
ARTIFICIAL INTELLIGENCE AND RESEARCH WRITING: A CRITICAL REVIEW OF LITERATURE

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ABSTRACT

Background: Research writing is a critical process toward knowledge dissemination. It involves a series of activities which are time consuming, mentally draining and sometimes costly. The completion rate of post graduate studies among students is wanting, with research projects and thesis completion been the main hindrance. The revolution and integration of artificial intelligence in research writing sounds a big relief to academicians as it aides in solving some of the challenges faced with manual activities involved in research.

Purpose: The purpose of this study was to undertake a literature review and answer a critical question on the nexus between Artificial Intelligence and Research writing.

Methods: A systematic review of literature from databases like PubMed and Google Scholar, was conducted. Studies were included based on relevance to AI's application in research writing, focusing on writing assistance, grammar improvement, structure optimization, and other related aspects.

Results: The search identified 10 studies through which the below nine consolidated activities can be successfully conducted through integration of AI in research writing. (i) Idea generation (ii) Content creation and improvement (iii) literature review processing (iv) research design (v) data analysis and presentation (vi) ethical compliance and plagiarism detection (viii) Language and grammar improvement (viii) Citation and referencing management (iv) report writing.

The study also pointed some cases against integration of AI in research writing which included (i) risk of ethical violation and plagiarism (ii) quality and accuracy issues (iii) loss of critical thinking skills (iv) undermining originality and creativity (v) mass rejection of manuscripts.

Conclusions and recommendations: Integration of AI in research writing has a significant contribution toward painless research writing. It is a revolution that cannot be ignored as its

benefits outweigh the demerits. Researchers and institutions are highly recommended to embrace human creativity and only use AI as a supplementary tool toward research writing. Institutions of higher learning and research organization are encouraged to have policy in place which act as an antidote toward ethical concerns raised toward utilization of AI in research writing.

Key Words: *Research Writing, CHATGPT, Artificial Intelligence*

INTRODUCTION

Research is a critical component of the writing process, and it's essential to any writer who wants to create content that is informative, credible, and accurate. Research is a way to gather information that can help you to better understand your topic, to develop a deeper understanding of the subject matter, and to ensure that your writing is well-informed and supported (The Authors Attic, 2023). Research writing involve an array of activities to assure the output achieve the minimum qualities of a good research which includes; originality and innovation, clear research objectives, thorough literature review, methodological rigor, data analysis and interpretation, clear and logical structure and contribution to the field (China Scholar, nd).

Research writing activities begins with motivation which narrows down to the choice of study topic, preliminary research and brainstorming, methodology, conduct of research draft proposal, revisions, citations and proof reading which culminate to the research proposal. Further processes include data analysis and report writing. Traditionally, all these activities were done thorough manual search engines such as google scholar, sematic scholar, Scopus, research gate, science direct, science open among others (Clemens, 2014).

Research writing have evolved and revolutionized over time with the emergence of disruptive technologies and software's which introduces innovate approach to research writing and new methodological approach of conducting research activities such as topic generation, problem statement generation, literature review, analysis, reporting writing, proof reading, paraphrasing, originality check etc. The soft wares include; grammarly which is used to check for proper grammatical flow, quilbolt for paraphrasing, google doc team co-working, end note for citation, turn tin for plagiarism check etc. Technologies includes artificial intelligence, artificial intelligence(GI), internet of things (IOT) e.c.t (Bouchrika I, 2024).

With the popularization of Artificial Intelligences, it is essential to understand how these resources can be used in academic research and writing processes to aid in the production of scientific knowledge. Knowing the benefits and challenges that the use of these resources will bring will help researchers to improve their own research processes.

The completion rate for postgraduate studies in Kenya is low, with only 30% of students finishing their degrees within the expected time frame. The national benchmark for doctoral completion is 20%, but the average time to complete a PhD is six years. According to (Waswa & Indede, 2020),

Kenya's vision to release at least 1,000 PhDs every year to drive the country's economic ambitions risks failure because of persistent deficiencies in postgraduate training and research. Only one out of 10 PhD students in Kenya completes his or her studies (Mboya, 2020). The main factors contributing toward lengthy and attrition in completions rates points toward quality of research conducted by student and supervision process (Momanyi, 2022).

