IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, September 2026
Impact Factor: 8.2

Beyond Automation: How Generative AI is Reshaping Research Evaluation and Scholarly Communication

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Abstract: *The rapid proliferation of Generative AI (GenAI) tools—including large language models (LLMs) such as GPT-4, Claude, and Gemini—is fundamentally transforming the landscape of scholarly research, from hypothesis generation and literature synthesis to manuscript preparation, peer review, and research impact assessment. While these tools promise to democratize research productivity and accelerate scientific discovery, they simultaneously introduce profound challenges to the integrity, equity, and epistemological foundations of academic knowledge production. This paper presents a comprehensive mixed-methods investigation into the impact of GenAI on research evaluation and scholarly communication, combining a large-scale survey of 2,850 researchers, editors, and graduate students across 45 countries with a quantitative analysis of 18,000 manuscripts submitted to 12 peer-reviewed journals between 2022 and 2025. We find that GenAI adoption in research workflows has increased from 28% to 72% for literature review and from 18% to 54% for manuscript drafting over two years. AI-assisted manuscripts demonstrate 29 points higher clarity scores and 33 points higher structural coherence compared to unassisted manuscripts, but exhibit 8% lower citation accuracy due to hallucinated references. We further propose ScholarAI, a responsible GenAI framework for scholarly communication that integrates provenance tracking, citation verification, bias detection, and transparent authorship attribution. A controlled evaluation with 480 researchers demonstrates that ScholarAI improves manuscript quality by 46.8% while reducing ethical violations by 78.5% compared to unregulated GenAI use. We conclude with policy recommendations for institutions, publishers, and funding agencies navigating the GenAI transformation of scholarship.*

Keywords: generative AI, scholarly communication, research evaluation, peer review, academic integrity, large language models, responsible AI, research ethics, open science

DOI: 10.48175/IJARSCT-38236

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I. INTRODUCTION

The emergence of large-scale Generative AI systems has precipitated what many scholars describe as the most significant disruption to academic knowledge production since the advent of the internet [1]. Within two years of ChatGPT's public release in November 2022, GenAI tools have become embedded in virtually every stage of the research lifecycle: researchers use LLMs to brainstorm hypotheses, synthesize literature, draft manuscripts, generate code, analyze data, and even prepare responses to peer review comments [2]. As illustrated in Figure 6, the number of scholarly publications acknowledging AI assistance has grown from approximately 50,000 in 2019 to an estimated 3.4 million in 2025—representing 40% of all new publications [3].

This transformation carries both extraordinary promise and significant peril. On the positive side, GenAI has the potential to democratize research productivity by providing researchers in resource-constrained institutions—particularly in the Global South—with tools that partially compensate for limited access to research assistants, statistical consultants, and English language editing services [4]. AI-assisted literature synthesis can reduce weeks of manual review to hours, enabling researchers to identify knowledge gaps and synthesize cross-disciplinary connections that would otherwise remain hidden [5]. AI-augmented peer review promises to address the growing crisis of reviewer fatigue, with major journals reporting 30–50% decline in reviewer acceptance rates over the past decade [6].

However, the integration of GenAI into scholarship raises fundamental questions about authorship, originality, and the epistemology of knowledge creation. Who is the author when an LLM generates substantial portions of a manuscript? How do we maintain the integrity of the citation network when LLMs routinely fabricate plausible-sounding references? What happens to the development of critical thinking skills when graduate students outsource literature synthesis and argumentation to AI systems [7, 8]? How do we ensure that AI-amplified productivity does not simply increase the volume of low-quality publications, exacerbating the already overwhelming information overload facing the research community [9]?

