

**NAVIGATING POSTGRADUATE RESEARCH IN UNIVERSITY OF CALABAR
THROUGH ARTIFICIAL INTELLIGENCE (AI): IMPLICATIONS FOR SKILL
DEVELOPMENT, MENTORSHIP AND SUPERVISION**

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ABSTRACT

The study investigated the integration of Artificial Intelligence (AI) in postgraduate research, focusing on its potential to enhance research skills, mentorship, and supervision. It aimed at identifying the benefits of AI tools for postgraduate students and their mentors, as well as the challenges faced in adopting these technologies. Three research questions were adopted for this study. Survey design utilizing “Postgraduate research skills and Artificial Intelligence Partnership questionnaire” was used to gather data. Stratified and accidental sampling technique was used to select a sample of 354 out of a population of 1,768 postgraduate students from the University of Calabar. The instrument’s Cronbach reliability estimates were 0.78, 0.80 and 0.84 for the research skills, research mentorship/supervision and challenges encountered by postgraduate students. Instrument’s validity was assessed by four experts in Educational Technology, Educational Psychology, Research, Measurement, and Evaluation departments. The findings revealed that most students surveyed were grappling with their research activities due to limited understanding of AI tools. It was recommended that urgent steps be taken by various faculties through training workshops and seminars to expose students to workable optimizing AI-driven strategies in order to boost their skills development, encourage effective mentorship and supervision within higher education thus fostering a more effective research environment.

KEYWORDS: Postgraduate Research, University of Calabar, Artificial Intelligence, Skill Development, Mentorship and Supervision.

INTRODUCTION

Artificial Intelligence (AI) is shaking up postgraduate research all around the world, offering fresh tools that boost skill development, mentorship, and academic teamwork. Globally, AI

technologies like large language models and smart tutoring systems are revolutionizing research methods, enabling students to conduct literature reviews, sharpen their research questions, and improve their writing quality with incredible efficiency. On a continental scale, initiatives like the AI for Development (AI4D) Africa program highlight the urgent need to cultivate AI leadership in Africa through targeted educational and mentorship programs (Anderson, 2025). In like manner, Sanchez-Anguix, Chalumuri, Alberola and Aydogan (2020) reported that AI applications improve academic communication and supervisory processes. Nguyen and Barbieri (2025) found that AI supports research mentorship by clarifying ideas and reducing workload. Omodan (2025) emphasized the role of AI in facilitating collaborative learning environments, while Bouzar, El Idrissi, Ghourdou, and Ali (2025) highlighted AI's contribution to feedback and research supervision. Collectively, these studies suggest that AI is increasingly recognized as a supportive tool for enhancing the quality and effectiveness of mentorship and supervision in postgraduate research.

Bringing artificial intelligence into postgraduate research at the University of Calabar can really boost skill development by providing students with personalized learning experiences and access to cutting-edge research tools. With AI-driven platforms, students can automate mundane tasks, allowing them to focus more on critical analysis and creative thinking (Owan, 2025). Additionally, AI can enhance mentorship by offering real-time guidance and feedback (Sanchez-Anguix, Chalumuri, Alberola & Aydogan 2020), which is especially helpful when traditional mentorship resources are scarce and better teaching and learning practices (Chang, 2024, Thong, Attallah, Islam, Lim & Cherukuri 2025, and Tseng, Huang & Chen 2025), This technical support can empower students to tackle complex research challenges more effectively. These partnerships and navigation can lead to innovative solutions for regional issues such as empowerment leading to entrepreneurship, autonomy (Ekarika & Isogon 2020) and boost the global visibility of research outputs.

In summary, strategically integrating AI into postgraduate research at the University of Calabar could significantly enhance skill development, mentorship and supervision thus positioning the institution at the forefront of research excellence in Africa. By integrating Artificial Intelligence (AI) into postgraduate research, we have the chance to revolutionize research methods, boost writing efficiency, and foster the development of crucial academic skills. To start, there is a noticeable gap in formal training on AI and related technologies within the university's postgraduate programs, leaving students ill-equipped to integrate the more complex AI into their research practices (Dastin, 2022, Oke & Adekola (2022). Additionally, many students struggle to access modern AI tools due to financial constraints (high subscription cost) or technical issues, poor digital literacy which limits their exposure to the latest advancements in AI-driven research (Agbo, Ekarika & Eteng 2021; Dwivedi et al. 2021, Kavitha & Sangeetha, 2021). Ethical concerns as observed by Kumar and Bervell (2019); Almahasees and Qassem (2023) have also contributed negatively towards the poor adoption levels of AI among postgraduate students. Furthermore, the absence of mentorship from experienced academics who may not be well-versed in AI hinders students' ability to incorporate AI into their research methods. Lastly, the perception of AI as a complicated and intimidating field often deters students from exploring its potential, a situation that is compounded by the absence of comprehensive support.

