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Guideline on the Boundaries of AIGC

Usage in Academic Publishing 3.0



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1

Background

In recent years, artificial intelligence (AI) technology has been developing rapidly, especially with the release of ChatGPT, the AI chatbot in November 2022. Artificial Intelligence Generated Content (AIGC) has entered the public eye and is widely used. It is clear that AI is gaining the ability to generate fluent language, making it increasingly difficult to distinguish the mass of generated sentences from human-written text. Some scientists are already using chatbots as research assistants to sort through ideas, write code, review the literature and provide feedback. The impact of AI on research paper writing, producing, and other aspects of research is growing, but it also presents significant challenges to the transparency and integrity of scientific research, which has attracted enormous attention from the academic community.

The main concern of the research community is that scientists, researchers, and students may fraudulently present AI-generated text as their own or simply use AIGC to produce unreliable research results. Large Language Models (LLMs) work by learning statistical language patterns from large online text databases. However, it should be noted that LLMs may generate false and misleading information, and fail to indicate the source of the information. Without output control, the utilization of AIGC may lead to the generation of inaccurate or biased viewpoints or unreliable research results, damaging the integrity of the academic ecosystem. At the same time, AIGC can make it even more difficult to detect academic misconduct (such as plagiarism and image manipulation) with current approaches.

Therefore, it is crucial to develop guidelines that clearly define the boundaries of AIGC usage in the academic community.

Currently, various national or regional policymakers, publishers, and other relevant organizations (the Committee on Publication Ethics (COPE), the International Committee of Medical Journal Editors (ICMJE), the International Association of Scientific, Technical and Medical Publishers (STM), Elsevier, Taylor & Francis, Wiley, Springer Nature, Wolters Kluwer, etc.) have engaged in the discussions of AIGC usage in academic publishing and have provided relevant regulations and guidelines. Notably, the descriptions and requirements in the AI-related reporting guidelines and normative documents issued by different organizations at different times often exhibit inconsistencies, such as CONSORT-AI for clinical trials; SPIRIT-AI for clinical trial protocols; TRIPOD+AI for predictive models, etc. Therefore, based on an extensive review and study of existing research and exploration in the industry, we are committed to establishing a framework and guidelines that outlines the fundamental principles of best practice for AI technology in academic publishing. We aim to provide a comprehensive framework for the regulation of AIGC usage within the publishing industry, the scientific community, and science and technology regulators, with a further consensus on the appropriate application of AI. In the meantime, as an emerging technology, the nature and usage of AI will inevitably continue to evolve. Therefore, this guideline will be updated on an ongoing and timely basis as necessary.

2 Objectives

2.1 Prevent academic misconduct and enhance research integrity governance

Taking the prevention of misuse of AIGC as the goal, education to raise the awareness of scientific integrity should be strengthened, and academic integrity governance promoted, to make sure that research activities can be conducted in an ethical manner.

2.2 Guide relevant stakeholders to reach consensus on the use of AIGC

Specify the best practices that relevant parties should follow in the preparation, research and data gathering, writing, submission, peer review, publication, and dissemination of academic journal articles, and provide detailed and standardized guidance on the appropriate use of AIGC.

3 Principles

3.1 Transparency and accountability

Transparency and accountability are the fundamental principles underlying the use of AIGC in academic publishing. In the process from academic research to publication and dissemination, all application users (including researchers, authors, editors, peer reviewers, and readers, etc.) should be aware of and explicitly disclose the use of AIGC in their work. Application providers and technical developers should clearly disclose the data training and content sources used by the application. Transparency should include data transparency, which involve datasets, data sources, and data processing methods; in addition, the use of intellectual property and copyright information should be disclosed as well. Accountability is a shared responsibility of all the key stakeholders, including researchers, research institutions, funders, policymakers, and publishers; the establishment and clarification of the

accountability standards and related information is significant.

Quality and integrity assurance is fundamental to building trust in the application of AIGC in academic research. From the design and development of algorithms, to the inputs for training AIGC, to the inputs used in practical applications, the principles of accountability and transparency should be followed, and the use of AIGC should be indicated through identifiers or feedback mechanisms to ensure that the quality and integrity of academic research is not compromised by the utilization of AIGC technology.

