APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) IN ACADEMIC RESEARCH WRITING OF BUSINESS AND ENTREPRENEURSHIP EDUCATION PROGRAMME IN TERTIARY INSTITUTIONS OF LEARNING IN NIGERIA

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Abstract

Business and entrepreneurship education programme is a field of study that is practice-oriented and aims to foster both business-oriented skills and enterprising skills with the main focus on teaching methods. The application of Artificial Intelligence (AI) in academic research writing is influencing and transforming various fields of studies in tertiary institutions of learning globally of which business and entrepreneurship education is not an exception. Researchers in Business and entrepreneurship education can use AI tools in academics research writing to perform tasks like, grammar, syntax, plagiarism detection, citation management, brainstorming, content structuring, literature review synthesis, and even simulating peer review, among others. The potential application of AI can transform academic research writing in business and entrepreneurship education in numerous ways. In view of the above, this study specifically explores how the application of AI can transform academic research writing, ethical issues involving data manipulation in academic research writing, threats in AI and ways to mitigate threats in the use of AI in academic research writing.

Introduction

The advent of Artificial Intelligence (AI) has revolutionized various fields in education including academic research writing. This transformation ranges from personalized learning experiences to intelligent tutoring systems. Mizumoto and Eguchi (2023) stated that AI is equipped with the potential ability to read and produce course syllabi drafts, tutor students to explain terms and abstract concepts and theories. It has the potential of transforming the way students learn and instructors teach. The use of AI is growing fast, and is expected to have a major transformative implication on research writing in all fields of studies especially business and entrepreneurship education programme. Business and entrepreneurship education is an evolving field of study in tertiary education of learning in Nigeria. The field of study is practice-oriented and aims to foster both business-oriented skills and enterprising skills with the main focus on teaching methods. Mwasalwiba, (2010) stated that it is education about entrepreneurship, that is, education focusing on transmitting declarative knowledge about what entrepreneurship is and what entrepreneurs do. The emerging interest in business and entrepreneurship education at the tertiary education level in Nigeria is seen as a new development emanating from the demands on higher education to provide means of conducting research by involving students in commercialization projects, both internally and through collaboration with private sector organizations. It is a means whereby tertiary institutions can use one stone to kill two birds. This phenomenon is a means according to Fayolle & Redford, (2014) to get free manpower to try out and test risky projects and interaction with local organizations while also providing practice-based education of an experiential character to their students. Danish Foundation for Entrepreneurship (2014) stated that many lecturers are in favour of business and entreprenueurship education which provides students with readymade “business embryos”, meaning they don’t have to worry about the quality of students’ venture ideas. The potential influence of AI can transform academic research writing in business and entrepreneurship education. This study specifically explore how AI tools can be used in academic research writing, ethical issues involving data manipulation in academic research writing, threats in AI and ways to mitigate threats in the use of AI in academic research writing.