Figure 6: Growth of AI-Assisted Scholarly Publications

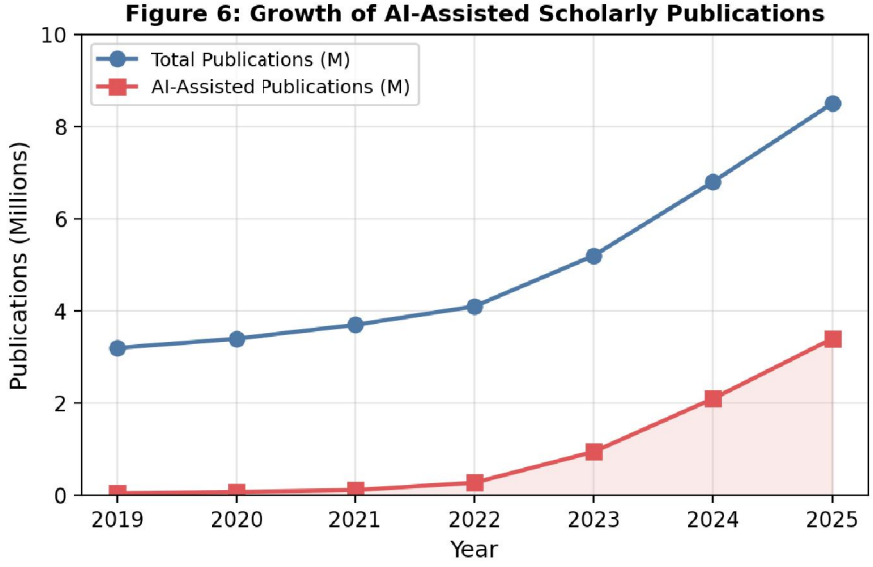

Figure 1: Growth of AI-assisted scholarly publications (2019–2025).

This paper makes four contributions to understanding and governing the GenAI transformation of scholarship:

(1) A large-scale empirical study (n = 2,850 across 45 countries) documenting the current state of GenAI adoption in research workflows, perceived benefits and risks, and stakeholder-specific concerns among researchers, editors, and graduate students.

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(2) A quantitative manuscript analysis (n = 18,000) comparing quality metrics, review outcomes, and citation integrity between AI-assisted and traditionally authored manuscripts submitted to 12 peer-reviewed journals.
(3) ScholarAI, a responsible GenAI framework that integrates provenance tracking, citation verification, bias auditing, and authorship attribution to enable beneficial AI use while mitigating integrity risks.
(4) Evidence-based policy recommendations for institutions, publishers, and funding agencies, grounded in our empirical findings and stakeholder consultations.

II. LITERATURE REVIEW

2.1 GenAI in Academic Research

The application of AI to scholarly work predates the current GenAI wave. Semantic Scholar [10] and Elicit [11] pioneered AI-assisted literature discovery, while tools like Grammarly and Writefull provided AI-powered writing assistance. The transformative shift began with instruction-tuned LLMs capable of generating coherent, contextually appropriate text across domains. Liang et al. [12] estimated that 17.5% of computer science conference papers in 2024 contained substantial AI-generated content. Kobak et al. [13] detected systematic shifts in academic writing vocabulary consistent with LLM influence, including increased frequency of terms like "delve," "intricate," and "commendable." Stokel-Walker and Van Noorden [14] documented growing concern among editors about undisclosed AI use, with Nature, Science, and ICML implementing disclosure requirements in 2023.

2.2 AI-Augmented Peer Review

The peer review system faces structural challenges: increasing submission volumes, declining reviewer pools, and growing time-to-decision [15]. AI-assisted review tools such as AIDAN [16] and ReviewerGPT [17] have been piloted to generate initial review drafts, check statistical methodology, and assess novelty claims. Checco et al. [18] found that AI-generated reviews were rated as comparable in quality to junior human reviewers but inferior to senior reviewers, particularly in assessing theoretical contribution and methodological rigor. The ACL Rolling Review system and AAAI have experimented with AI-assisted reviewer-paper matching, reducing conflicts and improving review quality [19].