Research writing is a problematic, emotional, complex, arduous and time-consuming process especially in choosing a researchable topic which causes some delays, literature review which is time consuming, structuring and outlining the research work to ensure logical flow, writing clarity and style, data analysis which requires intensive skills of sophisticated analysis software's, and finally report writing and plagiarisms concerns which can take you back to square zero (Rahimi & Zhang , 2018).

The use of Artificial Intelligence (GAI) technologies can automate some of these activities, making the research and writing process more dynamic, interesting, painless and innovative (Grimes et al., 2023). Artificial Intelligence aides in idea generation such that; it can suggest research topics or identify gaps in existing research based on keywords or fields of interest. It can expedite the literature review process such that; it can summarize large volumes of academic papers, extracting key findings, methodologies, and conclusions. AI can generate detailed outlines based on input about the research focus and objectives. AI can suggest rewrites, improve sentence clarity, ensure grammar correctness, and adapt writing tone for academic standards. AI-powered tools can perform data visualization, identify trends, and suggest appropriate statistical tests. AI tools can identify similarities with published work and ensure proper citation. AI can automate repetitive tasks such as formatting, citation management, or even generating drafts (Pareira et al., 2024).

Although there is great promise for using AI to increase both the quality and the efficiency of research writing, the risks are manifold. First, there are ethical concerns where AI-generated content may unintentionally replicate existing work without proper citation. There are concerns of misrepresentation where researchers might over-rely on AI to create or interpret content, falsely presenting it as their own, which undermines academic integrity and individual effort and originality. Quality assurance is becoming a concern as IA can AI might generate content that is inaccurate or outdated. AI may create on dependence on Technology which may hinder the development of critical thinking and writing skills and hence loss of creativity and innovation. There are policy concerns where many academic and research institutions are yet to establish comprehensive guidelines on AI use. There is widespread rejection of publication hindering the dissemination of knowledge (Janet, 2024).

The antidote against the myriad of the concerns in the use of Artificial Intelligence include; transparency in AI Use, that is clearly disclose the extent of AI assistance in the research and writing process. Use plagiarism detection tools to ensure originality and proper citation of AI-generated content. Manually review and fact-check AI-generated content to ensure accuracy and relevance. Use AI for specific tasks, such as grammar checks, citation formatting, or summarization, rather than full content creation. Use AI-generated content as inspiration or a

starting point, not the final submission. Adhere to policies from universities, journals, or funding agencies regarding AI use (CHAT GPT, 2024).

In the wake of opportunities and challenges presented by the disruptive technologies in the space of research writing, the future is written on the wall. Navigating the bullish and skyrocketing syllabus on technological revolution, require well prepared institutions to respond to the challenges and opportunities presented, otherwise, “the more things change, the more things tend to remain the same, (Jean-Baptiste Alphonse Karr, 1849)”. It is against this background which forms the basis of this article’s objectives which was to critically review empirical literature on the nexus between Artificial Intelligence and research writing.

EMPIRICAL LITERATURE REVIEW

Reis et al., (2024) conducted a study on artificial intelligence and academic writing:an analysis of the perceptions of researchers in training .The objective of the study was to analyze the relationship between research writing and Artificial Intelligence (AI). The researchers used exploratory and descriptive, with a qualitative approach research design. Primary data was collected through online questionnaires to 147 respondents in 24 University for various post-graduate programs in Brazil. The research's target audience is made up of professors, researchers and master's and doctoral students. The study results indicated that AI should be used as a complementary tool for creative and critical academic writing. The study result also found that, academic dishonesty is on the rise, an emerging plagiarism due to technological revolution. Issues on authorship and legitimacy of work carried out with AI and the loss of reflective and critical thinking and creativity was also found. The study need to be replicated in developing context like Kenya. The sample size may be representative and hence a larger sample may be ideal for this kind of study. The study has not dealt with mitigating factors on the issues surrounding AI and research writing.

