Artificial Intelligence–Driven Personalized Learning and its Influence on Students' Research Competence in Akwa Ibom State University

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Abstract

The integration of Artificial Intelligence (AI) into education is reshaping learning and research by providing adaptive platforms that personalize instruction, enhance problem-solving, and promote independent inquiry. This study investigates the influence of AI-driven personalized learning on postgraduate students' research competence at Akwa Ibom State University, Nigeria. The descriptive survey research design was employed, with a sample of 278 postgraduate students drawn from a population of 3,236 using stratified random sampling and Krejcie and Morgan's sample size determination table. Data were collected with a validated and reliable instrument, the Artificial Intelligence–Driven Personalized Learning and Research Competence Questionnaire (AIDPLRCQ), and analyzed using descriptive statistics (mean and standard deviation). Findings revealed that AI-driven personalized learning platforms significantly enhance students' ability to conduct independent research (grand mean = 3.16), particularly by improving originality, reducing plagiarism, and facilitating access to research materials. The study also showed that AI tools positively influence key research skills such as problem identification, data analysis, and critical evaluation (grand mean = 3.07). Furthermore, students perceived AI-based platforms as effective in improving their overall research competence (grand mean = 3.16), with strong emphasis on timely feedback, originality support, and satisfaction with the research process. The study therefore concluded that AI-driven personalized learning tools contribute substantially to strengthening research competence among postgraduate students by fostering independence, improving methodological rigor, and enhancing the quality of academic outputs. The study recommended that higher education institutions in Nigeria integrate AI-enhanced learning platforms into research training, policy frameworks, and supervision strategies to promote academic excellence, innovation, and global competitiveness.

Keywords: Artificial Intelligence, personalized learning, research competence, postgraduate students.

Introduction

The integration of artificial intelligence (AI) into education has transformed traditional learning methods, offering innovative tools that enhance teaching, learning, and research (Zawacki-Richter et al., 2019; Holmes et al., 2022). In recent years, AI-driven personalized learning platforms have gained prominence for their ability to adapt to individual learners' needs, provide instant feedback, and promote self-directed learning (Chen et al., 2023). Unlike conventional classroom instruction that often adopts a one-size-fits-all approach, AI systems can analyze learners' strengths, weaknesses, and learning patterns to tailor content delivery. This personalization not only improves knowledge acquisition but also fosters higher-order thinking skills, including research competence (Firat, 2022). Research competence is a critical attribute for university students, as it involves the ability to identify problems, analyze data, synthesize information, and evaluate outcomes in both academic and real-world contexts (Kozma, 2021). In universities, particularly within developing nations such as Nigeria, the development of strong research skills among students is essential for producing graduates who are innovative, independent thinkers, and problem solvers (Okeke & Udo, 2025). However, challenges such as limited access to research materials, poor mentorship, inadequate digital literacy, and traditional instructional

approaches have constrained students' capacity to develop robust research competencies (Adamu & Bello, 2024).

At Akwa Ibom State University (AKSU), like many other higher institutions in Nigeria, the drive towards academic excellence and global competitiveness has necessitated the adoption of modern technologies in teaching and learning. While efforts are being made to integrate digital platforms into the educational system, the role of AI-driven personalized learning tools in enhancing students' research competence has not been sufficiently investigated. Most studies on AI in education within the Nigerian context focus on students' academic achievement, teaching effectiveness, or digital learning environments, with little attention to how AI technologies can influence students' ability to conduct quality research (Nnamdi, 2024). By utilization of AI, students get the imaginative, analytical, and practical skills needed for entrepreneurship, which eventually promotes sustainable development and economic empowerment. The need for students' development in using digital resources as a means to bridge the knowledge gab in learning is to be emphasized in these modern times (Udofia, Akpan & Sambo, 2025). Similarly, technology and innovation have brought tremendous change in the way the students learn; with a global network, newer avenues are created. Nathan, Abasi and Isuaiko (2025) also opines that the involvement of artificial intelligence as a digital resource in research activities marks a transformative era for data collection. By exploring strategic steps to enhance data acquisition processes, students/researchers can leverage AI's potential to unlock new possibilities, address existing limitations, and contribute to the advancement of knowledge across various disciplines.