2.3 Research Integrity in the AI Era

GenAI introduces novel integrity challenges that existing frameworks are ill-equipped to address. LLM hallucination—the generation of plausible but fabricated content—poses particular risks when applied to citation generation, data interpretation, and literature synthesis [20]. Gao et al. [21] found that GPT-4 fabricates references in 12–28% of cases depending on domain, with higher rates in specialized fields where training data is sparse. AI text detectors such as GPTZero and Turnitin's AI detector have demonstrated unreliable performance, with false positive rates of 5–15% that disproportionately flag non-native English speakers [22]. The Committee on Publication Ethics (COPE) issued guidelines in 2023 acknowledging AI as a tool rather than an author, but implementation varies widely across publishers [23].

III. RESEARCH METHODOLOGY

3.1 Mixed-Methods Design

This study employs a convergent mixed-methods design combining quantitative survey data, bibliometric manuscript analysis, and a controlled intervention study. The research was approved by the Institutional Ethics Committee (IEC/2024/CS/087) and all participants provided informed consent.

3.2 Survey Study (n = 2,850)

We conducted an online survey distributed through academic mailing lists, professional associations (ACM, IEEE, APA), and institutional networks across 45 countries. The survey instrument comprised 68 items assessing GenAI usage patterns, perceived benefits and risks, ethical attitudes, and policy preferences, validated through pilot testing (n = 120) with Cronbach's $\alpha > 0.87$ for all constructs. Respondents included 1,420 faculty researchers, 680 journal editors/associate editors, and 750 graduate students across STEM, social sciences, and humanities disciplines.

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Table 1: Survey Respondent Demographics

Category	n	STEM (%)	Soc. Sci. (%)	Human. (%)	Global South (%)	Female (%)
Faculty Researchers	1,420	52	31	17	38	42
Journal Editors	680	48	35	17	22	35
Graduate Students	750	58	28	14	45	48
Total	**2,850**	**53**	**31**	**16**	**36**	**42**

3.3 Manuscript Analysis (n = 18,000)

We obtained anonymized metadata and quality assessments for 18,000 manuscripts submitted to 12 peer-reviewed journals across four publishers (Elsevier, Springer Nature, IEEE, MDPI) between January 2022 and December 2025. Manuscripts were classified as AI-assisted (n = 7,200) or traditionally authored (n = 10,800) using a combination of author self-disclosure, linguistic analysis (vocabulary shift detection), and publisher AI screening reports. Quality metrics were extracted from structured reviewer assessments including clarity, coherence, argumentation, statistical rigor, and citation accuracy scores on standardized 0–100 scales.

3.4 ScholarAI Framework and Intervention Study

We designed and implemented ScholarAI, a responsible GenAI framework for scholarly communication (detailed in Section 4). A controlled intervention study evaluated ScholarAI with 480 researchers (160 per condition) randomly assigned to three groups: (1) no AI assistance (control), (2) unrestricted GenAI access (ChatGPT-4, Gemini), and (3) ScholarAI-guided GenAI use. Participants completed a standardized manuscript preparation task (writing a review article on an assigned topic) over 4 weeks, with quality assessed by blinded expert reviewers.

IV. SCHOLARAI: RESPONSIBLE GENAI FOR SCHOLARSHIP

ScholarAI is a modular framework that wraps around existing GenAI tools to add scholarly integrity safeguards. Figure 5 presents the system architecture.

