



Artificial Intelligence and the Development of Academic Authorship: Analyzing AI-Generated Content, Ethical Issues, and Intellectual Property Challenges

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ABSTRACT

This paper aims to analyze the impact of artificial intelligence (AI) on scholarly communication and authorship. It illustrates the challenges and possibilities of incorporating AI into research that focuses on authorship attribution, intellectual property (IP), ethics, and legal aspects. The paper explores recent literature findings and outlines AI applications in academic research, authorship, and IP policies. The approaches of analysis include case studies with a literature review. This study demonstrates that artificial intelligence technologies, such as natural language processing (NLP) systems and large language models (LLM), evolve in composition and responsibility into intellectual contribution by incorporating multidisciplinary aspects and analyzing previous authorship models (COPE, ICMJE, and CSE). The methodology gathers data, studies the case of AI applications, and delivers standards to follow for academic publication in the AI era. The findings suggest that existing authorship models are inappropriate for AI contributions and suggest revised criteria that consider the ethical and legal aspects of accountability and IP. Technological advances have implications in academic writing, a fact carried by AI tools to enhance productivity and speed with transparency and intellectual contribution concerns. As artificial intelligence continues to affect scholarly work, authorship, and writing, frameworks must evolve to provide credit verification and maintain the integrity of research findings.

1. INTRODUCTION

Authorship is the major source of the symbolic capital that an individual or group progress, honor, prestige, recognition, or legitimacy within a culture. Based on scholarly communication, Academic authorship is the foundation of this communication, serving the purpose of accountability and openness in research and as a representative of the intellectual outcome of researchers. The authorship of the published scientific publications reveals a wide range of responsibilities and workloads such as conceptualization, modelling, writing, data collection, data analysis, and accountability (Thurston et al., 2023). Alongside technical developments that have transformed the conduct, documentation, and issuance of research and writing, academic authorship has evolved

over the preceding few decades. The core criteria for deciding intellectual authorship depends on ethical and academic traditions when authorship attribution is for human effort. As author lists increase, traditional authorship methods lose their ability to prove contribution due to lack of transparency, increase of complexity, and arisen of unethical challenges such as gift authors and ghost authors (Ni et al., 2021). However, a process for recognizing authorship contributions could potentially guarantee providing adequate recognition, and early and regular contact during the research and writing phases may be beneficial to minimize or decrease any disputes (Thurston et al., 2023). Significant advances in the research field began with the introduction of digital technologies such as word processors and online collaboration platforms in the second half of the 20th

century. In addition to increasing the efficiency of data processing and paper preparation, these technologies prepared the path for widespread collaborative practices in academic work. Word processors have made writing significantly more process-oriented, recursive, nonlinear, open-ended, and intuitive than former technology (Filetti et al., 2024). As these computerized tools developed, it became harder to distinguish between human participation and preset algorithms, changing academic conceptions of originality and contribution. Even though each of these components is necessary for the processes that go into creating academic writing, guiding concerns about the politics of text production and emergent authorship receive little consideration in high education institutions while academic journals are beginning to engage with this issue. Also, it is common to ignore concerns about the writer's identity (Lalwani, 2025).

By providing complex solutions to difficult problems and AI-generated content through a range of techniques and algorithms, artificial intelligence (AI) has transformed industries and content creation (Castillo-Girones et al., 2025). Artificial intelligence has appeared as a key component revolutionizing academic content generation. AI natural language processing (NLP) system that will be employed in a range of writing styles, including scholarly and scientific papers, is OpenAI's generative pre-trained transformer (GPT) model (Hosseini et al., 2024). There are more reasons than requirements for using AI authoring tools. The effectiveness of AI authoring tools in academic writing is related to users' digital literacy, which impacts their ability to engage with and benefit from these AI tools and technologies. In addition to data analysis, AI is utilized in academic work to provide text literature reviews and even research hypothesis recommendations (Zhao et al., 2024). The development of advanced natural language processing and machine learning algorithms made it possible for AI systems to provide more complex and logical academic output that is contextually appropriate (Saeed et al., 2022). Since AI systems assist with phases of the research process, including writing publications, creating manuscripts drafts, and merging complex datasets, these developments pose significant questions about traditional notions of authorship. Authors today commonly employ tools such as style editors, AI-based grammar editors, and plagiarism detectors to enhance their articles before submitting them (Schneider et al., 2025). This technological intervention has advantages and challenges. AI-driven algorithms are changing academic writing by providing institutions with previously unattainable speed, accuracy, and efficiency. These algorithms enable collaborative advances and innovative discoveries (Zong and Guan, 2024). However, the increasing support for AI raises ethical concerns and

practical issues about accountability, intellectual property (IP) rights, and what defines intellectual contribution. As algorithms operate in processes that limit human academics, criteria of authorship and academic integrity are challenged (Tawfeeq et al., 2023). Since AI models are complex, transparent systems, users and stakeholders may struggle to make decisions. This lack of openness can affect user confidence, compromise accountability, and the ability to identify and correct biases (Akinrinola et al., 2024). To deliver credit while preserving the reliability and validity of academic outcomes, these frameworks redirect the significant perspectives on which scholarly contributions are created.

The main problem of the research is that the existing authorship frameworks are inadequate for hybrid contributions with the utilization of artificial intelligence (AI) systems. The study aims to synthesize recent debates and emerging complex challenges related to the use of AI generated evidence in academic research. human intellect. Nevertheless, the increased application of AI to drafting, data analysis, and conceptual synthesis has resulted in a hybrid authorship environment. Such a contrast creates misunderstanding in the allocation of credit, accountability, and intellectual property law. To fill this gap, the review attempts to answer the following questions:

- How to develop a cohesive and transparent framework of assigning human and AI performances and contributions?
- How is authorship redefined using AI?
- What are the ethical and legal concerns of content creation with the support of AI?
- How should academic and policy frameworks be adjusted to benefit from these developments?

2. LITERATURE REVIEW

Recent research findings show that complexity derived from contributions by AI exceeds the traditional authorship standards, which had relied on human intellectual input (Lee, 2024). Also, to describe academic writing and authorship and remain strong and relevant in the digital age, the norms and regulations that sustain them must evolve with the high speed at which technology is changing. Authors goal is to impart more developed and evolved understanding of academic writing and authorship using Generative AI tools. They also attempt to provide the foundation of robust and adaptable new standards in academic publications through systematic reviews and synthesizes of multiple standpoints and developments in the literature.

A. Traditional Authorship Models

Accountability and responsibility of intellectual contributions in scholarly communication is known as traditional academic authorship. The reference to the authors in the publications is significant for credit assignment under existing authorship models that depend on the International Committee of Medical Journal Editors (ICMJE) standards. Such a system is used to protect and prioritize the individual creative work and intellectual contribution of the authors (Gasparyan, 2013). According to International Committee of Medical Journal Editors (2024) authorship involves contributions in a phase of work, such as conception or design, collection of data, drafting or critical revision, final approval of the version to appear in print, and accountability for all of the work (International Committee of Medical Journal Editors, 2024). Such a norm has been crucial in maintaining the integrity of academic records because it ensures that the authors are credited. The traditional authorship model is still correct for articles, narrative reviews, short original articles, case reports, and letters of group authors (Gasparyan, 2013).

The single authorship model was prevalent during the preliminary stages of scientific research when the study was often an individual activity. As scientific research became challenging, collaborative research became more common, leading to the emergence of multi-author publications. To distinguish between writers, authorship analysis employed techniques derived from human skills and the role of each researcher. This modification needed the development of authorship order norms (Huang et al., 2024). Co-author characteristics and structural elements influence future collaboration opportunities. In various fields, the first author is the principal contributor, while the final author is the senior or supervisory contributor. Such hierarchical representations assist readers and reviewers in better understanding the division of work and intellectual effort among affiliates. An author may have multiple collaborators, each of whom may have co-authors with less expertise or connections or have active co-authors for themselves, while their co-authors may be isolated from the network and group (Bunker Whittington et al. 2024). In other words, the theoretical explanation of the author order in Huang et al. (2024) is confirmed by the network metrics of Bunker Whittington et al. (2024), which connects the standard of sequenced attribution to quantifiable measures of scholarly impact and connectivity.

The most significant turning moment in the history of authorship was the early 20th-century introduction of peer review as a method for accountability and quality control. Research publications are among the significant aspects of any research, and the process utilized to ensure

research quality is peer review. In different scientific fields, peer reviews proved their relevance and strengthened the argument in favor of transparency in authorship assignment, submitting authorship contributions for external scrutiny (Kankanhalli, 2024). Great joint projects, such as the Human Genome Project, also formed a significant era of intellectual collaboration. The main objective of the Human Genome Project was to discover the genetic source of human illnesses and improve further therapies for them. The number of members in the project violated the traditional approach to authorship due to the integration of information from different disciplines for one research goal (Jasim, 2022; Torrey, 2024). This development demonstrated a fundamental shift in the distribution of credit and accountability among researchers, reflecting the increasing complexity of scientific research.

Many cases of authorship misattribution have highlighted a range of ethical challenges, prompting the development of leading practices and guiding principles to promote ethical authorship and reduce pressures related to credit attribution (Kovacs et al., 2024). For example, associations of professionals and academic institutions have developed codes of conduct that provide guidelines for resolving authorship disputes and ensuring that contributions are appropriately acknowledged. Although the standards for contributions in various domains might range enormously, these guidelines have proven especially important in interdisciplinary research. Since the application of ChatGPT in writing publications where Open Researcher and Contributor ID (ORCID) invalidate this approach, there are authorship inconsistencies and problematic situations that violate existing rules of behavior and ethical standards (Kendall and Teixeira, 2024). Consequently, traditional authorship models have evolved beyond merely identifying authors to incorporating a broader perspective of leadership responsibility and involvement in scholarly research.

