The Emergent Role of Artificial Intelligence as Tool in Conducting Academic Research

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ABSTRACT

Academic and non-academic research institutes are the two key global sectors that are accomplishing the research agenda. This paper focuses on the implications of using AI tools in academic research. Academic institutions conduct rigorous research to find the impact of different issues on society. Artificial Intelligence (AI) impacts society, organizations, and governance. AI has significantly transformed various domains, including higher education and academic research. Because of its effect on research and education in multidisciplinary fields, there is increasingly significant interest in finding AI's effect on research. In this context, there is a growing concern to find the impact of AI on research in academic institutions. This article aims to engage in a rigorous dialogue on AI's role in academic research. Conducting a systematic literature review of AI's impact on academic research, this study aims to investigate 1) how AI tools are affecting academic research and 2) ethical dilemmas in using AI in academic research. By exploring the advantages and challenges of using innovative applications of AI tools in academic research, this study will give stakeholders, especially researchers, educators, and students, a comprehensive view of how AI could shape educational and interdisciplinary research practices in the future.

Keywords: Artificial Intelligence, Academic Research, Ethical Concern.

1. INTRODUCTION

Context and Purpose

Academic and non-academic research institutes play crucial roles in advancing global research agendas, with academic institutions contributing significantly to understanding multidisciplinary issues across socio-economic, environmental, scientific, and technological domains. Research, being a transdisciplinary concept, provides a solid foundation for fostering interdisciplinary communication. The integration of Artificial Intelligence (AI) into research further underscores this potential, as AI's applications span various disciplines and hold pragmatic value, motivating deeper engagement in interdisciplinary dialogue.

AI is a transdisciplinary field with a long history and philosophy in education, computer science, engineering, business, healthcare, manufacturing, and management (Cao, 2023). AI significantly impacts multidisciplinary fields to solve complex problems efficiently in areas such as education, engineering, business, medicine, etc., improving quality (Patil, Patel, & Lawand, 2023).

Although adopting AI as a research tool is still in the initial stage (Pigola et al., 2023), AI has dramatically altered the landscape of academic research, shifting scholarly paradigms (Pal, 2023). AI's growing capability is critical for academic research at the intersection of technological innovation and academic inquiry. AI is starting to unsettle established

methodologies, ethical paradigms, and fundamental principles that have long guided scholarly work. Its transformative power is evident across multiple disciplines, enabling researchers to engage with complex datasets and questions at an unprecedented level (Butson & Spronken-Smith, 2024).

Significance

Using AI tools poses risks that can negatively impact individuals, groups, organizations, communities, society, and the environment in the long or short term. Without proper controls, AI systems can exacerbate inequitable or undesirable outcomes for individuals and communities (OSTP, 2023). As AI increasingly changes the world and raises important questions for society, economy, and governance, scholarly works have focused mainly on using AI. Therefore, it is critical to study and understand how AI systems will affect academic research in the foreseeable future (Agbor et al., 2024).

AI tools can contribute to academic research; therefore, more investigation is needed to determine AI's impact on academic research (Pigola et al., 2023). It is important to know the moral considerations in advancing the effect of AI in academic research. Limited scholarly works address the potential effects of using AI tools in academic research that unravel the significant effect of AI in academic research (Agbor et al., 2024). Consequently, more rigorous research is needed to determine AI tools' impact on academic research activities (Chankseliani & McCowan, 2021).

Goal

This paper attempts to examine the potential effect of AI on academic research. It focuses explicitly on studying 1) how AI tools are affecting academic research and 2) ethical dilemmas in using AI in academic research.

2. AI IN INTERDISCIPLINARY RESEARCH

AI facilitates interdisciplinary research by integrating methods and knowledge from different fields (Rolnik, 2024). The transformative impact of AI is most vividly captured in its capacity to facilitate interdisciplinary research. AI's ability to quickly and efficiently analyze datasets from diverse academic fields allows researchers to make connections they might not have otherwise considered, opening the door to novel interdisciplinary research and collaborations (Butson & Spronken-Smith, 2024). Academic research contributes to understanding multidisciplinary concepts (Lovakov et al., 2022), which draws on knowledge from different disciplines but stays within their boundaries (Choi & Pak, 2006). That research covers various factors in multidisciplinary fields related to socio-economic, environment, arts, science, law, health, engineering, and technology (Chankseliani & McCowan, 2021). Interdisciplinary research analyzes, synthesizes, and synchronizes multidisciplinary concepts into a coordinated, integrated, and coherent whole (Choi & Pak, 2006).