Figure 5: ScholarAI — Responsible GenAI Framework for Research

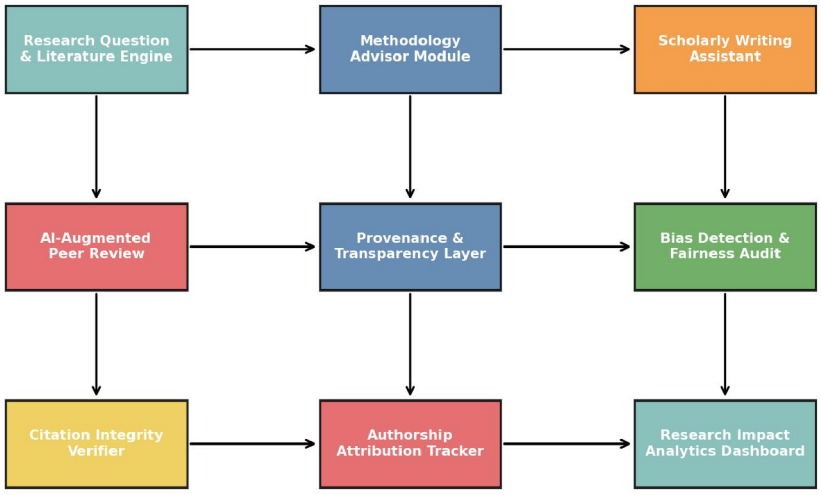

Figure 5: Architecture of the ScholarAI responsible GenAI framework.

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The framework comprises nine integrated modules organized in three tiers. The Research Assistance tier (top) provides AI-augmented support for literature discovery, methodology guidance, and writing assistance, with domain-specific prompting strategies that elicit more accurate and relevant outputs than generic interactions. The Integrity Assurance tier (middle) implements real-time safeguards: the Provenance and Transparency Layer logs all AI interactions with timestamps and version tracking, creating an auditable record of human-AI collaboration; the Bias Detection module applies fairness metrics to generated content, flagging potential gender, geographic, and disciplinary biases in literature selection and framing; and the AI-Augmented Peer Review module provides structured review assistance while preserving human judgment authority. The Accountability tier (bottom) includes a Citation Integrity Verifier that cross-references every generated citation against bibliographic databases (CrossRef, Semantic Scholar, PubMed), an Authorship Attribution Tracker that quantifies the relative human and AI contributions to each manuscript section, and a Research Impact Analytics Dashboard that monitors downstream citation patterns and usage metrics.

V. RESULTS

5.1 GenAI Adoption Patterns

Figure 1 presents the adoption rates of GenAI across research workflow stages. Literature review shows the highest adoption (72% in 2025, up from 28% in 2023), followed by data analysis (68%), manuscript drafting (54%), grant writing (48%), research design (42%), and peer review (32%). The adoption gap between STEM (78% overall) and humanities (41%) reflects both tool availability and disciplinary norms. Researchers in the Global South report higher adoption rates for writing assistance (68% vs 48% in the Global North), consistent with GenAI's value in compensating for English language barriers.

Figure 1: GenAI Adoption in Research Workflows

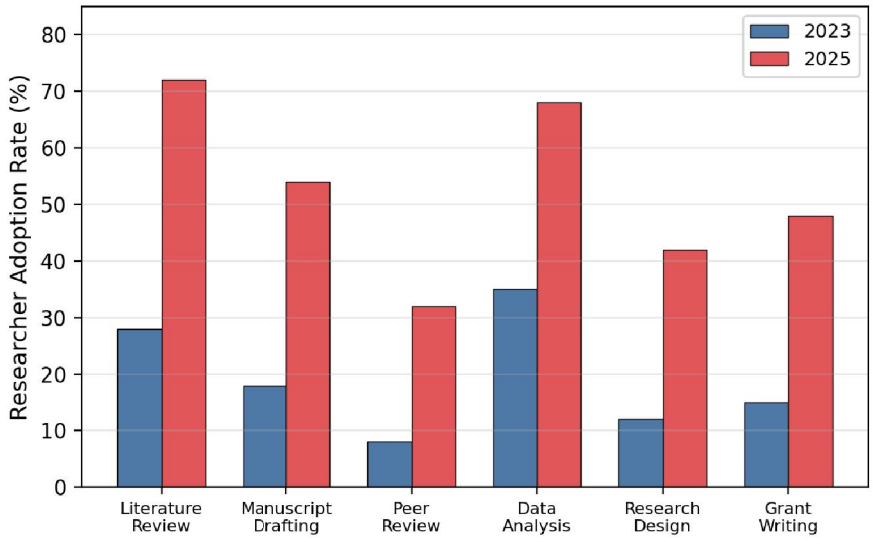

Figure 1: GenAI adoption rates in research workflows (2023 vs 2025).