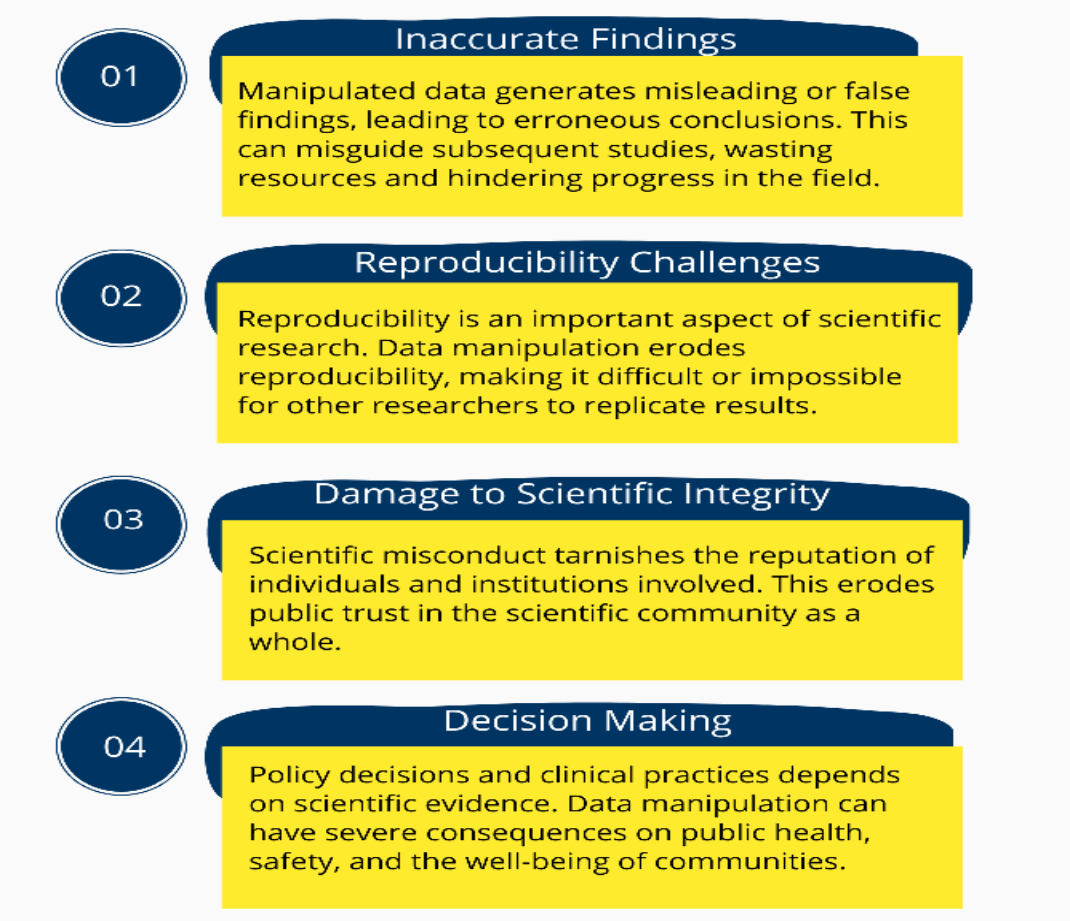
AI and Academic Research Writing

AI tools are significantly influencing academic research writing by aiding with grammar, syntax, plagiarism detection, citation management, brainstorming, content structuring, literature review synthesis, and even simulating peer review. While offering benefits like increased speed, enhanced clarity, and improved writing mechanics, concerns exist regarding over-reliance potentially hindering independent writing skills, creativity, and originality. Researchers are using AI strategically for specific tasks, emphasizing the need for human judgment and critical evaluation to ensure information accuracy and maintain academic integrity. Khalifa and Albadawy, (2024) pointed that AI tools like ChatGPT and Grammarly have been significantly enhancing writing quality due to their ability to check grammar and generate text and feedback. Bahammam et al., (2023) added that AI writing tools like Connected Paper and Semantic Scholar help students find related references on the topic effortlessly. The use of AI for academic research writing is also associated with better efficiency, consistency, writing style, and language choice. However, academic research writing is one of the sectors that could be most significantly disrupted by generative AI according to European Commission, (2024) because it can raise ethical issues. The next section focuses on ethical issues involving data manipulation in academic research writing.

AI and Ethical Issues in academic research writing

AI can result in ethical issues in academic research writing which include proper data storage and the protection of sensitive personal information, respect for autonomy and privacy scientific misconduct and other deviations from good research practice, societal impacts of research, and open data. Shamoo and Resnik, (2022) added that ethical issues like the handling of academic authorship and authorship order, peer review, editorial responsibilities, etc. Data manipulation can lead to serious consequences in quality academic research writing and credibility as can be seen in fig.1

