NIGERIAN JOURNAL OF BUSINESS EDUCATION
Volume 13, Number 2, 2026

AWARENESS AND UTILIZATION OF GENERATIVE ARTIFICIAL INTELLIGENCE TOOLS FOR ENHANCED RESEARCH PRODUCTIVITY AMONG POLYTECHNICS ACADEMICS IN NIGER STATE

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Abstract
This study investigated the awareness and utilization of generative artificial intelligence tools among Polytechnic academics in Niger State to enhance research productivity. Generative artificial intelligence (AI) techniques have allowed educators and scholars to improve their productivity and efficiency in academic research. The research employed a descriptive survey design. The study population comprised one thousand three hundred five (1305) academics from two polytechnics in Niger State. The study utilized a sample size of three hundred ninety-one (391) participants, employing a stratified simple random sampling technique. The data collection tool was a questionnaire created by the researchers and validated by three research specialists. The Cronbach Alpha coefficient was employed to assess the instrument's reliability, yielding a coefficient of 0.81. Out of the three hundred ninety-one (391) copies of the disseminated questionnaire, two hundred and seventy-six (276) were collected and utilized for data analysis. The mean and standard deviation were employed to analyze the research questions, while t-test statistic was used to analyze the hypotheses at a significance level of 0.05. The study's findings indicated moderate awareness and utilization of AI tools for research productivity among Polytechnic academics in Niger State. The study recommended that Polytechnic lecturers and instructors in Niger State should augment their awareness and utilization of AI tools to promote research output.

Keywords: *Artificial Intelligence, Generative AI, Generative AI tools, Research Productivity*

Introduction

The investigation and dissemination of research findings are essential to academic endeavors in Nigerian higher institutions. The process of academic writing can be arduous and anxiety-inducing in various respects. Consequently, academic writing is an essential component of research and teaching that employs a systematic mode of expression. In academic publications, instructors and educators employ scholarly writing to articulate data-supported arguments and rational reasoning (Khalifa & Albadawy, 2024). Academic research productivity, as defined by Kasundra and Kantaria (2022), encompasses the output of literary work by researchers, which is often quantified by the number of publications (including journal articles, books, book chapters, conference papers, seminar papers, reviews, or other creative works), citations, grants acquired, and contributions to knowledge. Harzing and Van der Wal (2008) assert that citation analysis is a crucial instrument for assessing the impact and influence of research output. The frequency of citations of a researcher's work correlates positively with its perceived impact on the field. Citation analysis can be conducted with technologies such as Google Scholar, Scopus, and Web of Science. The integration of artificial intelligence techniques has allowed educators and scholars to improve their productivity and efficiency in academic study.

Zhang and Lu (2021) define artificial intelligence as the emulation of human cognition, enabling computers to think and behave like humans through tasks such as learning and problem-solving. The utilization of artificial intelligence (AI) in academic research is increasingly acknowledged by lecturers in Nigerian higher education institutions for its advantages in enhancing workflow efficiency and productivity in academic writing. Samson (2024) asserts that AI can be employed in multiple facets of academic writing, including composition, editing, citation, and enhancing overall research. A subset of AI is referred to as Generative Artificial Intelligence or generative AI. Generative AI, as defined by Altares-Lopez, et al.

(2024), is a form of artificial intelligence capable of producing novel content, including text, graphics, or music, hence enhancing creativity and innovation in educational settings. They additionally characterized Generative AI as one of the most groundbreaking domains of artificial intelligence. Khalifa and Albadawy (2024) delineated six principal domains in which Artificial Intelligence can enhance academic functions: Idea Development and Research Design, Content Development and Structuring, Literature Review and Synthesis, Data Management and Analysis, Editing, Reviewing and Publishing Support, and Communication, Outreach, and Ethical Compliance. They asserted that academic writing and research are progressively enhanced by diverse AI tools, each designed to address requirements in the research process. Examples of AI tools include QuillBot, Bit AI, Scite Assistant, PDFgear Copilot, Consensus, Connected Papers, Listmaps, Jenni, PaperPal, Research Rabbit, ChatGPT, WebChatGPT, Elicit, ChatPDF, SciSpace AI, Gamma, Meta, Bing Chat, Claude, and Mendeley.

