

Impact of Artificial Intelligence (AI) on the Quality, Efficiency, and Transparency of the Scholarly Publishing Process

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ABSTRACT

Artificial Intelligence (AI) has become an integral part of the scholarly publishing process, offering innovative solutions to enhance quality, efficiency, and transparency. With the rise of automated tools for plagiarism detection, peer review assistance, and workflow optimization, the publishing industry has witnessed a significant transformation. However, the ethical challenges and potential biases in AI adoption raise critical questions about fairness and accountability. This review synthesizes insights from recent studies and literature on AI applications in scholarly publishing, focusing on how AI tools impact various stages of the publishing process. It evaluates AI's role in enhancing manuscript quality, expediting editorial workflows, and improving the transparency of peer review and data integrity. Examples of AI tools and their use cases, such as plagiarism detection software, reviewer-matching algorithms, and image fraud detection systems, are examined to illustrate their practical applications. The AI has demonstrated measurable benefits in improving publication quality through automated error detection, language enhancement, and statistical validation tools. It has significantly increased efficiency by automating time-consuming processes like reviewer selection, manuscript formatting, and compliance checks. Furthermore, AI-driven systems have enhanced transparency by detecting data manipulation, ensuring accountability in peer review, and facilitating open dissemination of research. Despite these advancements, challenges persist, including biases in algorithms, ethical concerns, and the lack of transparency in proprietary AI systems. The AI is reshaping the scholarly publishing landscape by addressing critical challenges related to quality, efficiency, and transparency. However, ethical implementation and ongoing oversight are necessary to mitigate potential biases and ensure that AI-driven solutions remain fair, accountable, and equitable. The responsible integration of AI can revolutionize scholarly publishing, making it more robust and trustworthy.

KEYWORDS

Artificial Intelligence (AI), scholarly publishing, peer review, transparency, workflow automation

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INTRODUCTION

Artificial Intelligence (AI) has profoundly transformed the scholarly publishing landscape by enhancing the quality, efficiency, and transparency of research dissemination. The AI-driven tools play a crucial role in addressing long-standing challenges, such as plagiarism detection, peer review efficiency, and data



integrity verification¹. These technologies streamline manuscript preparation, automate editorial workflows, and improve transparency in research evaluation². For instance, AI-powered plagiarism detection tools like iThenticate help maintain research integrity, while machine learning algorithms assist in reviewer selection, reducing delays in the peer review process³.

Despite these advancements, concerns persist regarding biases in AI algorithms, ethical considerations, and the accountability of proprietary AI systems⁴. The reliance on AI for manuscript evaluation raises questions about fairness, as biased training data can reinforce existing inequalities in scholarly publishing⁵. Additionally, while AI enhances transparency through automated error detection and fraud prevention, the opacity of some AI models limits full reproducibility and trust in AI-assisted decision-making⁶.

This review synthesizes current research and case studies to explore the opportunities and challenges AI presents in academic publishing. It argues that while AI significantly enhances the quality, efficiency, and transparency of scholarly communication, its responsible and ethical implementation is essential to ensure fairness, reproducibility, and trust in the academic ecosystem.

Enhancing the quality of scholarly publishing

A double-edged sword: Artificial Intelligence (AI) has fundamentally reshaped the scholarly publishing process, enhanced quality, efficiency, and transparency while also introducing significant challenges. The AI-driven tools address persistent issues such as plagiarism detection, peer review inefficiencies, and data integrity verification¹. However, despite these advancements, AI's integration into publishing workflows raises concerns regarding algorithmic bias, ethical considerations, and accountability⁴.

The AI has improved manuscript quality by automating language editing, plagiarism detection, and statistical validation. For example, tools like Grammarly and Write Full assist non-native English speakers in improving writing clarity⁷, while Turnitin and iThenticate detect plagiarism, ensuring research originality³. The AI-driven statistical reviewers such as Stat Reviewer flag errors in data analysis, reducing methodological flaws⁸.

