

METHODS ARTICLE

Artificial intelligence-assisted manuscript text and visuals: Supporting scientific communication while preserving scientific integrity



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Abstract

Artificial intelligence is increasingly used in manuscript preparation, from language refinement and text generation to the creation and modification of scientific visuals. However, responsible use of artificial intelligence in scholarly publishing depends less on whether artificial intelligence was used than on the role it played in producing material submitted for publication. This paper summarises artificial intelligence use across two domains: manuscript text and manuscript visuals. For text, we distinguish between artificial intelligence applications that primarily support communication, such as grammar and language refinement, and those that generate or substantively shape scholarly content. The latter raises greater concerns regarding accuracy, authorship, verification, and disclosure. For visuals, we distinguish between artificial intelligence-assisted preparation of explanatory materials, such as schematic diagrams, and artificial intelligence-generated or artificial intelligence-altered images that purport to represent research data, uses that are subject to substantially greater restrictions under current publishing guidance. Drawing on recommendations from the International Committee of Medical Journal Editors, the Committee on Publication Ethics, and representative publisher policies, we summarise the established principle that human authors remain responsible for the accuracy, interpretation, and integrity of all artificial intelligence-assisted content to different forms of artificial intelligence use in manuscript preparation. We further highlight that expectations regarding disclosure, permitted uses, and restrictions on artificial intelligence-generated or Artificial intelligence-altered content vary across journals and publishers.

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Key messages

Artificial intelligence can support the preparation of scientific manuscripts, but its use must be guided by transparency, verification, and human accountability. The key consideration is not simply whether artificial intelligence was used, but what role artificial intelligence played in creating content that becomes part of the scientific record. Authors remain responsible for the accuracy, interpretation, and integrity of their work and should evaluate, disclose, and document artificial intelligence use in accordance with journal requirements.

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Research AI and scientific writing

Artificial intelligence (AI) is becoming increasingly integrated into scholarly publishing. Researchers encounter AI-assisted technologies during manuscript preparation, including language refinement, translation, text generation, reference management, and the development of scientific visual materials. As these tools become increasingly accessible, researchers need to understand not only what AI tools can do, but also how their use aligns with evolving expectations in scholarly publishing.

AI use in manuscripts is not addressed through a single universally applicable policy. Instead, expectations are shaped by recommendations from organisations such as the International Committee of Medical Journal Editors (ICMJE) [1, 2] and the Committee on Publication Ethics (COPE) [3], together with journal- and publisher-specific policies [4-6]. These recommendations and policies do not position AI as inherently incompatible with scientific publishing; rather, they emphasise transparency, author accountability, and human responsibility for the accuracy and integrity of published work [1-3]. However, the existence of such guidance does not necessarily ensure that researchers understand, interpret, or apply it consistently. Authors may require practical support to translate these principles into decisions about specific uses of AI during manuscript preparation.

A central principle emerging from current guidance is that the implications of AI use depend not only on whether AI was used, but also on the role AI played in preparing material that becomes part of the scientific record. AI may assist researchers in communicating scientific information, but it cannot replace the scientific judgement required to generate, evaluate, and interpret knowledge. Responsibility for the content of a manuscript remains with the authors, and AI systems cannot assume authorship or accountability for published work [1, 2].

This paper focuses specifically on the use of AI tools in written and visual materials prepared for journal submission. The author collated the editorial and publication-ethics guidance and publisher policies based on their own familiarity with these materials. This paper offers practical considerations for assessing the role of AI in manuscript preparation, including whether it was used to assist communication, generate content, modify visual materials, or form part of the research methodology. The considerations presented here relate to expectations relevant to journal submission and publication. Researchers should therefore consider not only whether AI was used, but also the specific function it performed, whether its use complies with the requirements of the target journal and publisher, as well as whether the final manuscript remains accurate, transparent, and scientifically accountable.

AI use in manuscript text: assistance, generation, and accountability

Among current applications of AI in journal manuscripts, the use of AI-assisted technologies for written content is an area in which editorial guidance is relatively well developed. Researchers may encounter AI tools during language refinement, grammar correction, spelling correction, translation, and other aspects of manuscript preparation. The ICMJE recognises that authors may use AI-assisted technologies during manuscript preparation but emphasises that authors remain responsible for reviewing, approving, and ensuring the accuracy of all submitted content [1, 2].

The use of AI in manuscript text should therefore be considered according to the role it plays rather than simply whether an AI tool was used. Some applications primarily assist authors in communicating researcher-generated work. Examples include improving sentence structure, readability, grammar, and language expression. These applications may support scientific communication; however, as noted above, they do not replace the scientific judgement underlying the research itself.