In Niger State, Nigeria, there is a significant increase in the dissemination of local knowledge, vocational training, and technological advancement by polytechnic academics. Nonetheless, the knowledge and use of these AI tools by lecturers continue to be a subject of concern for investigation. Generative artificial intelligence technologies encompass machine learning, natural language processing, and data analytics. These gadgets have the potential to transform academic research through the automation of intricate processes, expedited analysis of extensive research data, and the provision of predicted insights. Polytechnic teachers in Niger State with a strong comprehension and proficiency in utilizing AI tools may see substantial enhancements in their research productivity. Lecturers in polytechnic systems encounter obstacles such as constrained resources, insufficient financing, and a lack of global research networks. These challenges often diminish lecturers' productivity when they aspire to perform exceptionally or create a significant effect. AI technologies ought to be implemented in academic systems to enable lecturers to overcome challenges and enhance research output.

The knowledge and comprehension of several AI technologies in academic research among polytechnic instructors constitute a facet of the awareness component of this study. Familiarity with generative artificial intelligence techniques does not guarantee their efficient utilization. Awareness encompasses comprehension of the use of these tools, the specific tasks for which they are beneficial, and their application within the research process. Al-Mamary, et al. (2021) assert that instructors' understanding of AI technologies significantly influences their adoption and integration into routine practice. Various factors, including institutional support, continuous professional development, and exposure to emerging technology, influence this awareness. Conversely, utilization denotes the degree to which Generative Artificial Intelligence techniques have been integrated into academic study. It may encompass automated data collection, literature review, or support in manuscript composition. The relationship between awareness and utilization is intricate; heightened awareness may facilitate uptake, but inadequate information may result in missed opportunities for enhancing research output. Alimi, et al. (2021) assert that the capacity to utilize AI technologies is contingent upon awareness of these tools. An absence of comprehension will lead to an absence of utilization.

The connection between awareness and utilization is crucial, especially in regions such as Niger State, where the educational system encounters significant challenges. It is crucial to investigate the level of knowledge possessed by polytechnic teachers and the obstacles they encounter in the successful utilization of AI tools. A significant barrier is the digital gap, characterized by varying access levels to new technology among academics. Lecturers may be familiar with AI technologies but lack the necessary equipment or ability to employ them effectively in their studies. This disparity indicates a significant correlation between awareness of accessible technology and its incorporation into regular research practices. The situation is further compounded by the socio-economic elements present in Niger State. Polytechnic instructors typically engage in several activities, including instruction, administrative duties, and personal pursuits. They may be hindered by temporal limitations from effectively employing AI techniques. Comprehending this dynamic is crucial as it illustrates the simultaneous influence of external influences on knowledge or application. The absence of specialized training programs and seminars aimed at enhancing AI skills is the reason many instructors struggle to keep abreast of rapidly emerging technology or hesitate to utilize them.

Furthermore, institutional culture profoundly influences instructors' comprehension and implementation of AI methodologies. The prioritization of research in well-resourced Polytechnics, coupled with adequate training and incentives, significantly enhances the likelihood of high staff adoption rates (Hodges, et al., 2020). The institutional culture underscores the necessity for higher education institutions to implement support systems and policies that enhance knowledge of AI, facilitating its practical use in research endeavors. Research indicates that the utilization of AI tools can enhance academic output. AI tools aid in idea generation, increase content organization, and assist in literature reviews, hence substantially improving the quality of academic writing (Khalifa & Albadawy, 2024). Platforms such as ChatGPT facilitate drafting and editing, enabling academics to concentrate on advanced analysis and innovation (Pinzolits, 2023). Moreover, AI can automate monotonous processes, minimize errors and facilitate expedited data evaluations, hence improving total efficiency (Mujtaba, 2024). Notwithstanding these advantages, dependency on AI technologies engenders ethical dilemmas about academic integrity and the risk of excessive reliance on technology (Watermeyer, et al., 2023). Maintaining the quality of academic work necessitates a balance between AI utilization and human intuition. Consequently, the productivity benefits of AI tools have emphasized the necessity for awareness and implementation in polytechnic education. The utilization of AI positively impacts the enhancement of efficiency in academic research production and may also improve the quality of research findings. Lecturers can ensure comprehensive data processing and identify AI trends that are not immediately apparent.