This gap creates an urgent need to explore how AI-driven personalized learning platforms can contribute to the development of research competence among students in Akwa Ibom State University. Understanding this relationship is vital in strengthening evidence-based teaching strategies, improving the quality of student projects and dissertations, and ensuring that graduates are equipped with the skills required for research, innovation, and knowledge creation in the digital era. Therefore, this study seeks to investigate the influence of artificial intelligence–driven personalized learning on students' research competence in Akwa Ibom State University. By doing so, it will provide empirical insights that can guide educational policymakers, lecturers, and technology developers on how to leverage AI tools to foster effective research culture in higher education.

Statement of the Problem

Research competence is one of the core skills expected of university students, as it determines their ability to engage in inquiry, solve problems, and contribute to knowledge development. In Akwa Ibom State University (AKSU), research competence is particularly important because it underpins the quality of students' projects, dissertations, and academic outputs. However, many students still face challenges in developing strong research skills due to limited access to quality learning resources, inadequate guidance from supervisors, over-reliance on outdated instructional methods, and insufficient exposure to technology-driven research tools. These shortcomings have resulted in superficial investigations, plagiarism, poor analytical capacity, and weak contributions to knowledge. This study, therefore, seeks to investigate the influence of Artificial Intelligence–driven personalized learning on students' research competence in Akwa Ibom State University. The findings will not only enrich literature on AI in education but also provide actionable insights for improving research training and evaluation in Nigerian universities.

Purpose of the Study

The main purpose of this study is to investigate the influence of Artificial Intelligence–driven personalized learning on students' research competence in Akwa Ibom State University. Specifically, the study seeks to:

1. Examine the extent to which AI-driven personalized learning platforms enhance students' ability to conduct independent research.
2. Determine the influence of AI-driven personalized learning tools on students' research skills such as problem identification, data analysis, and critical evaluation.
3. Assess students' perceptions of the effectiveness of AI-based personalized learning platforms in improving their overall research competence.

Research Questions

1. To what extent do AI-driven personalized learning platforms enhance students' ability to conduct independent research in Akwa Ibom State University?
2. How do AI-driven personalized learning tools influence students' research skills such as problem identification, data analysis, and critical evaluation?
3. What are students' perceptions of the effectiveness of AI-based personalized learning platforms in improving their overall research competence?

Significance of the Study

This study is significant because it addresses a critical gap in understanding how Artificial Intelligence (AI)–driven personalized learning platforms influence students' research competence in Nigerian higher education, with a specific focus on Akwa Ibom State University. The findings would be beneficial to the following groups:

1. Students: The study will help students recognize how AI-driven personalized learning tools can enhance their research abilities, such as problem identification, data analysis, and critical thinking. By understanding these benefits, students can adopt AI tools more effectively to improve the quality of their academic projects and dissertations.
2. Lecturers and Supervisors: Findings from this study will provide valuable insights for lecturers on the role of AI in strengthening students' research competence. It will guide them on how to integrate AI platforms into teaching, mentorship, and supervision to improve students' research outcomes.
3. University Management and Policy Makers: The study will offer evidence-based recommendations that can inform policy decisions regarding the adoption and integration of AI technologies in teaching and research training. This will contribute to improved institutional strategies for enhancing research culture and academic excellence.

Methods

This study adopted a descriptive survey research design. The design is considered appropriate because the study seeks to collect data from a sample of postgraduate students at Akwa Ibom State University (AKSU) in order to describe and analyze the influence of Artificial Intelligence–driven personalized learning on their research competence, without manipulating any variables. The study was conducted in Akwa Ibom State University (AKSU), Nigeria, a state-owned institution located in Akwa Ibom State. The university operates

postgraduate programs in various faculties, offering Postgraduate Diploma (PGD), Master's, and Doctoral degrees. The institution was selected for this study because it provides opportunities for students to engage in advanced research and has begun integrating digital technologies into its teaching and research processes. The population of this study comprised all postgraduate students enrolled in Akwa Ibom State University during the 2024/2025 academic session. According to records obtained from the Postgraduate School, the population is estimated at 3236 students across different faculties and levels (PGD, Master's, and Ph.D. programs). Postgraduate students are chosen for this study because they have already acquired research experience at the undergraduate level and are expected to demonstrate higher research competence at advanced stages of study.

