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Integrating AI into Research Curriculum: Assessment of Scope, Perceived Impacts, and Challenges Encountered

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Abstract
This study investigates the integration of artificial intelligence (AI) into the research curriculum in Nigerian and Bangladeshi universities. Objectives include exploring research areas of integration, perceived impacts, and challenges encountered. The study employed the convergent parallel mixed method, recruiting 55 university teachers for the quantitative survey and 6 university teachers for the qualitative method. Quantitative findings reveal that AI is predominantly integrated into writing literature reviews and conducting data analysis tasks, with varied adoption rates across specific research activities such as formulating research questions and identifying gaps in the literature. Qualitative insights underscore the transformative effects of AI on enhancing students' critical thinking, analytical skills, and writing proficiency. However, significant challenges emerge, including balancing AI integration with foundational research skills, addressing resource limitations, and navigating ethical considerations. Implications of the study suggest the need for tailored educational strategies to effectively integrate AI into curricula, supported by adequate resources and ethical guidelines. These measures aim to optimize AI's potential in fostering innovation and rigor in research education, thereby preparing students for future professional challenges in academia and beyond.

Keywords: *AI; Research; Ethical aspects; Curricula*

Introduction

Academic research is made possible through the use of structured writing. It helps to articulate ideas clearly. However, students tend to struggle more with these the strict requirements for systematic organization, precision, and citation style (Khalifa & Albadawy, 2024; Gupta et al., 2022; Marzuki et al., 2023). They also face the challenge of crafting an in-depth and original piece of work after accumulating a large volume of texts (Dwivedi et al, 2023; Moses & Mohammad, 2019). More problems emerge when students carry the essence of a second language deeply within them try to combine the material and fill the void with fresh, original and appropriate ideas (Kearney, 2017). Such students have it tougher though but they must learn how to writers' coherent work in terms of research findings in a bid to live up the demands of the academic rule that says "Publish or perish" ; they are able to publish research because research is a key component for the success of students at university and invaluable to a student's career (Bavdekar & Tullu, 2016; Heron et al., 2020; Wilkins et al., 2021). For students whose native

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language is not English, writing academic papers is the first critical step in asserting about their status in the area of expertise.

The new generation of artificial intelligence has shaped academic work in different perspectives (Yusuf et al., 2024). These technologies offer a range of functionalities that streamline the writing process, enhance writing accuracy, and improve the quality of the overall output. For instance, an AI based language editing applications can identify and rectify faults in grammar, recommend an appropriate word, and enhance sentence formation (Malik et al., 2023). The level of AI goes beyond text editing to say, assist in the summarization of a corpus of text, the core ideas and themes contained in a body of research and, conceivably, writing a literature review (Lloret & Palomer, 2012; Yusuf et al., 2024). Emphasizing the AI impact in research, ideas and innovation aspects have also been captured. Ready-made AI powered tools can give recommendations or insights, which are otherwise not obvious for researchers and thus generate ideas for further exploration (Xu et al., 2021; Davatgari Asl, H., Zoghi, M., & Rahmani, P. 2021.).

The use of AI in the academic world raises some eyebrows when such practice is involved in research as questions on the relevance of such practice arise as scholars note some ethical dilemmas, however, these tools have its good side. Some critics argue that over reliance on AI in writing, editing or data analysis for whatever context impairs the quality of the academic piece of work (Yusuf et al, 2024). In addition to this, some concerns are with regard to the prospects of AI able to produce bias or some errors thus impair the integrity of a research outcome (Osasona et al, 2024; Varsha, 2023). In the view of some authors, AI should not be regarded as a viable alternative to human brain and creativity but rather tools that complement human brain (Yusuf et al, 2024). Undoubtedly, when utilized for the right reasons, AI can assist in enhancing the entire research process by taking on tedious and time-consuming chores, and as a result, leaving researchers to deal with the key aspects of the research only. For example, AI can analyze big data sets, detect trends, and develop first drafts, which researchers can then enhance and expand using their thoughts and experience (Yaipraset & Hidayanto, 2023 ; Yuossef, M. 2023.). Consequently, it is essential for students to be trained on how to effectively use AI in their research activities.

