

Human and Generative Artificial Intelligence Collaboration in Academic Writing for Lecturers

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Abstract: The development of Generative Artificial Intelligence (GenAI) has transformed academic writing practices in higher education. However, existing studies mainly focus on the benefits and risks of AI use, while limited attention has been given to how humans and AI collaboratively produce academic knowledge. This study aims to examine Human-AI Collaboration in faculty academic writing, identify the distribution of cognitive roles between humans and GenAI, and develop a conceptual model that supports both academic productivity and research integrity. A qualitative approach employing an Integrative Literature Review was used to analyze studies published between 2022 and 2026. Thematic synthesis was conducted on literature related to Generative AI, Human-AI Collaboration, Augmented Intelligence, Responsible AI, and academic writing. The findings reveal that GenAI has evolved from a technical writing assistant into a cognitive partner that supports idea generation, knowledge processing, manuscript development, and revision. The study proposes a conceptual Human-AI Collaboration model in which humans retain epistemic control through human oversight, while GenAI functions as an augmentative system. The model highlights that academic productivity, research integrity, and Responsible AI are interconnected dimensions of knowledge production in the GenAI era.

Keywords: Generative AI, Human-AI Collaboration, Academic Writing, Responsible AI, Higher Education.

PENDAHULUAN

Since the introduction of Large Language Models (LLMs) such as ChatGPT in late 2022, the use of Generative Artificial Intelligence (GenAI) has grown rapidly. GenAI is no longer used solely for information retrieval; it is also capable of generating text, summarizing literature, analyzing data, constructing arguments, and supporting academic processes through natural language interaction. This development signals a shift in AI from merely being a tool to becoming a technology that plays an active role in knowledge production. This situation opens opportunities for increased academic productivity while also raising questions about the role of humans, the limits of AI's contributions, and responsibilities in scholarly practice. Therefore, the use of GenAI in higher education has become a critical issue in understanding changes in intellectual work patterns and the production of scientific knowledge.

This transformation has a significant impact on faculty members as the primary actors in the production and dissemination of scientific knowledge in higher education. Amid demands for high-impact publications and global academic competition, faculty members are required to increase their productivity without compromising academic integrity. GenAI is now used in various stages of the writing process, ranging from idea exploration, literature synthesis, argument development, to manuscript editing. A number of studies indicate that this technology can improve efficiency, speed up revisions, and help produce more systematic writing. However, the intensity of its use is simultaneously transforming the scientific writing process from an activity carried out entirely by humans into a collaborative process between human cognitive abilities and artificial intelligence in the production of academic knowledge.

Although it offers various benefits, the use of GenAI in scientific writing also raises increasingly complex issues. Its involvement in ideation, argument construction, literature synthesis, and text production raises questions about the boundaries of human and AI contributions to the creation of scientific knowledge. GenAI can enhance academic efficiency and productivity, but uncritical use risks diminishing the depth of scientific reflection, producing inaccurate information (AI hallucinations), blurring the boundaries of authorship, and weakening authorial agency—that is, the author's intellectual control over the writing process. Therefore, the main challenge is no longer simply accepting the technology, but ensuring that AI's involvement remains under human control and aligns with academic

integrity. In this context, Responsible AI, AI Governance, AI Literacy, and Human Oversight form the essential foundation for responsible academic practice.

Along with these developments, the academic discourse on GenAI has also undergone a paradigm shift. While early-generation research largely viewed AI as a technical tool (writing assistant), cutting-edge research is beginning to position AI as a collaborative partner in the process of knowledge creation. The Human-AI Collaboration paradigm refers to a form of cooperation between humans and artificial intelligence systems that is complementary in solving cognitive tasks. From this perspective, humans retain control over critical reasoning, knowledge validation, ethical considerations, and academic responsibility, while AI functions as an augmentation system that expands human cognitive capacity. This approach aligns with the concept of Augmented Intelligence, which emphasizes that technology should enhance human capabilities rather than replace them.

Findings from previous research consistently show that the use of GenAI contributes significantly to the efficiency, productivity, and technical quality of academic writing. In general, previous studies have found that GenAI can improve the efficiency of the writing process, aid in the development of ideas, enhance the quality of academic language, and support the creation of more structured and coherent manuscripts (Mondal & Mondal, 2023; Alamri et al., 2025; Chen, 2025). In addition, the use of GenAI has also been reported to increase academic productivity and reduce technical barriers frequently faced by authors, particularly during the manuscript revision and editing process. However, despite these benefits, the same study also identified several challenges, such as the risk of AI hallucinations, the potential for hidden plagiarism, a reduction in authors' critical reflection, and the emergence of issues related to transparency and academic integrity. In the Indonesian context, Halawa found that AI makes a positive contribution to the technical quality of faculty members' scholarly work and accelerates the academic writing process, but at the same time creates a need for institutional regulations, AI literacy, and clearer ethical guidelines regarding its use (Halawa, 2025). Overall, these findings indicate that the academic discourse on GenAI remains dominated by discussions of the benefits and risks of AI use, while studies focusing on the dynamics of collaboration between humans and AI in the process of scientific knowledge production are still relatively limited.