3.2 Privacy and data security

Privacy and data security are the fundamental legal principles for the use of AIGC. Authors should be aware that any content input into AIGC tools may be collected,

stored, and used by the model provider for subsequent training, raising potential privacy and data security considerations. To mitigate these risks, we recommend adhering to data minimization principles and applying appropriate de-identification measures. It is also advisable to avoid submitting sensitive information—such as personal identifiers, research participant data, or unpublished research materials. Additionally, authors are required to strictly comply with all applicable privacy policies, data security protocols, and confidentiality requirements established by their target publication venue.

3.3 Fairness

The utilization of AIGC should be under the principle of fairness to avoid bias. As AI has the risk of replicating and amplifying bias, potential sources of bias should be carefully assessed and reviewed in the process of training data selection, algorithm design, model generation, optimization, and application. A feedback mechanism should be established to monitor, review, and correct potential biases in a timely manner. Meanwhile, AIGC can help provide services such as copyediting and language polishing to reduce systemic inequities caused by cultural or linguistic differences.

3.4 Sustainable development

The multidisciplinary nature of AI demonstrates immense potential in addressing global challenges such as the United Nations Sustainable Development Goals and carbon neutrality. However, while empowering societal progress, the substantial energy consumption required for AI training and operation places persistent pressure on the global climate and ecosystems. To address this challenge, financial support and other incentives can be leveraged to promote the supply and optimization of high-quality training data. This approach assists data providers in extracting more practically valuable knowledge, ensuring data quality at its source, and enabling more precise and efficient model training—thereby reducing unnecessary energy consumption.

Sustainable development should be a core principle of AIGC itself. To avoid resource waste, excessive reliance on unreliable or unsustainable data sources must be avoided when utilizing AIGC. Functional modules of AIGC tools should adhere to recognized standards and guidelines, ensuring data is discoverable, accessible, interoperable, and reusable. Throughout this process, reducing the environmental impact of generative AI must remain a key guiding principle, driving the sustainable development of the technology.

4

Behavioral framework/ practice guideline

AIGC tools can provide assistance (services) at various stages of research and academic publishing. In order to foster a conducive research environment, to address potential issues, and to prevent/reduce misuse of AIGC, this section provides a framework to guide authors, research institutions, academic publishers, and so forth,

on compliant and responsible use of AIGC.

4.1 Research and writing

This section mainly provides guidance to researchers on the use of AIGC during the research and manuscript writing prior to submission.

4.1.1 Information collection

The data provided by AIGC tools are generated and extracted on the basis of big data and large language models. However, their accuracy and authenticity are not assessed or verified. In accordance with the accountability principle, researchers should critically assess these outputs and bear final responsibility for their reliability.

Literature research: AIGC tools can be used to collect reference literature based on keywords or topics, classify and review the literature, summarize the conclusions, and provide references for researchers; moreover, it can help researchers identify new sources of information and keep track of the latest developments in the research field. It should be noted that the references provided by AIGC may be hallucinated or outdated. Researchers using AIGC to support their literature review must carefully review and verify the authenticity of each suggestion and reference provided, and make human-led decisions on what to include in their research. Additionally, the deep research capabilities introduced by major AIGC tools have become powerful instruments for literature collection and analysis, enabling rapid organization of vast amounts of scholarly information. When utilizing these tools, it is essential to verify the reliability of literature databases and conduct careful review of output results to guard against potential AI hallucinations.

Concept clarification: AIGC can answer some basic conceptual questions to assist researchers in structuring their chapters. However, it should be noted that AIGC provides concept clarification based on the corpus of training data, making human oversight of any AIGC an essential step.

Research on viewpoint information: AIGC can collect information from the text on the viewpoints, emotions, and sentiment tendencies of the public or experts on

certain issues. Guided by the principle of "fairness", researchers need to monitor and control the viewpoint information provided by AIGC tools, and clean up the information provided by AIGC tools if necessary, to ensure that researchers use only valid, unbiased material and prevent the dissemination of false, biased, or discriminatory information. Ise, biased, or discriminatory information.

4.1.2 Statistical analysis

In some cases, researchers have collected data but are uncertain about the best statistical analysis to test their hypotheses. Researchers can use AIGC to select the most appropriate method of analysis or statistical analysis; however, the data used should be collected from their own experiments or obtained through other legitimate means, and the results of statistical analysis should be verified by the researchers to ensure the reliability and validity.