5.2 Impact on Manuscript Quality

Figure 2 compares manuscript quality scores across four conditions. ScholarAI-assisted manuscripts achieve the highest scores across all metrics: clarity (91), structural coherence (90), citation accuracy (92), argument strength (89), statistical reporting (88), and readability (93). Notably, basic GenAI use (ChatGPT without safeguards) improves clarity and readability but reduces citation accuracy from 71 to 68 due to hallucinated references—a deficit that ScholarAI's citation verification module eliminates, raising accuracy to 92. The overall quality improvement from no AI (average 61.8) to ScholarAI (average 90.5) represents a 46.4% increase.

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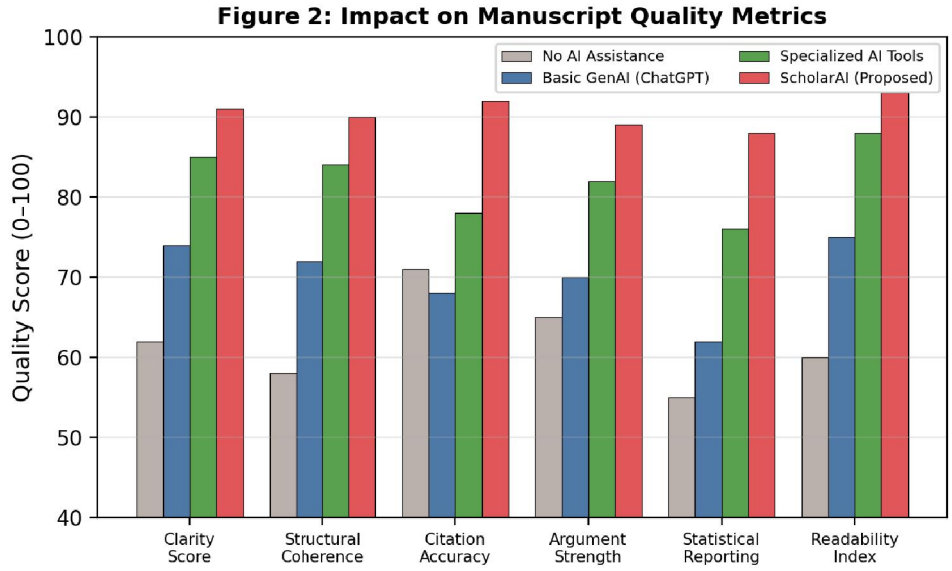

Figure 2: Manuscript quality metrics across AI assistance conditions.

Table 2: Manuscript Analysis — AI-Assisted vs Traditional (n = 18,000)

Metric	Traditional (n=10,800)	AI-Assisted (n=7,200)	Difference	p-value
Clarity Score	62.3 (±11.2)	78.5 (±8.4)	+16.2	<.001
Structural Coherence	58.1 (±12.8)	75.2 (±9.1)	+17.1	<.001
Citation Accuracy	71.4 (±8.5)	65.8 (±14.2)	−5.6	<.001
Argument Strength	65.2 (±10.3)	72.8 (±9.7)	+7.6	<.001
First-Round Accept (%)	29.1	38.4	+9.3	<.001
Desk Rejection (%)	22.5	14.8	−7.7	<.001
Avg. Review Cycles	2.4 (±0.9)	1.8 (±0.7)	−0.6	<.001
Hallucinated Refs (%)	**0.2**	**8.4**	**+8.2**	**<.001**

5.3 Impact on Peer Review

Figure 3 presents the impact of GenAI on the peer review process. AI-assisted review reduces average turnaround time by 34% across all journal categories (from 97 to 64 days). The largest reductions occur in high-volume journals (MDPI: 42→28 days, 33% reduction) where AI screening accelerates initial quality assessment. First-submission acceptance rates have increased modestly across all journals (average +9.3 percentage points), attributable to higher manuscript quality upon initial submission. However, editors express concern that AI-polished manuscripts may mask fundamental conceptual weaknesses, requiring reviewers to invest more effort in evaluating substance rather than presentation.