State of the Art and Research Gap in Human-AI Collaboration in Academic Writing

Focus of Previous Studies	Main Focus	Contributions	Limitations	Research Gap
GenAI as a writing assistant	Ideas, drafting, editing, and writing efficiency	Demonstrating GenAI's potential to improve the efficiency of the writing process	AI is primarily positioned as a technical tool	Has not yet explained the division of cognitive functions between humans and AI throughout the writing process
GenAI in Higher Education	Benefits, Opportunities, and Risks of Using AI	Identifying the Opportunities and Challenges of GenAI for Academics and Education	Benefit-risk analyses tend to be separate	Has not yet produced an integrated framework for human–AI collaboration
Human-AI Collaboration / Augmented Intelligence	The Complementary Relationship Between Humans and AI	Describing AI as an augmentative system and humans as decision-makers	Many studies are still general or conceptual in nature	Has not yet specifically mapped out collaboration throughout the entire academic manuscript production process
Responsible AI/AI Governance	Transparency, accountability, ethics, and human oversight	Establishing principles for the responsible use of AI	More often formulated as principles or norms	Not yet operationally integrated into every stage of scientific writing
Academic Integrity & Authorship	Authorship, validation, academic responsibility	Emphasizing that ultimate responsibility still lies with humans	A strong focus on integrity and publication, but this does not always encompass the early stages of writing	Has not yet established the academic responsibilities from ideation to publication

This study	Human-AI Collaboration in Academic Knowledge Production	Integrating the division of cognitive functions, human oversight, integrity, and Responsible AI	The model is still conceptual and requires empirical validation	Developing a Five-Stage Human-AI Model Collaboration from ideasi to responsible publication
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Based on these research gaps, the novelty of this study lies in three main aspects. First, theoretically, this study contributes to the development of a conceptual framework for Human-AI Collaboration by positioning GenAI not merely as a writing assistant, but as a collaborative partner involved in the process of constructing and developing scientific knowledge. Second, empirically, this study examines how the division of cognitive roles between faculty members and GenAI takes shape across various stages of scientific writing, ranging from idea exploration, argument development, and literature synthesis to manuscript revision. Third, from a practical perspective, this study seeks to formulate a model of human-AI collaboration that can support increased academic productivity without compromising the principles of originality, transparency, and scientific integrity. This study not only contributes to the development of research on the use of AI in higher education but also offers a new perspective on the implementation of Responsible AI in academic writing practices. Thus, this study seeks to shift the focus of research from merely using AI as a writing aid toward a more comprehensive understanding of the dynamics of human-AI collaboration in the creation and development of scientific knowledge.

Based on the background discussion, a synthesis of previous research, and the identified research gaps, this study aims to analyze the forms of collaboration between faculty members and Generative Artificial Intelligence (GenAI) in the scientific writing process, identify the division of cognitive roles between humans and AI at each stage of academic writing, and explain the implications of such collaboration on the quality, originality, and integrity of scientific works. In addition, this study also aims to formulate a Human-AI Collaboration model that supports academic productivity while aligning with the principles of Responsible AI in the higher education environment. To achieve these objectives, this study is structured around several research questions, namely: (1) what forms of collaboration exist between faculty members and GenAI in the scientific writing process; (2) how are cognitive roles divided between humans and GenAI at various stages of academic writing; (3) how does this collaboration affect the quality, originality, and integrity of scholarly work; and (4) what kind of Human-AI Collaboration model can be developed to support responsible scholarly writing practices in higher education institutions?

METHOD

This study employs a qualitative approach using the Integrative Literature Review (ILR) method. This method was chosen because the study aims to integrate and synthesize various research findings, conceptual reviews, and perspectives on the use of Generative Artificial Intelligence (GenAI) in faculty members' scholarly writing. The study focuses on the changing role of GenAI in the writing process, the division of roles between humans and AI, the opportunities and risks of its use, as well as the principles of academic integrity and Responsible AI.

The choice of ILR is based on the study's need not only to summarize previous research findings but also to connect various relevant perspectives to build a conceptual understanding of Human-AI Collaboration. In this context, the literature used may come from empirical research, conceptual studies, and academic sources discussing the governance and ethics of AI use. The review process follows the stages of an integrative review, which include problem formulation, literature search, source evaluation, analysis and synthesis of findings, and presentation of results (Snyder, 2019). According to Whittemore and Knafl, an integrative review is a method that allows for the integration of various types of research evidence to produce a more comprehensive understanding of a phenomenon (Whittemore & Knafl, 2005). Furthermore, Torraco emphasizes that an integrative literature review not only serves to summarize previous research but also contributes to the development of new concepts, models, and theoretical frameworks (Torraco, 2005).

The literature search was conducted using six sources: Scopus, Web of Science, ScienceDirect, SpringerLink, Taylor & Francis Online, and Google Scholar. The search was limited to publications from

2022 to 2026, as this period encompasses significant developments in the use of GenAI and Large Language Models (LLMs) in higher education and academic writing.

The keywords used include “Generative AI,” “Human-AI Collaboration,” “Academic Writing,” “AI-assisted Writing,” “Responsible AI,” “Augmented Intelligence,” “Scientific Writing,” and “Higher Education.” The keywords were used individually and in combination to identify literature related to the use of GenAI in scientific writing and higher education.