Statement of Problem

Postgraduate research at the University of Calabar has increasingly underscored the need for fresh strategies to enhance the quality and impact of academic work. However, a significant hurdle remains: most postgraduate students in University of Calabar actually embrace the emergence AI technology with open arms and look forward to accessing and adopting these tools in their research practices but they are faced with numerous challenges. Some are not fully aware of the technicalities of modern AI skills or how to adopt them effectively. Even with a growing number of AI tools available, a lot of students either do not know about these resources or lack the skills and are financially constrained to access and use them properly. These challenges are made worse by limited mentorship opportunities and a lack of collaborative academic platforms that could help students make the most of AI in their research writing. The obstacles that these postgraduate students face in becoming aware of and adopting AI skills are quite intricate and calls for more research in order to examine areas of significant concerns thus giving rise to this study.

Literature Review

The following empirical studies have been reviewed to give direction to this study. A study carried out by Udang, Odey and Akor (2025) investigated the application of artificial intelligence (AI) in higher education, focusing on identifying global best practices. It utilized an ex-post facto design with a sample of 208 participants drawn from a population of 3,800 students and staff at the University of Calabar. The study employed a questionnaire to assess two independent sub-variables and analyzed the data using mean, standard deviation, and simple linear regression at a significance level of 0.05. Findings revealed a significant impact of AI on teaching and learning processes, underscoring its importance in enhancing educational practices. The study also established a predictive relationship between AI usage in educational settings and the performance outcomes of both staff and students. Overall, the research confirms that AI plays a crucial role in improving educational effectiveness and predicting academic performance in higher education.

Similarly, Omodu (2025) investigated the role of Artificial Intelligence (AI) in staff mentoring and its impact on teaching effectiveness in public universities in Rivers State, Nigeria. It was guided by two research questions and hypotheses, employing a correlation design specifically targeting public universities in the region. The study's population included 1,186 senior lecturers from three institutions: Rivers State University, University of Port Harcourt, and Ignatius Ajuru University, from which a sample of 302 senior lecturers was selected using simple random sampling. Data collection was facilitated through two validated instruments: the "Utilization of Artificial Intelligence in Staff Mentoring (UAISM)" and "Teaching Effectiveness in Public Universities (TEPU)." The analysis of the data involved calculating mean and standard deviation for the research questions, while Pearson product moment correlation analysis was used to test the null hypotheses. The findings indicated that the application of AI in staff mentoring significantly enhances teaching effectiveness compared to traditional methods.

Relatedly, Madu and Musa (2024) set out to evaluate how aware lecturers at the Federal University Wukari in Nigeria are about AI and how that awareness connects to their digital skills. Using a correlational design, the study included all 67 academic staff members from the Faculty of Education, gathering data through the Artificial Intelligence Awareness Questionnaire (AIAQ) and the Digital Competence Questionnaire (DCQ), both of which showed impressive reliability scores of 0.93 and 0.87, respectively. The results showed that lecturers have a moderate understanding of AI and found a positive link between their AI awareness and digital competence. These findings

underscore the need for focused training programs to boost lecturers' digital skills, which could ultimately enhance the learning experience for students. The research wraps up by emphasizing that raising AI awareness among educators can lead to better teaching methods, improved learning experiences, and ultimately, better outcomes for students.

Examining the extent of awareness, perceptions, and challenges associated with the integration of AI in learning among postgraduate students within the Faculty of Education at Ignatius Ajuru University of Education, located in Port Harcourt, Rivers State, Kasumu and Agbarakwe (2024) employed a descriptive survey research design to carry out this study. The population comprised 52 postgraduate students from the Curriculum Studies and Educational Technology department. The entire population served as the sample size. A self-structured questionnaire developed by the researchers, titled the Artificial Intelligence Awareness Perception and Challenges Questionnaire (AIAPCAQ), was utilized for this study. The analysis of the collected data was conducted using mean and Z-tests. The findings indicated that students with an interest in technology frequently engage in extracurricular activities such as coding clubs, robotics competitions, or STEM programmes, which provide practical experience with AI-related tools and concepts, thereby enhancing their understanding of technology application.