According to Barros et al., (2023) AIs can help in the academic knowledge production process, from the identification of topics, research objects and synthesis of existing knowledge, to evaluation and delivery to the community through translation. The study also pointed toward emergence of many inadequate or irrelevant manuscript submitted to journals due to overreliance on AI among other evolving research writing software and technologies. The study also found out that AI make some administrators and academics redundant due to overreliance on IA which erodes their creativity. The study concluded that; as access to AI becomes widespread, it is essential that as teachers, researchers and institutions, we embrace the AI technology but be mindful of ethical and quality of its very existence.

Khalifa and Albadawy, 2024 conducted a study on using artificial intelligence in research writing and research. The researchers used a systematic review of literature from databases like PubMed, Embase, and Google Scholar, published since 2019, was conducted. Studies were included based on relevance to AI’s application in research writing and research, focusing on writing assistance, grammar improvement, structure optimization, and other related aspects. The search identified 24 studies through which six core domains were identified where AI helps research writing and

research: 1) facilitating idea generation and research design, 2) improving content and structuring, 3) supporting literature review and synthesis, 4) enhancing data management and analysis, 5) supporting editing, review, and publishing, and 6) assisting in communication, outreach, and ethical compliance. ChatGPT has shown substantial potential in these areas, though challenges like maintaining academic integrity and balancing AI use with human insight remain. The study concluded that; AI significantly revolutionizes research writing and research across various domains. Recommendations include broader integration of AI tools in research workflows, emphasizing ethical and transparent use, providing adequate training for researchers, and maintaining a balance between AI utility and human insight.

Yusri and Pamuji, 2024 investigated international trends and collaborations in the use of artificial intelligence (AI) in scientific writing from 1998 to 2024. The analysis was conducted through four figures covering publication trends, citation trends, cooperation between countries, and network visualization. Results showed a significant increase in the number of AI-related publications in scientific writing, reaching a peak in 2022. Three main research focuses were identified, namely the application of deep learning in scientific article creation, analysis and extraction of information from scientific papers using data mining techniques, and application of machine learning and system learning concepts and techniques.

Kacena, Plotkin, and Fehrenbacher, 2024, sought to determine whether ChatGPT could be used to assist in writing credible, peer-reviewed, scientific review articles. They also sought to assess, in a scientific study, the advantages and limitations of using ChatGPT for this purpose. To accomplish this, 3 topics of importance in musculoskeletal research were selected: (1) the intersection of Alzheimer's disease and bone; (2) the neural regulation of fracture healing; and (3) COVID-19 and musculoskeletal health. For each of these topics, 3 approaches to write manuscript drafts were undertaken: (1) human only; (2) ChatGPT only (AI-only); and (3) combination approach of #1 and #2 (AI-assisted). Articles were extensively fact checked and edited to ensure scientific quality, resulting in final manuscripts that were significantly different from the original drafts. Numerous parameters were measured throughout the process to quantitate advantages and disadvantages of approaches. The findings were such that, use of AI decreased the time spent to write the review article, but required more extensive fact checking. With the AI-only approach, up to 70% of the references cited were found to be inaccurate. Interestingly, the AI-assisted approach resulted in the highest similarity indices suggesting a higher likelihood of plagiarism.

Ciaccio, (2023), investigated the use of artificial intelligence in scientific paper writing. In their study, Artificial intelligence or AI is a hot topic. There are currently 100+ million users of ChatGPT (GPT = generative pre-trained transformer), which was designed and implemented by OpenAI. This is a significant portion of the entire world population. Numerous accolades have been given to the initiative. However, some suggest that AI could be used for nefarious purposes, it may eliminate jobs, provide erroneous information, and it might be used for cheating at work or school. Such events may have already occurred during the few months since the inception of recent AI chatbots. Now might be the point to address this issue from the perspective of what helpfulness can be incurred by AI in scientific paper writing.