B. Impact on Technological Advances

The significant impact of academic authorship is the technological advances that have altered the methods of research often conducted, communicated, and evaluated. Before the digital age, researchers used postal mail to contact one another and typewriters to compose publications. A vital change in thinking occurred with the introduction of digital word processing and email in the second part of the 20th century. Traditional organizations may improve their performance and support innovation by overcoming information gaps through digital transformation, which increases flexibility and adaptability (Du et al., 2023; Thabit and Jasim, 2015). Even if collaborators were geographically distant, these technologies enabled immediate communication and

simplified document creation (Sun, 2024). This digital revolution increased efficiency and enabled geographically spread research teams. With each technological development that employs new text creation techniques, the idea of machine authorship reappears in public conversation (Hongisto, 2025). However, studies have examined the phases involved in green technology innovation and the impact of digital transformation on organizations' performance (Sun, 2024).

Digitizing existing design and collaboration tools and introducing new digital tools is a significantly more profound innovation shift than previous tool generations. The primary advantage of digital tools is their ability to provide simultaneous real-time communication. Platforms such as Google Docs, Microsoft Office 365, and specialist collaborative writing tools allow scholars to work on a single manuscript synchronously (Yakubu et al., 2025). Another example is the new cloud-based CAD platform Onshape, which uses plug-in functional applications, real-time remote iteration, and team collaboration, as seen in Fig. 1 (Marion and Fixson, 2021).

The boundaries of traditional authorship are blurred by collaboration, making individual contributions less distinct and more iterative. The fluid character of contributions in such digital contexts causes new models that see authorship as a dynamic collaborative activity rather than a static solo performance (Hongisto, 2025). Digital repositories and online databases have also revolutionized the preservation and retrieval of scholarly content. In improving data accessibility, repositories rise as a digital alternative to academic communication (Picón, 2024). The most common used interdisciplinary databases are Web of Science (WOS) and Scopus. According to Aria et al. (2024), the common open bibliographic resources for medicine and economic fields, the physical sciences, and engineering are PubMed, EconBiz and arXiv. While increased accessibility to research has facilitated accountability and openness, it also concerns accidental plagiarism and disputed authorship claims worse (Magliocca et al., 2024; Picón, 2024). In the age of data sharing, these technological developments have brought attention to the requirement of modifying authorship standards to preserve the integrity of academic records. Although they reveal deviations from accepted authorship and affiliation procedures and provide data for investigating relevant questionable behavior, bibliometric analyses are crucial for preserving the integrity of research (Meho and Akl, 2025). An improvement in authorship standards is associated with integrating digital tools and AI into research procedures. By enabling researchers to generate hypotheses, compose portions of papers, and conduct complex analyses that traditionally required a significant amount of human workforce, natural language

processing applied to automate data analysis and AI-driven content production have increased efficiency and analytical rigor. These tools improve efficiency and accuracy. Nevertheless, the tools also make it demanding to determine the difference between machine and human input. Despite the transformational potential of AI, researchers must maintain agency and control over the scientific process (Filetti et al., 2024). A recent study indicates that applying automated systems in research involves reconsidering attribution regulations, requiring that the outcomes of these technologies be acknowledged alongside human effort (Magliocca et al., 2024).

The insights obtained from previous technological integrations emphasize the need for systematic updates to authorship criteria. Current research acknowledges that collaborative interaction among scholars greatly improves the quality and impact of academic outputs, whilst emphasizing the significance of individual intellectual ability and rational inquiry. However, regardless of established academic standards, incompatibility often arises from different interpretations of research objectives and criteria among collaborators. Researchers place a high value on their goals, objectives, paradigms, and perspectives, as evidenced by the design barriers, which are the most challenging to research partnerships (Jha et al., 2024).

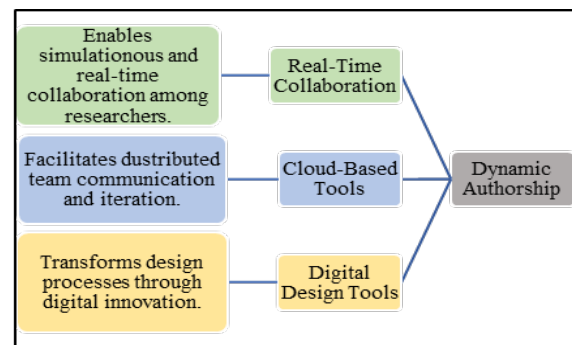


Fig. 1 Digital Tools and Collaborative Innovation

It is more crucial nowadays to accurately record each contributor's involvement to prevent disagreements and provide fair acknowledgment, especially in contexts where iterative digital contributions are applied. Moreover, the incorporation of technology has compelled numerous academic publications and organizations to reconsider traditional definitions of intellectual output. These measures support decision-making and evaluate the institution's performance (Gasser, 2024). Traditional authorship focuses on authorship order, citation counts, and more advanced quality and contributions context measures. Researchers use digital IDs such as ResearcherID, Scopus Author Identifier, ORCID, and ResearchGate to distinguish them from other

researchers. Thus, a researcher is acknowledged and given credit for their work throughout their lifetime. The National Institutes of Health (NIH) and researchers recommend and support ORCID. There is a green ORCID symbol next to each author's name. An individual can visit the author's record and discover more about them by clicking the symbol (Cappitelli and Villa, 2024). Authors can connect to a modern, open, and fair idea of authorship by integrating digital techniques into scholarly work.

The development of academic writing and authorship has been significantly affected by the revolutionary potential of technological advancements and enduring norms. Even if the concept of academic work has expanded and become more complicated due to recent technological breakthroughs, traditional authorship models set clear standards and procedures that support a premium on responsibility and intellectual contribution. As academic research develops in the digital era, authorship standards, and assessment measures must adapt to collaborative technologically enhanced research contexts.

3. THE ROLE OF AI IN SCHOLARLY CONTENT CREATION

Artificial intelligence is developing and reaching all industries, changing how businesses perform and communicate with customers. AI's rapid advancement has influenced how individuals connect, customize their experiences, and communicate with others. To improve customer experiences, businesses are implementing AI-driven technologies like chatbots, recommendation systems, intelligent tutoring systems (ITS), and predictive analytics (Massoudi et al., 2025). AI significantly affects the development, analysis, and publication of research. Research methods and authorship principles evolved within the past decade due to continuous advancements in AI technology. Case studies showing AI's impact on academic activities are presented in this section. Analyses specific platforms and tools used in academic publishing and provides a timeline of AI advancements essential to content creation. Lastly, it focuses on the benefits and challenges of using AI in educational institutions.

A. Artificial Intelligence Tools Advancements

The development of AI for authorship and writing has advanced significantly during the last few years. Early developments in machine learning (ML) formed the basis for more sophisticated techniques that appeared during the next decade. Systematic increases in academic interest in networks and neural networks to significant advancements and interest in these domains in connection with the theoretical foundations and practical uses of AI (Qadhi et al., 2024). Machine learning, decision trees, deep learning (DL), computer vision, and speech recognition

technologies are the tools employed in Artificial Intelligence in Education (AIED) research. Among the applications of AI are learning analytics, ITS, recommendation systems, educational robots, and automated grading (Guo et al., 2024). Through a focus on computer science and English education, the AIED research was conducted in various subject areas, including in language and STEM (science, technology, engineering, and mathematics) disciplines (Guo et al., 2024). Recent advances in machine learning and AI have eased the development of text recognition technology. Among the various techniques, deep learning tools like Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) have appeared as the leaders, demonstrating uncommon efficacy in text generation, image recognition, and the identification of complex textual patterns and structures (Meng and Wang, 2024).

The most modern natural language processing method developed is the transformer architecture, which has significantly enhanced AI-generated content, as Canchila et al. (2024) claim (Canchila et al., 2024). OpenAI's Generative Pre-Trained Transformer (GPT) series has transformed text generation by developing logical and social content models. In addition to establishing generative AI systems in social interaction, ChatGPT's launch made massive language models useful in a technologically dependent environment. ChatGPT demonstrates that robots can write or compose words in a cohesive and grammatically accurate manner when given instructions. Its offspring have been utilized to develop research article components, literature reviews, and hypotheses (Finkley, 2024). These algorithms can improve and mimic human writing styles by identifying linguistic patterns in massive training data. In different academic fields, specialized AI applications have been developed to exceed generalist models. For instance, by searching through biomedical literature and extracting relevant drug-target interactions, IBM Watson and other text mining-based tools that use NLP have been used in pharmaceutical and health research to generate hypotheses for new treatments. These AI-powered tools improve target discovery, drug development, and tailored therapy in the medical forum (Kandhare et al., 2025), as shown in Fig. 2. In the social sciences, the development of AI tools to analyze complex datasets and generate insights that inform qualitative content analysis. These AI features are integrated into the functions of multiple platforms. Tools like Scholarcy, which prioritize simple navigation of massive information databases and automatically summarize articles, have aided in bridging the gap between scholarly writing and raw data analysis (Michalak, 2024).

Platforms like Overleaf, which incorporate AI-based

recommendations for enhancing document clarity and grammar, further assist researchers in refining their work. However, these platforms interfere with creative flow because sometimes it requires more time and effort to achieve accuracy. These platforms, when integrated with citation tools and digital document management systems, have generated a Continual academic writing environment that authorizes rapid dissemination of research findings without the risk of compromise in accuracy and quality (Roffarello et al., 2025).

B. Practical Applications

Artificial Intelligence has countless practical applications to the innovation of scholarly materials, and such applications are becoming more influential in research across disciplines. Academic writing and its concept of systematic development use data to provide arguments and logical reasoning as an integral component of any generation (Khalifa and Albadawy, 2024). AI can save time and effort for writing text by helping with the first drafting of research and thus giving authors a point to start. Researchers can use AI technologies to produce some text and provide an outline or a set of topics, while the software will build logical drafts that are readable, structured, editable, and polished by a human author (Carobene et al., 2024). In recent publications, AI helps create an extremely comprehensive literature review by synthesizing and integrating information gathered from various articles, discussing the research, identifying breakthroughs, and outlining future research (Gill et al., 2025). This approach enhanced the review mechanism and reduced human error in data-gathering.