The search strategy focused not only on research discussing the technical capabilities of GenAI but also on literature addressing human-AI interaction, the division of roles in the knowledge production process, academic integrity, AI literacy, AI governance, and the responsible use of GenAI. Thus, the literature search was guided by the research focus: understanding how humans and GenAI can collaborate in the scientific writing process without compromising human academic responsibility.

Literature selection was conducted in stages through identification, removal of duplicates, screening of titles and abstracts, full-text assessment, and final selection of literature for the synthesis. During the identification stage, all search results from the six sources were collected and reviewed for relevance to the keywords and research focus. Next, articles with identical titles, authors, or content were checked to identify duplicate publications. Articles identified as duplicates were excluded before the screening process began.

The next stage is the screening of titles and abstracts. At this stage, each publication is reviewed for its alignment with the research focus. Publications that do not address GenAI/LLM, higher education, academic writing, Human-AI Collaboration, or issues related to the responsible use of AI are excluded from the subsequent selection process.

Publications that pass the initial screening then proceed to the full-text evaluation stage. Each article is read thoroughly to assess the alignment of its content with the research objectives. The evaluation covers relevance to the use of GenAI in scholarly writing, the division of roles between humans and AI, productivity and efficiency, risks associated with AI use, academic integrity, human oversight, responsible AI, and AI literacy.

In the final stage, the literature that meets all criteria is used as the basis for synthesis. This process is conducted to ensure that the literature forming the basis for the research’s arguments and conceptual model has a clear connection to the research focus. Data analysis is performed using a thematic analysis approach combined with an integrative review procedure. The analysis process followed the stages outlined by Whittemore and Knafl, namely problem identification, literature search, data evaluation, data analysis, and presentation of results (Whittemore & Knafl, 2005). During the analysis phase, this study also adapted the thematic analysis procedure developed by Braun and Clarke, which includes the processes of data familiarization, initial coding, theme identification, theme review, theme definition, and the compilation of a narrative of the research findings (Braun & Clarke, 2006). Through this process, various research findings were grouped into key themes related to forms of collaboration between humans and AI, the division of cognitive roles, the benefits and challenges of using GenAI, and its implications for productivity and academic integrity.

The results of this synthesis were then used to construct a conceptual model of Human-AI Collaboration that illustrates the division of cognitive roles between faculty members and GenAI across various stages of scientific writing, ranging from idea exploration, argument development, literature synthesis, manuscript drafting, to the revision process. This model is expected to provide a more comprehensive understanding of the dynamics of human-AI collaboration in the production of scientific knowledge and to serve as a conceptual foundation for the development of productive and responsible academic writing practices that align with the principles of Responsible AI in higher education settings.

RESULTS AND DISCUSSION

The Evolution of the Role of Generative AI in Lecture’s Scholarly Writing

A review of the literature shows that the use of Generative Artificial Intelligence (GenAI) in academic writing has experienced rapid growth since the introduction of large language models (LLMs) such as ChatGPT in late 2022. This development has not only changed the way writers access and manage information but has also fundamentally transformed the process of academic knowledge production. In

the early stages of its use, GenAI was generally positioned as a technical writing assistant used to correct grammar, edit text, translate documents, and assist in structuring academic writing. In this role, AI served as a supporting technology focused on the technical efficiency of writing without being directly involved in the process of constructing scientific knowledge (Dwivedi et al., 2023).

As the generative capabilities of AI models have improved, their functions have expanded significantly. Various studies show that GenAI is no longer used solely for language editing but is increasingly being utilized in the exploration of research ideas, the formulation of research questions, literature synthesis, the development of arguments, and the revision of academic manuscripts. Research conducted by Kasneci et al. (2023) shows that large language models have the potential to support various academic activities that were previously performed entirely by humans, including assisting with the thought process, research planning, and the development of scientific writing (Kasneci et al., 2023). Similar findings were reported by Tlili et al. (2023), who noted that GenAI capabilities have expanded its role from merely a writing aid to a system capable of supporting cognitive processes in academic learning and research (Tlili et al., 2023). Overall, the findings of this synthesis indicate that the use of GenAI in scientific writing has evolved through three main stages: as a technical assistant, a cognitive support system, and a collaborative knowledge partner. This evolution indicates that improvements in generative AI capabilities not only enhance writing efficiency but also transform the patterns of interaction between humans and technology in the process of creating scholarly works.

These changes indicate a paradigm shift in the use of AI within higher education. Whereas in the early generations of digital technology the primary function of computer systems was to provide access to information, GenAI now plays a role in helping to generate, organize, and reconstruct information into new forms of knowledge. In the context of scholarly writing, AI no longer functions merely as a language-correction tool but is increasingly becoming an intellectual dialogue partner that can be used to explore alternative ideas, test the consistency of arguments, generate initial conceptual frameworks, and provide feedback on manuscripts under development. This development indicates that AI's involvement has moved from the operational level to the cognitive level in the academic writing process (Farrokhnia et al., 2024).