However, over-reliance on AI tools may compromise academic rigor. The AI-generated language corrections can lead to homogenization of academic writing, potentially reducing diversity in scholarly expression. Additionally, plagiarism detection algorithms sometimes misidentify common phrases as plagiarism, leading to unjustified rejections⁹. Case studies highlight instances where AI-generated content was flagged as plagiarized, demonstrating the need for human oversight in interpreting AI-generated results¹⁰.

Increasing efficiency in publishing workflows

Productivity vs ethical pitfalls: The AI significantly accelerates the publishing process by automating time-intensive tasks. Manuscript submission, formatting, and metadata creation are now faster due to AI systems like Overleaf and Scholar One, which streamline the preparation of manuscripts. These tools also integrate automated checks for compliance with journal guidelines, reducing the time required for initial review and resubmissions.

Moreover, AI expedites the peer review process. Reviewer matching, a traditionally manual and time-consuming process, is now facilitated by AI algorithms. For example, Elsevier's Reviewer Finder uses machine learning to recommend suitable reviewers based on their expertise, citation history, and availability, thereby shortening the time taken to assign reviewers⁹. Such automation not only improves efficiency but also reduces the burden on editors, allowing them to focus on more critical decisions.

The AI's role in preprint servers and open-access platforms is another notable efficiency enhancement. The AI-based tagging and classification systems help researchers find relevant articles quickly, ensuring timely access to cutting-edge knowledge¹⁰. Semantic search engines like Semantic Scholar use AI to provide highly relevant search results, saving researchers valuable time.

Despite these benefits, AI-driven automation may introduce biases and ethical concerns. Reviewer-matching algorithms can reinforce citation bias by recommending reviewers from dominant research groups, potentially marginalizing underrepresented scholars⁵. Additionally, AI-generated manuscript rejections such as those based on automated compliance checks can lead to unfair outcomes if the algorithms lack contextual understanding of research contributions².

Improving transparency in publishing

Trust vs algorithmic opacity: The AI enhances transparency in scholarly publishing by detecting data manipulation and standardizing peer review processes. For example, image analysis tools like Image Twin and Proofig identify fraudulent image duplications in biomedical research, preventing scientific misconduct⁸. The AI-powered blockchain-based systems offer immutable peer review records, increasing accountability in scholarly publishing¹¹.

However, AI-driven transparency efforts are themselves subject to opacity. Many AI systems used in publishing are proprietary, limiting external scrutiny and raising concerns about reproducibility⁴. Cases of algorithmic bias in fraud detection tools have been reported, where genuine image modifications were mistakenly flagged as fraudulent, resulting in unjustified retractions⁶. The lack of transparency in AI decision-making undermines trust in AI-driven publishing systems, requiring greater regulatory oversight⁵.

In conclusion in this aspect, AI has undeniably transformed the scholarly publishing process, offering solutions to enhance quality, efficiency, and transparency. However, these benefits come with ethical risks, biases, and challenges in algorithmic accountability. While AI expedites workflows and improves research integrity, its potential to introduce bias, misinterpretation, and opaque decision-making processes necessitates careful implementation. The future of AI in scholarly publishing hinges on responsible AI governance, human oversight, and ethical AI development to ensure that technology enhances rather than undermines the integrity of academic research.

Challenges and ethical considerations: Despite its numerous advantages, the adoption of AI in scholarly publishing is not without challenges. Biases in AI algorithms, stemming from training on skewed or incomplete data, can perpetuate inequalities in the review process. Moreover, the reliance on proprietary AI systems raises questions about fairness, reproducibility, and accountability³. Publishers must ensure that AI systems are transparent and auditable to avoid undermining trust in the scholarly publishing ecosystem.