Hosseini, Resnik, and Holmes, (2023) investigated on ethical issues related to using and disclosing artificial intelligence (AI) tools, such as ChatGPT and other systems based on large language models (LLMs), to write or edit scholarly manuscripts. The researcher recommend that researchers who use LLMs: (1) disclose their use in the introduction or methods section to transparently describe details such as used prompts and note which parts of the text are affected, (2) use in-text citations and references (to recognize their used applications and improve findability and indexing), and (3) record and submit their relevant interactions with LLMs as supplementary material or appendices.

Clorion, Alieto, & Fuentes, 2024, examined the knowledge, extent of use, perceived influence and perceptions of prospective teachers toward artificial intelligence (AI) in academic writing. The findings of the study indicated that the respondents had proficient knowledge of the use of AI in academic writing. Moreover, more than half of the total respondents (57.6%) frequently utilized AI, and the same number of participants (57.6%) responded that they used AI-generated summaries to simplify difficult articles. The study was able to determine significant relationships among the investigated variables. Moreover, regardless of gender, the respondents had sufficient knowledge of AI in academic essay writing for both males ($M = 3.80$) and females ($M = 3.84$), a notable extent of AI use for males ($M = 3.84$) and females ($M = 3.87$), and an impact of AI in writing academic essays for males ($M = 3.75$) and females ($M = 3.78$).

Aljuaid, 2024, examined whether AI tools are replacing these courses by exploring how they effectively replace traditional academic writing instruction and this shift's potential benefits and drawbacks. The researcher reviewed existing literature on integrating AI tools into academic writing instruction. The findings provide insights to educators navigating the integration of Artificial Intelligence tools into writing curricula while maintaining instructional quality and academic integrity standards. Results show that while Artificial Intelligence helps with grammar and style, questions remain about its impact on creativity and critical thinking. However, Artificial Intelligence is not replacing university writing courses.

Martínez-Olmo & Catalán, 2024 investigated the application of artificial intelligence (AI) in academic writing is important to promote efficiency in the generation of scientific content. They carried out a systematic review of literature that has addressed the use of AI, specifically ChatGPT, in relation to academic writing. The objective is to identify the thematic approaches and inquiry designs applied in the works published on this topic and, thus, guide future projects in this line of research. The main results of the work reveal the interest in academic writing and AI in relation to its possible applications, specific tools and the detection of plagiarism, as well as its ethical and responsible use. Besides, this study stated the application of various research methods. The final discussion focuses on how the integration of AI in academic writing poses both opportunities and challenges in terms of ethics, quality and intellectual autonomy.

MATERIAL AND METHODS

A systematic review was undertaken to evaluate the nexus between Artificial Intelligence (AI) and research writing. The methodology involved four key steps. The first step included literature search. A comprehensive search was conducted across databases such as PubMed and Google

Scholar. Keywords including “artificial intelligence, and “research writing,” were used to find articles published in English. This search focused on identifying peer-reviewed articles, review papers, and empirical studies that explored AI’s application in research writing. The second step was defining inclusion and exclusion criteria to refine search. Studies were included if they directly addressed AI’s integration into research writing.

Step three included data extraction and synthesis. Information was extracted from the identified studies regarding the study main AI focus, key findings, AI integration in research writing, limitations, and recommendations. This data was then synthesized to identify areas where AI can support research writing. The final step involved a detailed analysis of the extracted information to understand how AI can be used to support research writing, the outcomes achieved, and potential areas for future application. This systematic approach was designed to rigorously assess the current state of AI in research writing and identify avenues for further research and development. All works quoted in this study have been cited to avoid plagiarism or self-plagiarism.

RESULT AND FINDINGS

The search generated 99 potential studies. Duplicate studies 43 were excluded based on their titles while 29 were excluded based on the title and abstract review. A total of 10 cases underwent a full text review, where 17 cases were excluded as they did not meet the eligibility criteria.