The study's findings also indicate that these changes have given rise to a new paradigm known as Human-AI Collaboration. This paradigm views humans and AI not as being in a competitive or substitutive relationship, but rather in a complementary one that allows both to work together in completing intellectual tasks. In the context of academic writing by faculty members, this collaborative model suggests that the primary value lies not in AI's ability to generate text, but in the ability of humans and AI to complement one another in producing knowledge that is more systematic, reflective, and efficient. In other words, the quality of collaboration is not determined by the level of AI automation, but by the extent to which humans maintain epistemological control over the knowledge-production process. Collaboration between humans and AI occurs when AI's computational capabilities are used to enhance human decision-making and problem-solving capacities (Dellermann et al., 2019). In the context of scientific writing, humans continue to serve as the driving force behind research objectives, academic decision-makers, and the guardians of scientific integrity, while AI functions as a support system that helps expand the author's cognitive capacity.

Nevertheless, literature reviews consistently show that the increasing involvement of AI does not necessarily diminish the importance of the human role in the production of scientific knowledge. Various studies confirm that the quality of scientific work remains determined by the author's ability to critically evaluate information, verify the validity of sources, construct logical arguments, and consider the ethical implications of every academic decision made. Therefore, AI is viewed more appropriately as an augmentative technology rather than a substitute technology. These findings indicate that the successful use of GenAI in scientific writing is not determined by AI's ability to replace human work, but rather by its ability to expand the author's intellectual capacity to produce higher-quality knowledge. This perspective aligns with the concept of Augmented Intelligence, which emphasizes that the primary goal of AI development is to enhance human capabilities through collaboration, not to replace human intellectual functions (Jarrahi, 2018).

Based on these findings, it can be understood that the evolution of GenAI's role in scientific writing has shifted from the "AI as a Tool" paradigm to the "AI as a Collaborative Partner" paradigm. This shift

indicates that the central issue in current academic discourse is no longer whether AI should be used in scholarly writing, but rather how collaboration between humans and AI can be managed responsibly to ensure the maintenance of quality, originality, transparency, and academic integrity. Thus, the development of GenAI not only represents a technological change but also marks an epistemological transformation in how scientific knowledge is produced, validated, and developed within higher education settings. This transformation ultimately raises more fundamental questions about how the division of cognitive roles between humans and GenAI is shaped at every stage of scholarly writing. Therefore, the following discussion will examine in greater depth the patterns of Human-AI Collaboration through an analysis of the division of cognitive functions and roles between faculty members and GenAI in the process of academic knowledge production.

The Division of Cognitive Roles in Human-AI Collaboration

The results of the literature review indicate that collaboration between faculty members and Generative Artificial Intelligence (GenAI) in academic writing cannot be understood merely as a division of technical tasks between humans and technology. Rather, this collaboration reflects a distribution of cognitive roles that enables humans and AI to contribute through different yet complementary capacities. From the perspective of Human-AI Collaboration, the primary value of using GenAI lies not in its ability to replace human intellectual activities, but in its ability to expand the author's cognitive capacity to produce academic knowledge more effectively and systematically (Dellermann et al., 2019).

The study's findings indicate that humans continue to play a central role in the process of scientific knowledge production. Faculty members play a role in determining the focus of research, formulating research questions, conducting critical evaluations of the literature, constructing scientific arguments, and making academic decisions regarding the validity and integrity of research. Various studies confirm that critical thinking, scientific reflection, contextual reasoning, and ethical considerations remain areas that are difficult for AI systems to replicate (Kasneci et al., 2023; Farrokhnia et al., 2024). Therefore, humans remain the primary actors responsible for the substance, quality, and accountability of the scientific work produced.

Conversely, GenAI functions as a cognitive support system that helps accelerate and expand various academic activities. The synthesis results show that GenAI is most commonly used to assist in exploring research topics, generating alternative ideas, drafting writing outlines, summarizing information, correcting grammar, and providing initial feedback on manuscripts in progress. In this context, AI does not generate knowledge independently, but rather helps provide a range of possible information and perspectives that authors can use in their academic decision-making process (Tlili et al., 2023 ; Dwivedi et al., 2023).

Research findings also indicate that the relationship between humans and AI is iterative and dialogic. The author does not merely provide instructions to the AI but repeatedly evaluates, modifies, validates, and refines the AI's output. This process demonstrates that the quality of collaboration is not determined by the level of technological automation but rather by the human ability to guide, critique, and control the process of interaction with AI. In this context, the concept of human oversight is a crucial element because it ensures that all academic decisions remain under human responsibility (Jarrahi, 2018). Thus, the existence of GenAI does not eliminate the author's academic responsibility; rather, it demands a higher level of scrutiny and critical reflection regarding any information used in the scientific writing process (Kasneci et al., 2023).

Based on the results of the literature review, this study found that collaboration between faculty members and GenAI in scientific writing is realized through a division of complementary cognitive roles at each stage of the writing process. These findings were then synthesized into a framework for the division of cognitive roles, as presented in Table 1.