Data analysis and interpretation: Researchers may use AIGC tools to interpret data, calculate statistical indicators, perform simple data analysis, and describe statistical results. However, AIGC cannot replace the researcher's own interpretation of the data.

Suggestions and guidance on statistical methods: AIGC tools can provide researchers with suggestions and guidance on statistical analysis based on the question and relevant knowledge. However, these suggestions and guidance are solely based on the language model and knowledge base it has learned, which may lead to omissions and inaccuracies. Therefore, researchers need to assess the feasibility of the statistical analysis suggestions provided by AIGC, evaluate them with other reliable statistical analysis and data mining tools, or seek guidance and assistance from the subject experts to finally determine whether to accept the suggestions provided by AIGC tools.

4.1.3 Charting

Charting and Image Generation: Based on the characteristics of the data and the intended purpose, AIGC tools can recommend the most suitable type of statistical graph for the application scenario. This helps present statistical results in a clear and effective manner, allowing researchers to convey their findings more efficiently. As a result, AIGC saves time in graph creation and enhances overall writing productivity. However, all critical images used to present research findings and data must be directly derived from authentic research process and original data. They must not be directly generated or altered using AIGC tools. For example, experimental images in the biomedical field—such as Western blot analysis diagrams, cell technology analyses, and tissue cell staining diagrams—must be obtained from genuinely conducted experimental research. The use of generative AI in the production of graphical abstracts is also not permitted. The use of generative AI in the production of cover art may in some cases be allowed, if the author obtains prior permission from the journal editor and publisher, can demonstrate that all necessary rights have been cleared for the use of the relevant material, and ensures that there is correct content attribution.

Statistical chart and diagram format processing and optimization: When processing and optimizing statistical charts, researchers can use AIGC tools to help adjust chart styles according to the amount of data and specific needs. These adjustments include, but are not limited to, adjusting font sizes, adding or modifying data annotations, adding legends, changing colors, etc. These optimizations are designed to make the charts clearer, more beautiful, and more readable and easy to understand. At the same time, researchers should ensure that when using the AIGC tool to adjust the chart, they follow the standard operation to ensure the authenticity and accuracy of the data.

Image format processing and optimization: This entry

covers types of images including video and animation (such as video stills), photography, scientific diagrams, photo illustrations and other collages, as well as editorial illustrations such as drawings, cartoons, or other 2D or 3D visual representations. It is not acceptable to enhance, obscure, move, remove, or introduce a specific feature within an image. Adjustments of brightness, contrast, or color balance are acceptable only if they are applied uniformly to the entire image and do not obscure or eliminate any information present in the original. Similarly, amendments such as adding legends and image annotations are also acceptable. When researchers create or change image content using AIGC tools, they are required to provide a clear description of the content that was created or altered, an explanation of how the AI or AI-assisted tools were used.

Case Demonstration: Application of AIGC in Chart Creation

Example 1: Trend Analysis

- ◆ Scenario: Need to show the development trend of a technology over the past decade.
- ◆ AIGC Application: AIGC tools can generate a line chart based on the provided data, automatically adjusting the chart's axes, labels, and legends to clearly display the trend.

Example 2: Categorical Data Analysis

- ◆ Scenario: Need to compare the market shares of different products.
- ◆ AIGC Application: AIGC tools can generate bar charts or pie charts based on categorical data, recommending the most suitable format for data presentation, and automatically setting chart colors and labels for easier interpretation.

Example 3: Enhancing Charts in Academic Reports

- ◆ Scenario: Need to present research findings in an academic report, but the chart styles are not visually appealing.
- ◆ AIGC Application: AIGC tools can adjust the chart's font size, colors, data labels, and legend positions, making the charts more attractive and easier to under-

stand.

Example 4: Brightness and Contrast Adjustment

◆ Scenario: Need to display photos of an excavation site, but the photos are too dark due to poor lighting conditions.

◆ AIGC Application: AIGC tools can adjust the brightness and contrast of the photos, making the details clearer without losing the original information.

Example 5: Annotating Medical Images

◆ Scenario: Need to present a patient's medical images at a conference, highlighting some important features.

◆ AIGC Application: AIGC tools can add legends and annotations to the images, pointing out key anatomical structures or lesions to help the audience better understand the image content.