This includes comprehending the strengths and pitfalls of AI and also considering ethical implications such as plagiarism and data privacy considerations, as well as bias. In the academic debate, concerns have been raised as regarding the impact of AI technology on the developed potential of socionics, as well as on the development of writing skills (Boudouaia et al., 2024; Escalante et al., 2023; Song & Song, 2023; Meyer et al., 2024). Yet, few studies have examined how AI is blended into research pedagogy, and the issues that arise from such blending. Further, this issue has not been researched in a cross-national framework which is important in appreciating the different educational setting as well as cultural factors related to the adoption of AI. Therefore, in this paper, we used the preliminary results of a broader survey aiming to fill this gap. In this regard, two countries, Nigeria and Bangladesh were purposively chosen to investigate the socionics potential amongst university teachers in these nations. These nations were chosen to provide insights from different educational and cultural backgrounds, enhancing the study's relevance and applicability. Three research questions guided this study:

1. Which areas of the research curriculum do university teachers in Nigeria and Bangladesh integrate AI technologies?
2. What are the perceived impacts of AI integration on research processes?
3. What challenges do educators encounter when integrating AI into the research curriculum, and how do they address these challenges?

Methodology

Data and participant recruitment

This study utilized the convergent parallel mixed method approach as defined by Creswell (2014) in order to understand the incorporation of AI in assisting the research work of undergraduate as well as graduate students enrolled in Nigerian and Bangladeshi universities. It further looked into the ways that teachers incorporated AI tools in practice to support students and studied the research processes after AI tools were incorporated. Methodology comprised of quantitative questionnaires and qualitative interviews of student and faculty members who participated in the teaching of research methods. Random sampling encompassed individuals from various professional backgrounds such as those in the sciences and those in the humanities, business, as well as data analytics so as to have an comprehensive perspective of AI in research.

The quantitative phase involved administering structured surveys to 55 teachers, targeting the areas where they engaged students with AI, gaining insights on their understanding of the AI integration throughout the research process, and the process of AI curriculum

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integration. These quantitative interviews were supplemented by qualitative ones with six teachers who were responsible for teaching research design and had incorporated AI into their class. The designed semi-structured interviews focused on teachers' views on AI incorporation into the research class, challenges faced, and advantages to the students from various disciplines. The other aspects investigated included teachers' views on AI as a tool for developing critical perspectives and ability to conduct research. The research was conducted at the same time in Nigerian and Bangladeshi universities in order to highlight regional variations in the use of AI technologies and educational methods.

Data analysis

Data collected was analyzed through quantitative and qualitative methods. For the quantitative part of the data, descriptive statistics of frequency, percentage, mean and standard deviation were utilized. These statistical tools helped us present and describe effectively the significant features of the dataset in the most succinct way possible. Frequencies and percentages guided the distribution of responses, while mean and standard deviation measures the average and spread of the data around the mean value.

For qualitative data, using Braun and Clarke's framework of thematic analysis (Braun & Clarke, 2006), which is a simple approach to identifying, analyzing and reporting patterns or themes within qualitative data, proved most effective. This allowed us to identify useful patterns and insights from the comments made by the respondents. We started by gaining an understanding of the data; we read through and re-read the interview transcripts to understand the content well enough; after this, we started coding. Subsequently, we created initial codes by outlining every sentence that bore significance and attaching short descriptive names to the statements to denote essential aspects of the data. All these codes were eventually allocated into groups which represented central characters in the codes, or likely themes, which were deliberated upon to ensure precise data representation. Lastly, we clearly identified and labeled the themes which succeeded in providing a logical and integrated description of the major issues facing for instance the educators during their AI-assisted research.