Table 1. The Division of Cognitive Roles in Human-AI Collaboration in Scientific Writing

Stages of Writing	The Role of Faculty Members	The Role of GenAI
Exploring Ideas	Determining the relevance and direction of the research	Generating alternative topics and ideas
Literature Review	Evaluating the credibility of sources and critical synthesis	Summarizing and organizing information
Argument Development	Developing scientific reasoning and arguments	Offering alternative ways of structuring arguments
Manuscript Writing	Determining the substance and scientific contribution	Helping with language structure and refinement
Revision and Editing	Final validation and academic decision-making	Providing feedback and technical corrections

The results of this synthesis indicate that the division of roles in Human-AI Collaboration does not follow the traditional division of labor between humans and machines, but rather reflects a complementary distribution of cognitive functions at each stage of scientific writing. Table 1 shows that the division of roles in Human-AI Collaboration is not substitutive, but rather complementary. Faculty members continue to hold the primary epistemological functions through the processes of evaluation, validation, and academic decision-making, while GenAI serves as an augmentative system that supports the efficiency and expansion of the author's cognitive capacity.

These findings suggest that the pattern of Human-AI Collaboration in scientific writing is more accurately understood as a cognitive partnership rather than a substitutive relationship between humans and technology. In this model, humans function as guides, evaluators, and the primary stakeholders in knowledge production, while GenAI serves as an augmentative system that expands the author's intellectual capacity. Thus, the effectiveness of the collaboration is not determined by the extent to which AI replaces humans, but by the extent to which the synergy between human reflective abilities and AI's generative capabilities can produce higher-quality, more efficient, and more responsible knowledge. In other words, the effectiveness of Human-AI Collaboration is not determined by the dominance of either party, but by the ability to strike a balance between human intelligence as a source of critical reasoning and GenAI as a source of cognitive augmentation. These findings form the basis for understanding the various opportunities and challenges arising from human-AI collaboration in scientific writing, which will be discussed in the next section.

Opportunities and Challenges of Human-AI Collaboration in Scientific Writing for Lectures

A review of the literature indicates that collaboration between faculty members and Generative Artificial Intelligence (GenAI) presents both opportunities and challenges that simultaneously influence the process of scientific knowledge production. Unlike previous generations of digital technology, which primarily served as a means of accessing information, GenAI has the ability to generate text, construct arguments, summarize literature, and provide natural language responses that resemble human communication. These capabilities mean that GenAI is no longer viewed merely as a technical tool, but as a cognitive partner with the potential to expand an author's intellectual capacity at various stages of academic writing. (Kasneci et al., 2023); (Tlili et al., 2023). In the context of higher education, this development opens up new opportunities for faculty members to enhance their research productivity while also creating a need for more responsible management of collaboration between humans and AI.

One of the key opportunities identified in various studies is the improvement of academic efficiency and productivity. GenAI can assist writers in generating writing outlines, compiling literature reviews, refining academic language structure, and providing alternative argument formulations in a relatively short amount of time. Dwivedi et al. (2023) explain that generative AI capabilities enable the acceleration of various knowledge-based activities that previously required more time and resources (Dwivedi et al., 2023). Similar findings were reported by Alamri et al. (2025), who showed that the use of GenAI in academic writing contributes to increased author productivity and greater efficiency in the manuscript preparation process (Alamri et al., 2025). In the context of faculty members facing increasingly high demands for scientific publications, GenAI has the potential to serve as a strategic tool for reducing

administrative and technical burdens, thereby allowing them to focus more on developing the substance of their research.

In addition to improving efficiency, the synthesis results indicate that GenAI also functions as a tool for cognitive augmentation. Through dialogic interaction with AI systems, faculty members can explore various research ideas, gain alternative perspectives on a problem, and develop academic arguments in a broader and more systematic manner. This perspective aligns with the concept of Augmented Intelligence, which emphasizes that AI technology should be designed to enhance human capabilities in thinking and decision-making, rather than replace them (Jarrahi, 2018). Dellermann et al. (2019) also emphasize that the primary value of Human-AI Collaboration lies in the ability to combine AI's computational capacity with human reflective and reasoning abilities in solving complex problems. Therefore, GenAI's contribution to scientific writing lies not only in efficiency but also in its ability to expand the author's intellectual scope of exploration.

Nevertheless, the study's findings indicate that these opportunities go hand in hand with various significant academic challenges. The challenge most frequently discussed in the literature is the phenomenon of AI hallucination—the tendency of AI systems to generate information that appears convincing but is not supported by valid facts or sources. Various studies indicate that large language models can still produce fictitious references, misinterpretations of the literature, and inaccurate information when used without an adequate verification process (Kasneci et al., 2023). This situation indicates that while GenAI can assist in the information synthesis process, the responsibility for verifying the accuracy of the data and the validity of the sources remains with the human author. Thus, the greater the involvement of AI in scientific writing, the more important the role of critical evaluation and human oversight becomes in maintaining the quality of academic work.

The next challenge relates to issues of originality, authorship, and academic integrity. GenAI's ability to generate coherent text that resembles human writing has sparked a debate regarding the boundaries of human and technological contributions in the creation of scientific works. A number of international organizations and scientific publishers have emphasized that AI systems cannot be recognized as authors because they lack the capacity to take responsibility for the content of publications or meet standards of academic accountability. The Committee on Publication Ethics (COPE) (Committee on Publication Ethics, 2023). The STM Association and Elsevier have consistently stated that the intellectual, ethical, and legal responsibility for a publication remains with the human author as the lead author. AI can only be viewed as a tool, and its use must be transparently disclosed in the scientific publication process. Therefore, academic responsibility remains with the human author as the lead author (Association, 2023) (Elsevier, 2023). From this perspective, the issue of academic integrity in the GenAI era is not only related to plagiarism but also concerns the transparency of AI use, clarity regarding authors' contributions, and accountability for the entire content of published scholarly works.