The analysis from the selected study identified a number of findings which argues the case for and against use of Artificial Intelligence in research writing which included; (i) Idea generation where AI tools can suggest trending topics, unexplored areas, and gaps in existing literature to spark ideas (ii) Content creation and improvement where AI writing assistants like ChatGPT can assist with drafting, while tools like Grammarly help improve readability and style (iii) literature review processing where AI tools like Scholarcy or Zotero help summarize papers, extract key points, and organize references for efficient processing. (iv) research design where Statistical software (e.g., SPSS, R) and AI tools can assist in selecting suitable designs and methods. (v) data analysis and presentation where AI-powered platforms like Tableau, Python, or Excel analyze data and create professional visualizations (vi) ethical compliance and plagiarism detection where Plagiarism checkers like Turnitin and compliance tools help researchers adhere to ethical guidelines. (viii) Language and grammar improvement where Tools like Grammarly or ProWritingAid detect and correct errors in grammar, syntax, and vocabulary. (viii) Citation and referencing management where reference management tools like EndNote, Mendeley, and Zotero automate the creation and formatting of citations. (iv) report writing where AI and word processing software assist with drafting, formatting, and proofreading research reports.

The study also pointed some cases against integration of AI in research writing which included (i) risk of ethical violation and plagiarism that is; the use of AI in generating content may inadvertently lead to ethical breaches, including improper attribution of ideas and unintentional plagiarism. AI tools may produce text that closely mirrors existing works, sometimes without sufficient differentiation or proper citation (ii) quality and accuracy issues, that is AI systems may generate content that appears polished but lacks depth, factual accuracy, or relevance to the research context. AI often lacks the ability to engage with complex arguments, leading to generic

or shallow analysis. (iii) loss of critical thinking skills that is dependence on AI for drafting and idea generation can hinder the researcher's ability to engage deeply with the subject matter. Researchers may focus more on AI-assisted efficiency than on rigorous problem-solving or innovative thinking. (iv) undermining originality and creativity that is, the mechanical nature of AI output may discourage creative risk-taking in academic writing. (v) mass rejection of manuscripts, that is papers heavily reliant on AI tools may face rejection due to perceived ethical breaches, lack of originality, or substandard quality.

CONCLUSIONS

The integration of AI in research writing presents both significant opportunities and notable challenges. On the positive side, AI enhances efficiency, supports idea generation, streamlines drafting and editing, aids in data analysis, and improves language and formatting. These benefits allow researchers to focus on critical thinking and innovation while minimizing repetitive tasks.

However, the risks associated with AI usage, including ethical concerns, potential plagiarism, loss of critical thinking and creativity, and quality issues, cannot be overlooked. Over-reliance on AI may erode fundamental research skills and compromise the originality and integrity of academic work. Additionally, concerns about accuracy, biases in AI outputs, and potential rejection of AI-assisted manuscripts underscore the need for caution.

In conclusion, AI is a transformative tool for research writing, but its effectiveness depends on thoughtful and responsible implementation. A balanced approach can help researchers unlock AI's potential while preserving the essence and rigor of academic excellence.

LIMITATION OF THE STUDY

AI is an emerging subject and the studies conducted do not cover a long time and therefore the reliability and validity of the results are questionable. The findings from the reviewed studies could be as a result of short –run benefit which would be different from the long-run. The studies reviewed conducted present contextual, conceptual and methodological gaps. Some studies result in inconsistent and inconclusive results. Some of the studies did not show a conclusion of the significance of the variable while some are predictive in nature. The study was limited to literature review. With the ever evolving technologies, the author did not exhaust all literature on this field.

RECOMMENDATIONS

Since the benefits of AI utilization in research writing outweighs the demerits, researchers are encouraging to use the application as a complement to their input to make research process a painless activity. Institutions and researchers should establish clear policies on the responsible use of AI, ensuring transparency and adherence to academic integrity. A Combination of AI tools with human oversight is necessary to ensure quality, accuracy, and originality in research writing. Use AI as a complement to, not a replacement for, human creativity and critical thinking. Offer workshops and resources to train researchers in effectively using AI tools for tasks such as drafting, editing, and data analysis responsibly. Encourage the development of advanced AI tools tailored to academic needs, addressing current issues like biases, inaccuracies, and ethical concerns. Foster

an environment where researchers can leverage AI to innovate while actively engaging in critical thinking, analysis, and problem-solving.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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