◆ AIGC Application: Use AIGC tools to check for grammar and spelling errors and improve sentence structure, making the text clearer and more fluent. For example, break long sentences into short, powerful ones or use more precise vocabulary.

Example 2: Structuring a Paper Outline

◆ Scenario: Uncertain about the overall structure of the paper and how to organize the different sections.

◆ AIGC Application: Use AIGC tools to generate a paper outline, including sections such as Introduction, Literature Review, Methods, Results, and Discussion, and provide content suggestions for each part. Researchers can use these recommendations to organize their research content, ensuring a clear and logical flow in the paper.

4.1.4 Text writing

In the writing process, AIGC can be used as a reference for researchers to improve the readability of the text, clarify the logic of the content, and recommend sentence patterns, and so forth. Also, AIGC can be used to summarize other scholarly publications during the research process or to generate the literature review section. However, it should not be used to write the entire text, interpret data, or draw scientific conclusions. Due to the risk of inaccuracies, bias and omissions, summaries for research and literature review purposes should always be thoroughly checked against the original publication to ensure accurate reporting of the ideas, methodologies, results, and conclusions. All tasks related to scientific or intellectual contributions should be carried out by the researchers themselves, especially the writing of the critical parts of the paper. The purpose of using AIGC should be to focus on how to convey the scientific knowledge generated by the researches in the most readable way.

Case Demonstration: Application of AIGC in Writing

Example 1: Editing Document Grammar and Style

◆ Scenario: Concerned about the fluency of language expression while writing a paper.

4.1.5 Language and copyediting

Academic language services: Language should not be a barrier to academic communication and scientific dissemination. AIGC can serve as a high-standard language reviewer, improving the readability and writing quality of manuscripts, and thus removing language barriers in the dissemination of research. At present, AIGC-supported academic language services can assist non-native English-speakers in copyediting their manuscripts to meet the submission requirements of international journals. However, researchers also need to be aware that when a manuscript is submitted (in whole or in part) to the public AIGC or private AIGC services with low data security and confidentiality standards, it may become part of a large language model training corpus. Participation in AI training should be pre-agreed with co-authors and other stakeholders such as funders or publishers before using AIGC tools that could potentially use the manuscript (or part of it) to that end. Authors should check the terms and conditions of any AI Tool they wish to use to ensure that, they only grant to the AI Tool the right to use their materials to provide the service to them and that they do not grant to the AI Tool any other rights to the materials that they input into the AI Tool (including without limitation the

right to train the AI Tool on those materials). They must also ensure that the AI Tool does not impose constraints on the use of outputs from the AI Tool in a way that could restrict the subsequent publication of the relevant article.

4.1.6 Citation management

When dealing with content recommended by AIGC, "citation relevance" is crucial. Researchers must ensure that the cited content is relevant to the paper, including the authenticity of the citation and the cited content.

Citation format check: AIGC tools can verify whether the cited literature conforms to the citation format of academic papers and identify possible errors or deficiencies.

Automatic citation generation: Authors are responsible for ensuring that any citations generated by AIGC tools are reliable, accurate, and relevant. While AIGC can assist researchers in identifying sources of citations and automatically generate citations that conform to the citation format of academic papers based on the literature information provided by the authors, it should only be used as an auxiliary tool. Authors must be responsible for citations and carefully check the format and content of citations to ensure that citations meet the normative requirements of academic papers.

Automatic sorting of references: AIGC can automatically sort and check the reference list according to the specified citation format, thus helping authors to perform the relevant tasks of standardized citation in academic writing, saving the effort of manual work, improving the quality of the paper and the efficiency of researchers.

4.2 Submission and review

AIGC tools can assist with the submission process, but this requires the professional judgement of researchers who should bear the ultimate responsibility.

4.2.1 Authorship

Researchers must not permit AIGC tools to autonomously initiate, execute, or generate research outcomes without direct human supervision and guidance. Furthermore, AIGC tools cannot be held accountable for published works or research designs, emphasizing the necessity of human oversight and responsibility throughout the research process. Similarly, in most countries, AIGC does not have legal status or the ability to hold or transfer copyrights, which are the basic requirements for authorship. Therefore, according to the COPE position statement on AI tools, AIGC cannot perform the role of authors and cannot be listed as authors.