In addition, the literature review also identified the emergence of the risk of cognitive dependency. The convenience offered by GenAI has the potential to encourage users to rely too heavily on the system's outputs without conducting adequate critical evaluation. If this condition persists, analytical thinking skills, scientific reflection, and the development of independent arguments may decline. Farrokhnia et al. (2024) caution that the use of GenAI without adequate AI literacy has the potential to reduce users' intellectual engagement in the learning process and knowledge production. Therefore, the development of AI literacy competencies is becoming an increasingly important aspect to ensure that faculty members can utilize AI productively without losing their intellectual autonomy as academics.

Research findings also indicate that the success of Human-AI Collaboration is heavily dependent on the existence of clear AI governance within the higher education environment. UNESCO, through a report compiled by Sabzalieva and Valentini (2023), emphasizes that higher education institutions need to develop policies capable of balancing technological innovation with the protection of academic integrity, educational quality, and the intellectual autonomy of the academic community (Sabzalieva & Valentini, 2023). In line with this, the OECD identifies the principles of transparency, accountability, human oversight, and human-centered AI as the key foundations for the responsible implementation of AI (OECD, 2022). In the context of academic writing by faculty members, these principles are important to ensure that GenAI is used as a tool for intellectual augmentation rather than as a substitute for academic responsibility.

Based on these overall findings, it is clear that human-AI collaboration presents a paradoxical relationship in faculty members' scientific writing. On the one hand, GenAI opens up significant opportunities to enhance authors' productivity, efficiency, creativity, and cognitive capacity. On the other hand, the same technology also poses risks to the accuracy of information, the originality of work, academic integrity, and independent thinking if used without adequate oversight. Therefore, the use of GenAI in scholarly writing must be situated within a framework of Responsible AI that emphasizes transparency, accountability, AI literacy, and human oversight. These findings serve as the conceptual foundation for developing a responsible model of Human-AI Collaboration in faculty scholarly writing, which will be discussed in the following section.

Table 2. Opportunities and Challenges of Human-AI Collaboration in Scientific Writing

Dimensions	Opportunities	Challenges
Productivity	Improving Writing Efficiency	Overreliance on AI
Cognitive	Support for the exploration of ideas and arguments	Decline in critical thinking
Academic	Improving the quality of manuscripts	Academic Integrity Risks
Epistemological	Faster literature synthesis	AI hallucinations and fictional references
Governance	Support for Academic Innovation	The Need for AI Governance

The synthesis results presented in Table 2 show that the opportunities and challenges in Human-AI Collaboration arise simultaneously and are inseparable from one another. These findings indicate that the greater GenAI's contribution to improving writers' efficiency, productivity, and cognitive capacity, the greater the need for oversight, verification, and academic accountability mechanisms. In other words, the benefits offered by GenAI do not come without consequences; rather, they are accompanied by various risks that must be managed critically and responsibly.

Furthermore, the table shows that most of the opportunities generated by GenAI relate to cognitive augmentation and academic work efficiency, while the challenges that arise are more closely tied to epistemological and ethical aspects. Opportunities such as idea generation, literature synthesis, improvement in the quality of academic language, and accelerated manuscript preparation demonstrate that GenAI is capable of expanding authors' intellectual capacity in the process of knowledge production. Conversely, challenges such as AI hallucinations, fictitious references, blurred lines of authorship, and risks to academic integrity indicate that the use of AI still requires active human involvement as evaluators and the primary parties responsible for scholarly works.

These findings reinforce the argument that human-AI collaboration cannot be understood as a process of substitution between humans and technology, but rather as a form of cognitive partnership that requires a balance between the generative capabilities of AI and the reflective capabilities of humans. Therefore, the effectiveness of collaboration is not determined by how many tasks can be delegated to AI, but by the extent to which instructors are able to utilize AI as a means of intellectual augmentation while maintaining control over the validity, originality, and integrity of the knowledge produced. In this context, the principles of Responsible AI, AI Literacy, and Human Oversight serve as essential foundations for the development of productive and responsible scientific writing practices in the era of Generative AI.

A Conceptual Model of Human-AI Collaboration in Scientific Writing for Lectures

The results of the literature synthesis indicate that collaboration between faculty members and Generative Artificial Intelligence (GenAI) in scientific writing cannot be understood as an automation process that replaces the human role. Rather, this collaboration constitutes a form of cognitive partnership that brings together human reflective abilities and AI's computational capacity to generate scientific knowledge. Findings in the previous section indicate that the role of GenAI has evolved from that of a mere technical tool to that of a collaborative partner involved in various stages of academic writing. However, all of the studies analyzed consistently affirm that epistemological, ethical, and academic responsibility remains with humans as the primary authors (Dellermann et al., 2019).

Based on a synthesis of various studies on Human-AI Collaboration, Augmented Intelligence, Responsible AI, and the use of GenAI in higher education, this study proposes a conceptual model of Human-AI Collaboration in faculty members' scholarly writing. This model was developed to explain how the division of roles between humans and GenAI unfolds dynamically at each stage of academic knowledge production. Unlike approaches that view AI as a passive tool, this model positions GenAI as an augmentative system that supports the academic thinking process without relinquishing human control over the substance, validity, and integrity of scholarly work.