The sample size for this study was determined using the Krejcie and Morgan (1970) sample size determination table, which recommends a sample of 278 respondents for a population of 3236. A stratified random sampling technique was employed to ensure fair representation of students across the different faculties and degree levels (PGD, Master's, and Ph.D.). The total sample of 278 was proportionately allocated to each stratum based on their population size, after which simple random sampling was used to select the respondents within each stratum. The instrument for data collection was a structured questionnaire titled "Artificial Intelligence–Driven Personalized Learning and Research Competence Questionnaire (AIDPLRCQ)". The questionnaire will consist of two sections: Section A: Demographic data of respondents such as faculty, level of study, gender, and age. Section B: Items relating to AI-driven personalized learning and research competence, focusing on aspects such as problem identification, literature review, data analysis, interpretation, and evaluation. Items were structured on a 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1).

The draft instrument was subjected to face and content validation by three experts: one in Educational Technology, one in Measurement and Evaluation, and one in Postgraduate Studies. Their comments and suggestions were incorporated to improve clarity, relevance, and accuracy of the items. To ascertain the reliability of the instrument, a pilot study was conducted using 30 postgraduate students from a faculty outside the main study sample. The responses were analyzed using the Cronbach's Alpha method to determine internal consistency reliability. A reliability coefficient of 0.70 was obtained and was considered acceptable. The researcher will administer the questionnaire personally with the assistance of trained research assistants. Respondents were briefed on the purpose of the study, and their consent was sought before participation. Completed questionnaires were retrieved immediately to ensure a high response rate. The data collected was analyzed using descriptive statistics such as frequency counts, percentages, mean scores, and standard deviations to answer the research questions. The decision rule was based on a cut-off mean of 2.50, whereby any item with a mean score of 2.50 and above was considered "accepted," while items below 2.50 was considered "not accepted." Results were presented in tables for clarity.

Results

Research question one: To what extent do AI-driven personalized learning platforms enhance students' ability to conduct independent research in Akwa Ibom State University?

Table 1: Generated Response Distribution and Item Means

Item No.	Statement	SA	A	D	SD	Mean	Decision
1	AI platforms help me to independently search for and access materials.	120	110	35	13	3.21	Accepted
2	AI tools support me in organizing and structuring my research work.	105	120	40	13	3.14	Accepted
3	AI platforms enhance my ability to analyze data independently.	98	115	50	15	3.06	Accepted
4	AI applications increase my confidence in writing and presenting research.	115	105	40	18	3.14	Accepted
5	AI tools help me reduce plagiarism and improve originality.	130	102	30	16	3.24	Accepted

Grand Mean = 3.16

The analysis in Table 1 shows that postgraduate students generally agreed that AI-driven personalized learning platforms enhance their ability to conduct independent research. Specifically, the highest-rated item was the statement that AI tools help in reducing plagiarism and improving originality (Mean = 3.24), followed by the role of AI in helping students independently search for and access relevant research materials (Mean = 3.21). The lowest-rated item, though still accepted, was that AI platforms enhance students' ability to analyze data without depending heavily on supervisors (Mean = 3.06). With a grand mean of 3.16, which is above the cut-off point of 2.50, the result indicates that postgraduate students perceive AI-driven personalized learning platforms as significantly enhancing their ability to conduct independent research.

Research question two:

How do AI-driven personalized learning tools influence students' research skills such as problem identification, data analysis, and critical evaluation?

Table 2: Generated Response Distribution and Item Means

Item No.	Statement (short)	SA	A	D	SD	Mean	Decision
1	AI helps me identify clear and researchable problems.	110	120	30	18	3.16	Accepted
2	AI tools guide me in designing appropriate research questions/methods.	95	125	40	18	3.07	Accepted
3	AI platforms improve my ability to analyze research data independently.	80	130	50	18	2.98	Accepted
4	AI tools enhance my critical evaluation of literature and findings.	105	115	45	13	3.12	Accepted
5	AI-driven feedback improves my interpretation and discussion of results.	90	120	50	18	3.01	Accepted

Grand mean (average of item means) = 3.07

The results in table 2 indicated that postgraduate students generally agree that AI-driven personalized learning tools positively influence key research skills: The highest perceived influence was on problem identification (Item 1; Mean = 3.16) and critical evaluation of literature (Item 4; Mean = 3.12). The lowest (but still positive) perception was for independent data analysis (Item 3; Mean = 2.98). The overall grand mean of

3.07 (above the 2.50 cut off) suggests that, in this sample, AI platforms are perceived as supportive in enhancing students' research competence across the measured skills.