Results

Table 1 presents the participants' demographic features. The results reveal that 58.2% of the participants are from Nigeria, while 41.8% are from Bangladesh. In terms of gender, 67.2% of the participants are male, 25.5% are female, and none identify as non-binary. Additionally, 7.3% of the participants preferred not to disclose their gender. Regarding academic status, 23.6% are Lecturer I, 34.6% are Senior Lecturers, 20.0% are Assistant Professors, 14.5% are Associate Professors, and 7.3% are Professors. When examining the disciplines, 5.4% of participants are from Arts and Fine Arts, 45.5% are from Education, 30.9% are from Engineering and Technology, 10.9% are from Humanities and Social Sciences, and 7.3% are from Natural Sciences. The participant demography indicates a diverse sample with several notable trends. This diversity reflects varied perspectives on AI-facilitated research across different academic and geographical contexts.

Table 1. Participant demography

	Frequency	Percent
Country		
Nigeria	32	58.2
Bangladesh	23	41.8
Gender		
Male	37	67.2
Female	14	25.5
Non-binary	0	0.0
Prefer not to say	4	7.3
Academic status		
Lecturer I	13	23.6
Senior lecturer	19	34.6
Assistant professor	11	20.0
Associate professor	8	14.5
Professor	4	7.3
Discipline		
Arts and fine Arts	3	5.4
Education	25	45.5
Engineering and Technology	17	30.9
Humanities and Social Sciences	6	10.9
Natural Sciences	4	7.3

Results from Survey

RQ1: Which area of the research curriculum do university teachers integrate AI technologies?

Table 1. Research areas for AI integration

Items	F	%
Academic writing		
Using AI tools for grammar and style correction	21	38.2
Enhancing writing clarity and coherence with AI	10	18.2

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Generating writing prompts and suggestions	15	27.3
Automated referencing and citation management	16	29.1
Establishing Researchable Topics		
Using AI to explore trending research topics	12	21.8
Generating novel research ideas with AI	10	18.2
Assessing the feasibility of research topics using AI tools	8	14.5
Formulating Objectives and Research Questions		
Identifying key objectives with AI analysis	7	12.7
Refining research questions using AI	7	12.7
Identifying Gaps		
literature mining to identify research gaps	23	41.8
Maping existing research and highlight underexplored areas	20	36.4
Writing Literature Reviews		
Summarizing large volumes of literature	35	63.6
Comprehensive literature synthesis	42	76.4
Identifying key themes and trends	31	56.4
Structuring literature reviews	38	69.1
Data analysis		
Statistical analysis and hypothesis testing	27	49.1
Machine learning for predictive analytics	12	21.8
Data visualization	15	27.3
Handling big data	3	5.5

Table 1 outlines the research areas where university teachers integrate AI. In **academic writing**, the most common application of AI is grammar and style correction, with 38.2% of teachers utilizing these tools. Automated referencing and citation management is also significant, used by 29.1% of teachers. AI tools for generating writing prompts and suggestions are employed by 27.3% of teachers while enhancing writing clarity and coherence with AI is applied by 18.2% of teachers. When it comes to **establishing researchable topics**, AI is used to explore trending research topics by 21.8% of teachers. Additionally, 18.2% of teachers use AI for generating novel research ideas, and 14.5% assess the feasibility of research topics using AI tools. For **formulating objectives and research questions**, 12.7% of teachers use integrated AI to identify key objectives and refine research questions.

In the area of **identifying gaps in the literature**, literature mining to identify research gaps is integrated by 41.8% of teachers, and mapping existing research to highlight underexplored areas is done by 36.4% of teachers. **Writing literature reviews** sees a high level of AI integration. The most prevalent use is for comprehensive literature synthesis, with 76.4% of teachers incorporating AI in this task. Structuring literature reviews is facilitated by AI for 69.1% of teachers, summarizing large volumes of literature by 63.6%, and identifying key themes and trends by 56.4%. Regarding **data analysis**, AI is used for statistical analysis and hypothesis testing by 49.1% of teachers, followed by data visualization at 27.3%, machine learning for predictive analytics at 21.8%, and handling big data by 5.5%.

In summary, the data indicates that the integration of AI in the research curriculum is most prominent in writing literature reviews and data analysis. AI technologies are less frequently used for formulating objectives and research questions, as well as assessing the feasibility of research topics. The trend shows that teachers are leveraging AI to enhance efficiency and accuracy in academic writing, literature review, and data analysis tasks.