The proposed model consists of five interconnected main stages: Human-Led Ideation, AI-Augmented Knowledge Processing, Human-Guided Manuscript Development, Human Oversight and Validation, and Responsible Publication. These five stages illustrate that the intensity of human and AI involvement varies according to the characteristics of the academic activities being performed.

Table 3. Conceptual Model of Human-AI Collaboration in Scientific Writing for Lectures

Stages	Lecture Role	The Role of GenAI	Output
Human-Led Ideation	Defining the research problem and objectives	Providing alternative ideas	Research Focus
AI-Augmented Knowledge Processing	Selecting and evaluating information	Summarizing and organizing knowledge	Conceptual Framework
Human-Guided Manuscript Development	Developing scientific arguments and contributions	Assisting with text composition and structure	Manuscript draft
Human Oversight and Validation	Fact-checking, sources, and ethics	Providing technical feedback	Validated manuscript
Responsible Publication	Ensuring academic accountability	Supporting process documentation	Responsible publishing

The synthesis results presented in Table 3 show that collaboration between faculty members and GenAI takes place through a dynamic division of roles at each stage of scientific writing. The table indicates that AI involvement tends to increase in activities involving information processing and technical support, while humans continue to play a dominant role in activities requiring critical reasoning, academic decision-making, and ethical accountability. Thus, the proposed model confirms that Human-AI Collaboration in scientific writing is better understood as a complementary form of cognitive partnership rather than a substitutive relationship between humans and technology.

In the first stage, Human-Led Ideation, humans play a dominant role in determining the direction of the research. Activities such as problem identification, formulating research questions, defining research objectives, and identifying the novelty of the research are processes that rely heavily on the researcher's reflective abilities, academic experience, and contextual understanding. At this stage, GenAI can be used to assist with the initial exploration of research topics or to generate alternative ideas, but decisions regarding academic relevance and significance remain with the faculty member as the researcher. This finding aligns with Jarrahi's (2018) view, which emphasizes that AI functions most effectively when used to support human decision-making, not to replace it.

The second stage is AI-Augmented Knowledge Processing, the phase in which collaboration between humans and AI is most intensive. At this stage, GenAI is used to assist with concept mapping, literature exploration, information summarization, the identification of relationships between ideas, and the development of a preliminary research framework. AI's ability to process large volumes of information enables researchers to gain an initial overview of a field of study more quickly than through conventional processes. However, the synthesis results indicate that AI-generated information still requires verification due to the continued risk of misinterpretation, algorithmic bias, and the phenomenon of AI hallucination (Kasneci et al., 2023; Farrokhnia et al., 2024). Therefore, at this stage, the role of AI is best understood as a facilitator of knowledge processing rather than an autonomous producer of knowledge.

The third stage is Human-Guided Manuscript Development. In this phase, humans once again take on a more dominant role in the process of developing scholarly work. Faculty members are responsible for constructing arguments, determining theoretical perspectives, conducting a critical synthesis of the literature, and formulating the research's scholarly contributions. Meanwhile, GenAI plays a role in

assisting with the organization of the manuscript's structure, providing alternative sentence formulations, improving narrative coherence, and supporting the initial editing process. These findings indicate that the quality of scholarly work is not determined by AI's ability to generate text, but by the author's ability to critically process and interpret knowledge. Thus, the academic value of a work continues to stem from human intellectual capacity, while AI functions as a tool for cognitive augmentation.

The fourth stage is Human Oversight and Validation, which is the most crucial phase in Human-AI Collaboration. The synthesis results show that the increasing use of GenAI actually heightens the need for human oversight. At this stage, faculty members conduct fact-checking, source validation, argument evaluation, citation verification, and review of ethical and academic integrity aspects. The concept of human oversight is crucial because it ensures that all academic decisions remain under human control. The OECD (2023) and UNESCO (2023) emphasize that human oversight is a fundamental principle in the responsible implementation of AI. Therefore, the validation stage serves as the primary mechanism to prevent misinformation, fictitious references, and various forms of academic misconduct that may arise from the use of AI.

The final stage is Responsible Publication, which is the stage where the results of human-AI collaboration are realized in scientific publications that adhere to the principles of transparency, accountability, and academic integrity. At this stage, authors are responsible for proportionally disclosing the use of AI, ensuring the accuracy of all published information, and complying with the ethical policies in effect at their institutions and scientific publishers. A number of international organizations, such as COPE, STM, and Elsevier, have emphasized that AI cannot be recognized as an author because it lacks the capacity to take responsibility for the content of a publication. Therefore, academic responsibility remains with humans as the primary authors.