The integration of AI solutions into the research activities of Polytechnic instructors in Niger State is a significant challenge. Substantial capital expenditure, specialized technical knowledge, and extensive computational infrastructure are essential for the maintenance and advancement of generative AI models (Sidhu, 2022). The predominant obstacle to integrating technology into education is the prevailing attitude. Certain teachers may harbour skepticism towards AI, perceiving technology as a potential replacement rather than a complement to their contributions. Disproving these beliefs through specialized training and awareness initiatives might foster a more sophisticated decision-making framework in which AI is perceived as an assistant that enhances the job of lecturers, particularly in research activities. The recognition and utilization of generative artificial intelligence technologies by polytechnic lecturers in Niger State is a crucial area for enhancing academic research productivity. Multiple factors, including resource availability, institutional culture, and the broader socio-economic context, affect the relationship between awareness and utilization. By overcoming the obstacles to the use of various AI technologies, educational institutions can enable academics to fully harness the promise of technology in their research. It is essential to underscore the necessity of ongoing professional development in enhancing polytechnic instructors' awareness and utilization of generative artificial intelligence (AI) tools for academic research. programmes, workshops, and seminars centered on artificial intelligence can bridge the knowledge gap. These programmes inform educators about the various tools and offer practical experience in effectively utilizing these technologies. Cui and Yin (2023) determined that professional development is essential for fostering an innovative culture and enhancing educational outcomes. Training programs should encompass practical demonstrations, case studies, and interactive elements that enable educators to comprehend the immediate use of AI technology in their research methodologies.

The application of AI tools in academic research must take into account the ethical implications. Data privacy, algorithmic bias, and the legitimacy of study findings are increasingly significant concerns in the era of artificial intelligence. Polytechnic lecturers and instructors seek guidance and training on ethical standards and optimal procedures for employing generative artificial intelligence in research. Ethical norms are essential since they ensure individuals use new technology responsibly, with a keen understanding of its potential implications for academic integrity and societal perceptions of research (Onyejegbu, 2023). The evaluation of polytechnic instructors in Niger State regarding their awareness and utilization of generative artificial intelligence tools is a crucial measure for enhancing academic research productivity. By acknowledging the complex interplay between awareness, utilization, and many external influences, educational stakeholders can foster a culture that embraces AI as a catalyst for innovation and enhancement. As scholars enhance their expertise in AI utilization, they will also augment their research outcomes. They would also enhance the advancement of knowledge and technology in Nigeria's educational sector, leading

to a more resilient economy and better societal consequences. The journey towards a more AI-integrated academic environment may be challenging, although, with commitment and collaboration, it is undoubtedly achievable. This research seeks to evaluate the knowledge and utilization of AI technologies among instructors in Polytechnics in Niger State.

The rapid advancement and incorporation of Generative artificial intelligence (AI) technology have transformed numerous industries, including education. Although AI tools possess the capacity to significantly enhance academic research productivity, numerous polytechnic educators exhibit varying levels of comprehension and use of these technologies in their research endeavors. Prior studies indicate that although certain lecturers acknowledge the advantages of AI, including enhanced data analysis, literature reviews, and citation management, others exhibit reluctance or inability to integrate these tools into their research methodologies due to issues such as inadequate digital literacy, insufficient training, and restricted access to resources. The disparity in awareness and use of AI techniques constitutes a significant challenge for polytechnic scholars aiming to enhance their research productivity amid escalating academic pressures. Moreover, the potential repercussions of neglecting these AI technologies may lead to reduced competitiveness in research productivity, adversely affecting the academic reputation of polytechnic institutions. The current work on AI tools in education predominantly examines traditional institutions, resulting in a lack of insight into the distinct challenges and opportunities encountered by polytechnic lecturers and instructors. This study examines the difficulties of awareness, and effective integration of AI tools in the research endeavors of polytechnic lecturers and instructors. Comprehending these processes will yield insights into methods for enhancing research productivity and promoting polytechnic education in the context of contemporary technological advancements.

This study seeks to examine the extent of polytechnic lecturers and instructors' awareness and use of generative artificial intelligence tools to enhance academic research output in Niger State.

Specifically, the study aims at:

1. Assessing the present awareness levels of various AI tools for academic research among polytechnic lecturers and instructors in Niger State.
2. Assessing the degree to which polytechnic teachers and instructors utilize AI tools in their research endeavors.

The subsequent research questions were established to direct the study:

1. To what degree are Polytechnic lecturers and instructors in Niger State cognizant of AI tools that enhance academic research productivity?
2. To what degree do Polytechnic lecturers in Niger State utilize AI tools to enhance academic research productivity?

The subsequent null hypotheses were established to direct the study:

1. There is no substantial difference in the average response scores of lecturers from the Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru regarding their awareness of AI technologies for enhanced research productivity in Niger State.
2. There is no substantial difference in the average response scores of lecturers from the Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru, regarding the amount of utilization of Generative Artificial Intelligence tools for enhanced research productivity in Niger State.