RQ2: What are the perceived impacts of AI integration on research processes?

Table 2. University's Teachers perceived impact of AI integration in Research

Items	Mean	Std. deviation
AI tools have enhanced students' ability to critically analyze complex research problems during research.	3.45	0.53
The teaching of AI has improved students' logical reasoning and decision-making skills during research.	3.71	0.27
AI applications have significantly improved students' data analysis and interpretation skills.	3.26	0.11

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Using AI in research has helped students develop better hypotheses and research questions.	4.28	0.24
The introduction of AI has changed the way students approach and design research projects.	2.34	0.63
AI tools have enabled students to adopt more innovative and efficient research methodologies.	3.31	0.42

Based on the data provided in Table 2, the perceived impacts of AI integration on research processes among university teachers vary across different dimensions. Teachers generally believe that AI tools have positively influenced students' ability to critically analyze complex research problems (M = 3.45, SD = 0.53). Furthermore, the teaching of AI is highly regarded for improving students' logical reasoning and decision-making skills during research (M = 3.71, SD = 0.27). In terms of data analysis and interpretation skills, the impact of AI applications is perceived slightly positively (M = 3.26, SD = 0.11), indicating a moderate level of agreement. Notably, teachers strongly agree (M = 4.28, SD = 0.24) that AI integration has facilitated the development of better hypotheses and research questions. Conversely, the integration of AI seems to have less impact on altering students' approaches to research project design (M = 2.34, SD = 0.63), although it has helped students to adopt more innovative research methodologies (M = 3.31, SD = 0.42). Overall, while teachers acknowledge the potential of AI in certain research areas, there remain varying degrees of impact across different facets of their research processes.

RQ3: What challenges do university teachers face when integrating AI in research teaching?

Table 3. Challenges experienced by university teachers when integrating AI in research teaching

Items	Mean	Std. deviation
Balancing the teaching of AI applications with foundational research skills is challenging.	4.02	0.78
Students often lack the necessary background in AI, making it difficult to teach AI-enhanced research techniques.	4.38	0.66
The availability of AI resources and tools for teaching research processes is insufficient.	4.67	0.39
There is a lack of institutional support for integrating AI into the research curriculum.	4.35	0.46
Students have difficulty applying AI tools to real-world research projects.	4.26	0.38
The fast pace of AI advancements makes it difficult to keep the research curriculum up to date.	4.57	1.31
Ethical considerations and biases in AI are challenging to address adequately when teaching research processes.	4.73	0.35

Based on Table 3, it is evident that several significant challenges are perceived in this educational context. Firstly, balancing the teaching of AI applications with foundational research skills is identified as challenging by teachers (M = 4.02, SD = 0.78). This suggests that teachers find integrating AI seamlessly into traditional research methodologies demanding without compromising essential foundational skills. Secondly, students' lack of necessary background in AI poses a considerable obstacle, as indicated by a high mean score of 4.38. Thirdly, the availability of AI resources and tools for teaching research processes is perceived as insufficient (M = 4.67, 0.39), impeding the teaching of AI-facilitated research processes. Moreover, there is a notable lack of institutional support for integrating AI into the research curriculum (M = 4.35, SD = 0.46).

Students' difficulty applying AI tools to real-world research projects is also highlighted as a significant challenge (M = 4.26, SD = 0.38). Furthermore, the rapid pace of AI advancements presents a significant challenge to teachers (M = 4.57, SD = 1.31). Lastly, addressing ethical considerations and biases in AI poses a complex challenge to university teachers (M = 4.73, SD = 0.35). In summary, while AI offers promising opportunities to enhance research teaching, the challenges identified highlight the need for comprehensive support, resources, and ongoing professional development to effectively integrate AI into the research curriculum in higher education settings.

Results from interview

RQ1: Which area of the research curriculum do university teachers integrate AI technologies?

To address the research question, informants identified various research areas where they have integrated AI for their students during the research process. Three consistent themes emerged: AI integration into data analysis, language structure, and research synthesis.