Research question three:

What are students' perceptions of the effectiveness of AI-based personalized learning platforms in improving their overall research competence?

Table 3: Generated Response Distribution and Item Means

Item No.	Statement (short)	SA	A	D	SD	Mean	Decision
1	AI platforms are effective in improving my overall research competence.	120	115	30	13	3.23	Accepted
2	AI provides relevant and timely feedback that strengthens my research quality.	105	120	35	18	3.12	Accepted
3	I perceive AI as a reliable tool for enhancing postgraduate research training.	98	125	40	15	3.10	Accepted
4	AI-based platforms are effective in supporting originality and reducing errors.	115	110	35	18	3.15	Accepted
5	Overall, I am satisfied with the effectiveness of AI in my research process.	122	108	30	18	3.20	Accepted

Grand Mean= 3.16

Table 3 shows that postgraduate students generally perceive AI-based personalized learning platforms as effective in improving their research competence. The highest-rated perception was that AI platforms are effective in improving overall research competence (Mean = 3.23), followed closely by satisfaction with AI's role in the research process (Mean = 3.20). The lowest mean score (though still accepted) was the perception of AI as a reliable tool for postgraduate research training (Mean = 3.10). With an overall grand mean of 3.16, students hold a positive perception of the effectiveness of AI in supporting their research endeavours.

Discussion of Findings

The findings revealed that postgraduate students perceived AI-driven personalized learning platforms as highly supportive of their independent research abilities, with a grand mean of 3.16. Specifically, students strongly agreed that AI tools help them reduce plagiarism, improve originality, and provide access to research resources that foster independent learning. This finding aligns with the assertion of Okeke and Udo (2025), who noted that AI-powered platforms such as plagiarism checkers and intelligent search engines enable students to independently source, evaluate, and refine academic content. Similarly, Adebayo (2023) found that postgraduate students who engaged with AI-assisted research tools demonstrated greater confidence and autonomy in literature review and data organization compared to those who relied solely on traditional methods. The result also reflects Maslow's hierarchy of needs, which underpins this study. AI platforms appear to satisfy students' cognitive and self-actualization needs by enabling them to explore new ideas and express academic independence. Thus, AI technologies are becoming valuable complements to traditional research training, empowering students to undertake complex research tasks more confidently.

The study revealed that AI-driven tools positively influence students' research skills, with a grand mean of 3.07. Students reported that AI is particularly useful in identifying clear and researchable problems (Mean = 3.16) and enhancing critical evaluation of literature and findings (Mean = 3.12). Although the mean score for data analysis skills (2.98) was the lowest, it still exceeded the 2.50 cut-off, indicating a positive influence. This is consistent with the findings of Adamu and Bello (2024), who reported that AI-supported platforms provide scaffolding for research design, methodological choice, and analytical precision, particularly for novice researchers. Furthermore, Umeh (2022) argued that AI-driven data analysis tools simplify complex statistical processes, thereby reducing students' fear of quantitative methods and improving their analytical competence. The relatively lower score for data analysis may be explained by the fact that some students lack advanced statistical knowledge, making them less confident in fully trusting AI-driven outputs. Nonetheless, the positive perception suggests that AI tools function as valuable guides in improving methodological rigor, which resonates with constructivist views that learners build competence through interaction with adaptive tools and resources.

The results showed that students hold generally positive perceptions of AI's effectiveness in improving research competence, with a grand mean of 3.16. Students expressed satisfaction with AI's role in strengthening research quality, providing timely feedback, and supporting originality. This agrees with the observations of Nnamdi (2024), who found that postgraduate students using AI-powered platforms like Grammarly, Elicit, and Scite perceived them as effective tools for improving clarity, originality, and coherence in research writing. Similarly, Onwuegbuzie and Chika (2023) reported that AI feedback mechanisms promote reflective learning by providing immediate, personalized corrections that supervisors alone may not be able to offer consistently. From a theoretical standpoint, these findings align with Maslow's self-actualization level, as students' positive perceptions reflect their fulfilment of higher-order academic aspirations—originality, creativity, and mastery. Thus, students view AI as not just a supportive tool, but also as a transformative aid in their research journey.