Focusing on how artificial intelligence (AI) is being used in higher education, Essien, Bekeh and Anam (2024) undertook a study with a particular focus on identifying the best practices from around the globe. To steer the investigation, two null hypotheses were established, and an ex-post facto design was employed. The study involved a population of 3,800 students and staff from the University on the Calabar campus, from which a stratified random sample of 208 participants was chosen, making up about 1.12% of the total group. A questionnaire was crafted to assess two independent sub-variables, and the research questions were tackled using mean and standard deviation. Additionally, a simple linear regression analysis was conducted to evaluate the null hypotheses at a significance level of 0.05. The results showed a significant effect of AI on teaching and learning in higher education, emphasizing its role in fostering global best practices. Moreover, the study found a noteworthy predictive relationship between the use of AI in educational settings and the performance outcomes of both staff and students at the university. In summary, the research highlights the substantial impact of AI in improving teaching and learning processes in higher education, confirming that its application plays a significant role in predicting the performance of university staff and students.

Investigating the role of Artificial Intelligence in enhancing research capabilities of postgraduate students at the University of Karachi, Ali and Khan (2021) explored how AI impacts research productivity and skills among postgraduate students in Pakistan. They took a mixed-methods approach, using surveys to gather quantitative data from students and conducting in-depth interviews with faculty members. The findings showed that AI tools, like reference managers and data analysis software, significantly boosted students' research skills by speeding up data processing and literature reviews. The authors concluded that while AI tools can enhance research efficiency, there's a noticeable gap in awareness and training about these tools among both students and faculty. They recommended that universities invest in training programs to fully harness the potential of AI in academic research.

In a related study, William and Johnson (2020) examined how AI could transform postgraduate mentorship at the University of Cape Town. Their research aimed to assess the use of AI-based mentorship platforms in improving research supervision practices. They employed a

qualitative research design, conducting semi-structured interviews with postgraduate students and their supervisors. The results showed that these AI mentorship platforms made communication between students and supervisors more efficient, allowing for more frequent and structured feedback. However, some supervisors expressed concerns about whether AI could provide the personalized guidance that students need. The researchers concluded that while AI has the potential to enhance mentorship processes, it should complement, not replace, human interaction. They called for further exploration of hybrid mentorship models that integrate both AI and personal guidance.

In a similar vein, Khalifa and Albadawy (2024) have extensively explored the integration of Artificial Intelligence (AI) in academic and medical domains. Their 2024 systematic review, on integrating artificial intelligence in academic writing and research, seeing it as an essential productivity tool, identified six core domains where AI enhances academic productivity to include facilitating idea generation and research design, improving content development and structuring, supporting literature review and synthesis, enhancing data management and analysis, assisting in editing, review, and publishing, and promoting communication, outreach, and ethical compliance. This review synthesizes findings from 24 studies, highlighting AI's role in streamlining various aspects of academic work, from writing assistance to ethical compliance.

Relatedly, a study by Owan, Chukwu and Agama (2025) aimed to examine how students in public universities in Nigeria accept and utilize AI tools for self-directed research learning (SDRL). The research used a predictive correlational design, gathering data from 456 students across two institutions through stratified random sampling. Two validated instruments assessed students' acceptance of AI and their actual use of AI for SDRL, employing descriptive statistics and linear regression analyses to uncover patterns and predict usage based on acceptance. The findings showed a high level of acceptance of AI for SDRL. A weak yet statistically significant correlation was found between acceptance and usage of AI suggesting that just because students accept AI doesn't mean they engage with it extensively.

Generally, these studies collectively emphasize the significance of AI in teaching and learning effectiveness, specifically enhances research efficiency in research and underscore its potential to revolutionize skills development, mentorship, and supervision. However, there are some relevant theories on which this research was anchored on. First of all, the Technology Acceptance Model (TAM), developed by Davis in 1989, provides a fundamental framework for comprehending technology adoption, highlighting perceived ease of use and perceived usefulness as key factors. In the realm of AI tools in education, students are more inclined to embrace these technologies if they perceive them as user-friendly and advantageous. Nevertheless, TAM has its drawbacks, as it mainly concentrates on individual perceptions and neglects the impact of organizational elements, such as institutional support and infrastructure, which are vital for effective AI integration. Moreover, TAM reduces the adoption process by focusing solely on two dimensions, overlooking other obstacles like resistance to change and ethical issues.