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Integration into data analysis

This theme occurs consistently in the interview responses. Participants narrated how they teach their students to use AI packages in Python and R for analyzing complex research data. In Bangladesh, AI usage in research varies significantly across academic fields. One respondent, a computer science instructor, stated, "I teach my students how to use machine learning packages for instance, TensorFlow and PyTorch in their data analysis during applied research." Another computer science instructor acknowledged use of similar tools in "The accommodation of students of various background levels". A respondent from the Economics department commented that she teaches "R and Python packages for data analysis". Such particular integration of AI technology is to enable students go beyond and manage massive sets of data, apply complex methodologies to their analytics and be able to extract sage data from research.

Language structure

This theme came up as one of the most frequent areas where AI is already integrated into the research education process. Participants gave accounts of how they coach their students to employ AI applications in enhancing coherence in writing as well as improving their work quality. An English professor has for instance stated that he "sometimes shows students how to use GrammarlyGo for checking language structure and Turnitin for any cases of cheating." Another informant from Nigeria stated that he "tells his students to edit proposals with the help of AI ChatGPT to make them better for publication and more professional." Another educator from Nigeria added "…in our department, we stress the role of ProWritingAid and Scribbr for students who need to improve their language structure. These tools have already been embedded in the course as a means of improving students' writing skills so that they can write good quality academic works." At the same time, they also stress that it is important for students to use these tools in an ethical manner and ensures that no grammatical errors exist in the students' research work. For example, one teacher from Nigeria narrated that they "instruct students on the responsible use of AI tools like Grammarly, ensuring proper citation practices and adherence to academic integrity standards." This approach improves writing quality and also fosters ethical research conduct among students.

Research synthesis

Although not consistently discussed by all participants, few participants narrated how they exposed students to research synthesis, particularly synthesizing AI-generated texts. The goal is to prevent the outright use of AI-generated texts in research without human intuition as such acts constitute cheating. One science educator from Nigeria narrated

"I am not against the use of AI in research… in fact, I strongly advocate for its use. However, it is unethical to generate information from AI and paste such texts into research work without human editing. For this reason, I developed a research framework which postgraduate students need to follow to synthesize AI-generated texts…. The framework consists of five steps, including familiarizing, conceptualizing, inquiring, evaluating, and synthesizing… I exposed students to the framework in three different lecture hours, labeled as practice, mastery, and challenge…This framework has worked as students have developed critical thinking in synthesizing AI-generated texts"

From the above narrations, we identified some patterns. The research area where AI was integrated by the participants largely depends on the discipline. For example, science educators tend to teach AI in literature synthesis. Language teachers tend to focus more on grammatical structure, while educators within the computer science discipline focus more on teaching data analysis. However, integration into multidisciplinary was not narrated.

RQ2: What are the perceived impacts of AI integration on research processes?

To address this question, we asked informants to narrate their perceived impacts of teaching AI in the above research areas. We classify these impacts under three thematic categories, including the development of (1) critical and analytic thinking, and (2) Writing skills.

Development of critical and analytic thinking

This theme was consistently discussed in the interview sessions. Informants narrated how the teaching of AI has helped students develop critical thinking. For example, one educator from Nigeria narrated that "students developed critical thinking to synthesize AI-generated text after exposure to the critical thinking framework." Another educator responded, "I observed that students improved their ability to evaluate AI-generated results critically, which enhanced their problem-solving skills in research contexts." Additionally, a respondent from Bangladesh noted, "Students in our department have shown enhanced analytical skills through AI-based research projects, where they critically analyze data interpretations and challenge algorithmic assumptions." Respondents also noted that in Bangladesh, through the

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use of AI, "students have become more adept at evaluating and synthesizing literature during research." They narrated that "students who quickly adapt to AI tools are capable of producing more complex simulations and analyses." While these impacts have been discussed consistently across the informants, it was also noted that students' progress may initially be slower."