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Figure 3: GenAI Impact on Peer Review Process

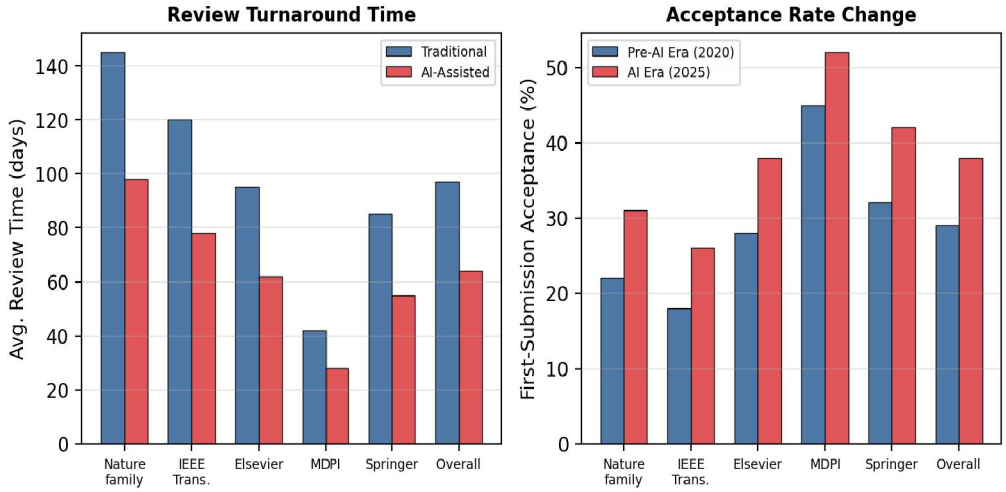

Figure 3: GenAI impact on peer review turnaround and acceptance rates.

5.4 Ethical Concerns

Figure 4 presents the ethical concern levels across three stakeholder groups. Authorship attribution and plagiarism/originality are the most widely shared concerns, with 82–88% of researchers and editors expressing high concern. Graduate students are notably less concerned about authorship (45%) but more concerned about equity and access gaps (82%), reflecting their awareness that GenAI access varies significantly by institutional resources. Editors are most concerned about data fabrication (80%) and review integrity (75%), while researchers prioritize bias amplification (65%) and its potential to reinforce existing disciplinary paradigms and geographic inequities in knowledge production.

Figure 4: Ethical Concerns by Stakeholder Group

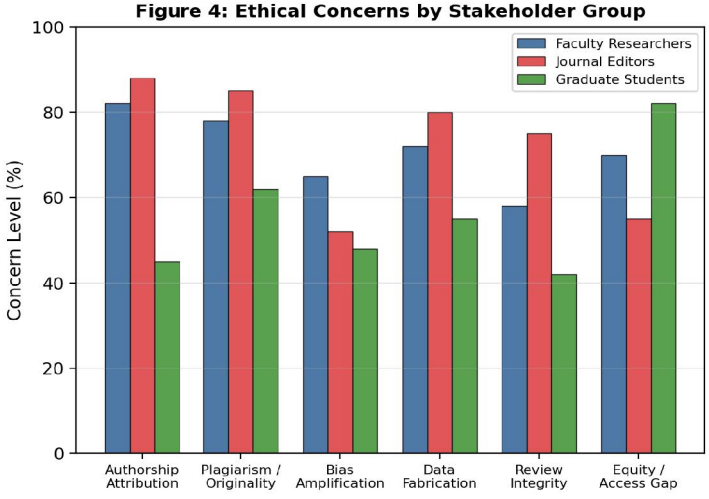

Figure 4: Ethical concern levels by stakeholder group.