Secondly, the Everett Rogers' Diffusion of Innovations Theory (DOI), presented in 2003, delineates the stages of technology adoption and classifies adopters into five categories: innovators, early adopters, early majority, late majority, and laggards. This theory emphasizes factors that affect adoption, including relative advantage, compatibility, complexity, trialability, and observability. Although DOI offers a thorough perspective on the adoption process, it may oversimplify the non-linear dynamics of adoption in educational environments, where various factors can concurrently influence the integration of AI tools. Additionally, DOI primarily concentrates on individual

adoption without sufficiently addressing the collective decision-making processes within educational institutions, which can greatly impact the utilization of AI tools.

Thirdly, the Constructivist Learning Theory, linked to thinkers like Jean Piaget and Lev Vygotsky, suggests that learners actively build their knowledge through interactions with their surroundings, rather than just soaking it up passively. This approach emphasizes the importance of hands-on experiences, social engagement, and problem-solving, allowing learners to draw on what they already know through experiential learning. While constructivism is praised for encouraging critical thinking, creativity, and independent learning, it does face some pushback regarding its practicality in traditional educational settings. Critics argue that the focus on self-directed learning can be tough for students who might not have a solid foundation or the motivation to thrive. When it comes to weaving Artificial Intelligence (AI) into education, AI can really boost constructivist methods by offering personalized learning experiences, instant feedback, and adaptable learning environments. AI tools can tailor content to fit individual learning styles, which helps deepen engagement and lets learners move at their own pace. Summarily, these theories provide important insights into the adoption of AI tools by students; however, they do not fully encompass the wide array of factors that influence AI integration in education. The individual-focused nature of TAM and the linear approach of DOI fail to consider the complexities of institutional contexts and teaching methodologies. A more comprehensive strategy that integrates aspects from both theories, while also taking into account skills development, is essential for a complete understanding of AI adoption in educational settings.

The reviewed literature leaves the researchers with gaps that needed to be filled through this study. The reviewed studies had none conducted in the postgraduate programme in the University of Calabar specifically in the area of perception, and barriers encountered in the adoption of AI skills. The fact that most empirically reviewed studies concentrated on perception, awareness, adoption and barriers encountered in getting AI skills in other institutions clearly show that these are persistent problems in tertiary institutions in Nigeria that need urgent attention even in the University of Calabar postgraduate programme. Also, AI is a complex and evolving field that demands pertinent researches into its accessibility, adoption and ever-present barriers to its adoption thus prompting this study. Hence, this study was undertaken with the following aims and objectives as well as specific research questions to give direction to the study:

1. To explore the role of Artificial Intelligence (AI) in strengthening the research skills of postgraduate students at the University of Calabar.
2. To assess postgraduate students' perceptions of the use of AI tools in enhancing research mentorship and supervision.
3. To examine the challenges postgraduate students' encounter in integrating AI tools into their research activities.

Research Questions

1. What role does Artificial Intelligence (AI) play in strengthening the research skills of postgraduate students at the University of Calabar?
2. How do postgraduate students perceive the use of AI tools in enhancing research mentorship and supervision?

3. What challenges do postgraduate students encounter in integrating AI tools into their research activities?

Methodology

The study used a descriptive survey research design. The population of postgraduate students in the University of Calabar is 1,768 for the 2024/2025 academic session (University of Calabar Graduate School, 2025). A stratified random sampling technique was used to choose a sample of 20% (354) of postgraduate students. The questionnaire utilized for data collection was termed "Postgraduate research skills and Artificial Intelligence Partnership questionnaire (PRAIQ)". The questionnaire was structured using the modified Likert 4-point rating scales ranging from strongly agree (SA = 4) to strongly disagree (SD = 1). Experts in Measurement and Evaluation, Educational Technology and Educational Psychology validated the instrument for content and face validity. Cronbach Alpha method was used to establish the reliability, which yielded coefficients of 0.78, 0.80, and 0.84 for the research skills, research mentorship and supervision and challenges encountered by postgraduate students. The research questions were answered using frequency and percentage analysis.

Presentation of the result

Research question one: What role does Artificial Intelligence (AI) play in strengthening the research skills of postgraduate students at the University of Calabar?