AI's integration into academic research offers transformative benefits, including streamlined data processing and support in academic writing, but it also raises concerns such as biases, lack of creativity, and ethical challenges, like authorship and data misuse. All of these issues are also transdisciplinary ones that support and motivate inter-disciplinary communication. Furthermore, addressing these issues requires transparency, expert verification, and ethical regulations. Transdisciplinarity integrates the natural, social, and sciences in a humanities context, transcending their boundaries (Choi & Pak, 2006). The transdisciplinary nature of both research and AI underscores their potential to strengthen interdisciplinary communication and collaboration, enhancing trust and fostering innovation across diverse fields, especially analogical thinking, which is essentially a creative one and provide the necessary input to

inductive, deductive and abductive logical thinking.

3. ACADEMIC RESEARCH

Academic and non-academic research institutes are the two key global sectors accomplishing the research agenda. Academic institutions conduct rigorous research to find the impact of different issues on society (Chankseliani & McCowan, 2021). Academic research, which is "the creative and systematic work undertaken to increase the stock of knowledge" (Organization for Economic Co-operation and Development, 2015, p. 1), is an important aspect of scholarly works that promote new knowledge (Agbor et al., 2024). Academic research can improve understanding of different knowledge disciplines. Teaching and research are two functions of a higher education institution that are often considered inseparable (Lovakov et al., 2022).

4. APPLYING AI TOOLS IN ACADEMIC RESEARCH

As shown in Figure 1, AI's impact on the academic research process is multidimensional. AI tools are adopted at different stages of the research process, including literature, problem exploration and selection, solution exploration and selection, problem-solving, paradigm discovery, and generating innovative ideas (Pigola et al., 2023). Specific research activities, such as writing, data analysis, and automated content analysis in literature reviews, are mainly included (Butson & Spronken-Smith, 2024).
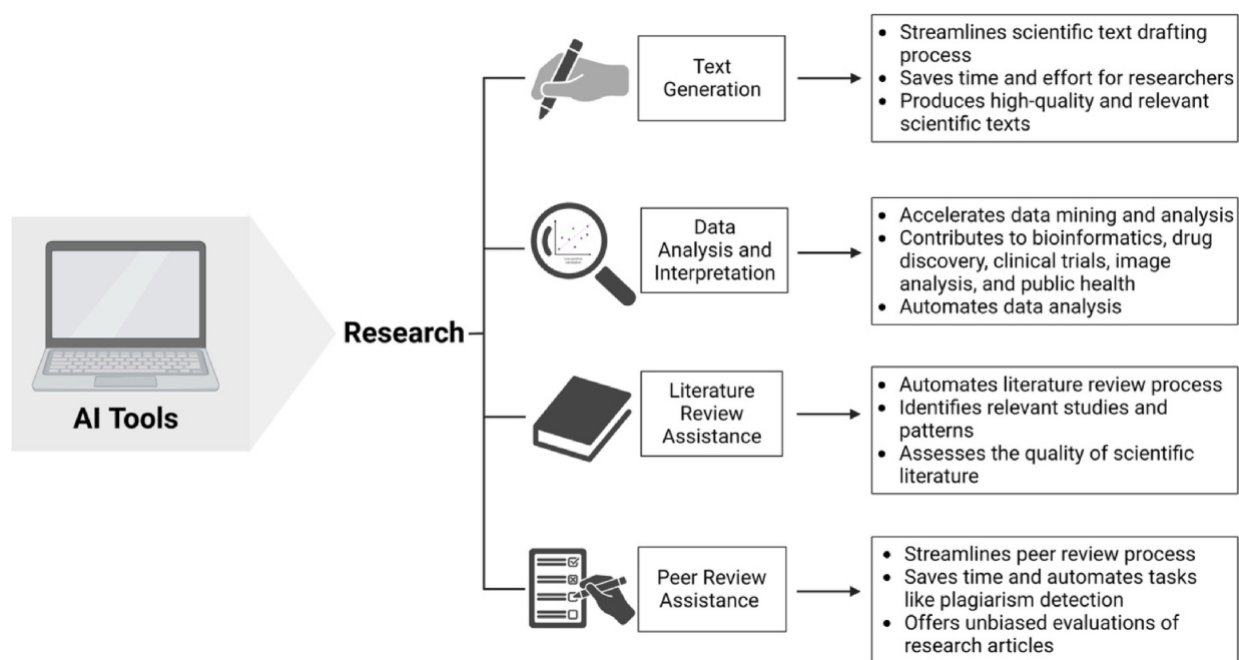

Figure 1: Using AI tools in Research (Source: Alqahtani et al., 2023).

Conceptual Foundation
AI tools can provide researchers with relevant information for their studies (Kooli, 2023). AI's transformative role is not merely operational but has profound implications for research foundations. By enabling more complex and large-scale analyses, AI allows for a more nuanced understanding of phenomena, effectively expanding the parameters of what can be known and studied. AI acts as a transformative force that augments human capabilities rather than merely serving as a tool

for automating repetitive tasks. It actively participates in the research process, shaping how research is conducted and what questions can be asked and answered. Therefore, the facilitative role of AI in academic research cannot be dismissed as mere technological window dressing; instead, it marks a methodological pivot of consequence (Butson & Spronken-Smith, 2024). Based on the query, AI can also provide promising research ideas (Rahman & Watanobe, 2023).