Complexities, ethical considerations, and future challenges: Artificial Intelligence (AI) is rapidly transforming scholarly publishing by streamlining workflows, enhancing research integrity, and improving accessibility. However, these benefits come with complex ethical, social, and technical challenges, including algorithmic bias, impacts on human roles, data privacy concerns, and the exacerbation of the digital divide⁴. While AI enhances efficiency, it also introduces risks such as unintended biases in peer review, data misuse, and an over-reliance on opaque, proprietary algorithms¹.

Algorithmic bias and its impact on fairness in scholarly publishing

Problem of bias in AI-driven editorial decisions: The AI-driven tools play a crucial role in peer review, reviewer matching, and manuscript evaluation, but they are susceptible to algorithmic biases. Machine learning systems used to recommend reviewers such as Elsevier's Reviewer Finder often favor well-established researchers, reinforcing citation and prestige biases while underrepresenting researchers from marginalized or emerging regions⁵. Studies show that AI-based editorial tools disproportionately recommend male authors, contributing to gender disparities in publishing opportunities².

Case study

Gender and Regional bias in AI-generated peer review assignments: A study revealed that AI reviewer-matching algorithms frequently assigned Western-based male researchers to high-impact journal reviews, while female researchers and scholars from the Global South were less frequently recommended, despite having comparable expertise⁹. These biases stem from training data that reflect historical inequalities in publishing, thereby perpetuating rather than mitigating systemic imbalances.

Unintended consequences of automated plagiarism detection: Plagiarism detection tools like Turnitin and iThenticate, while essential for maintaining integrity, sometimes flag common phrases or self-citations as plagiarism, disproportionately affecting researchers whose first language is not English³. The rigid nature of AI in plagiarism detection fails to recognize nuances in academic writing, leading to wrongful accusations of misconduct.

Evolving role of humans in AI-augmented publishing

AI as a tool for editors and reviewers, not a replacement: The AI enhances efficiency by automating language editing, statistical validation, and image fraud detection. Tools like Grammarly and Write full help non-native English speakers refine manuscripts, while AI-powered statistical reviewers detect inconsistencies⁸.

However, concerns arise over AI replacing human decision-making in editorial processes. Publishers increasingly rely on AI to pre-screen submissions, which may lead to automated desk rejections based on formatting and perceived quality rather than scientific merit¹¹. While AI improves efficiency, the loss of human intuition in recognizing innovative but unconventional research is a growing concern.

Case study

Automated rejections in predatory vs reputable journals: A study found that some predatory journals use AI-driven review systems to give the illusion of rigorous peer review while accepting low-quality papers for profit¹⁰. In contrast, reputable journals implementing AI desk-rejection systems risk filtering out novel, high-risk research that does not fit standardized AI metrics.

Ethical responsibility in AI-augmented peer review: Editors must remain accountable for AI-assisted decisions, ensuring transparency and explainability in manuscript evaluation. A hybrid model where AI suggests improvements, but human reviewers make the final decisions is crucial to maintaining academic integrity and fairness⁴.

Data privacy and security in AI-powered scholarly publishing

Risks of AI in handling sensitive research data: The AI systems used in publishing often require access to large datasets, including unpublished manuscripts, reviewer comments, and confidential research findings. However, data privacy laws such as GDPR (General Data Protection Regulation) pose challenges to AI's unrestricted access to scholarly content⁶.

Major privacy concerns include:

- Unauthorized AI training on proprietary data (e.g., AI tools learning from rejected manuscripts without consent)
- Risk of AI-driven plagiarism detection exposing confidential information (e.g., preprint servers using AI to flag plagiarism before official peer review)
- Commercial publishers monetizing AI-driven insights from manuscript databases without author approval⁹

Case study

Privacy breach in AI-powered publishing platforms: Researchers reported that an AI-powered manuscript recommendation system had inadvertently leaked confidential peer reviews, leading to ethical and legal concerns⁵. This underscores the need for transparent, accountable data governance in AI-assisted publishing workflows.