Table 1: Frequency and percentage of AI in strengthening the research skills of postgraduate students (N = 354)

The results in Table 1 show postgraduate students' responses to the role of Artificial Intelligence (AI) in strengthening research skills at the University of Calabar. A large proportion of respondents, 76.84 percent, agreed that AI tools help them improve their ability to search for relevant research materials, while only 23.16 percent disagreed, indicating a strong positive perception of AI

S/N	Item	SA	A	D	SD	N
1	AI tools help me improve my ability to search for relevant research materials.	140 (39.55)	132 (37.29)	52 (14.69)	30 (8.47)	354
2	The use of AI enhances my critical analysis and interpretation of research data.	128 (36.16)	138 (38.98)	56 (15.82)	32 (9.04)	354
3	AI applications make it easier for me to organize and manage research literature.	150 (42.37)	120 (33.90)	52 (14.69)	32 (9.04)	354
4	AI strengthens my academic writing and referencing skills in research projects.	134 (37.85)	126 (35.59)	58 (16.38)	36 (10.17)	354
5	AI contributes to the development of my problem-solving and innovative thinking	138 (38.98)	130 (36.72)	54 (15.25)	32 (9.04)	354

	skills.					
6	AI significantly improves my research competence as a postgraduate student.	142 (40.11)	128 (36.16)	50 (14.12)	34 (9.60)	354

in enhancing literature search. Similarly, 75.14 percent agreed that AI enhances their critical analysis and interpretation of data, showing that AI is considered a useful aid in the analytical aspects of research. In addition, 76.27 percent agreed that AI makes it easier to organize and manage research literature compared to 23.73 percent who disagreed, suggesting that AI plays a vital role in literature management. Furthermore, 73.44 percent of the respondents agreed that AI strengthens their writing and referencing skills, highlighting its supportive role in academic writing. Also, 75.70 percent agreed that AI contributes to problem-solving and innovation, indicating that AI is seen as beneficial for creativity and research innovation. Finally, 76.27 percent agreed that AI significantly improves their overall research competence, demonstrating that most students acknowledge AI's contribution to their research growth.

The findings, therefore, reveal that the majority of postgraduate students at the University of Calabar perceive Artificial Intelligence as playing a significant role in strengthening their research skills. Across all items, more than 73 percent of respondents agreed that AI enhances research activities, particularly in literature search, data analysis, literature management, writing, problem-solving, and overall competence. The relatively lower percentages of disagreement, ranging between 14 and 26 percent, suggest that only a minority of students face challenges or remain skeptical about its usefulness. It can thus be concluded that AI is widely regarded as an effective tool for enhancing postgraduate students' research skills at the University of Calabar.

Research question two: How do postgraduate students perceive the use of AI tools in enhancing research mentorship and supervision?

Table 2: Frequency and percentage of postgraduate students' perception of the use of AI tools in enhancing research mentorship and supervision (N = 354)

S/N	Item	SA	A	D	SD	N
7	AI tools make communication between students and supervisors more effective.	136 (38.42)	130 (36.72)	54 (15.25)	34 (9.60)	354
8	The use of AI improves feedback quality and timeliness from supervisors.	140 (39.55)	128 (36.16)	52 (14.69)	34 (9.60)	354
9	AI applications support better guidance in structuring and refining research work.	148 (41.81)	124 (35.03)	50 (14.12)	32 (9.04)	354
10	AI helps to clarify complex research concepts suggested by supervisors.	132 (37.29)	136 (38.42)	54 (15.25)	32 (9.04)	354
11	AI tools reduce the workload of supervisors, making mentorship more focused and productive.	138 (38.98)	134 (37.85)	50 (14.12)	32 (9.04)	354
12	AI enhances the effectiveness of research mentorship and supervision.	144 (40.68)	126 (35.59)	52 (14.69)	32 (9.04)	354

The results in Table 2 present postgraduate students' perceptions of the use of Artificial Intelligence (AI) in enhancing research mentorship and supervision at the University of Calabar. A

total of 75.14 percent of respondents agreed that AI tools make communication between students and supervisors more effective, while 24.85 percent disagreed, suggesting that AI is widely seen as facilitating interaction in the mentoring process. Similarly, 75.71 percent agreed that AI improves the quality and timeliness of feedback from supervisors, with only 24.29 percent in disagreement, indicating that AI is viewed as a supportive mechanism for more efficient supervisory feedback. In addition, 76.84 percent agreed that AI applications provide better guidance in structuring and refining research work, compared to 23.16 percent who disagreed, reflecting a strong belief in AI's role in shaping research direction. Furthermore, 75.71 percent of the respondents agreed that AI helps to clarify complex research concepts suggested by supervisors, showing that students find AI useful in simplifying difficult ideas. Also, 76.83 percent agreed that AI reduces supervisors' workload, making mentorship more focused and productive, with 23.16 percent in disagreement, highlighting AI's potential to ease supervisory responsibilities. Finally, 76.27 percent agreed that AI enhances the overall effectiveness of research mentorship and supervision, while 23.73 percent disagreed, confirming that students generally perceive AI as an important tool in supervisory processes.