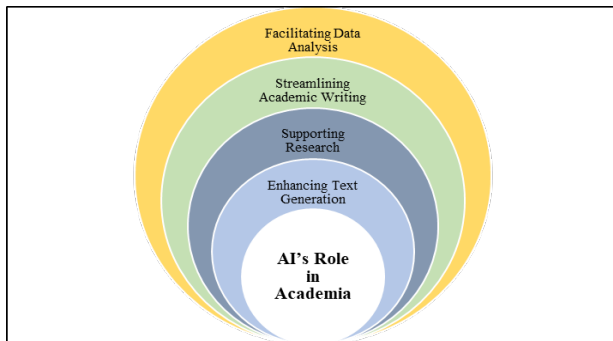


Fig. 2 The Impact of AI in Academia

An additional notable example involves a collaborative project in which an AI system co-authored a study on the impacts of climate change. In this instance, the AI-generated sections supplied methodological elaboration and contextual background to assist researchers in synthesizing data from disparate sources (Ewa and Ugwu, 2025). However, the study's tight timeline limited its

capacity to evaluate the long-term effects of climate change. Therefore, when deploying AI for remote sensing in food systems research, it is essential to integrate humans as a precautionary measure. Deep learning models known as large language models (LLMs) are capable of a wide range of natural language processing and analysis tasks, such as text generation, translation, and classification; conversational question answering, data pattern recognition; and customization of the possible effects of climate change. Non-LLM GenAI systems may already provide images of an individual's house or area during floods, while LLMs in generative AI are applied to depict climate consequences in diverse ways. The AI ensured the content was coherent and well-structured, while the human experts offered critical interpretations and assessments (Cappitelli and Villa, 2024).

Moreover, academic conferences and journals special issues have begun to promote AI-generated material. For instance, the editor of the Journal of Clinical Psychopharmacology rejected the inclusion of AI in publications; this editor must trust that writers and reviewers will follow his directions because additional disruptive types of AI, such as Scopus AI, will arise in 2024. The World Association of Medical Editors (WAME) argues that editors must have the tools to recognize information altered or generated by AI. Regardless of their financial circumstances, editors must have access to these materials (De Leon et al., 2025). Improving efficiency and serving as an innovative co-creator are the two roles of AI in the research process highlighted by these case studies. Beyond authoring whole sections of articles, AI is also effectively utilized to assist via the peer review process. Journals may improve reporting quality by requiring and monitoring commitment to reporting rules. Reviews might be automated, for example, using programs like StatReviewer. By assisting reviewers in deciding potential mistakes or emphases that require further explanation and automating portions of the review process, these AI systems enhance the quality and legitimacy of scientific papers (Muthiah et al., 2024).

C. Benefits and Challenges

Incorporating AI into the generation of academic content has significant benefits. Increased Scalability and Efficiency: AI systems can process massive amounts of data and generate logical language in a fraction of the period required by human researchers; the ability of generative AI to tailor training to each student's particular learning preferences and styles, provide instant feedback, and foster student creativity are some of the numerous possible benefits for education (AlAli and Wardat, 2024). For example, automated literature reviews and data synthesis tools reduce the time required for preliminary

research (Kovacs et al., 2024). This enhanced efficiency allows scholars to concentrate on creative analysis instead of challenging writing tasks. Enhanced Data Analysis: AI systems can properly analyze big and complex datasets and are excellent at finding patterns. Even though AI technologies are significantly beneficial for scientific writing, they should not function as a replacement for human expertise. It emphasizes how important it is to proofread and edit content produced by AI to avoid plagiarism and ensure highly qualified papers. Although ChatGPT has benefits like text shortening and title creation, it lacks uniqueness (Awqati and Jasim, 2025; Singh et al., 2025). AI-driven analytics, on the other hand, enables the efficient distribution of training materials based on learner data and performance indicators (Kobrossy et al., 2025). This functionality is significant in fields like biology and economics, where big databases are applied to make decisions (Costa et al., 2024). AI's predictive analytics identify contemporary trends and research gaps that might remain unreported. Despite these benefits, the incorporation of AI into scholarly work is not without challenges:

1. **Transparency and Attribution Issues:** One major issue is the ambiguity of AI systems decision-making processes. Since artificial neural networks (ANN) are black box systems, identifying the production approach of outputs is challenging for ANN. Due to the difficulty distinguishing contributions produced by humans and AI, the lack of transparency may make it crucial to assign intellectual credit (Resnik and Hosseini, 2024). There is a possibility that AI tools lack the human interaction and interpersonal skills of peers or instructors. Accordingly, their limited capacity for human interaction can delay the development of group cohesion and the execution of collaborative learning activities that are vital for a comprehensive educational experience (Michel-Villarreal et al., 2023).
2. **Ethical Dilemmas:** There are concerns regarding representing responsibility, plagiarism, and bias via the application of AI (Tawfeeq et al., 2023). For instance, unintentional problems with content overlapping or duplication could be interpreted as plagiarism if an AI creates text based on previously published material. Also, biases in training data can result in distorted perspectives or the reaffirmation of preexisting academic biases, securing data privacy and providing equal access to AI-powered learning materials (Khreisat et al., 2024).
3. **Attribution and Authorship:** Finding correct authorship becomes more challenging as AI systems gradually contribute to the writing and analysis processes (Resnik and Hosseini, 2024). AI tools produce answers based on training data that include a large quantity of online information. Even though the model aims to generate accurate and optimal writing, it may still

produce inaccurate or deceptive results. There are concerns about whether AI should be given credit as a co-author and how to credit its authorship. Continuous updates of authorship conventions to reflect the hybrid nature of contemporary research practices (Michel-Villarreal et al., 2023).

Due to continuous technological advancements, numerous practical applications in various study disciplines, and introduced benefits and challenges, AI has changed the ways academic material is generated (Abdulaali et al., 2020). AI is developing at a rapid pace, and this raises the level of uncertainty and stresses the need to reconsider traditional standards and instructional approaches. The state demonstrates the importance of individuals, authors, and academics to understand the nature of AI, to acquire essential information, and to handle these technologies effectively for implementation into the classroom with straight ethical principles. Innovative content production and more efficient data processing are allowed through deep learning algorithms and NLP models, AI tools that have changed traditional research procedures (Hutson, 2024). In an attempt to ensure academic integrity and sustainability in the highly dynamic digital settings, such advancements need to be thoroughly analyzed from the lens of transparency, ethics, and attribution issues, respectively, irrespective of whether they present an optimistic opportunity to enhance scholarly output and innovation (Tawfeeq et al., 2023)

D. Authorship Implications

While authorship is a significant component of independent and group writing, there is insufficient study on editing writing generated by AI. However, as generative AI becomes more widely used in academic writing and authorship, the ability to edit AI-generated text effectively is also gaining momentum (Radtko and Rummel, 2025). These impacts are extensive in ethical legislation and policy, prompting academics and institutions to reconsider long-standing frameworks.

1) Ethical Considerations

The use of AI in generating scholarly literature poses a significant challenge to traditional concepts of accountability, originality, and academic recognition. Islam and Greenwood (2024) argue that privileging the individual author constrains the diversity of perspectives in scholarly discourse and ignores the collaborative nature of textual production, a paradigm that is rapidly becoming outdated. However, it becomes challenging to distinguish between human and artificial agencies when AI systems generate academic literature, which presents significant ethical issues (International Committee of Medical Journal Editors, 2024).

Accountability is one of the most essential ethical concerns. The authors manage the quality and integrity of the research provided in traditional models. However, there are questions regarding who is liable for errors when applying AI if the tool's output is inaccurate or deceptive. This issue is driven by training techniques, which employ big databases that may contain incomplete or misleading information, causing the content created to repeat these errors (Williamson and Prybutok, 2024). For instance, if an AI system generates material that unintentionally misrepresents facts or differs from strict restrictions, it becomes challenging to identify responsibility. Authors who use AI tools argue that their contributions serve the purpose of assisting the AI's tasks; on the other hand, the authors argue that researchers should be responsible.

In addition, the increasing use of AI to draft and evaluate scholarly material raises a critical ethical dilemma: although AI cannot replicate human interaction and intellectual activity essential to genuine knowledge creation, its growing importance nevertheless risks damaging academic recognition accorded to human contributors (Alier et al., 2024). This risk increases when AI systems generate text fragments with the support of a human author, as it becomes more challenging to recognize contributions and provide adequate recognition (Ismail, 2024). Such circumstances could blur the true origins of academic ideas and interpretations and lead to conflicts concerning intellectual property. In writing and authorship, plagiarism and misrepresentation are two major ethical issues. AI systems generate text by examining quantities of published content, especially those based on extensive language models (Hutson, 2025). This procedure may directly copy existing text without sufficient supervision, which causes concerns about unintentional plagiarism. If plagiarism in published works is regularly detected, readers and scholars may question their authenticity. Non-plagiarized authors can address the lack of confidence and inequitably compromise their reputations (Lalwani, 2025). It is challenging for reviewers to recognize unethical replication and innovative usage of previous work when AI is involved. Ethical guidelines must be updated to address whether information produced by AI is original research and how any similarities support academic integrity.

Moreover, the rapid advancement of AI and increasing privacy concerns have raised debates over the most effective governance frameworks for AI and the integration of its technical features and ethical values into authorship guidelines. Table 1 depicts the comparison of traditional and AI-assisted authorship. There is a continuing debate on the ethical bounds of using AI in academic endeavors (Machado et al., 2025). According to

scholars, considering AI as a solo tool is insufficient, and reviewing its benefits is mandatory for the specific meaning of intellectual activity (Awqati and Jasim, 2025; Resnik and Hosseini, 2024). Since researchers with higher levels of AI literacy are associated with increased utilization of AI tools and technology for writing, which enhances outcomes and academic performance, this debate also focuses on transparency (Singh et al., 2025). Transparency requirements ensure that readers and reviewers are aware of the source of the information and protect the legitimacy of the scholarly record and the confidence of the academic community.

