replace the researcher's critical thinking and scientific knowledge.

Keywords: Artificial Intelligence; Generative Artificial Intelligence; Scientific Publication Ethics; Scholarly Communication.

Resumo

O uso de ferramentas de inteligência artificial (IA) está transformando a forma como pesquisas são planejadas, conduzidas, escritas e revisadas, oferecendo oportunidades, mas também impondo limites, particularmente relacionados à integridade científica. Esta nota editorial aborda os usos e os limites das ferramentas de IA na elaboração de artigos científicos. As principais possibilidades de uso incluem apoio à escrita e edição, tradução, seleção de periódicos, revisão da literatura, gestão de citações e referências, produção de sínteses e visualizações. Por sua vez, os limites se relacionam à falta de criatividade, perpetuação de preconceitos e desigualdades (vieses), risco de alucinações (informações falsas), questões de originalidade e propriedade intelectual, e responsabilidade autoral. Orienta-se para a adoção de boas práticas no uso das ferramentas de IA na elaboração de artigos científicos. Tal uso deve ser pautado pela transparência, supervisão humana e responsabilidade, deve ser declarado aos editores no momento da submissão do artigo e, quando pertinente, mencionado no próprio artigo. Embora as ferramentas de IA sejam assistentes úteis na elaboração de artigos científicos, elas não devem substituir o pensamento crítico e o conhecimento científico do pesquisador.

Palavras-chave: Inteligência Artificial; Inteligência Artificial Generativa; Ética na Publicação Científica; Comunicação Acadêmica.

Introduction

Although the development of artificial intelligence (AI) tools dates back to the mid-20th century, it was not until the early 2020s that their use became widespread. This was only possible due to advances in technologies related to natural language processing (NLP) tasks, particularly those involving large language models. Research focused on the task of text completion and translation was responsible for this advancement, by introducing the concept of context-aware processing of small text fragments¹. By training on large volumes of text data, the machine learns patterns and can suggest the next word to be typed, based on previously typed words, or the translation of entire sentences, or even the answer to a question asked in a chat. However, this suggestion is purely probabilistic, which indicates that the machine cannot identify the meaning of any text it delivers to the user. Bender and colleagues used the term probabilistic (or stochastic) parrot as a metaphor for the results produced by intelligent services that solve NLP tasks. A parrot can repeat human speech but does not understand what it is saying². Thus, NLP is performed without an understanding of natural language. For this reason, hallucinations may occur, e. g., responses that are grammatically correct and contextually plausible, yet entirely incorrect.

Chatbots and other generative AI tools have become widely available, and their use has become widespread, driven by factors such as the existence of large amounts of training data for models, the evolution of technological infrastructure, and increased computer processing power^{3,4}. The ease of use of available conversational services and the feeling that the conversation flows as if a human were responding create a false sense of confidence in the responses provided, as the text is grammatically flawless and contextually plausible, especially if the person involved is not well-versed in the topic of conversation. On the other hand, mastery of the topic being discussed with such services is a powerful ally in the production of new knowledge.

In the academic community, initially, the use of AI tools for text generation sparked controversy^{5,6}. However, it soon became clear that banning their use was not the solution. The United Nations Educational, Scientific and Cultural Organization (UNESCO⁷), as well as other entities, began working to develop standards and guidelines aimed at promoting the responsible use of AI tools. The International Committee of Medical Journal Editors (ICMJE) updated its Recommendations for the conduct, reporting, editing, and publication of research in medical journals in May 2023 to address the use of AI tools. The ICMJE provided guidance on how the use of AI tools should be reported in articles and formally established that such tools cannot be listed as authors of scientific articles⁸. The recommendations of the World Association of Medical Editors (WAME) align with those of the ICMJE, recognizing that the widespread use of chatbots in scientific articles raises concerns about the lack of authenticity of the content⁹. The European Association of Science Editors (EASE) has published recommendations on the use of AI in scholarly communication, containing guidelines for editors, journals, publishing organizations, authors, and peer reviewers¹⁰.

In Brazil, the SciELO Network (Scientific Electronic Library Online) released a guide in 2023 on the use of AI tools and resources in scholarly communication. It states they are free to use AI tools in the preparation, writing, revision, and translation of their articles, but must respect the rules of attribution and adhere to scientific ethics and integrity¹¹.