Development of writing skills

To explore the impacts of AI-facilitated research, one respondent from Bangladesh noted that "using AI tools requires experimentation and planning to enhance good writing quality. He also highlighted varying student adaptation levels to these tools by saying "Students have adopted strongly to AI tools… it has become part of their research life…through constant use of the tool, I observed significant change in their writing skills as they can now generate substantial error-free texts." In Nigeria, participants emphasized that frequent use of AI during research has contributed to the development of strong writing skills among students. One educator commented, "Through regular practice with AI writing assistants like Grammarly and Hemingway Editor, students have significantly improved their writing clarity and coherence. They are better able to structure their arguments and refine their academic writing style." Moreover, according to one respondent from Bangladesh, "students with limited English proficiency have significantly improved their writing, as AI tools help polish and correct their language skills."

From the above analyses, it appears that teaching AI in research significantly enhances students' critical and analytical thinking abilities as well as their writing skills. AI tools prompt the learners to think at an advanced level by having them to analyse and evaluate the AI-generated content which in turn enhance their problem-solving and critical data analysis skills. In addition, the automated AI in writing instruction helps the students to improve their writing in terms of clarity, coherence as well as quality. Students with low English proficiency seem to enjoy such services as the requirements of the AI tools are automated correction and feedback to enhance their language skills. As a whole, AI in research education prepares students' skills for strong engagement in a variety of tasks such as analyzing, problem solving, and better writing. These competencies are important for academic progress and are transferable to different workplaces, making students more prepared for future endeavors in their occupations.

RQ3: What challenges do university teachers face when integrating AI in research teaching?

We asked the informants to narrate the challenges they encountered when teaching AI-facilitated research. From their narration, two themes emerged: (1) varied technological backgrounds and (2) awareness and ethical use of AI.

Varied Technological Backgrounds and Skills

The educators in Nigeria and Bangladesh stressed the incorporation of AI tools in their programs but in consideration of the variety of the technological background that exists among students. They suggested sound ways out of this problem. For instance, one of the respondents remarked the "need for additional education and resources that target a variety of proficiency level and background to allow effective use of AI in the pedagogic research." Another one was advocating for "learning in stages including first principles of AI and further developing as students move along." This strategy aims at enabling the effective use of AI tools by students irrespective of the range of exposure and proficiency that they have. A respondent from Nigeria asserted that "in synchronizing the Literacy of AI tools with the varying technological background of the students, customization of students' AI literacy education is essential….by providing additional aids and specific pedagogical skills, the imbalance can be corrected and terminally every learner will have robotics tools to use."

Awareness and ethical use of AI

However, such a situation is more common in Nigerian higher education system but not in the rest of the world. Another challenge informants stated is awareness and ethics of AI use. Such a challenge was however leveled more in the Nigerian higher education setting. As an illustration, one informant remarked, "I encountered a great difficulty the first time I taught Mid Research AIdi…most students know the term AI but they have not used any AI tool" In order to overcome these challenges, the informants stressed on the requirement of practical activities to enable students form AI technologies like ChatGPT – which quite a number of students are not used to.

. Moreover, there is a concern about the ethical use of AI-generated ideas, prompting educators to advocate for frameworks that encourage critical thinking and ethical synthesis of AI-provided content. One informant from Nigeria commented that "…due to lack of awareness of these tools, they tend to use AI tools unethically when they were exposed to them… addressing this ethical issue becomes a problem." The informant further offered a solution to this problem by highlighting the need to

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"implement ethical guidelines and frameworks that promote critical thinking and responsible AI integration."

Discussion

This study explores how university teachers integrate AI into research. Using a mixed method, we present the discussion of the result by triangulating the findings. The study findings show that the integration of AI technologies into the research curriculum varies across disciplines. Quantitatively, AI is extensively used in writing literature reviews and data analysis, which is consistent with existing literature emphasizing the role of AI in improving efficiency and accuracy in these areas (Khalifa & Albadawy, 2024). Additionally, teachers integrate AI tools for literature synthesis and structuring, aiding in handling large volumes of information, as supported by studies on AI's capacity to process and summarize literature effectively (Wagner et al., 2022). In language structure, qualitative data highlights the use of AI tools like Grammarly and Turnitin to enhance writing proficiency. Existing literature has emphasized this integration by suggesting that such tools can improve grammatical accuracy and coherence in academic writing (Khalifa & Albadawy, 2024).