Table 1. Comparison: Traditional Human Authorship vs. AI-Assisted Authorship

#	Traditional Human Authorship	AI-Assisted Authorship
1.	Strict accountability: The integrity of the work is directly the responsibility of each author.	Shared accountability dilemma: When AI plays a significant role, it becomes difficult to assign credit for mistakes or misunderstandings.
2.	Clear criteria: Contributions depend on conception, design, implementation, and revision.	Blurred contribution boundaries: Originality may be limited by the integration of AI-generated text with human-authored content.
3.	Well-defined credit allocation: The sequence of authorship frequently indicates the degree of human participation.	Risk of diluted credit: If AI technologies function as "invisible" assistance instead of collaborative partners, the intellectual contribution of humans may be underestimated.

2) Legal and Intellectual Property Issues

Existing legal frameworks for copyright and intellectual property are challenging as AI generates an increasing scholarly generation. Recently, copyright laws have been developed to protect human intellectual work by prohibiting non-human entities from acquiring or gaining credit for creative works. In copyright law, authorship refers to the person who created the content. The author is the lawful copyright owner and has ethical and financial rights to the work. Copyright law preserves the authorship of literary and creative works to ensure that the original writers are acknowledged and maintain ownership over their work (Gaffar and Albarashdi, 2024). For instance, the UK has initiated a consultation on how AI may change IP legislation concerning patents and confidential data (Bhushan and Tahiru, 2025). In another example, The University of Waterloo employs an IP ownership model, making it one of Canada's most successful business universities. 'Everything you discover at Waterloo belongs to you' has been the university's slogan. Although this is beyond the scope of Canadian patent and copyright laws,

the author maintains ownership of intellectual property through Policy 73 of the University of Waterloo. The university's viewpoint on this issue is by this policy, which serves as a counter to any contrary agreements. The ownership of intellectual property, however, belongs to the institution in cases when it explicitly assigns the author of the work (Ramli and Zainol, 2023). It is challenging when AI systems bring uniqueness to work because of this traditional legal viewpoint. Since AI cannot have legal rights, the problem of attributing intellectual property arises when algorithms produce big data.

According to recent analyses, existing copyright systems cannot cope with these challenges. Attribution of authorship solely to human contributors may inadequately reflect the creative process that supports an academic work, such as a significant amount of the text created by AI; legal debates occur regarding whether AI-generated material gets recognized or granted additional protection under an improved IP policy (Gaffar and Albarashdi, 2024). Despite acknowledging that human scientists award legal ownership, some scholars advocate for a hybrid framework whereby human and AI contributions are proven. The development of robust frameworks prioritizes differentiating between human and AI contributions, guaranteeing the transparency of AI-generated data, and preserving the strict requirements of peer review and academic quality. This approach will enable the education community to benefit from AI's advantages while verifying that technological advancements promote the quality and authenticity of scholarly work rather than compromise it (Kaya, 2024). The legal implications of AI-generated material extend beyond ownership issues and involve liability for potential copyright violations. AI systems learn by examining long sections of published content, although their output may unintentionally replicate copyrighted material, which might result in liability concerns. Oberting IV (2024) argues that copyright law recognizes particular situations in which misusing a third-party platform by users is prohibited or otherwise unique. This problem is particularly significant in international environments where copyright laws vary extensively, and the increasing usage of AI-generated research complicates regulation.

The rapid advancement of AI emphasizes the significance of updating intellectual property laws. An individual who explores creativity and intellectual dedication as the work creator identifies as an author, a term related to the act of creation. In the absence of new laws, legal experts argue that the existing approach might limit innovation by developing a culture of uncertainty on what defines original work (Gaffar and Albarashdi, 2024). Therefore, lawmakers must immediately reconsider patent and copyright rules to consider the hybrid nature of modern

scholarly contributions and authorship, Fig. 3 shows the advantages and disadvantages of updating AI and IP laws. The process requires collaboration between legal experts and scientists from academic institutions.

3) Policy and Standardization

There is increasing recognition that to solve the ethical and legal concerns, publishers and academic institutions must develop new standards and regulations considering the complexity of AI-assisted authoring. International organizations such as the Committee on Publication Ethics (COPE), ICMJE, and Council of Science Editors (CSE) have comparable opinions on authorship, AI disclosure, openness and responsibility, and the ethical purpose of AI in their recommendations on applying AI in academic publications (Kocak, 2024). Several academic associations recommend that authors show the usage of AI technologies in the research and writing stages. In addition to accountability for any violations of publishing ethics, the authors maintain full responsibility for their work, including content generated by AI (Alnaimat et al., 2024).

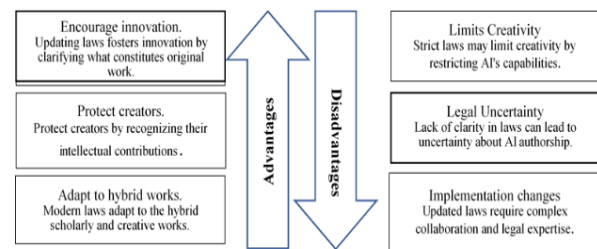


Fig. 3. Impact on updating AI and IP laws.

Specific disclosure requirements begin in scholarly papers. For example, editing tools for grammar and spelling correction are allowed, but the International Conference on Machine Learning has prohibited paper submissions that contain text generated by a large language model. Likewise, the Nature publication requires the authors using these models in scientific writing to attach a statement outlining the percentage of applying AI for the authoring or data analysis editing. These actions intend to encourage transparency and support the integrity of the academic record by differentiating between the contributions of AI and human authors (Pividori and Greene, 2024). Standardization is crucial in developing contribution and authorship models that integrate human and AI work. Innovative frameworks exist to record AI contributions to authorship despite their lack of legal authorship status. In addition, academic stakeholders, publishers, universities, and educational institutions develop concepts and approaches to integrating AI into scholarly work. These models emphasize credit attribution while preserving the distinction between human insight and machine-assisted

output by describing AI as a supportive contributor instead of an independent author (Gulumbe et al., 2024).

In addition to revising authorship criteria, policymakers are considering a comprehensive framework that addresses the broader impacts of AI on scientific publication. Suggestions involve establishing ethical committees focused on AI contributions, building databases on AI usage in research findings, and creating metrics for AI performance in content creation. Such initiatives are used to facilitate a structured approach to the integration of AI in the academic publication community while maintaining the component of creativity and responsibility (Gulumbe et al., 2024). The academic community may maintain strict standards for transparency, ethical accountability, and reproducibility in the age of AI-assisted research by defining AI disclosures using the framework mentioned in Table 2. Development of updated regulations and standardized processes is a prerequisite for adaptation to the academic research regulations.

Since AI is developing rapidly, scientists, educational institutions, funding agencies, and publishers should be debating how AI will affect research and updating themselves on the already existing ethical standards and policies. According to Resnik and Hosseini (2024), changing guidelines is often compulsory because academics must learn how to adapt and utilize AI in their academic practice (Resnik and Hosseini, 2024). The following components are the requirements for an enhanced policy framework:

1. **Transparency Measures:** These measures are thorough explanations of how AI tools are functioned for data analysis, drafting, and revision; they also document the functions that AI systems performed during the research process.
2. **Attribution Standards:** Examples include credit-assignment policies that differentiate between human and AI contributions and incentives for research integrity that concentrate on responsibility.
3. **Regulatory:** As AI technologies advance and contemporary issues arise on the establishment of interdisciplinary committees charged with evaluating and tracking the incorporation of AI in academic findings and content. Additionally, update policies on a regular basis.
4. **Collaborative Frameworks:** The goal of these frameworks is to standardize authorship criteria and set practices and standards for future research content by combining academic institutions, publishers, and legal experts.

Table 2. Standard AI-Disclosure Template

Element	Description
Identification	Article title and DOI; human authors' names with ORCID IDs; AI tool name,

	version, developer.
Scope of AI Involvement	Specific tasks performed (conceptual brainstorming, data analysis, draft generation, figure creation); approximate percentage of AI use.
Data Source	Description of input datasets and pre-processing steps; AI training data sources.
Methodological Transparency	Algorithms/models used (GPT-4, BERT); prompts, fine-tuning procedures.
Human Supervision	Review and editing by authors; criteria for human validation of AI outputs.
Ethical and Legal Compliance	Adherence to ethics committee requirements; confirmation of copyright clearance for AI-sourced material.
Limitations and Risks	Known biases or performance limitations of the AI tool; mitigation measures for misinformation or data leakage.
Accountability	Declaration by each human author accepting responsibility for all content; journal editor's acknowledgment of AI-disclosure review

4. THEORETICAL AND CONCEPTUAL FRAMEWORK

To make our literature review rigorous and relevant, researchers applied inclusion and exclusion criteria related to the study of AI-assisted scholarly authorship. Also, searched the peer-reviewed articles of journals, conference papers, and policy analyses published after 2020, and they covered: (1) the role of AI in academic writing processes; (2) the available authorship attribution models; (3) the ethical responsibility or intellectual property implications of AI assistance, and (4) the case studies of human-AI collaboration. Researchers excluded non-scholarly materials (blog posts, opinion editorials not supported by theoretical or empirical evidence) as well as studies of AI that were not related to authorship or research integrity. The search was conducted in Web of Science, Scopus, PubMed, and Google Scholar to create the titles, abstracts, and full-text. Through transparent reporting and following requirements, researchers reduced the chances of selection bias and ensured that their synthesis is based on evidence that is directly relevant to developing authorship structures in the AI age.