In March 2026, the National Council for Scientific and Technological Development (CNPq) established, through Administrative Order No. 2,664/2026, the Policy on Integrity in Scientific Activity, which includes guidelines regarding the use of generative AI in research and publication¹². Notable provisions include the mandatory declaration of the use of such tools at any stage of the research (conception, drafting, data analysis, submission), the prohibition of using AI tools to draft scientific review report, and the reinforcement of authors' responsibility in the use of AI. This policy also provides for sanctions against researchers who commit violations. Several higher education institutions are also publishing their internal policies on the ethical use of AI tools, seeking to establish guidelines for faculty, students, and technical-administrative staff on how to use these tools to ensure accountability, transparency, privacy, and data protection.

In the context of rapidly evolving capabilities of AI tools, with the expansion of their use and the emergence of standards and guidelines, it is pertinent to provide authors with guidance for conducting their work. Below, we present some uses and limitations of AI tools, with a focus on the preparation of scientific articles. Finally, guidance is provided on adopting best practices in the use of AI tools when writing scientific articles.

Uses of AI tools in the preparation of scientific articles

AI tools can serve as a very useful assistant in various stages of scientific article writing, helping authors improve the communication of their research¹³. Below, we will present some of the potential uses of such tools.

Writing and editing

One of the most frequent uses of AI tools in academia is to support writing and editing, and there are several excellent tools available for this purpose¹⁴. Clarity in scientific writing is a fundamental obligation of authors, and AI tools, when used appropriately, can contribute to this, helping especially those who are less experienced or who are not native speakers of the language in which the article is written¹⁵. Scientific articles follow a standard structure (IMRD—introduction, methods, results, and discussion) and are written in generally impersonal language, using terms and expressions commonly found in scientific literature, which favors the application of AI tools based on Large Language Models (LLMs).

There are several tools that can assist in writing and editing texts, aiming to correct typos and grammatical errors, as well as make the language clearer and more aligned with the scientific writing standards expected for a given field of knowledge. Specialized tools can suggest adjustments directly within the text, making it more suitable for potential publication, for example.

It is not recommended to use AI tools for the complete writing of texts, for several reasons. First, AI can hallucinate (this problem will be addressed in greater depth below, under limitations), that is, invent texts that are plausible but incorrect. If you are an expert who has already read and studied extensively on the subject, you will know how to evaluate these potential errors, but many have used this resource without a basic grasp of the subject matter, which can lead to the replication of errors in publications, for example. Second, when using AI to generate the entire text, there is a high risk of losing your voice or writing style and reproducing biases and linguistic quirks that make the writing increasingly mechanical.

In the writing process, always with human oversight in mind, AI helps unlock and generate ideas and suggest improvements and revisions to the original text. In this process, it is possible to use, in addition to specialized tools, generic tools (chatbots) that can generate good results for these functions based on well-crafted prompts that indicate, for example, the specific persona (author or reviewer of a scientific article in a given field) and that provide an explanation, or even examples, so that the requested revision of the text is based on scientific writing standards¹¹.

Translation

Another very common use is the translation of texts, whether entire articles or fragments, such as abstracts. Based on a survey of researchers from 20 countries, Naddaf and Quill state that this is the primary use of AI tools in the research context¹⁶. The use of LLM-based AI tools has made translations of scientific texts more accessible. Often, a researcher who is not a native English speaker but is familiar with the language can produce the English version of their article without needing to hire a professional or a company specializing in academic translation. Just as with text editing, there are specific and generic tools that can be used for translation. Care must be taken here with terms that have no direct equivalent and that may be kept in the original language so as not to lose their context.

Selection of journals

Selecting the journal to which the article will be submitted is an important step that should ideally take place before the article is written. This allows the article to be drafted in accordance with the chosen journal's guidelines, eliminating the need to adapt it to those guidelines later. There are several AI tools that assist in selecting journals. Currently, most major commercial publishers offer such tools. Examples include: Elsevier Journal Finder^d, Springer Journal Finder^e, Taylor & Francis Journal Suggester^f, and Wiley Journal Finder^g. In the health field, JANE (Journal/Author Name Estimator)^h is recommended; this free tool allows users to simply paste the title or abstract of an article to find a journal whose scope aligns with the article, similar articles, or even potential reviewers for a specific article.