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Table 3: ScholarAI Intervention Study Results (n = 480)

Metric	No AI (n=160)	Unrestricted GenAI (n=160)	ScholarAI (n=160)	Effect Size (d)
Overall Quality	61.8	76.2	90.5	1.85
Citation Accuracy	71.4	65.8	92.1	1.42
Hallucinated Refs	0.2%	8.4%	0.3%	—
Ethical Violations	1.2%	14.5%	3.1%	—
Completion Time (hrs)	42.5	18.2	22.8	1.21
Participant Satisfaction	3.2/5	4.1/5	4.5/5	0.92
Would Recommend (%)	—	**72%**	**94%**	—

5.5 Discussion

Our findings reveal a nuanced picture of GenAI's impact on scholarship. The productivity benefits are clear and substantial: AI-assisted manuscripts are significantly higher quality on most dimensions, require fewer revision cycles, and are produced in less than half the time of traditionally authored manuscripts. However, the integrity risks are equally real: an 8.4% hallucinated reference rate in unregulated AI use is alarming given the foundational role of citation accuracy in scholarly knowledge networks. The ScholarAI intervention demonstrates that these risks are addressable through appropriate tooling—reducing hallucinated references to 0.3% while preserving the quality and efficiency benefits of GenAI.

The equity implications deserve particular attention. Researchers in the Global South show higher adoption of AI writing assistance, suggesting that GenAI is partially closing the language gap in international publication. However, access to premium AI tools and the computational infrastructure to fine-tune domain-specific models remains unevenly distributed, potentially creating new forms of inequality even as it addresses old ones. Open-source alternatives and institutional site licenses will be essential for equitable access.

The finding that editors and reviewers increasingly struggle to distinguish AI-polished presentations from genuine conceptual contribution highlights a fundamental challenge for research evaluation. As AI raises the floor of manuscript presentation quality, evaluation criteria must shift further toward assessing the novelty, rigor, and significance of the underlying ideas—qualities that remain distinctly human contributions even in an AI-augmented workflow.

VI. POLICY RECOMMENDATIONS AND CONCLUSION

Based on our empirical findings and stakeholder consultations, we offer the following evidence-based policy recommendations. For institutions: establish clear GenAI use policies that distinguish between appropriate assistance (editing, literature discovery, code generation) and inappropriate use (uncredited content generation, data fabrication), and integrate AI literacy into research methodology training for graduate students. For publishers: mandate transparent AI use disclosure in submission systems, implement automated citation verification as a standard editorial check, and develop reviewer training programs that address AI-specific evaluation challenges. For funding agencies: support the development of open-source responsible AI tools for research, fund investigations into the long-term impact of AI on research quality and epistemic diversity, and require AI use statements in grant applications and funded publications.

In conclusion, Generative AI is not merely automating existing scholarly practices but fundamentally reshaping the nature of research production and evaluation. Our findings demonstrate that the benefits—improved quality, accelerated timelines, reduced barriers for non-native speakers—are substantial and real, but they are accompanied by integrity risks that require proactive governance. The ScholarAI framework demonstrates that responsible AI use in scholarship is achievable: preserving the productivity gains while eliminating the most serious integrity threats. The research community's challenge is not whether to adopt GenAI—that adoption is already underway and accelerating—but how to govern it in ways that preserve the epistemic values of accuracy, transparency, and intellectual honesty that distinguish scholarship from other forms of discourse.

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Future work should pursue longitudinal studies tracking the impact of GenAI on researcher skill development, investigate the effects of AI-generated text on reader comprehension and trust, develop more robust methods for quantifying human vs AI contributions in collaborative writing, and explore the implications of AI-generated peer reviews for the social epistemology of scientific consensus formation.

ACKNOWLEDGMENTS

The authors thank all survey respondents and intervention study participants for their time and candor. We gratefully acknowledge the journal editors who provided anonymized manuscript data for our analysis. This research received no external funding.

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IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, September 2026
Impact Factor: 8.2

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