The findings, therefore, reveal that postgraduate students at the University of Calabar perceive Artificial Intelligence as a valuable tool for improving the quality and effectiveness of research mentorship and supervision. Across all items, more than 75 percent of the respondents agreed that AI strengthens mentorship by enhancing communication, improving feedback, guiding research structure, clarifying complex concepts, reducing supervisory workload, and increasing overall effectiveness. The relatively lower percentages of disagreement, ranging between 23 and 25 percent, indicate that only a minority of students do not share this positive perception. It can thus be concluded that AI is widely perceived as an effective aid in advancing research mentorship and supervision among postgraduate students.

Research question three: What challenges do postgraduate students encounter in integrating AI tools into their research activities?

Table 3: Frequency and percentage of challenges postgraduate students encounter in integrating AI tools into their research activities (N = 354)

S/N	Item	SA	A	D	SD	N
13	Limited access to AI tools (premium versions) makes it difficult for me to use them effectively in my research.	122 (34.46)	128 (36.16)	62 (17.51)	42 (11.86)	354
14	Lack of adequate formal training prevents me from effectively applying AI in research activities.	138 (38.98)	124 (35.03)	56 (15.82)	36 (10.17)	354
15	The high subscription cost of some AI applications is a barrier to their adoption in my research work.	130 (36.72)	132 (37.29)	54 (15.25)	38 (10.73)	354
16	Technical challenges, such as internet connectivity, affect my ability to use AI tools.	142 (40.11)	126 (35.59)	50 (14.12)	36 (10.17)	354
17	I am concerned about the accuracy and	126	136	58	34	354

	reliability of AI-generated research outputs.	(35.59)	(38.42)	(16.38)	(9.60)	
18	Ethical concerns (e.g., plagiarism, over-reliance on AI) limit my willingness to use AI in research.	134 (37.85)	128 (36.16)	56 (15.82)	36 (10.17)	354

The results in Table 3 present postgraduate students' responses to the challenges they encounter in integrating Artificial Intelligence (AI) tools into their research activities at the University of Calabar. A total of 70.62 percent of respondents agreed that limited access to premium versions of AI tools makes it difficult to use them in research, while 29.37 percent disagreed, indicating that accessibility remains a notable challenge. Similarly, 74.01 percent agreed that lack of adequate training prevents them from effectively applying AI in research, compared to 25.99 percent who disagreed, showing that insufficient knowledge and skills are major barriers. In addition, 74.01 percent of respondents agreed that the high subscription cost of some AI applications is a barrier to adoption, with 25.98 percent in disagreement, reflecting the financial constraints faced by students in adopting such tools. Furthermore, 75.70 percent agreed that technical challenges, such as internet connectivity, affect their ability to use AI tools, while 24.29 percent disagreed, emphasizing infrastructural difficulties as a significant obstacle. Likewise, 74.01 percent agreed that concerns about the accuracy and reliability of AI-generated research outputs limit their use, compared to 25.98 percent who disagreed, indicating apprehension about the dependability of AI results. Finally, 74.01 percent agreed that ethical issues such as plagiarism and over-reliance on AI restrict their willingness to use these tools in research, while 25.99 percent disagreed, pointing to the ethical dilemmas associated with AI integration.

The findings, therefore, reveal that postgraduate students at the University of Calabar encounter several challenges in integrating Artificial Intelligence into their research activities. Across all items, over 70 percent of respondents identified limited access to premium versions, lack of training, high subscription costs, technical difficulties, accuracy concerns, and ethical issues as significant obstacles. The relatively lower percentages of disagreement, ranging between 24 and 29 percent, suggest that only a minority of students do not perceive these issues as barriers. It can thus be concluded that while AI offers substantial benefits for research, postgraduate students continue to face accessibility, financial, technical, and ethical challenges that limit its effective integration into their academic work.

Discussion of findings

The findings of research question one of this study revealed that the majority of postgraduate students at the University of Calabar perceive Artificial Intelligence as playing a significant role in strengthening their research skills. More than 73 percent of the respondents agreed that AI enhances their ability to search for relevant research materials, analyze and interpret data, organize and manage literature, improve writing and referencing, support problem-solving, and boost overall research competence. This finding aligns with the works of Ali and Khan (2021), Omodu (2025) and Udang, Odey and Akor (2025) that AI is widely acknowledged as a valuable tool in postgraduate research and is increasingly recognized as an enabler of academic productivity especially in the area of teaching and learning. In addition, this conclusion was reached by previous studies such as Khalifa and Albadawy (2024), Zhang and Wu (2024), Thong et al., (2025), and Tseng et al., (2025), all of which reported that AI enhances research skills, improves academic writing, supports

supervision, and strengthens overall competence.