Figure 1: Ethical Issues in academic research writing

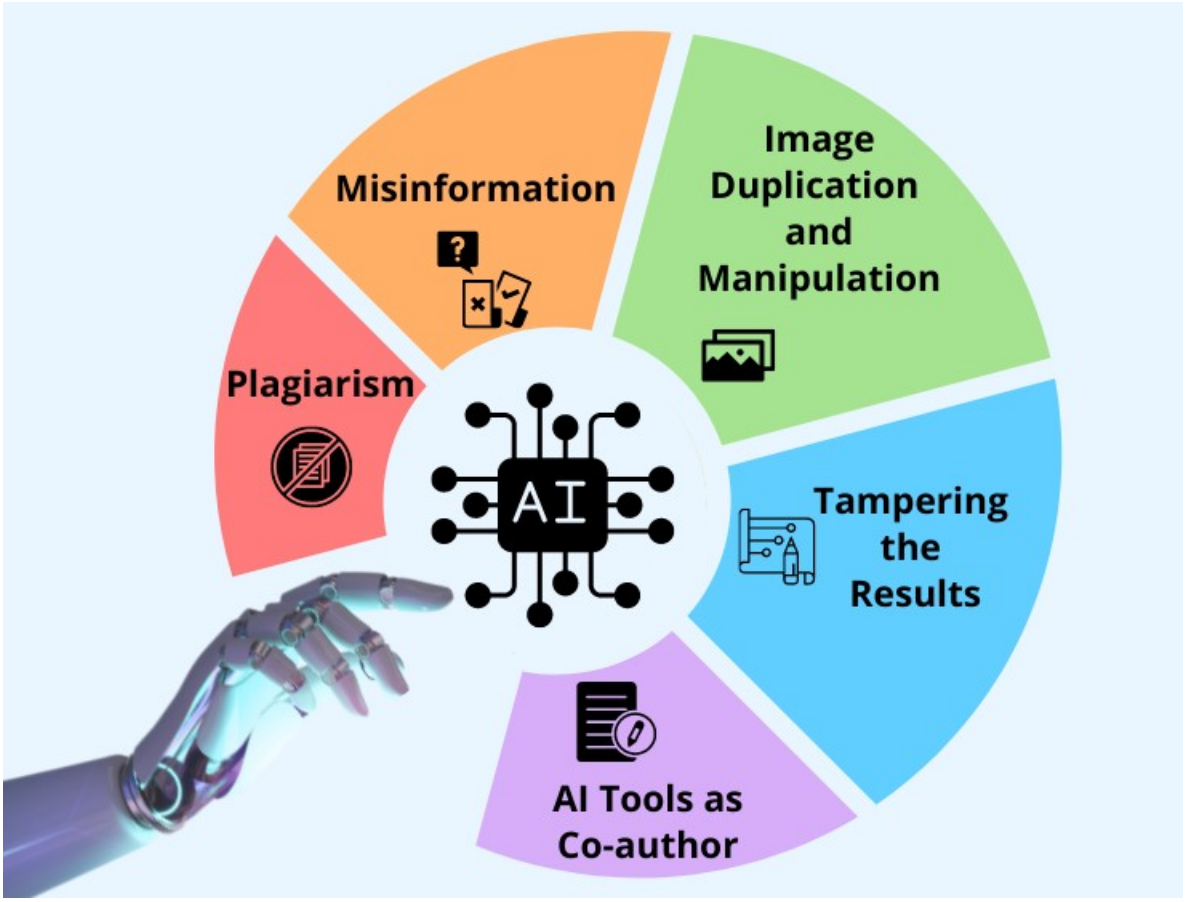


Source: OpenAI (2023)

Threats of AI in Academic Research Writing

The application of AI in academic research writing is accompanied by some hidden risks; which has the potential to damage scientific integrity. Some threats of AI in scientific research are presented in fig. 2.

Figure 2: **Threats of AI in Academic Research Writing**



Source: OpenAI (2023)

In plagiarism, AI algorithms are capable of generating texts, including research articles, essays, and scientific reports. Although this automates research, it raises concerns about the misuse of AI-generated content. It can also generate text that closely mimics human writing styles. This makes it difficult to differentiate between AI-generated content and original work. ALLEA, (2023) refer to plagiarism as using other people's work and ideas without giving proper credit to the original source. Intellectual product which includes ideas, results, text, or images can be used in a way that implies that it is one's own idea. This is a major threat of AI in academic research writing. In addition, AI-generated content may disseminate inaccurate or misleading information. Furthermore, the sophisticated content generated by AI makes it difficult to identify the misleading information. Also, with the risk of wrong references, it would be difficult to trace the source of the information and verify its authenticity. Mittelstadt & Floridi, (2016) stated that applying AI in academic research writing involve the use of massive amounts of data, which will commonly involve sensitive personal information. Also, Image duplication and manipulation is another threat: AI algorithms focused on image generation can create realistic and convincing images that are indistinguishable from the original one. Additionally, the accessibility of AI tools and software allow individuals with even a basic technical background to engage in manipulation. AI is used for manuscript production, reuse of images and graphs without provision of source. Images should clearly and correctly represent research results.