A greater level of scrutiny is required when AI contributes to generating manuscript content. AI-assisted systems may produce text, summaries, factual statements, or references that require independent verification by authors before submission. Authors remain responsible for ensuring that information included in the manuscript is accurate, appropriately supported by evidence, and consistent with the underlying research. AI-generated references or citations require particular attention because inaccurate or unsupported references may compromise the reliability of the scientific record [1, 2].

Transparency is another central principle of responsible AI use. Authors should disclose the use of AI-assisted technologies according to the requirements of the target journal and should clearly understand the extent to which AI contributed to manuscript preparation. The use of AI does not transfer responsibility for the submitted work from authors to the technology. ICMJE emphasises that AI systems cannot be listed as authors because they cannot assume responsibility for the accuracy, integrity, and originality of published work [1]. COPE similarly highlights that accountability for published content remains with human authors and cannot be assigned to AI tools [3].

A useful way to interpret current editorial expectations is to consider whether AI is assisting the communication of existing scientific work or contributing material that becomes part of the scientific record. As AI involvement moves from language assistance toward content generation or modification of substantive meaning, the importance of verification, transparency, and author oversight

increases. This role-based view, rather than the fact of AI use alone, should guide evaluation. These categories should be understood as points along a continuum rather than as mutually exclusive classifications, because even apparently assistive uses may alter meaning, emphasis, interpretation, or the reader's perception of evidence [Table 1](#).

AI use in manuscript visuals: Communication, modification, and scientific integrity

Visual materials are an essential component of journal manuscripts. Figures, diagrams, schematics, illustrations, and other graphical elements often serve as important tools for communicating scientific findings and concepts. However, compared with AI-assisted writing, editorial guidance regarding AI use in manuscript visuals remains more heterogeneous

and still evolving, and disclosure requirements and permissions vary depending on the type of visual material involved. Expectations for AI-assisted explanatory diagrams, AI-assisted copy-editing of text within figures, and AI involvement in images representing actual research data are not identical, and ICMJE, individual journals, and publishers do not converge on a single standard across these categories. This reflects the broader challenge that visual materials may serve different functions: some communicate concepts or summarise information, whereas others represent experimental data or evidence that forms part of the scientific record.

A useful distinction is whether AI assists in communicating researcher-generated information or whether AI generates or modifies visual content that may influence scientific interpretation. AI-assisted

Table 1 Summary of current editorial guidance on artificial intelligence use in journal manuscripts

Artificial intelligence application in journal manuscripts	How this use should be considered	Key considerations for authors
Artificial intelligence-assisted grammar correction, spelling correction, and language refinement	Primarily supports communication of researcher-generated work	Authors remain responsible for the accuracy, meaning, attribution, and integrity of the manuscript. AI-assisted editing should not change the scientific meaning, interpretation, or conclusions. Disclosure should follow the requirements of the target journal
Artificial intelligence-assisted translation or readability improvement	Supports presentation of existing scientific information in another language or a more accessible form	Authors should verify that scientific meaning, terminology, context, citations, and qualifications have been preserved. Any substantive changes introduced during translation or editing should be corrected and, where required, disclosed
AI-assisted drafting or expansion of manuscript text	Represents a more substantial contribution of AI to the written content	Authors should critically review the output, verify factual accuracy and originality, check citations, remove unsupported claims, and ensure that the final text reflects their own scientific judgement. Disclosure may be required even when authors substantially revise the AI-generated text
AI-generated references, citations, or literature summaries	A potentially unreliable source of bibliographic and scholarly information. May introduce inaccurate, incomplete, or unsupported information into the manuscript	Authors must independently verify every reference, citation, quotation, and literature summary before submission. AI-generated output may contain fabricated, inaccurate, incomplete, or mismatched citations; accuracy and completeness must not be assumed
Artificial intelligence-generated or substantially AI-written text incorporated into a manuscript	Contributes directly to content that becomes part of the scientific record	Authors remain responsible for accuracy, originality, interpretation, attribution, and compliance with journal requirements. Authors should disclose the use of Artificial intelligence in the manner and location specified by the target journal or publisher
Artificial intelligence as an author or listed contributor	Not compatible with authorship responsibility	Artificial intelligence systems cannot assume responsibility for the published work, approve the final version, disclose conflicts of interest, or respond to allegations of misconduct. They therefore cannot meet standard authorship criteria
Artificial intelligence-assisted preparation of explanatory visuals (e.g., conceptual diagrams, schematics, workflow illustrations)	May support communication of scientific concepts or researcher-generated information, but permissibility depends on journal policy	Authors should verify scientific accuracy, ensure that the visual does not imply evidence that was not obtained, retain appropriate records of the process where relevant, and comply with journal-specific requirements for disclosure, labeling, or permission
Artificial intelligence-assisted formatting or visualization of author-generated data	May be part of the presentation or analysis workflow, depending on how the tool processes the data	Authors should ensure that the output is directly derived from the underlying data, does not introduce or suppress information, and can be reproduced or explained. The tool, version, relevant settings, and processing steps should be reported when required or when they affect interpretation
Artificial intelligence-generated or AI-altered research images, figures, or evidence-bearing visual materials	May affect the representation or interpretation of scientific evidence and therefore presents a high integrity risk	Authors should follow the specific policy of the target journal or publisher. Generating or materially altering evidence-bearing images may be prohibited or may require explicit editorial permission and detailed disclosure. Artificial intelligence should not introduce, remove, obscure, or alter scientific information in a way that changes the underlying evidence
Artificial intelligence-assisted enhancement of research images, such as denoising, upscaling, background removal, or restoration	Requires case-by-case assessment because enhancement may alter features relevant to interpretation	Authors should preserve the original files, document the processing steps, confirm that scientifically relevant information has not been changed, and disclose the intervention when required. If the effect on the evidence cannot be reliably assessed, the enhancement should not be used