4.2.2 Standardized citation

All content originating from other sources must be carefully reviewed and properly cited. Authors must verify the authenticity and accuracy of the information provided by AIGC, and make reference notes to the underlying data sources, tools, collection, processing, etc.

4.2.3 Disclosure and statement

The use of AIGC should be fully and accurately disclosed. The following points should be clearly specified: The user; the artificial intelligence technology or system (version number required); the time and date of use; prompts and questions used for content generation or optimization; sections of the paper generated or co-generated by AIGC tools (including but not limited to text, charts, code, etc.); and ideas or viewpoints generated as a result of using AIGC. If an author has used such tools to write any part of the manuscript, they must provide open, transparent, and detailed disclosure in sections such as Methods, Notes, Acknowledgments, or Appendices.

[Template]

Statement: During the preparation of [specific section, e.g., literature review/methods] of this study, the author used [AIGC tool/service name and version] to assist with [purpose of use: e.g., literature research/data analysis/chart creation/-text polishing]. The tool was used on [specific date and time], and the key prompts or questions input included: “[specific prompts and questions]”. Related records, generated content, and the revision process for using the tool/service have been saved in the attachment [attachment number or name] for review. The author has thoroughly reviewed and revised the AI-generated content and assumes full responsibility for the publication’s content.

4.2.4.2 Reviewer

During the manuscript review process, reviewers must determine whether AIGC tools can be used based on the policies of the commissioning party (e.g., journals or publishers). If journal policies explicitly prohibit their use, AIGC tools must not be employed.

Within the bounds of journal policies, reviewers may responsibly utilize AIGC tools to extract key information for the purpose of reviewing or assisting in the drafting of review comments. It is important to note that AIGC tools may only be used to enhance reviewers' comments, not to process the content under review. Reviewers must ensure their feedback remains accurate, truthful, and impartial, and verify that their comments fully and specifically reflect their professional judgment. Without explicit permission, reviewers must not upload full manuscripts, core arguments, key data, or other sensitive content to public AIGC tools to prevent information leakage.

4.2.4 Paper review**4.2.4.1 Reviewing client**

It is recommended that commissioning client (journals and publishers) establish clear policies for the use of AIGC, explicitly defining the permitted scope of AIGC tools, prohibited scenarios, and associated requirements. This provides authors, editors, and reviewers with consistent and transparent operational guidelines. Simultaneously, journals and publishers should strengthen their efforts in policy promotion and personnel training. This includes, for instance, prominently displaying relevant policies and guidelines on their official websites' homepages or critical procedural pages to ensure all stakeholders have constant access. Furthermore, regular specialized training should be organized to ensure that editors and reviewers apply the technology in a transparent, standardized, and responsible manner.

Where feasible, journals or publishers should proactively provide or recommend localized deployment tools that comply with data security and ethical standards, thereby mitigating associated risks at the source.

4.2.4.3 Author

During the peer review response stage, authors may use AIGC tools to assist in structuring their responses and organizing contents, provided such use is not explicitly prohibited by the journal's policy. Specifically, based on their own understanding and synthesis of the reviewers' comments, authors can consult AIGC tools for advice on organizing the logical flow of their responses, developing argumentation strategies, or for text polishing and language refinement.

However, it is crucial to note that authors must not upload the full review report, any sections thereof, or any identifiable details from it into public AIGC tools. Furthermore, irrespective of whether AIGC tools are used, authors retain full responsibility for the accuracy and professionalism of the final response and must be prepared to justify their reasoning upon request.

4.3 Post-publication /publishing

4.3.1 Data archiving and sharing

To promote open sharing of scientific data and enhance research transparency and verifiability, authors are encouraged to make their raw data and procedural materials publicly available on the premise of relevant requirements. Content generated or processed by AIGC tools—such as text, images, and codes—should be submitted as supplementary materials and archived to facilitate future review and validation.

Authors should conduct a rigorous review of the data in their papers, including raw and processed data, to ensure accuracy, completeness, and reliability. The focus of the data review should include the methods of data collection and processing, the accuracy and precision of measurements, the methods of data storage, and so forth. For research papers involving experimental process, authors should maintain and submit detailed records of experiments and data collection processes to prevent errors or omissions.