Furthermore, result tampering can compromise academic research writing integrity and hinder the reproducibility of the findings thereby blocking scientific progress. Moreover, the sophisticated nature of the AI algorithms can make it challenging to identify the subtle alterations in the results; thereby making it difficult to discern between genuine outcomes and tampered ones. The involvement of AI in academic research writing raises concerns about the potential threat it poses to research integrity. While AI co-

authorship offers benefits such as increased efficiency and productivity, it raises questions on the ownership and results in ethical, legal, and intellectual property challenges. AI poses a significant threat to academic research writing quality and scientific integrity. Safeguarding the credibility of research is necessary to protect the intellectual integrity. While AI holds tremendous potential to advance academic research writing, it is imperative to recognize and address the increasing threats of scientific misconduct and data manipulation.

Ways of Mitigating the Threats of Using AI in Academic Research Writing

The application of AI tools in academic research writing is very promising in tertiary institutions of learning global. However, the threats associated with the use of AI in academic research writing can be mitigated as presented in fig. 3.

Figure 3: Ways to Mitigate Threats of AI in Academic Research Writing



Source: OpenAI (2023)

Institutions of higher learning should establish robust protocols for data collection, storage, and access. Also, researchers should adhere to rigorous data collection practices and ensure a proper documentation of the same. Transparency in data collection methods allows scrutiny and enhances the reliability and credibility of research. Therefore, strict data governance frameworks, including data auditing and verification must be implemented which can help maintain the integrity of research data.

Detection tools can also help to prevent plagiarism. Therefore, technologists must continually enhance plagiarism detection algorithms by training machine learning models on diverse datasets that encompass AI-generated text. This will enable it to recognize patterns and anomalies associated with AI-generated content. In addition, implementing digital watermarking techniques and embedding metadata in the images can increase their traceability and decrease their visual realism. Also, technologies to verify the originality of images can decrease the image duplication and manipulation issues.

Furthermore, emphasizing open science practices, such as sharing research data, methodologies, and code, promotes transparency. This can foster collaboration which facilitates a better peer-reviewing. Furthermore, making research data openly available can also enable independent verification to detect any potential instances of data manipulation. Also, peer review can play a critical role in evaluating the quality and integrity of research. Furthermore, independent replication of studies by other researchers can help in identifying the potential data manipulation. This can strengthen the robustness of research findings and reduces the likelihood of data manipulation going unnoticed.

It is also worthy to note that, tertiary institution of learning should develop and enforce ethical guidelines specifically tailored to AI applications. Furthermore, ethical review boards and oversight committees can play a crucial role in evaluating the ethical implications of AI research projects and ensuring compliance. Researchers, students, and professionals, especially in business and entrepreneurship education programme should be educated about the risks of using AI in academic research writing. In addition, creating an environment that prioritizes research integrity will foster a culture where data manipulation is unacceptable. They must be apprised of the consequences of unethical behavior. Thus, encouraging open discussions, promoting ethical behavior, and providing support for researchers to address challenges can help in educating the upcoming researchers.

Conclusion

This study calls for a collective responsibility of researchers in institutions of higher learning especially in business and entrepreneurship education programme to uphold the highest standards of research integrity and combat data manipulation effectively. Also, encouraging collaboration between AI systems and human researchers by striking a balance between accuracy and human intellect can add value in academic research writing. Researchers can use AI tools for improvising their text and interpreting the data. Human oversight and critical evaluation of AI-generated contributions are essential to ensure the validity of research outcomes; without compromising scientific ethics and conduct.

Recommendations

The following recommendations were drawn from the study.

1. There is need for tertiary institutions of learning to develop and enforce ethical guidelines specifically tailored to the application of AI in academic and research writing.
2. Researchers, students, and professionals, especially in business and entrepreneurship education programme should be educated about the risks of using AI in academic research writing
3. There should an enabling law to implement consequences of unethical behavior in academic and research writing using AI tools.
4. There should be training and re-training of students and researchers on the use of AI in academic research writing.
5. Adequate funding of business and entrepreneurship education programme at the tertiary institution of learning is recommended to ensure proper integration of AI tools in teaching and learning and research.

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