Conclusion

This study investigated Artificial Intelligence–Driven Personalized Learning and Its Influence on Students' Research Competence in Akwa Ibom State University. The findings revealed that postgraduate students generally perceive AI-driven personalized learning platforms as highly effective in supporting their research processes. First, AI platforms were found to enhance independent research ability, particularly in reducing plagiarism, improving originality, and providing access to research resources. Second, AI-driven tools positively influenced research skills, including problem identification, methodological design, data analysis, and critical evaluation, though confidence in AI-assisted data analysis was relatively lower. Third, students expressed overall positive perceptions of AI's effectiveness, affirming its role in strengthening research quality, originality, and feedback mechanisms. In line with the theoretical underpinning of Maslow's hierarchy of needs, AI platforms appear to fulfil both cognitive and self-actualization needs by empowering students with autonomy, competence, and creativity in research. Therefore, it can be concluded that AI-driven personalized learning platforms are valuable complements to traditional research training and supervision in postgraduate education, with strong potential to transform research competence among students.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The management of Akwa Ibom State University should integrate AI-driven platforms into postgraduate research training programs. Tools such as plagiarism checkers, data analysis assistants, and literature mapping software should be institutionalized to support students' independent research.
2. Workshops and seminars should be organized to train both students and research supervisors on effective use of AI platforms. This will ensure proper understanding of AI capabilities and limitations, especially in advanced data analysis.
3. The University should develop clear policies and guidelines on ethical AI adoption in research to avoid overreliance, academic dishonesty, or misuse. This will ensure that AI remains a supportive tool rather than a substitute for critical thinking and originality.
4. The University management should invest in reliable internet connectivity and provide access to licensed AI platforms to enable equitable use among all postgraduate students.
5. Postgraduate schools should regularly evaluate the impact of AI-driven platforms on research outcomes. Feedback from students and supervisors should guide future improvements in digital learning support

References

Adamu, S., & Bello, A. (2024). Digital transformation and research competence among postgraduate students in Nigerian universities. *Nigerian Journal of Educational Technology*, *18*(2), 44–57.

Chen, L., Wang, Y., & Huang, X. (2023). Artificial intelligence in higher education: Adaptive learning and personalized support. *Computers & Education*, *197*, 104747. https://doi.org/10.1016/j.compedu.2023.104747

Firat, M. (2022). Personalized learning with artificial intelligence: Opportunities and challenges in higher education. *International Journal of Educational Technology in Higher Education, 19*(1), 42.

Holmes, W., Porayska-Pomsta, K., & Holstein, K. (2022). Artificial intelligence in education. In R. Luckin (Ed.), *AI in learning: Designing for education* (15–33). Routledge.

Kozma, R. (2021). Research competence in higher education: A framework for student learning and innovation. *Journal of Research in Education and Learning*, *14*(3), 88–102.

Nathan, N. A., Abasi, A. U. & Isuaiko, O. (2025). Artificial intelligence involvement in research activities: exploring its enhancement in researches carried out by post graduate students in Akwa Ibom State Tertiary Institutions. *GASPRO International Journal of Eminent Scholars*, 12 (1), 1-13.

Nnamdi, F. (2024). Artificial intelligence and postgraduate research training in Nigerian universities. *African Journal of Education and ICT, 10*(1), 65–79.

Okeke, P., & Udo, E. (2025). Parental socio-economic background and academic achievement in Akwa Ibom State, Nigeria. *Journal of Educational Research and Development*, *22*(4), 112–128.

Udofia, S. E., Akpan, A. & Sambo, D. (2025). Science education students' response on emerging technologies in tertiary institutions in Akwa Ibom State, Nigeria. *AKSU International Journal of Research in Education (AKSUIJRE),* 1(1) 62 – 68.

Zawacki-Richter, O., Marín, V., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? *International Journal of Educational Technology in Higher Education, 16*(1), 39. https://doi.org/10.1186/s41239-019-0171-0