A. Existing Models

Human creativity, responsibility, and uniqueness in academic work are recognized within traditional conceptual and ethical frameworks for authorship. Guidelines developed by the International Committee of Medical Journal Editors have affected the determination of authorship criteria (Pividori and Greene, 2024). Table 3

below summarizes the models that include contributions to the work's conception and design, data analysis, critical revisions, and final approval. Here are the common frameworks:

- **ICMJE Guidelines:** These guidelines provide a clear and well-established standard for authorship that centers on intellectual contribution and accountability. They define that each author contributes to the work and commits to taking responsibility for it (International Committee of Medical Journal Editors, 2024).
- **CRedit (Contributor Roles Taxonomy):** Contributors are assigned specific positions by the CRediT taxonomy which makes distinctions between distinct roles (conceptualization data, curation, and formal analysis). In collaborative multidisciplinary projects, this taxonomy aids in ensuring transparency (Thurston et al., 2023).
- **Collaborative Authorship Models:** Large-scale interdisciplinary research projects have caused traditional models to change into supporting multi-author works in which the division of work and contribution is acknowledged. This model defines the contributions of each team by reflecting shared responsibility (Zwart et al., 2024).

These models define ethical responsibilities and duties, considering that authorship is the exclusive result of human knowledge. However, these models experience new challenges as technological breakthroughs such as AI become significant in academic methodologies.

Table 3. Traditional Models Summarization

Framework	Key Criteria	Ethical Emphasis
ICMJE Guidelines	Substantial intellectual contribution, drafting/revising content, approval	Accountability, transparency, responsibility
CRedit Taxonomy	Detailed contributor roles (conceptualization and methodology)	Fair attribution, role delineation
Collaborative Model	Multi-author contributions with shared responsibilities	Team-based credit allocation, debate resolution

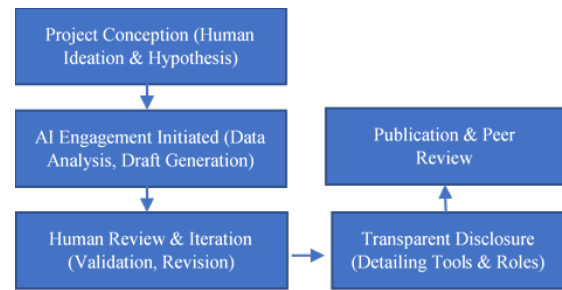


Fig. 4. Process Cycle for Integrating AI Contributions

B. Integrating AI Contributions

The integration of AI into academic writing and authorship has led to debates regarding whether AI should be perceived as a co-author or an advanced tool; Table 4 shows this aspect. The case proves the hybrid nature of modern authorship, in which previous boundaries become fuzzy by the collaborative efforts of humans and robots. Educational goals of teaching, writing, and research are affected by the blurring of authorship responsibilities, causing a shift in teaching methodologies. As concerns regarding students relying on AI to generate texts increase, there may be fewer opportunities for them to develop their writing and analytical skills, risking academic integrity (Zhao et al., 2024).

Table 4. Debate: AI as a Tool vs. AI as a Co-Author

Aspect	AI as a Tool	AI as a Co-Author
Role Definition	Like computerized reference managers or statistical software, AI is an effective tool.	AI known for producing unique content and using creativity with human researchers.
Accountability	The human authors and scientists who control and manage AI results accept full responsibility.	AI develops accountability questions including how to divide mistakes or deletions between AI and humans.
Attribution	Direct attribution is unnecessary for AI-generated content since it functions as a derivative tool.	Co-authorship supporters claim that influential AI contributions should be acknowledged.
Ethical Considerations	By supporting human leadership and traditional ethical standards AI secures clarity.	Challenging questions verified traditions and offered refreshed concepts for reviewing ethical limits and transparency.

Most researchers, authors, and scientists claim that AI can generate superior results, while it lacks the self-awareness

and ethical thinking needed for human creativity. They propose that AI can operate as an inactive and unprotected tool against destructive data (Awqati and Jasim, 2025). Alavi et al. (2025) suggest that by interrupting essential attributes such as self-maintenance and adaptability, the damage weakens the AI's internal consistency and reduces its ability for regeneration. However, supporters of the AI co-authorship model argue that the contributions of AI and machine learning research findings should be attributed where machine-generated impact is evident. Fig. 4 displays the process cycle diagram to illustrate how to manage AI integration in practical situations. Hybrid conceptual models provide the two perspectives with new research and suggestions as conceptual models develop:

- Hybrid Contribution Model: This model supports a contributorship statement that documents AI and human inputs. AI contributions might be classified under data structure and preliminary drafting, whereas human contributions might cover conceptualization and critical analysis. These models certify transparent attributes without providing AI with the status of a traditional author (Hutson, 2025).
- Disclosed AI Framework: The core content and function of the AI component are described in a discrete acknowledgment manuscript suggested by another new method. Detailed explanations of the AI tools utilized in data sources and tasks will be included. In addition to providing context for assessing the originality of the research, this transparency safeguards the integrity of the scholarly work (Hutson, 2025).

This workflow depicted in the diagram shows how AI participation is essential but controlled, placing AI alongside human contributions without taking the place of human researcher's duties.

C. Future-Oriented Frameworks

Providing the challenge identified by integrating AI systems into academic processes, there is a critical requirement for prospective frameworks to balance the contributions of humans and AI. Adapting frameworks to encourage innovation and ensure accountability and openness. Therefore, Fig. 5 illustrates the proposed hybrid authorship model as a dynamic framework that integrates human and AI characteristics through independent but related responsibilities.

1) Human Contributions:

- Conceptualization and Hypothesis Development: Defining the research question and designing the study.
- Critical Analysis and Interpretation: Ensuring the integrity of data interpretation and results.

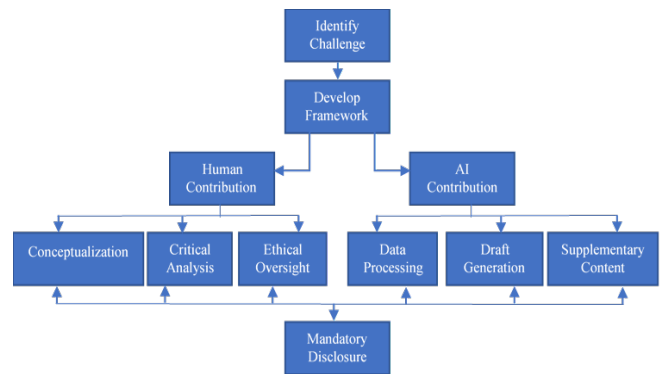


Fig. 5. Hybrid Authorship Model

- Ethical Oversight: Maintaining accountability and ensuring adherence to ethical guidelines.

2) AI Contributions:

- Data Processing and Synthesis: Running algorithms to extract patterns and preliminary data analysis.
- Draft Generation: Creating initial drafts and suggesting language improvements.
- Supplementary Content Creation: Providing quantitative analysis or visualizations that support the research findings.

3. Mandatory Disclosure and Attribution: Details on contributions that AI performs are provided in an additional (AI Disclosure Statement). This includes the computational methods implemented along with the tool name, version, and training data.

5. ANALYSIS AND DISCUSSION

A. Findings

The use of AI in the development of scholarly work experienced significant effects on how authorship is defined, recognized, and controlled. Findings are the outcome of literature review and analyzing its case studies. This contains elements crucial to understanding these developments; as following:

1. Evolving Definitions: When AI contributions are used in research work the academic community is becoming uncertain about what authorship is. While AI has shown that it can produce significant academic content, traditional definitions that considered human intellectual input are being reexamined and these definitions are crucial when integrating contributions within a single framework.
2. Accountability Challenges: The uncertainty within responsibility for AI-generated material is a significant problem. Although authors are held accountable for the integrity of their work, the addition of AI as a contributor raises challenging questions about accountability for mistakes, deceptions, and ethical violations. Recent arguments have emphasized how

the boundaries between human control and AI are fuzzy in modern attribution systems.

3. **Policy Gaps:** Updated editorial guidelines and intellectual property laws are mandatory to include contributions produced by AI. The frameworks that currently exist were created when technology had less impact on research results. Due to AI's development, documents of intellectual contribution require legal and regulatory improvement.
4. **Hybrid Models:** Scholars argue that the integration of humans and machines may reflect authorship models in the future. While human creativity and leadership are invaluable, these hybrid models recognize that AI systems can contribute to data processing, preliminary drafting, and conceptual synthesis. These models suggest a dual-attribution system in which the roles of humans and AI are stated without presenting AI systems with the same legal authorship as humans.

Findings demonstrate that hybrid models are not effectively represented by traditional authorship models. Researchers, therefore, propose a unified authorship criteria framework comprising:

1. **Transparent Contributions:** outline specific roles for human and AI inputs.
2. **Ethical Accountability:** assign clear responsibility for content accuracy and integrity.
3. **Legal Compliance:** ensure alignment with updated IP and copyright regulations.
4. **Dynamic Attribution:** adopt a flexible ordering that reflects the actual contribution weight.
5. **Mandatory AI Disclosure:** document the tools used, tasks performed, and extent of AI assistance.
6. **Credential Integration:** incorporate persistent digital identifiers for traceable contributions.

B. Comparative Analysis

Comparing authorship practices influenced by AI with traditional authorship standards can assist in satisfactorily understanding the transition in authorship practices. Table 5 compiles the main differences.

Table 5. Comparison of Traditional vs. AI-Influenced Authorship Standards

Aspect	Traditional Authorship	Emerging AI-Influenced Authorship
Contribution Definition	Creativity and intellectual contributions of humans.	A blend of input from AI and human intellectual contributions.
Accountability	Well-defined and exclusively attributed to human authors.	Accountability is to humans while AI has an impact on the procedure.
Attribution	Role's definition	Requests for an

	using designated guidelines (ICMJE and CRediT).	updated contributorship model that considers AI contributions.
Transparency	Minimal disclosure emphasizes human efforts and techniques.	Directs mandatory AI disclosure statements that describe the functions and procedures of AI.
Policy and Regulations	Administered by documented regulations of ethics and intellectual property.	Needs to address new copyright issues and incorporate AI contributions.