Literature Review

Literature review is another step that must also be completed before beginning to write the article. Compiling the set of articles to be cited, especially in the introduction and discussion sections, can be facilitated with the support of AI tools specialized in search. These tools typically search open scientific information databases, such as Semantic Scholarⁱ and OpenAlex^j. One must be cautious here, as the journals and articles indexed in these databases are not always of high quality, which may require the researcher to exercise greater discernment to identify relevant and academically well-crafted articles.

Such tools can help identify relevant articles in the field and literature reviews that may be useful for contextualizing the article's topic and highlighting gaps, thereby contributing to the body of citations in the introduction. They can also help locate similar articles whose findings may engage with the article in question, which are useful for shaping the discussion. There are tools that can be used for retrieving references, and others that specialize in synthesizing content.

Citation and Reference Management

A very laborious and time-consuming step in the preparation of scientific articles is the organization of citations and references. Bibliographic reference management tools, such as Zotero^k, EndNote^l e Mendeley^m are very useful for automatically formatting citations and references according to specific standards (such as Vancouver, Associação Brasileira de Normas Técnicas – ABNT, American Psychological Association – APA, etc.). Recently, AI resources have been released that can be integrated with these tools. For example, Zotero is a free, open-source tool used to organize reference libraries and format citations and reference lists. ZotAI is a complementary tool that connects to the Zotero reference library and allows users to analyze and read documents

^d <https://journalfinder.elsevier.com/>

^e <https://link.springer.com/journals>

^f <https://authorservices.taylorandfrancis.com/publishing-your-research/choosing-a-journal/journal-suggester/>

^g <https://www.wiley.com/en-us/journal-finder/>

^h <https://jane.biosemantics.org/>

ⁱ <https://www.semanticscholar.org>

^j <https://openalex.org>

^k <https://www.zotero.org/>

^l <https://endnote.com/>

^m <https://www.mendeley.com/>

using AI. The use of these tools streamlines the formatting of citations and references, with the added advantage of reducing the likelihood of errors in matching citations to references, which are common when the process is done manually.

Production of summaries and visualizations

Text summarization is the most common function of general-purpose tools, such as chatbots. However, even tools designed for reference management may offer text summarization services. Beyond text summarization, there are currently AI tools that can be used to create graphs and diagrams based on information provided via commands or from datasets. Such figures can be used to illustrate certain aspects of the article, for example, a theoretical model, the steps of the sampling procedure adopted in the study, or the relationship between analyzed categories or variables. Infographics and videos can be used as visual abstracts of the articles.

Limitations of AI tools

It is widely recognized that the indiscriminate use of AI tools can compromise scientific integrity. Chatbots are generative AI tools that produce a wide range of content based on a large volume of pre-existing data. Depending on how these tools are used, the terms of service allow for the appropriation of content provided by the user - for example, for the purpose of reviewing, formatting, or editing a text - to build their own learning database. WAME warns against retaining academic content generated or edited by AI tools, as there is a possibility that such content may appear in future responses, which carries a risk of inadvertent plagiarism. Additionally, users should be aware of the risk of breaching confidentiality when providing chatbots with partial or complete content from their work⁹.

Another important and frequently reported problem is that these tools generate “hallucinations”, that is, they can create references, data, and facts that may seem convincing but are false or inaccurate. A recent study highlights the alarming number of published articles that include false references generated by AI, ranging from 2% to 6% of articles with fabricated references¹⁷. Considering this, the authors’ responsibility for published content must be emphasized. It is widely agreed that AI tools cannot be listed as authors, as they cannot assume responsibility for the content.

Publication is part of the cycle of scientific knowledge production, and writing is a fundamental step in this process. Writing is labor-intensive, requiring extensive reading and skills in organizing ideas and academic writing. In addition to contextualizing the topic under study, justifying the study, describing the research methods, and presenting the results, an article also includes the discussion section, a crucial part where a dialogue takes place between the results of the study being reported and the relevant literature. It is also the section where recommendations for future research are presented, existing gaps are identified, and ideas for new investigations are proposed. The inappropriate use of AI can lead to a lack of originality, due to the limited capacity of these tools to generate new ideas. It also contributes to the perpetuation of biases, since algorithms tend to reproduce biases present in the training data.

Due to these limitations, the editorial policies of scientific journals specify what is and is not permitted regarding the use of AI tools. In most cases, such use is permitted for text enhancement, aiming to correct writing errors and suggest the use of terms or phrases that are clearer or more understandable to the reading public, as well as to organize references. On the other hand, it is prohibited to use AI to generate, manipulate, or draft the research report, its results, and extensive sections of the article¹⁸.