AI's role in the publication process is conceived not merely as an efficiency-boosting measure but as a radical rethinking of peer-review paradigms. AI significantly affects how researchers think about research problems, examine data and methodology, and consider what to consider knowledge. This redefines academic research traditions (Butson & Spronken-Smith, 2024).

Literature Review
Many digital platforms use AI tools to find published papers, books, conference proceedings, and editorial comments for research. These tools summarize, indicate trends on any research subject, analyze data, define the best theory, and compile and synthesize content (Pigola et al., 2023). AI can help identify relevant publications, highlight findings, and suggest potential research gaps, making the review process more efficient and comprehensive (Rolnik, 2024). AI's ability in natural language processing has proven invaluable in literature review tasks, where algorithms can scan and summarize vast quantities of literature, providing researchers with logical summaries (Butson & Spronken-Smith, 2024). AI-assisted research has the potential to ease and improve the literature review (Agbor et al., 2024).

Automation
AI tools can automate repetitive and time-consuming tasks, saving researchers time and allowing them to focus on more complex and important aspects of their research (Kooli, 2023). AI's capacity for automation frees researchers from time-consuming tasks, enhancing research

reliability and validity. AI can help with intellectual tasks that allow researchers to focus on their work's conceptual aspects and engage more with research questions (Butson & Spronken-Smith, 2024).

Data Analysis
AI can collect and process large amounts of data efficiently. AI, with its unlimited availability, accessibility, and production capacity, allows researchers to collect data at any time from any location. AI can assist researchers in collecting high-quality data by providing more objective, efficient, and customized information, reducing the risk of human error (Kooli, 2023). AI tools can collect and analyze large datasets quickly and easily (Agbor et al., 2024); AI can significantly reduce human error in data collection and analysis (Butson & Spronken-Smith, 2024). AI is a valuable resource for data analysis and literature reviews. Integrating AI into academic research has significant potential to facilitate the exploration of large data sets (Pigola et al., 2023).

Text Generate
AI also contributes to the writing in the research process. Beyond mere grammar checks or stylistic suggestions, AI-driven writing aids have the potential to recalibrate the researcher's relationship with their text. These tools can help authors to prepare more coherent argumentative structures and even find logical inconsistencies, thereby interrogating the text's epistemic integrity (Butson & Spronken-Smith, 2024). The emergence of AI's capability of generating organized text has gained massive acceptance by scholars across academic disciplines (Agbor et al., 2024).

Research Writing
Academic writing is essential to academic research based on structured expression of ideas, data-driven arguments, and logical reasoning. AI is increasingly integrated into academic writing. AI can offer many supports to researchers, including practical assistance in the research writing process. AI can improve writing in academic research by finding, correcting, and

improving typographical and grammatical errors and inconsistencies. AI can also provide advanced vocabulary and recommended improvement strategies (Rahman & Watanobe, 2023). Grammar checkers and online language editors employ AI tools to identify text errors. They are valuable resources for creating academic papers by identifying errors that other grammar checkers may miss, such as grammatical and syntax issues, word choices, pronoun usage, articles, and spelling (Pigola et al., 2023).

Writing is essential, especially for academic research. The structured expression of ideas, data-driven arguments, and logical reasoning characterize it. However, integrating AI tools into writing in academic research poses challenges, such as handling vast amounts of information and complex ideas (Khalifa & Albadawy, 2024).

5. DRAWBACKS OF AI-ASSISTED ACADEMIC RESEARCH

If AI tools are used as a substitute for human researchers without being critically evaluated and verified before being used in the research process, the research cannot be ensured to be reliable and ethical. Consequently, AI often requires human interpretation, evaluation, close observation, and outcome verification for meaningful and actionable research findings (Kooli, 2023).

Copyright
The copyright issue in AI-assisted research may lead to legal challenges (Agbor et al., 2024). Given the need for accountability, AI does not meet the requirements for authorship. Scholarly works must be the author's own and not present others' ideas, data, words, or other material without adequate citation and transparent referencing. Therefore, the use of AI tools must be declared and clearly explained in research publications (Li, 2023). In traditional research, informed consent from sources is a non-negotiable ethical basis. However, the

multifaceted nature of AI complicates this straightforward contractual agreement, raising ethical and methodological concerns and creating a dilemma for researchers (Butson & Spronken-Smith, 2024).