Fig. 6 depicts the traditional and new AI-influenced authoring process. The traditional authoring method begins with human researchers introducing concepts and creating hypotheses. This phase defines human-driven conception, in which academics develop research questions and design studies based on their ability and perspectives. The researcher's skills and analytical procedures are then employed to gather and analyze data. Following data analysis, the research paper is written exclusively by human authors who interpret the results, develop the narrative, and ensure that the content meets discipline criteria. After a strict peer review, the paper's definitive version is released, with definitive revisions and full accountability for the human authors.

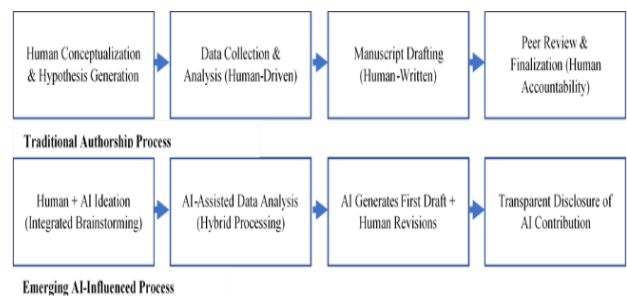


Fig. 6. Comparative process

The recent AI-driven method integrates technology at multiple levels. For instance, the research process begins with generating concepts, although it occurs collaboratively with AI systems and human researchers participating in collaborative brainstorming sessions. This hybrid conceptualization technique combines human creativity with AI's ability to process big data and provide creative solutions. As the process proceeds, data gathering and analysis become additionally hybrid. AI-assisted data analysis tools enhance human approaches by ensuring optimized, high-efficiency, and flexible processing with

the advantage of professionalism in high-quality practices delivered by human experts such as methodological rigor, ethical standards, and expertise characteristic of professional researchers. During the article drafting procedure, the AI system produces a first draft as the fundamental text. The human authors then review and edit this text, interpret the results, and provide explanations of and references to complicated ideas. The approach ends with a final publishing stage, which involves an open disclosure of the AI's contributions so that study elements are understood and accountability is achieved. Apart from improving productivity, this new procedure also suggests novel ways of attribution and accountability in academic writing.

C. Future Research Directions

Although far from being unrecognizable in scientific publications and scholarly authorship, appreciations of constant progress in AI, contemporary articles are still filled with gaps. Policy development, responsibility, and attribution models need further study and work. The following are necessary fields of concern for further investigation:

1. Empirical Studies on Hybrid Authorship: Further exploration is needed to know how the hybrid form of authorship affects the quality of work, accuracy, and reproducibility in scholarly work. Comparison of outputs from a conventional as well as an AI-assisted authorship model would help present a clearer picture of the good and the bad of using AI.
2. Intellectual Property Policy Analysis: Such an important field for further scholarly exploration should be understanding and the development of records for the changes in intellectual property law experiences in connection with the advancements of AI. Analyzing the policy can give insight into how frameworks maintain pace with technological advances.
3. Ethical Evaluation: Scholarly analysis is needed to understand the ethical aspects of the improvements to AI. The issues that scholarly studies should query include how transparency influences the perception of academic credibility, the levels of peer review, and the confidence of people in research studies.

Academic publication standards are expected to develop following the policy evolution practices listed below:

- Increased Transparency: Mandatory disclosure of AI contributions for standard practice.
- Enhanced Regulatory Frameworks: Updating intellectual property laws to incorporate hybrid attribution models, recognizing human and machine inputs.
- Refined Evaluation Metrics: Peer review and academic evaluations might shift toward assessing the quality and originality of hybrid works rather than solely human contributions.

- Collaboration: The formation of interdisciplinary committees to oversee AI integration in research could become commonplace, ensuring ethical and legal integrity.

Recent research indicates that AI is gaining influence over traditional authorship. The future directions of research introduce the importance of being flexible, open, and having ethical strategies, and the comparative analyses show the difference between the current standards and new behaviors. Standards and procedures of Academia must evolve, working together with the AI creation to endorse the credibility and ethics of education communication.

6. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, using artificial intelligence in research in academia necessarily leads to substantial alteration of the traditional authorship concepts, posing essential questions of transparency and accountability, and the future of academic publication. Confirming that academic communication and authorship remain robust, open, and ethically acceptable, this section addresses the primary results of analysis and considers the implications for the education community, and gives practical recommendations.

The research describes how AI systems' capabilities constantly increase the authorship standards established by human creativity and effort. Traditional models, like the ICMJE standards, emphasized human-initiated work in creating, designing, analyzing, writing, and finalizing (International Committee of Medical Journal Editors, 2024; Pivdori and Greene, 2024). Policymakers, researchers, educational institutions, and scientists notice the principle of authorship, nevertheless, it can produce substantial academic writing, analyze big data, and create initial hypotheses (International Committee of Medical Journal Editors, 2024). The use of AI in research can challenge established authorship practices, prompting a reevaluation of how the contribution of ideas is interpreted and acknowledged. Accountability, openness, and ethics are a part of dedication towards achieving balance, and AI as a transformational approach. Adaptation to these changes is significant for the preservation of the integrity of academic communication.

A. Implications for the Scholarly Community

The impact of such emerging relationships on scholars, publishers, and policymakers is of great importance. Using AI to enhance research findings without losing ethical standards or intellectual accountability is a researcher's problem. The predictions about the way AI can decrease human intelligence, the mission is based on its capacity to enhance data processing and provide straightforward

innovation insights. Consequently, researchers must approach the issue cautiously, allowing its advantages to be used while auditing its results.

Publishers and scholarly publications are also compelled to review their current guidelines. Traditional authorship standards that imply human authorship are becoming progressively less adequate in an era of AI-assisted research. Editors and reviewers must adopt new standards that allow for the open disclosure of AI contributions to preserve robust peer review and ensure the sources of intellectual knowledge are credited (Pivadori and Greene, 2024); where legal and regulatory issues are the main challenges facing policymakers. A comprehensive change is necessary to balance between AI-driven research and the existing framework for IP laws, which fails to adjust for contributions made by AI tools. To preserve the rights of human authors while also considering AI, it is essential to develop adaptable policies that recognize hybrid research findings (Resnik and Hosseini, 2024). In addition, academic standards must adjust to reflect the crucial time that academia is currently experiencing. Considering the challenge faced by AI, collaboration among academics, publishers, and policymakers is required to establish a framework that can balance creative innovation and traditional practices. Using hybrid authorship and applying strict disclosure requirements allows researchers to contribute intellectually while developing ethical norms. This strategy will also improve the credibility of scientific research and ensure the validity of academic publications.

B. Recommendations

Researchers provide key recommendations regarding the enormous potential and challenges that AI generates for authorship:

1. Development of Authorship Guidelines: Scholars, policymakers, educational institutes, and publishers need to develop authorship standards that address AI participation. Such standards should be specific about the roles of human researchers and AI systems, the description of which content originates from AI and makes researchers responsible for the project.
2. AI Disclosure Statements: It is mandatory that researchers include disclosure statements detailing the percentage and nature of AI assistance in their articles. Such statements should cover the specific AI tools used, the tasks they performed (drafting, data analysis, visualization), and any inherent limitations. This transparency is critical for maintaining confidence and integrity in scholarly communication.
3. Enhanced Ethical Training: Education institutions should implement training programs that educate researchers on the ethical implications of AI in academic work and authorship. These programs should provide guidance on issues such as avoiding plagiarism, ensuring proper attribution, and supporting accountability despite AI's involvement.
4. Interdisciplinary Committees: Forming interdisciplinary committees that include computer scientists, ethics, legal experts, policymakers, and specific scholars can ease the development of comprehensive oversight mechanisms. These committees would be responsible for periodically reviewing and updating authorship and attribution policies to reflect technological advancements.

Future Research: Funding agencies should prioritize research initiatives that explore the impact of AI on scholarly communication. Studies examining citation patterns, authorship accountability, and the evolution of research outputs in hybrid contexts are needed to inform policy development and best practices.

REFERENCES

- [1] Abdulaali Jasim, Y., Othman Alsaigh, M., Miqdad Flaih, T., & Ghanem Saeed, M. (2020). On announcement for university whiteboard using mobile application. *Computer Science Research and Its Development Journal*, 12(1), 63-78. DOI: [10.22303/csrid.12.1.2020.63-78](https://doi.org/10.22303/csrid.12.1.2020.63-78)
- [2] Akinrinola, O., Okoye, C. C., Ofodile, O. C., & Ugochukwu, C. E. (2024). Navigating and reviewing ethical dilemmas in AI development: Strategies for transparency, fairness, and accountability. *GSC Advanced Research and Reviews*, 18(3), 050-058. DOI: [10.30574/gscarr.2024.18.3.0088](https://doi.org/10.30574/gscarr.2024.18.3.0088)
- [3] AlAli, R., & Wardat, Y. (2024). Opportunities and challenges of integrating generative artificial intelligence in education. *International Journal of Religion*, 5(7), 784-793. <https://doi.org/10.61707/8y29gv34>
- [4] Alavi, A., Akhouni, H., & Kouchmeshki, F. (2025). Analyzing Advanced AI Systems Against Definitions of Life and Consciousness. *arXiv preprint arXiv:2502.05007*. DOI: [10.13140/RG.2.2.11586.49606](https://doi.org/10.13140/RG.2.2.11586.49606)
- [5] Alier, M., García-Peñalvo, F., & Camba, J. D. (2024). Generative artificial intelligence in education: From deceptive to disruptive. DOI: [10.9781/ijimai.2024.02.011](https://doi.org/10.9781/ijimai.2024.02.011)
- [6] Alnaimat, F., Al-Halaseh, S., & AlSamhori, A. R. F. (2024). Evolution of Research Reporting Standards: Adapting to the Influence of Artificial Intelligence, Statistics Software, and Writing Tools. *Journal of Korean Medical Science*, 39(32). <https://doi.org/10.3346/jkms.2024.39.e231>
- [7] Aria, M., Le, T., Cuccurullo, C., Belfiore, A., & Choe, J. (2024). openalexR: An R-Tool for Collecting Bibliometric Data from OpenAlex. *R J*, 15(4), 167-180. DOI: [10.32614/RJ-2023-089](https://doi.org/10.32614/RJ-2023-089)
- [8] Awqati, A. J. & Jasim, Y. A. (2025). Distinguishing human creativity from AI-generated literary texts. *PROSPECTIVE RESEARCHES*, 25(2), 40-47. [10.61704/jpr.v25i2.pp40-47](https://doi.org/10.61704/jpr.v25i2.pp40-47)
- [9] Bhushan, T., & Tahiru, H. A. (2025). Protecting AI-generated inventions under the UK's IP regulatory