Best practices in the use of AI in the preparation of articles

Guidelines on best practices are evolving as technologies advance. There is a consensus that AI tools should be used responsibly and their use should be documented transparently, in alignment with best practices in research and scientific publishing. The undeclared use of AI tools may require corrective actions and may be considered misconduct, leading, in extreme cases, to the retraction of the article¹⁹.

With the widespread use of AI tools, practices traditionally considered breaches of integrity or scientific misconduct, such as fabrication, manipulation, plagiarism, and spurious attribution of authorship, are also becoming more widespread and reaching a new level. Journals have received many articles in which there are indications, or even evidence, of the use of AI tools that are not adequately reported by the authors²⁰. Scientific editors have always been entrusted with the responsibility of verifying the requirements of ethics and integrity in scientific research at a stage when the research has already been conducted and its results reported. Often, breaches of integrity go undetected during the editorial workflow - screening, evaluation by editors and external peers, and editorial approval - and manuscripts end up being retracted. The widespread use of AI tools imposes an additional layer of responsibility on editors, as these tools facilitate the fabrication of data, results, or even entire articles, and can also compromise the integrity of authorship claims.

One of the first limitations on the use of AI tools expressed by organizations representing scientific publishers was the prohibition against listing these tools as authors. There is a unanimous understanding that AI tools cannot be listed as authors, as they cannot be held accountable for the accuracy, integrity, and originality of the work, which are indispensable requirements of authorship. According to the ICMJE recommendations, in their January 2026 version²¹, the journal should require authors to disclose in their submission whether they used AI tools in the preparation of the work. Authors who have used such technologies must describe, in the submission letter and in the methods section of the article, where applicable, what they used, for what purpose, and how they used it. Authors are responsible for all submitted material, including that generated by AI tools. Therefore, they must carefully review all AI-generated material that may be incorrect, incomplete, or biased. They must ensure that there is no plagiarism and that the cited documents are correctly attributed. It is also not acceptable to cite AI-generated material as a primary source.

Closing remarks

Although the use of AI tools can facilitate the writing of a scientific article, it should not replace the researcher's critical thinking and scientific knowledge. All content produced or assisted by AI technology must undergo human verification to ensure accuracy and avoid errors.

Disclosure of AI use is a fundamental principle that constitutes a practice of integrity. Authors must clearly and thoroughly disclose all AI use at the time of submission, including the name and version of the tool used, the purpose of its use, and how it was used.

The inclusion of unpublished materials and confidential or sensitive information, such as data from research participants, in AI tools is potentially problematic. The use of free AI tools carries the hidden cost of the user transferring all content entered during their interactions for use in future training and model refinement. Given the costs associated with training and refinement, this use does not occur immediately but takes place over a period of six months to a year. Considering that many journals take longer than this to review and publish a submitted article, it is not possible to guarantee originality, as the AI may have used this data.

The ethical use of such tools depends on people, on everyone who participates in the ecosystem of science and publishing: researchers, authors, reviewers, and editors. Training in the proper and safe use of AI tools is essential, starting with the education of researchers. And given that technologies are evolving rapidly, guidelines for their

use must keep pace to enable the advancement of science while ensuring integrity at every stage of research and scientific publication.