Limited Creativity and Critical Thinking
Reliance on AI in academic research reduces the creativity associated with human intelligence. While using AI tools in research presents some advantages, unethical reliance on AI tools diminishes human creativity in scholarly activities (Agbor et al., 2024). AI lacks the creativity to generate new ideas to advance scientific and academic research (Kooli, 2023). Relying on AI in scholarly works in academic research may limit critical thinking and creativity and encourage less effort among academic researchers and possible plagiarism (Agbor et al., 2024).

Contextual Bias
AI has higher capacities and expertise in data analysis, but AI also has the potential to perpetuate harmful biases (Kooli, 2023). AI systems can inadvertently perpetuate biases based on their training data, leading to skewed results. Researchers must be cautious about data sources and implement techniques to mitigate bias (Rolnik, 2024). Since AI relies on pre-programmed algorithms, it cannot understand the context. If biased data trains AI, it will generate erroneous information and recommendations (Kooli, 2023). Consequently, there is concern about the potential for bias in the peer review process due to AI automation (Agbor et al., 2024).

Decreased Rigor
Using AI in academic research may lessen the rigor of scholarly research. It may also encourage less effort among academic researchers and possible plagiarism (Agbor et al., 2024).

Transparency and Reproducibility
The AI model's lack of transparency can hinder reproducibility, a cornerstone of scientific research (Rolnik, 2024).

6. ETHICAL CONCERNS OF USING AI TOOLS IN RESEARCH

Using AI in research has raised concerns about critical ethical issues (Pigola et al., 2023). There are possible ethical challenges associated with using AI in academic research.

Authorship

Ethical issues such as authorship, data ownership, control, consent, and discrimination are concerns when using AI tools irresponsibly. (Kooli, 2023; Satheeskumar, 2024). Ethical issues have been raised, primarily about acknowledging authorship (Pigola et al., 2023). In a traditional research model, informed consent is a non-negotiable ethical cornerstone (Butson & Spronken-Smith, 2024). However, in AI-assisted research, researchers may copy AI-generated information without providing proper citations, leading to plagiarism (Bahrini et al., 2023).

In addition, there could be potential misuse of data in AI-assisted research. AI may cause ethical dilemmas because it uses biased algorithms that require human involvement. Consequently, implementing AI tools in academic research may face resistance from those wary of replacing human judgment with AI systems (Alqahtani et al., 2023).

Ethical Guidelines for Using AI

Guidelines for using AI in academic research are important and urgently needed. An ethical policy for applying AI tools in academic research is needed. Guidelines for using AI tools must be developed to distinguish between AI-assisted research and human-written papers (Agbor et al., 2024).

Data Privacy and Security

AI in research often involves handling sensitive data, raising concerns about privacy and security. Researchers must adhere to strict data protection protocols and ethical standards to safeguard sensitive information (Rolnik, 2024).

7. AVOID MISAPPLICATION OF AI IN RESEARCH

To avoid and mitigate the misuse of AI in research, researchers' awareness of the misapplication of AI in research is crucial. Researchers should take measures to mitigate the potential risks. AI-assisted research findings should have human interpretation and evaluation to be meaningful and acceptable. Human experts should independently verify the research findings produced by AI tools to ensure accuracy and validity. In addition, there should be regulations to ensure the responsible and ethical use of AI tools in research. Also, to mitigate the biased results, researchers should be careful about the data used to train the AI they used in their research. Additionally, using AI tools in research should be transparent and disclosed to all stakeholders. Researchers should also work with experts to develop best practices regarding using AI tools in research (Kooli, 2023).

Reliance on AI assistance in academic research has raised the issue of responsible use of this innovative technology. Therefore, careful consideration of the ethical implications of AI in academic research is needed (Agbor et al., 2024). AI in academic research needs more practical exercises to analyze ethical issues (Pigola et al., 2023). AI tools can be used as an aid to human researchers, not as a substitute. AI tools rely on pre-programmed algorithms, which may have severe limitations in contextual understanding. Therefore, to ensure that research is reliable and ethical, it is vital to critically evaluate and verify the information provided by AI tools before using them in research (Kooli, 2023).

8. CONCLUSIONS

This paper analyzed the impacts of using AI in academic research. The AI tools are impacting academic research. The AI has been accepted as a powerful tool in academic research. However, AI raises ethical challenges to academic research. Therefore, its use should be based on

ethical grounds (Agbor et al., 2024). AI tools have the potential for substantial advancements in research but also for negative impacts on society. Consequently, they require assurance of ethical application in academic research. However, despite massive interest and efforts, implementing ethical practices in AI is still uncertain. A unified professional philosophy is necessary to ensure stable ethical conduct that benefits society (Strümke1 et al., 2022). By exploring the effect of using innovative applications of AI tools in academic research, this study will give stakeholders, especially researchers, educators, and students, a comprehensive view of how AI could shape educational and research practices in the future (Collins et al., 2021).

9. ACKNOWLEDGEMENT

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