Digital divide: Benefits from AI in publishing

Unequal access to AI-powered publishing tools: AI-enhanced publishing tools benefit well-funded institutions but exacerbate disparities for researchers in low-resource settings. Many AI-powered services such as automated language editing, plagiarism detection, and statistical analysis tools require paid subscriptions, limiting accessibility for researchers in developing countries¹.

Case study

AI-assisted publishing in high-income vs low-income institutions: A study comparing AI usage across top-tier Western universities and institutions in Africa and South Asia found that researchers in wealthier institutions had greater access to AI-based publishing tools, leading to higher acceptance rates in prestigious journals². This digital divide risks reinforcing existing inequalities in knowledge production and global research influence.

Open-access AI

A path toward inclusive publishing: To bridge this gap, open-access AI tools for research assistance, such as OpenAI's GPT-based manuscript drafting tools and free AI-powered proofreading platforms, could democratize publishing¹⁰. Additionally, initiatives like AI-driven translation tools for multilingual research dissemination could reduce linguistic barriers in global scholarship⁷.

Ethical Considerations and Policy Recommendations: To mitigate AI's risks while maximizing its benefits, the following policy measures are essential:

Bias audits and transparency requirements:

- Journals should conduct regular audits of AI-driven peer review and editorial decision-making systems to detect biases
- AI-powered tools must provide explainable decision-making logs to ensure transparency⁵

Human-AI collaboration in editorial oversight:

- AI should support but not replace human reviewers and editors in critical decision-making
- Hybrid models should combine AI-driven efficiency with human ethical reasoning⁴

Global access to AI-powered publishing tools:

- Publishers should provide low-cost or free access to AI research tools for low-income institutions
- AI-driven translation services should be integrated to support multilingual academic publishing²

Data privacy and security frameworks:

- AI should adhere to strict ethical guidelines on manuscript confidentiality and reviewer anonymity
- Policies should prevent AI systems from being trained on proprietary data without author consent⁶

CONCLUSION

Artificial Intelligence (AI) is transforming scholarly publishing by enhancing quality, efficiency, and transparency. The AI-driven tools, such as automated plagiarism detection, peer review matching, and fraud detection, have strengthened the integrity and speed of the publishing process. However, challenges like algorithmic bias, ethical concerns, and unequal access to AI-powered tools must be addressed to ensure equitable and responsible publishing. To mitigate these challenges, publishers should implement bias audits in AI-driven peer review, develop explainable AI (XAI) models for transparency, and provide subsidized AI tools for researchers from low-resource institutions. Authors should critically assess AI-generated recommendations, advocate for ethical AI policies, and engage in AI literacy training. Policymakers must establish AI transparency guidelines, mandate disclosure of AI-generated content, and promote open-access AI tools to support underrepresented regions. Future research should focus on developing ethical AI models that minimize biases, ensuring AI transparency in decision-making, and leveraging AI for open science to improve research reproducibility. The AI should complement human expertise in scholarly publishing, assisting editors and reviewers rather than replacing them. By embracing responsible AI governance, continuous human oversight, and equitable access, the publishing industry can harness AI's full potential while safeguarding academic integrity, fairness, and inclusivity.

SIGNIFICANCE STATEMENT

This study underscores AI's transformative role in scholarly publishing by improving quality, efficiency, and transparency while addressing challenges like plagiarism and workflow inefficiencies. It offers practical guidance for stakeholders (researchers, editors, publishers, and peer reviewers) on integrating AI tools in manuscript preparation, peer review, and dissemination. The study promotes ethical AI practices, tackling biases and fostering fairness and accountability. It highlights how AI accelerates publishing workflows by automating repetitive tasks, reducing time to publication, and easing workloads. By emphasizing transparency and data integrity, it aids in ensuring reliable, reproducible research outputs. Additionally, it explores future directions for AI in publishing, focusing on reducing algorithmic biases and advancing ethical practices.

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