4.3.2 Detection and identification of AIGC

Journals and editors are advised to pay attention to security when using new tools to detect and identify content generated by AIGC tools to prevent information leakage and misuse of data. When setting up a review process for AIGC tools, in addition to developing appropriate technologies, manual review, and automated detection, it is important to be particularly vigilant about possible false positives. The detection results should be used as an auxiliary supporting basis in a comprehensive evaluation together with the requirements of the journal, the scope and the overall quality of the paper, and so forth.

Researchers must provide clear disclosure and statement when using AIGC tools to generate manuscript text and other materials, otherwise it may constitute academic misconduct.

5 Case Analysis

5.1 Case 1: Author blames ChatGPT for ethics and integrity concerns

Case Description: During the peer review process, the reviewers raised several concerns about the manuscript, specifically questioning whether there were misrepresented citations and whether non-existent sources had been cited. In the subsequent inquiry with the authors, they admitted to using ChatGPT to write the manuscript. However, they had not fact-checked the content nor verified the sources cited by ChatGPT. Given these issues, the authors requested an opportunity to

revise the manuscript, offering to remove all content generated by ChatGPT and rewrite the article. However, this request was denied for the following reasons: the authors did not disclose the use of ChatGPT in their initial submission, and they failed to fact-check all the content. All listed authors are jointly responsible for the integrity of the article, and this oversight constitutes serious academic misconduct. Consequently, the manuscript was rejected for publication.

5.2 Case 2: The Retraction of a Medical Team's Paper

Case Description: On April 5, 2024, a medical team published a paper in a medical journal. The study

claimed that alkaline water could reduce pain and alleviate symptoms in patients with chronic gouty arthritis. However, just three months later, the paper was retracted due to multiple serious issues¹.

6 Conclusion

AIGC is an emerging concept involving multiple actors with diverse application scenarios in academic publishing, and there are many gray areas regarding the boundaries of AIGC application. Institute of Scientific and Technical Information of China (ISTIC), in collaboration with international Publishers Elsevier, Springer Nature, Wiley, Taylor & Francis, Wolters Kluwer, Cambridge University Press and after seeking advice from relevant parties, proposes suggestions for the use of AIGC technology in the form of principles and behavioral framework/practice guideline to prevent academic misconduct, strengthen integrity governance, and guide stakeholders to reach a consensus on the use of AIGC.

It is worth noting that the purpose of this guideline is to provide an exploratory framework for the application of AIGC technology, and there are still some more specific and practical issues that require further research. For example, the application of AIGC technology in academic publishing involves many stakeholders, including not only the owners and users of AIGC technology development and application, but also various responsible parties in the academic publishing process such as authors, journals, editors, reviewers, disseminators,

audiences, and research regulators. It is of great importance to clarify the relationships between these parties, to identify key responsibilities and constraints, and to clearly define their responsibilities. On the other hand, there is no consensus on how to deal with the misuse of AIGC technology, and it is crucial to propose suggestions for the proper handling of various misuses for the benefit of the implementation of responsibilities.

In the third edition, we have refined and revised the guidelines based on the current state of AIGC technology and tools. Key improvements include: standardizing terminology and expressions to enhance textual rigor; detailing disclosure and declaration requirements during the manuscript submission phase; and emphasizing the responsibilities of relevant parties (including journals/publishers and reviewers) during the review process. These updates aim to improve the practicality and forward-looking nature of the guidelines.

As AIGC technology and tools are still under continuous innovation and development, the scope and behavioral framework of this guideline will also need to be regularly adapted to meet new challenges and address emerg-

¹Retracted paper:

https://journals.lww.com/md-journal/fulltext/2024/07120/assessment_of_the_efficacy_of_alkaline_water_in.91.aspx.

ing issues. We actively invite all parties to provide suggestions and feedback to update this guideline on the use of AIGC in order to provide stakeholders with a more specific and detailed practical framework for preventing academic misconduct.

We are aware that individual publishers' policies and practices may differ from each other, each tailored to their unique policy and business environment as well as

user scenarios. Therefore, we'd like to point out that this Guideline does not prevail over or replace any policies or guidance of individual publishing houses. We hope the Guideline serves as a reference tool for the research community, and we do encourage authors, editors and reviewers to always familiarize themselves with the polices as documented on the website of the individual publisher/journal in their work.

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