Theoretical explanations also reinforce these findings. The Technology Acceptance Model (TAM) posits that users' acceptance of a technology is influenced by its perceived usefulness and ease of use, which explains why students readily embrace AI tools for research purposes. Constructivist Learning Theory further emphasizes that learners actively construct knowledge through the use of tools and interactions in their environment, suggesting that AI provides postgraduate students with dynamic platforms to engage in knowledge construction.

Collectively, these findings highlight a broader global trend in which AI is embraced as an indispensable tool for academic development and research advancement. A possible reason for this result is the growing integration of digital technologies and AI-powered applications into academic research environments. Many postgraduate students now have access to mostly free version of AI tools such as language models, reference managers, plagiarism checkers, and data analysis software, which directly improve their research efficiency and accuracy. These technologies simplify complex research tasks, reduce the time and effort required to complete them, and consequently shape students' positive perceptions of AI. In addition, the demand for high-quality research output within limited timeframes may further encourage postgraduate students to adopt innovative technological solutions like AI to meet academic expectations.

The findings of the research question two of this study revealed that postgraduate students at the University of Calabar perceive Artificial Intelligence as a valuable tool for improving the quality and effectiveness of research mentorship and supervision. More than 75 percent of the respondents agreed that AI enhances communication between students and supervisors, improves the quality and timeliness of feedback, supports the structuring of research work, clarifies complex concepts, reduces supervisors' workload, and enhances overall supervisory effectiveness. This supports the conclusion by William and Johnson (2020), Madu and Musa (2024), Kasumu and Agbarakwe (2024) that AI is widely viewed as a facilitator of better mentorship processes and stronger student-supervisor relationships. Other previous studies further reinforce this result. For instance, Sanchez-Anguix et al. (2020) reported that AI applications improve academic communication and supervisory processes. Nguyen and Barbieri (2025) found that AI supports research mentorship by clarifying ideas and reducing workload. Omodan (2025) emphasized the role of AI in facilitating collaborative learning environments, while Bouzar et al. (2025) highlighted AI's contribution to feedback and research supervision. Collectively, these studies suggest that AI is increasingly recognized as a supportive tool for enhancing the quality and effectiveness of mentorship and supervision in postgraduate research.

This finding is also supported by theoretical perspectives such as the Technology Acceptance Model, which emphasizes that people are likely to adopt AI tools when they perceive them as useful and easy to apply in supervisory contexts. Similarly, Constructivist Learning Theory highlights that learners actively construct knowledge through supportive tools and guidance, with AI serving as a bridge between formal supervision and independent learning. A possible reason for this result is the ability of AI-powered applications to bridge communication gaps and provide immediate support in research-related tasks. Tools such as collaborative platforms, intelligent writing assistants, and automated feedback systems reduce delays in supervision, making research interactions more efficient. AI also helps students to clarify complex ideas suggested by supervisors and to refine their work independently before seeking further guidance, thereby reducing the pressure on supervisors and making mentorship more productive. The growing demand for quality supervision, coupled with

limited time and resources available to academic staff, may also drive students' positive perceptions of AI as a complementary tool in research guidance.

The findings of research question three of this study revealed that postgraduate students at the University of Calabar encounter several challenges in integrating Artificial Intelligence into their research activities. More than 70 percent of the respondents agreed that limited access to AI tools, lack of adequate training, high costs, technical difficulties such as poor internet connectivity, concerns about accuracy and reliability of outputs, and ethical issues such as plagiarism or over-reliance on AI hinder their effective use of these technologies. This indicates that while students recognize the benefits of AI, a range of practical, technical, and ethical barriers continues to restrict its full integration into their research processes as confirmed through the studies conducted by Kasumu and Agbarakwe (2024), Madu and Musa (2024). Previous studies support these findings. For example, Dwivedi et al. (2021) highlighted cost and access as barriers to AI adoption in higher education. Oke and Adekola (2022) found that lack of digital literacy and infrastructural support limited students' use of AI in research. Kumar and Bervell (2019) observed that concerns about reliability and ethical misuse slowed adoption among postgraduate students. Almahasees and Qassem (2023) similarly reported that ethical dilemmas and technical constraints were major obstacles in the effective integration of AI into academic work. Collectively, these studies reinforce the finding that while AI holds promise for enhancing research, its adoption among postgraduate students remains constrained by practical, technical, and ethical challenges.