Method

This study employed a descriptive survey research design. The research was conducted in two polytechnic institutions in Niger State. The study population consisted of one thousand three hundred and five (1305) lecturers from Federal and State Polytechnics in Niger State. Further analysis revealed that nine hundred and thirty-one lecturers are affiliated with the Federal Polytechnic, Bida, whereas three hundred seventy-four academics are associated with the Niger State Polytechnic, Zungeru. The study utilized a sample size of three hundred ninety-one (391). The sample size was derived from 30% of the entire population across the two strata. The employed sample strategy was stratified simple random sampling. The data collection instrument was a researchers-developed questionnaire named the Polytechnic Lecturers' Awareness and Utilization of AI Tools Research Questionnaire (PLAUAITRQ). The instrument was

validated by three experts: two from the Computer Science Department and one from Measurement and Evaluation at the Federal Polytechnic, Bida. The instrument's reliability was assessed using the Cronbach Alpha coefficient, resulting in a reliability score of 0.81 for the entire instrument. Three hundred ninety-one (391) copies of the questionnaire were distributed to the respondents via personal contact. Two hundred seventy-six (276) copies were successfully collected after completion, indicating a return rate of 71%. The acquired data was analyzed utilizing a criterion mean of 3.0 and a standard deviation for the research inquiries. The hypotheses were concurrently evaluated using a t-test at a significance threshold of 0.05. The data collected from respondents were analyzed utilizing a 5-point rating scale: Fully Aware (FA - 5 points), Aware (A - 4 points), Undecided (UD - 3 points), Slightly Aware (SA - 2 points), and Unaware (UA - 1 point) for Section A. Section B employed the subsequent five-point rating scale: Always Used (AU – 5 points), Often Used (OU – 4 points), Undecided (UD – 3 points), Sometimes Used (SU – 2 points), and Never Used (NU – 1 point). The criterion used was that, for the research inquiries, participants considered any item with a mean value of 3.0 or higher as a positive response. The respondents considered any mean value of 2.99 or lower as an unfavorable response. Conversely, the criterion for the hypotheses stipulates that any estimated t-value smaller than the t-table value is not rejected; otherwise, it is rejected.

Results

Research Question 1: To what extent are Polytechnic lecturers in Niger State aware of AI tools for improved academic research productivity?

Table 1: **Distribution of respondents' mean responses on the extent of awareness of AI Tools by Polytechnic lecturers in Niger State**

N = 276

S/N	ITEMS	Mean	SD	Remark
1	QuillBot	3.04	1.19	Aware
2	Bit AI	3.47	1.15	Aware
3	Scite Assistant	2.87	1.09	Slightly aware
4	PDFgear Copilot	3.13	1.26	Aware
5	Consensus	3.07	1.24	Aware
6	Connected Papers	3.01	1.26	Aware
7	List maps	3.48	1.20	Aware
8	Jenni	3.20	1.11	Aware
9	PaperPal	3.40	1.19	Aware
10	Research Rabbit	3.19	1.22	Aware
11	ChatGPT	3.27	1.33	Aware
12	WebChatGPT	3.21	1.27	Aware
13	Elicit	3.28	1.33	Aware
14	ChatPDF	3.40	1.36	Aware
15	SciSpace AI	3.34	1.29	Aware
16	Gamma	3.14	1.36	Aware
17	Meta	3.27	1.23	Aware
18	Bing Chat	4.93	.25	Aware
19	Claude	3.27	1.23	Aware
20	Mendeley	4.93	.25	Aware
	Grand Mean and Standard Deviation	**3.39**	**1.14**	Aware

Source: Field Result (2025)

The result in Table 1 above shows that Polytechnic lecturers in Niger State were aware of Generative AI tools for improving research productivity with 19 items listed above the 3.0 criterion mark, except for item 2, which showed slight awareness.

Research Question 2: To what extent do Polytechnic lecturers in Niger State use AI tools for improved academic research productivity?

Table 2: **Distribution of respondents' mean responses on the extent of use of AI Tools by Polytechnic lecturers in Niger State**

N = 276

S/N	ITEMS	Mean	SD	Remark
1	Generating research topics	3.94	.99	Utilized
2	Gathering information	3.93	.86	Utilized
3	Conducting Literature reviews	3.67	1.01	Utilized
4	Generating ideas	3.87	.81	Utilized
5	Writing clear and concise arguments	3.80	.83	Utilized
6	Analyzing citations	3.73	.85	Utilized
7	Paraphrasing documents	3.93	.99	Utilized
8	Checking grammar and spelling	3.61	1.07	Utilized
9	Summarizing documents	3.87	.88	Utilized
10	Collecting data	3.74	1.17	Utilized
11	Analyzing data	3.74	1.11	Utilized
12	Creating references and bibliographies	4.00	1.09	Utilized
12	Checking for plagiarism	3.81	1.22	Utilized
14	Presenting research report slides	3.74	.92	Utilized
	Grand Mean and Standard Deviation	**3.81**	**0.98**	Utilized

Source: Field Result (2025)

The result in Table 2 above shows that Polytechnic lecturers in Niger State utilize Generative AI tools for improved research productivity with all the 14 items listed above the 3.0 criterion mark.