preparation of explanatory materials, such as conceptual diagrams or schematic illustrations, may be treated differently from AI-generated or AI-altered images that represent scientific evidence. Researchers should therefore consider not only the use of AI itself but also the role AI played in creating the submitted visual material. In particular, AI enhancement or editing of real images (e.g., denoising, background removal, upscaling) occupies a grey zone and should be approached with extra caution and transparency.

Major publishers have developed guidance addressing the use of AI in manuscript figures and images, although the details vary across publishers [4-6]. For example, Elsevier's guidance for authors addresses the use of generative AI and AI-assisted tools in relation to images and figures submitted with manuscripts. It restricts the use of AI tools to create or alter images that could affect the accuracy or integrity of the scientific record, while recognizing that AI may be appropriate when it forms part of the research methodology and is described transparently [4]. Similarly, Springer Nature emphasises that authors remain responsible for the accuracy and integrity of submitted material and provides guidance regarding the use of generative AI in figures and images submitted for publication [5].

The distinction between visual communication and visual modification is particularly important. AI-assisted tools may help researchers organize, format, or present information generated from their own research. However, the use of AI to add, remove, obscure, or modify features within scientific images raises different concerns because such changes may alter the interpretation of the underlying evidence. Generating or materially altering images that purport to represent actual research results—such as micrographs, histology or pathology images, Western blots, radiology or imaging scans, gel images, or photographs of specimens—is largely prohibited, because AI-generated data images can misrepresent findings that never actually occurred. By contrast, a number of journals and publishers allow AI-generated schematic diagrams, illustrations, flowcharts, and graphical abstracts that do not claim to be a record of an experimental result, provided their AI origin is clearly disclosed; however, some publishers prohibit AI-generated images without explicit editorial permission, and others apply case-by-case, risk-based scrutiny. Any AI involvement that affects the content, meaning, or reproducibility of a scientific figure requires careful evaluation and transparency. Some publisher policies distinguish between AI used to prepare manuscript visuals and AI that forms part of the research methodology. When AI is an integral component of the research method, its use should be described transparently and reproducibly as part of the study methodology rather than treated solely as manuscript preparation [4-6].

Current guidance therefore does not support a simple classification of all AI-assisted visual materials as acceptable or unacceptable. Instead, researchers should determine the function of AI within the visual workflow, distinguish between explanatory materials and research evidence, follow the requirements of the target journal or publisher, and, when in doubt, treat AI-generated data images as prohibited unless explicitly allowed.

Conclusions: Preserving scientific integrity in an evolving AI landscape

AI will continue to influence how researchers prepare and communicate scientific manuscripts. As AI-assisted technologies become increasingly integrated into scholarly publishing, the central question is not simply whether AI was used, but what role AI played in creating the material submitted for publication.

Current editorial guidance generally emphasises that AI may support some aspects of manuscript preparation, but human authors remain responsible for the work's accuracy and integrity. The extent of verification and disclosure should be proportionate to the role AI played in the workflow and should follow the requirements of the target journal or publisher. AI used primarily to assist the communication of researcher-generated information may present different considerations from AI used to generate or modify content that forms part of the scientific record; however, even communication-focused uses require human review for accuracy, attribution, bias, and unintended changes in meaning.

Researchers using AI in journal manuscripts should therefore understand how AI contributed to written and visual materials, verify all AI-assisted content, disclose AI use in accordance with—and, where journal requirements are unclear, consistently with—the policies of the target journal or publisher. As AI capabilities continue to change, maintaining scientific integrity will depend less on restating these principles and more on operationalizing them; through disclosure norms, verification habits, and editorial guidance that keep pace with the technology itself.

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Author contributions

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Conflict of interest

I do not have any conflict of interest.

Data availability statement

Not applicable

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Supplementary file

None

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