References

1. Vaswani A, Shazeer N, Parmar N, Uszkoreit J, Jones L, Gomez AN et al. Attention is all you need. In: Proceedings of the 31st Conference on Neural Information Processing Systems (NIPS 2017); 2017 Dec 4-9; Long Beach, CA. Bellefontaine: NIPS; 2017. p. 1–11.
2. Bender EM, Gebru T, McMillan-Major A, Shmitchell S. On the dangers of stochastic parrots: can language models be too big? In: Proceedings of the 2021 ACM FAccT Conference. New York: ACM; 2021. p. 610-23. [cited 2026 May 17]. Available from: <https://dl.acm.org/doi/10.1145/3442188.3445922>
3. Al-Amin M, Ali MS, Salam A, Khan A, Ali A, Ullah A, et al. History of generative Artificial Intelligence (AI) chatbots: past, present, and future development. ArXiv. Feb 4, 2024 . <https://doi.org/10.48550/arXiv.2402.05122>
4. Santaella L. Balanço crítico preliminar do ChatGPT. Rev Famecos. 2023;30(1):e44380. <https://doi.org/10.15448/1980-3729.2023.1.44380>
5. Thorp HH. ChatGPT is fun, but not an author. Science. 2023;379(6630):313. <https://doi.org/10.1126/science.adg7879>
6. Stokel-Walker C. AI bot ChatGPT writes smart essays: should professors worry? Nature. Dec 9, 2022. <https://doi.org/10.1038/d41586-022-04397-7>
7. Fengchun M, Wayne H. Guia para a IA generativa na educação e na pesquisa. Paris: Unesco; 2024.
8. International Committee of Medical Journal Editors. Recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals. Vancouver: ICMJE; 2023 [cited 2026 May 17]. Available from: <http://www.icmje.org/recommendations/>
9. Zielinski C, Winker MA, Aggarwal R, Ferris LE, Heinemann M, Lapeña JF et al. Chatbots, IA generativa e manuscritos acadêmicos: recomendações da WAME sobre chatbots e inteligência artificial generativa em relação a publicações acadêmicas. Braspen J. 2024;39(2):112-8. <https://doi.org/10.37111/braspenj.2024.39.1.18>.
10. European Association of Science Editors. Recommendations on the use of ai in scholarly communication. London: EASE; 2024 [cited 2026 May 17]. Available from: <https://ease.org.uk/2024/09/recommendations-on-the-use-of-ai-in-scholarly-communication/>
11. Scientific Electronic Library Online. Guia de uso de ferramentas e recursos de Inteligência Artificial na comunicação de pesquisas na Rede SciELO (versão preliminar). São Paulo: SciELO; 2023 [cited 2026 May 17]. Available from: <https://www.scielo.org/documents/30/Guia-de-uso-de-ferramentas-e-recursos-de-IA-20230914.pdf>
12. Conselho Nacional de Desenvolvimento Científico e Tecnológico (BR). Portaria Nº 2.664, de 6 de março de 2026. Institui a política de integridade na atividade científica do CNPq. Diário Oficial da União. 11 mar 2026.
13. Del Giglio A, Costa MUP. The use of artificial intelligence to improve the scientific writing of non-native English speakers. Rev Assoc Med Bras. 2023;69(9):e20230560. <https://doi.org/10.1590/1806-9282.20230560>.
14. Granjeiro JM, Cury AADB, Cury JA, Bueno M, Sousa-Neto MD, Estrela C. The future of scientific writing: ai tools, benefits, and ethical implications. Braz Dent J. 2025;36(1):1-10. <https://doi.org/10.1590/0103-644020256471>
15. Opdyke A. Sharpening the pencil, not replacing the hand: de-stigmatising AI use in research writing. Learn Publish. 2026;39(2):145-52. <https://doi.org/10.1002/leap.2055>
16. Naddaf M, Quill E. Hallucinated citations are polluting the scientific literature. What can be done? Nature. 2026;652(8108):26-9. <https://doi.org/10.1038/d41586-026-00969-z>
17. Mohammadi E, Thelwall M, Cai Y, Collier T, Tahamtan I, Eftekhari A. Is generative AI reshaping academic practices worldwide? A survey of adoption, benefits, and concerns. Inf Process Manage. 2026;63(1):104350. <https://doi.org/10.1016/j.ipm.2025.104350>
18. Anwar M. The ghost in the machine: why generative AI is a crisis of authorship, not just a tool. The Scholarly Kitchen. Jan 22, 2026 [cited 2026 May 17]. Available from: <https://scholarlykitchen.sspnet.org/2026/01/22/guest-post-the-ghost-in-the-machine-why-generative-ai-is-a-crisis-of-authorship-not-just-a-tool/>
19. Nicholas D, Herman E, Clark D, Abrizah A, Revez J, Rodríguez-Bravo B et al. Integrity and Misconduct, Where Does Artificial Intelligence Lead? Learn Publ. 2025 Jul 8;38(3):210-22. <https://doi.org/10.1002/leap.2013>

20. He Y, Bu Y. Academic journals' AI policies fail to curb the surge in AI-assisted academic writing. *Proc Natl Acad Sci U S A*. 2026;123(9):e2526734123. <https://doi.org/10.1073/pnas.2526734123>
21. International Committee of Medical Journal Editors. Recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals. Updated January 2026. Vancouver: ICMJE; 2026 [cited 2026 May 17]. Available from: https://www.icmje.org/news-and-editorials/updated_recommendations_jan2026.html