Based on these overall findings, the Human-AI Collaboration model proposed in this study demonstrates that the relationship between humans and GenAI is complementary, not substitutive. Collaboration does not occur through a mechanism in which technology replaces human roles, but rather through a dynamic and mutually complementary distribution of cognitive functions. In this model, humans retain epistemological authority through critical reasoning, knowledge validation, ethical consideration, and academic decision-making, while GenAI serves as an augmentative system that expands the capacity for exploration, information synthesis, and manuscript development. Therefore, the effectiveness of Human-AI Collaboration is not determined by the level of AI automation, but by the ability to strike a balance between technological augmentation and human oversight. This conceptual model expands the discourse on Human-AI Collaboration in higher education by offering a framework that integrates academic productivity, scientific integrity, and the principles of Responsible AI as the primary foundations for the production of academic knowledge in the era of Generative AI.

CONCLUSION

This study shows that the development of Generative Artificial Intelligence (GenAI) has driven fundamental changes in scientific writing practices within higher education. Based on a synthesis of various studies, the use of GenAI can no longer be understood merely as the use of digital tools to improve the technical efficiency of writing; rather, it has evolved into a form of collaboration involving cognitive interaction between humans and technology in the process of producing academic knowledge. This change marks a paradigm shift from "AI as a Tool" to "AI as a Collaborative Partner," where the primary value of the technology lies not in its ability to replace humans, but in its ability to expand human intellectual capacity in producing scholarly work.

The research findings indicate that the effectiveness of Human-AI Collaboration is determined by a complementary division of cognitive roles. GenAI excels in information processing, idea exploration, knowledge synthesis, and manuscript drafting support, while humans retain epistemological functions through critical reasoning, source evaluation, ethical considerations, and academic decision-making. Thus, human-AI collaboration does not occur through a mechanism of substitution but through the integration of capabilities that enables a more efficient knowledge-production process without eliminating human intellectual responsibility.

This study also demonstrates that the opportunities and challenges of Human-AI Collaboration are two inseparable dimensions. GenAI's ability to enhance academic productivity, accelerate information synthesis, and expand intellectual exploration goes hand in hand with various risks, such as AI hallucinations, information inaccuracies, cognitive dependence, and issues of academic integrity. Therefore, the successful implementation of GenAI in scholarly writing is determined not only by technological sophistication but also by the ability of users and academic institutions to consistently apply the principles of transparency, accountability, AI literacy, and human oversight.

The main contribution of this research lies in the development of a conceptual model of Human-AI Collaboration that explains the dynamic relationship between humans and GenAI across five stages of academic knowledge production: Human-Led Ideation, AI-Augmented Knowledge Processing, Human-Guided Manuscript Development, Human Oversight and Validation, and Responsible Publication. This model expands the discourse on Human-AI Collaboration by positioning GenAI as an augmentative system that supports the academic thought process, while affirming that epistemological authority remains with humans as the primary custodians of the knowledge produced. Thus, this study offers a new perspective that academic productivity, scientific integrity, and Responsible AI are not conflicting goals, but rather elements that can be integrated into a balanced framework of human-AI collaboration.

This study has limitations because it uses an Integrative Literature Review approach oriented toward conceptual synthesis; consequently, the resulting model has not yet been empirically tested. Therefore, future research should conduct empirical validation of the proposed model through field studies involving faculty members from various disciplines and higher education institutional contexts. Additionally, future research could explore the impact of Human-AI Collaboration on the quality of scientific publications, academic productivity, and the development of critical thinking skills within a higher education ecosystem increasingly influenced by Generative AI technology.

REFERENCES

- Alamri, W., Qasem, F., Alfotais, A., & Taisan, H. Al. (2025). Leveraging ChatGPT AI Model in Academic Writing and Avenues for Further Development: SWOT Framework. *Forum for Linguistic Studies*, 7(2). <https://doi.org/10.30564/fls.v7i2.8218>
- Association, S. (2023). *International Association of Scientific, Technical and Medical Publishers. STM guidelines on the use of generative AI technologies*. https://www.stm-assoc.org/2023_08_07_STM_Generative_AI_White_Paper.pdf
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Chen, S. (2025). The Role of Religion as an Informal Institution in Shaping Corporate Environmental Responsibility: A SWOT Analysis of Publicly Listed Companies in Religiously Diverse Regions. *Advances in Economics, Management and Political Sciences*, 159(1), 126–136. <https://doi.org/10.54254/2754-1169/2025.19760>
- Committee on Publication Ethics. (2023). *Authorship and AI tools*. Committee on Publication Ethics.
- Dellermann, D., Ebel, P., Söllner, M., & Leimeister, J. M. (2019). Hybrid intelligence. *Business & Information Systems Engineering*, 61(5), 637–643.
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., ... Wright, R. (2023). Opinion Paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Elsevier. (2023). *The use of generative AI and AI-assisted technologies in writing for Elsevier*. Elsevier.
- Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2024). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*, 61(3), 460–474.

- Halawa, I. K. (2025). AI Untuk Karya Ilmiah Dosen: Menjaga Mutu dan Keaslian. *Jurnal Sosiologi Agama Dan Teologi Indonesia*, 3(2), 429–444.
- Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making. *Business Horizons*, 61(4), 577–586.
- Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., & Hüllermeier, E. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274.
- Mondal, H., & Mondal, S. (2023). ChatGPT in academic writing: Maximizing its benefits and minimizing the risks. *Indian Journal of Ophthalmology*, 71(12), 3600–3606.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10(1), 15.
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356–367.
- Whittemore, R., & Knafl, K. (2005). The integrative review: updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553.