- regime. *Journal of Intellectual Property Rights*, 30(1), 86-100. DOI: [10.56042/jipr.v30i1.7973](https://doi.org/10.56042/jipr.v30i1.7973)
- [10] Bunker Whittington, K., King, M. M., & Cingolani, I. (2024). Structure, status, and span: gender differences in co-authorship networks across 16 region-subject pairs (2009–2013). *Scientometrics*, 129(1), 147-179. DOI: [10.1007/s11192-023-04885-1](https://doi.org/10.1007/s11192-023-04885-1)
- [11] Canchila, S., Meneses-Eraso, C., Casanoves-Boix, J., Cortés Pellicer, P., & Castello Sirvent, F. (2024). Natural language processing: An overview of models, transformers and applied practices. DOI: [10.2298/CSIS230217031C](https://doi.org/10.2298/CSIS230217031C)
- [12] Cappitelli, F., & Villa, F. (2024). Knowledge behind the scenes of a peer-reviewed journal helps in publishing your manuscript. *Annals of Microbiology*, 74(1), 35. <https://doi.org/10.1186/s13213-024-01777-4>
- [13] Carobene, A., Padoan, A., Cabitza, F., Banfi, G., & Plebani, M. (2024). Rising adoption of artificial intelligence in scientific publishing: evaluating the role, risks, and ethical implications in paper drafting and review process. *Clinical Chemistry and Laboratory Medicine (CCLM)*, 62(5), 835-843. <https://doi.org/10.1515/cclm-2023-1136>
- [14] Castillo-Girones, S., Munera, S., Martínez-Sober, M., Blasco, J., Cubero, S., & Gómez-Sanchis, J. (2025). Artificial Neural Networks in Agriculture, the core of artificial intelligence: What, When, and Why. *Computers and Electronics in Agriculture*, 230, 109938. <https://doi.org/10.1016/j.compag.2025.109938>
- [15] Costa, K., Ntsobi, P. M., & Mfolo, L. (2024). Challenges, benefits and recommendations for using generative artificial intelligence in academic writing—a case of ChatGPT. *Medicon Engineering Themes*. DOI: [10.31222/osf.io/7hr5v](https://doi.org/10.31222/osf.io/7hr5v)
- [16] De Leon, J., de Leon-Martinez, S., Artés-Rodríguez, A., Baca-García, E., & De las Cuevas, C. (2025). Reflections on the Potential and Risks of AI for Scientific Article Writing after the AI Endorsement by Some Scientific Publishers: Focusing on Scopus AI. *Actas Españolas de Psiquiatría*, 53(2), 433. doi: [10.62641/aep.v53i2.1849](https://doi.org/10.62641/aep.v53i2.1849)
- [17] Du, Y., Wang, Q., & Zhou, J. (2023). How does digital inclusive finance affect economic resilience: Evidence from 285 cities in China. *International Review of Financial Analysis*, 88, 102709. <https://doi.org/10.1016/j.irfa.2023.102709>
- [18] Ewa, W. O., & Ugwu, O. O. (2025). Security vulnerability assessments for sustainable infrastructure: a scientometric review. *Environment, Development and Sustainability*, 1-34. DOI: [10.1007/s10668-025-06029-2](https://doi.org/10.1007/s10668-025-06029-2)
- [19] Filetti, S., Fenza, G., & Gallo, A. (2024). Research design and writing of scholarly articles: New artificial intelligence tools available for researchers. *Endocrine*, 85(3), 1104-1116. DOI: [10.1007/s12020-024-03977-z](https://doi.org/10.1007/s12020-024-03977-z)
- [20] Finkley, I. (2024). By AI: Authorship, Literature, & Large Language Models. http://imanif.github.io/files/Finkley_HonorsThesis.pdf
- [21] Gaffar, H., & Albarashdi, S. (2024). Copyright protection for AI-generated works: Exploring originality and ownership in a digital landscape. *Asian Journal of International Law*, 1-24. DOI: <https://doi.org/10.1017/S2044251323000735>
- [22] Gasparyan, A. Y. (2013). Authorship and contributorship in scholarly journals. *Journal of Korean medical science*, 28(6), 801. doi: [10.3346/jkms.2013.28.6.801](https://doi.org/10.3346/jkms.2013.28.6.801)
- [23] Gasser, R. B. (2024). Neoliberalism in academia: reflections from a parasitologist. *Parasites & Vectors*, 17(1), 487. DOI: [10.1186/s13071-024-06574-1](https://doi.org/10.1186/s13071-024-06574-1)
- [24] Gill, S. S., Golec, M., Hu, J., Xu, M., Du, J., Wu, H., & Uhlig, S. (2025). Edge AI: A taxonomy, systematic review and future directions. *Cluster Computing*, 28(1), 1-53. <https://doi.org/10.48550/arXiv.2407.04053>
- [25] Gulumbe, B. H., Audu, S. M., & Hashim, A. M. (2024). Balancing AI and academic integrity: what are the positions of academic publishers and universities?. *AI & SOCIETY*, 1-10. DOI: [10.1007/s00146-024-01946-8](https://doi.org/10.1007/s00146-024-01946-8)
- [26] Guo, S., Zheng, Y., & Zhai, X. (2024). Artificial intelligence in education research during 2013–2023: A review based on bibliometric analysis. *Education and Information Technologies*, 29(13), 16387-16409. DOI: [10.1007/s10639-024-12491-8](https://doi.org/10.1007/s10639-024-12491-8)
- [27] Hongisto, T. (2025). Advertising with AI—On the presentation of authorship of ChatGPT-generated books. *Electronic Book Review*. <https://electronicbookreview.com/essay/advertising-with-ai-on-the-presentation-of-authorship-of-chatgpt-generated-books/>
- [28] Hosseini, M., Rasmussen, L. M., & Resnik, D. B. (2024). Using AI to write scholarly publications. *Accountability in research*, 31(7), 715-723. <https://doi.org/10.1080/08989621.2023.2168535>
- [29] Huang, B., Chen, C., & Shu, K. (2024). Can large language models identify authorship?. *arXiv preprint arXiv:2403.08213*. <https://doi.org/10.48550/arXiv.2403.08213>
- [30] Hutson, J. (2024). Rethinking plagiarism in the era of generative AI. *Journal of Intelligent Communication*, 3(2), 20-31. DOI: [10.54963/jic.v4i1.220](https://doi.org/10.54963/jic.v4i1.220)
- [31] Hutson, J. (2025). Human-AI Collaboration in Writing: A Multidimensional Framework for Creative and Intellectual Authorship. *International Journal of Changes in Education*. DOI: [10.47852/bonviewIJCE52024908](https://doi.org/10.47852/bonviewIJCE52024908)
- [32] International Committee of Medical Journal Editors. (2024). Recommendations for the conduct, reporting, editing and publication of scholarly work in medical journals (revised in January 2024): a Korean translation. *The Ewha Medical Journal*, 47(4). <https://doi.org/10.12771/emj.2024.e48>
- [33] Islam, G., & Greenwood, M. (2024). Generative artificial intelligence as hypercommons: Ethics of authorship and ownership. *Journal of Business Ethics*, 192(4), 659-663. DOI: [10.1007/s10551-024-05741-9](https://doi.org/10.1007/s10551-024-05741-9)
- [34] Ismail, I. A. (2024). Restoring Gilgamesh Through AI With a Negotiation Algorithm Approach. *Theory and Practice in Language Studies*, 14(10), 3046-3056. DOI: [10.17507/tpls.1410.05](https://doi.org/10.17507/tpls.1410.05)
- [35] Jasim, Y. A. (2022). A Genetic Disaster of Human Cloning. *Cihan University-Erbil Scientific Journal*, 6(1), 53-56. DOI: [10.24086/cuesj.v6n1y2022.pp53-56](https://doi.org/10.24086/cuesj.v6n1y2022.pp53-56)
- [36] Jha, S., Singh, A. K., & Chauhan, R. (2024). Deploying fuzzy analytic hierarchy process and sensitivity analysis to identify and prioritize the barriers faced by early-career social science researchers during research