Hypotheses Testing

Hypotheses 1: There is no significant difference in the mean response scores of The Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru lecturers on the extent of awareness of AI tools for improved research productivity in Niger State.

Table 3: Computation of significant differences in the mean response scores of respondents on the extent of awareness of AI tools for improved research productivity.

Respondents	**N**	$\bar{x}$	**SD**	**t-cal.**	**t. crit.**	**Df**	α	**Decision**
FPB	150	3.39	1.14					
				-0.14	1.96	274	0.05	Do not reject
NSP	126	3.41	1.14					

Source: Field Result (2025)

The data in Table 3 above showed that the t-calculated value of -0.14 at 274 degrees of freedom and 0.05 significance level was obtained, with the t-critical value of 1.96. The null hypothesis was not rejected because the t-critical value was greater than the t-calculated value. This implied that there was no significant difference in the mean response scores of The Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru lecturers on the extent of awareness of AI tools for improved research productivity in Niger State.

Table 4: Computation of significant differences in the mean response scores of respondents on the extent of the use of AI tools for improved research productivity.

Respondents	N	$\bar{x}$	SD	t-cal.	t. crit.	Df	α	Decision
FPB	150	3.80	.99					
				-0.17	1.96	274	0.05	Do not reject
NSP	126	3.82	.98					

Source: Field Result (2025)

The data in Table 4 above showed that the t-calculated value of -0.17 at 274 degrees of freedom and 0.05 significance level was obtained, with the t-critical value of 1.96. The null hypothesis was not rejected because the t-critical value was greater than the t-calculated value. This implied that there was no significant difference in the mean response scores of The Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru lecturers on the extent of utilization of AI tools for improved research productivity in Niger State.

Discussion of Findings

Analysis of Data, Research Question 1, and Hypothesis 1: Awareness of generative AI tools for improved academic research productivity. The findings of the study revealed that Polytechnic academics in Niger State were aware of generative AI tools for improved academic research productivity. In addition, the result showed that there was no significant difference in the mean response scores of The Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru lecturers on the extent of awareness of AI tools for improved research productivity in Niger State. The moderate awareness level of generative AI tools for improved academic research productivity did not agree with the findings of Yusuf, et al., (2024) who asserted that academics globally exhibit high awareness and familiarity with generative AI tools, particularly for information retrieval and text paraphrasing, showcasing the potential for enhanced research productivity. The moderate level of awareness exhibited by Polytechnic lecturers in Niger State may relate to the low computer infrastructure and literacy existing in the institutions.

Analysis of Data, Research Question 2, and Hypothesis 2: Utilization of generative AI tools for improved academic research productivity. The findings of the study revealed that Polytechnic academics in Niger State were utilizing generative AI tools to boost academic research productivity. In addition, the result showed that there was no significant difference in the mean response scores of The Federal Polytechnic, Bida, and Niger State Polytechnic, Zungeru lecturers on the extent of utilization of generative AI tools for improved research productivity in Niger State. The moderate utilization level of generative AI tools for improved academic research productivity did not agree with the findings of Abdullah and MohdZaid (2023) who asserted that researchers perceive high engagement with Generative AI adoption in higher education research, but readiness to adopt varies. The moderate rate of utilization of generative AI by Polytechnic academics may be related to concerns about potential negative impacts and the need for responsible usage.

Conclusion

Based on the data obtained from the study, it could be concluded that Polytechnic academics in Niger State, to a moderate extent, are aware and use generative AI tools to improve research productivity.

Recommendations

Based on the findings and conclusions drawn from the study, the following recommendations were made:

1. Managements of Polytechnics in Niger State should make greater investments in computer infrastructures, networks, and human capital development to boost the levels of awareness and use of generative AI tools for improved academic research productivity.
2. Academic staff of Polytechnics in Niger State should embark on self-professional development through training workshops and seminars to enable them gain more knowledge of and expertise in the use of generative AI tools for improved academic research productivity.

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