While these areas consistently received AI integration, educators also exposed students to frameworks that help synthesize AI-generated texts responsibly. This integration arises from research evidence showing that AI technologies exhibit bias and produce inaccurate texts (Yusuf et al., 2024). The introduction of ethical frameworks aligns with studies advocating for a balanced use of AI to foster critical thinking and prevent academic dishonesty (Prem, 2023). Although teachers integrate AI in various research areas, the findings indicate that such integration is discipline-specific, with science educators focusing on literature synthesis, language teachers on grammatical structure, and computer science instructors on data analysis. While disciplinary integration holds substantial benefits, we encourage an interdisciplinary approach to AI integration to promote inclusivity and enhance integrated learning.

The study also found that AI offers several impacts when integrated into the research curriculum. Teachers observe that AI tools significantly enhance students' critical and analytical thinking skills, aligning with literature that emphasizes AI's role in fostering higher-order thinking (Walter, 2024). As used in practice, AI tools such as Grammarly and Hemingway Editor help students improve the clarity, coherence and quality of their written works. This supports the findings by Boudouaia et al. (2024) which postulated that the use of AI writing assistants improves the writing skills of students. Such tools are particularly useful to students with low proficiency of the English language since they offer language skill feedback and corrections that enhance their language skills (Wei, 2023). In general, integration of AI in instructional research education enhances reasoning and analysis abilities and also more importantly improves the writing skills of students. These alterations are of great importance for academic achievement and motivate students with professional challenges.

Even though incorporating optogenetic techniques during the research process has come with its advantages, severe challenges still exist. The most important is ensuring the competent and appropriate usage of the AI systems together with the requisite research skills (Holmes et al., 2019). In addition, the background knowledge of the students in AI subjects is almost non-existent, which poses a problem in the teaching step, calling for additional teaching and book materials (Luckin et al., 2016). The scarcity of resources inhibits the efficient assimilation of AI which points to the need for institutional aid (Ade-Ibijola & Okonkwo, 2023). The constant evolution and growth of AI also come with the problem of keeping the syllabus up to date, hence the need for adequate exposure (Abdulibdeh et al., 2024). Moreover, the very context of the AI makes its ethical usage globally complex, hence the need for prescribing norms (Yusuf et al., 2024). These issues noted above cannot be adequately addressed without a comprehensive approach which facilitates effective utilization of AI in tertiary education.

Conclusions and Implications

The advent of more sophisticated artificial intelligence began to change the landscape of academic research. Even if the usage of AI in academic research raised debates of whether such practices are in conflict with the research ethics, it is an indisputable fact that these tools render great assistance when used judiciously. While various efforts have been made to enhance AI capabilities across multiple domains of academic work, its applicability in the learning of conducting research has not received extensive attention. This underlies the conduct of the present study. Findings revealed that Use of AI by university teachers when teaching research is accentuated in areas such as data editing, language synthesis, research gap identification, topic definition, among others. The study also revealed that the incorporation of AI into research teaching proved to enhance students' capacity in analyzing multi-layered challenges, problem formulation, and improvements in writing. But there were some issues such as integration of AI with basic skills, infrastructure

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and ethical issues. Implications of these findings suggest that tackling these issues involve global procedures such as special teaching, providing more means and resources and developing heretic approaches. These measures are important in order to make maximal use of AI technology and meanwhile improving students' education and readiness for further scientific and occupational practice.

Ethical Approval Declaration

"All procedures involving human participants in this study were conducted in accordance with the ethical standards set by applicable research guidelines and the principles of the 1964 Declaration of Helsinki and its subsequent amendments. Ethical approval was secured before the commencement of data collection."

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Data availability:-

The datasets generated and analysed during the current study will be available from the author upon reasonable request.

Consent for publication:-

I hereby provide consent for the publication of the manuscript detailed above.

Competing interests:-

The authors declare no competing interests

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