- collaborations. *Higher Education Quarterly*, 78(4), e12542. <https://doi.org/10.1111/hequ.12542>
- [37] Kandhare, P., Kurlkar, M., Deshpande, T., & Pawar, A. (2025). A Review on Revolutionizing Healthcare Technologies with AI and ML Applications in Pharmaceutical Sciences. *Drugs and Drug Candidates*, 4(1), 9. <https://doi.org/10.3390/ddc4010009>
- [38] Kankanhalli, A. (2024). Peer review in the age of generative AI. *Journal of the Association for Information Systems*, 25(1), 76-84. DOI:10.17705/1jais.00865
- [39] Kaya, Ü. Ü. (2024). What if ChatGPT Could...? Navigating the Ethical Frontiers of Generative AI in Academia. *Asian Journal of Distance Education*, 19(2). DOI:10.5281/zenodo.12656373
- [40] Kendall, G., & Teixeira da Silva, J. A. (2024). Risks of abuse of large language models, like ChatGPT, in scientific publishing: Authorship, predatory publishing, and paper mills. *Learned Publishing*, 37(1). doi: 10.1002/leap.1578
- [41] Khalifa, M., & Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. *Computer Methods and Programs in Biomedicine Update*, 100145. <https://doi.org/10.1016/j.cmpbup.2024.100145>
- [42] Khreisat, M. N., Khilani, D., Rusho, M. A., Karkkulainen, E. A., Tabuena, A. C., & Ubras, A. D. (2024). Ethical implications of AI integration in educational decision making: Systematic review. *Educational Administration: Theory and Practice*, 30(5), 8521-8527. Doi: 10.53555/kuey.v30i5.4406
- [43] Kobrossy, S., Jasim, Y., & Awqati, A. (2025). The Impact of Integrating Artificial Intelligence into Learning by Doing Concept: Economic Growth and Innovation. 5th International Conference on Administrative and Financial Sciences, (CIC-ICAFS'2025) pp 147-159. DOI:10.24086/icafs2025/paper.1574
- [44] Kocak, Z. (2024). Publication ethics in the era of artificial intelligence. *Journal of Korean Medical Science*, 39(33). <https://doi.org/10.3346/jkms.2024.39.e249>
- [45] Kovacs, M., Hosseini, M., Holcombe, A. O., Zwart, H., Katz, D. S., & Holmes, K. (2024). Group authorship, an excellent opportunity laced with ethical, legal and technical challenges. *Accountability in Research*, 1-23. DOI:10.1080/08989621.2024.2322557
- [46] Lalwani, N. (2025). Plagiarism in Publications: All about Being Fair!. *Indian Journal of Radiology and Imaging*, 35(S 01), S36-S45. DOI:10.1055/s-0044-1791745
- [47] Lee, E. (2024). Prompting progress: authorship in the age of AI. *Fla. L. Rev.*, 76, 1445. DOI:10.2139/ssrn.4609687
- [48] Machado, H., Silva, S., & Neiva, L. (2025). Publics' views on ethical challenges of artificial intelligence: a scoping review. *AI and Ethics*, 5(1), 139-167. DOI:10.1007/s43681-023-00387-1
- [49] Magliocca, P., Canestrino, R., Carayannis, E. G., & Gagliardi, A. R. (2024). Understanding human-technology interaction: evolving boundaries. *European Journal of Innovation Management*. DOI:10.1108/EJIM-04-2024-0341
- [50] Marion, T. J., & Fixson, S. K. (2021). The transformation of the innovation process: How digital tools are changing work, collaboration, and organizations in new product development. *Journal of Product Innovation Management*, 38(1), 192-215. DOI:10.1111/jpim.12547
- [51] Massoudi, A., Agha, A., Zamoun, K. (2025). Bridging Artificial Intelligence Marketing and Customer Loyalty: The Mediating Role of Perceived Value. *Cihan University-Erbil Journal of Humanities and Social Sciences (CUEJHSS)*, 9(1), 106-113. DOI:10.2139/ssrn.5240332
- [52] Meho, L. I., & Akl, E. A. (2025). Using bibliometrics to detect questionable authorship and affiliation practices and their impact on global research metrics: A case study of 14 universities. *Quantitative Science Studies*, 1-36. DOI:10.1162/qss.a.00339
- [53] Meng, F., & Wang, C. (2024). Artificial Intelligence and Machine Learning Approaches to Text Recognition: A Research Overview. *J. Math. Tech. Comput. Math*, 3, 1-5. DOI: 10.33140/JMTCM
- [54] Michalak, R. (2024). Fostering undergraduate academic research: rolling out a tech stack with AI-powered tools in a library. *Journal of Library Administration*, 64(3), 335-346. DOI:10.1080/01930826.2024.2316523
- [55] Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & Gerardou, F. S. (2023). Challenges and opportunities of generative AI for higher education as explained by ChatGPT. *Education Sciences*, 13(9), 856. <https://doi.org/10.3390/educsci13090856>
- [56] Muthiah, A., Lee, L. K., Koh, J., Liu, A., & Tan, A. (2024). Quality of systematic reviews and meta-analyses in dermatology. *Cochrane Evidence Synthesis and Methods*, 2(5), e12056. DOI:10.1002/cesm.12056
- [57] Ni, C., Smith, E., Yuan, H., Larivière, V., & Sugimoto, C. R. (2021). The gendered nature of authorship. *Science advances*, 7(36), eabe4639. DOI:10.1126/sciadv.abe4639
- [58] Oberting IV, V. A. (2024). Generative Artificial Intelligence and Copyright in the Film and Media Industry. *Washington and Lee Law Review Online*, 82(2), 123. <https://scholarlycommons.law.wlu.edu/wlulr-online/vol82/iss2/2/>
- [59] Picón, G. A. (2024). Perspective of the Institutional Digital Repository in the Protection and Diffusion of Academic Activity. *Ciencia Latina Revista Científica Multidisciplinar*, 8(2), 4210-4227. DOI:10.37811/cl_rcm.v8i2.10831
- [60] Pividori, M., & Greene, C. S. (2024). A publishing infrastructure for Artificial Intelligence (AI)-assisted academic authoring. *Journal of the American Medical Informatics Association*, 31(9), 2103-2113. DOI:10.1101/2023.01.21.525030
- [61] Qadhi, S. M., Alduais, A., Chaaban, Y., & Khraisheh, M. (2024). Generative AI, research ethics, and higher education research: Insights from a scientometric analysis. *Information*, 15(6), 325. DOI:10.3390/info15060325
- [62] Radtke, A., & Rummel, N. (2025). Generative AI in academic writing: Does information on authorship impact learners' revision behavior?. *Computers and Education: Artificial Intelligence*, 8, 100350. DOI:10.1016/j.caeai.2024.100350
- [63] Ramli, N., & Zainol, Z. A. (2023). Intellectual property ownership model in academia: An analysis. *Journal of Intellectual Property Rights (JIPR)*, 19(3), 177-188.

- [64] Resnik, D. B., & Hosseini, M. (2024). The ethics of using artificial intelligence in scientific research: new guidance needed for a new tool. *AI and Ethics*, 1-23. DOI:10.1007/s43681-024-00493-8
- [65] Roffarello, A. M., Calò, T., Scibetta, L., & De Russis, L. (2025). Investigating How Computer Science Researchers Design Their Co-Writing Experiences With AI. <https://doi.org/10.1145/3706598.3713205>
- [66] Saeed, M. G., Jasim, Y. A., & Raewf, M. B. (2022). Analyzing social media sentiment: twitter as a case study. *ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal*, 11(4), 427-450. DOI:10.14201/adcaij.28394
- [67] Schneider, D. M., Mishra, A., Gluski, J., Shah, H., Ward, M., Brown, E. D., & Lo, S. F. L. (2025). Prevalence of Artificial Intelligence-Generated Text in Neurosurgical Publications: Implications for Academic Integrity and Ethical Authorship. *Cureus*, 17(2). DOI:10.7759/cureus.79086
- [68] Singh, E., Vasishta, P., & Singla, A. (2025). AI-enhanced education: exploring the impact of AI literacy on generation Z's academic performance in Northern India. *Quality Assurance in Education*, 33(2), 185-202. DOI:10.1108/QAE-02-2024-0037
- [69] Sun, Y. (2024). Digital transformation and corporates' green technology innovation performance—The mediating role of knowledge sharing. *Finance Research Letters*, 62, 105105. DOI:10.1016/j.frl.2024.105105
- [70] Tawfeeq, T. M., Awqati, A. J., & Jasim, Y. A. (2023). The ethical implications of chatgpt ai chatbot: A review. *JMCER*, 2023, 49-57. <https://jmcer.org/research/the-ethical-implications-of-chatgpt-ai-chatbot-a-review/>
- [71] Thabit, T. H., & Jasim, Y. A. (2015). A manuscript of knowledge representation. *International Journal of Human Resource & Industrial Research*, 4(4), 10-21. www.arseam.com
- [72] Thurston, M. M., Moniri, N. H., Bowen, J. P., Winkles, C. L., & Miller, S. W. (2023). Managing the “Three Cs” of Academic Literature Authorship: Contributions, Credit, and Conflict. *American Journal of Pharmaceutical Education*, 87(5), 100009. DOI:10.1016/j.ajpe.2022.10.002
- [73] Torrey, E. F. (2024). Did the human genome project affect research on schizophrenia?. *Psychiatry Research*, 333, 115691. DOI:10.1016/j.psychres.2023.115691
- [74] Williamson, S. M., & Prybutok, V. (2024). The era of artificial intelligence deception: Unraveling the complexities of false realities and emerging threats of misinformation. *Information*, 15(6), 299. <https://doi.org/10.3390/info15060299>
- [75] Yakubu, M. A., Sain, Z. H., Lawal, U. S., Budiman, S. A., & Permana, D. (2025). Analysis of Online Academic Writing Tools Usage among Postgraduate Students in North-west Nigeria. *Kharisma: Jurnal Administrasi dan Manajemen Pendidikan*, 4(1), 1-13. DOI:10.59373/kharisma.v4i1.69
- [76] Zhao, X., Xu, J., & Cox, A. (2024). Incorporating artificial intelligence into student academic writing in higher education: The use of Wordtune by Chinese international students. <https://hdl.handle.net/10125/106712>
- [77] Zong, Z., & Guan, Y. (2024). AI-driven intelligent data analytics and predictive analysis in Industry 4.0: Transforming knowledge, innovation, and efficiency. *Journal of the Knowledge Economy*, 1-40. DOI: 10.1007/s13132-024-02001-z