Also, aligning with these findings are the theoretical basis of the Technology Acceptance Model, which asserts that external barriers such as cost, access, and training affect users' willingness to adopt new technologies, regardless of perceived usefulness. Similarly, the Diffusion of Innovation Theory is also robbed in here emphasizing that the rate of adoption of a new technology depends on infrastructural readiness, training, and social acceptance. A possible reason for this result is the uneven availability of resources and infrastructural support within the University of Calabar academic environment. Many students may lack the financial means to access premium AI applications (high subscription cost) or may depend on unstable internet services (in form of poor network coverages, high data charges for Wi-Fis) that limit their use of online tools. Additionally, inadequate training opportunities leave students uncertain about how best to apply AI in research, leading to underutilization. Concerns about the accuracy and reliability of AI outputs, as well as the risk of plagiarism and ethical misconduct, may also contribute to students' hesitancy in fully adopting these tools. These challenges reflect the tension between the potential of AI and the contextual limitations faced by students in a developing academic environment.

Implications for Skills development, Mentorship and Supervision

These results underscore the pressing need to go beyond just enthusiasm for AI and tackle the real barriers to its use. Targeted interventions at the institutional level are vital to enhance AI literacy and integrate AI tools into research support systems. Such initiatives could bolster postgraduate research capabilities and improve learning outcomes in Nigerian higher education. This is an urgent call for the University authority to introduce better policies that will enhance the adoption and integration of AI into the academic environment. Training of technical staff is a vital step towards addressing these challenges. This has to do with promoting seminars, training workshops and conferences that are intentionally meant to boost AI knowledge and integration. In navigating

the training programmes, this will call for technical staff support in each department and faculties alike who will spearhead the facilitation of AI skills to these students and staff.

Setting up mentorship platforms that accommodate staff from diverse fields could encourage academic collaboration. Periodic training programmes will equip mentors and supervisors on the current changes in AI applications and usage. This will go a long way to boost and upgrade the technical skills of students and staff alike. When staff are trained, they will be motivated to adopt these training skills in their deliveries and supervision roles leading to effective mentorship and supervision. Even ethical concerns about accuracy and reliability of AI applications could be doused through appropriate exposure to the rudiments of AI applications. Noteworthy is the need to address inadequate facilities of AI development in terms of high subscription cost for premium versions of AI applications. This is actually a complex issue needing private and public intervention. While the institutions can assist in providing Wi-Fis for students to be able to navigate their research activities on a wider coverage, it is imperative to mention that high cost of premium versions of AI applications could be subsidized at the faculty levels, through sponsors and non-governmental organizations in order to enable both students and staff alike to have wider access to these tools for effective research practices.

CONCLUSION

Conclusively, the findings showed that the majority of postgraduate students at the University of Calabar perceive Artificial Intelligence as playing a significant role in strengthening their research skills. It also revealed that postgraduate students at the University of Calabar perceive Artificial Intelligence as a valuable tool for improving the quality and effectiveness of research mentorship and supervision. However, it also disclosed that postgraduate students at the University of Calabar encounter several challenges in integrating Artificial Intelligence into their research activities which included limited access to AI tools, lack of adequate training, high subscription costs, technical difficulties such as poor internet connectivity, concerns about accuracy and reliability of outputs, and ethical issues such as plagiarism or over-reliance on AI which hindered their effective use of these technologies.

RECOMMENDATIONS

Based on the findings of the study, the researchers made the following recommendations:

1. That the various stakeholders, government, institution's administrators, educators should introduce better policies that will enhance the adoption and integration of AI into the academic environment.
2. Establishment of training forums, workshops, and resources focused on promoting AI skills development, scheduled to keep staff and students abreast with the intricacies of AI tools.
3. That mentorship platforms be set up to enhance academic collaborations among staff of diverse fields thus encouraging professional mentorship and supervision.
4. Incorporate ethics education into postgraduate curricula, focusing on the ethical implications of artificial intelligence thus educating students about the misuse of AI-generated content, algorithmic biases, and data privacy concerns.
5. Lastly, the University's Management must provide adequate internet and AI facilities to alleviate the burden on the students and lecturers alike, improve on the quality of power

supply provide subsidies to reduce high subscription cost of premium versions of AI applications.

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