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Determinants of Artificial Intelligence (AI) Utilisation for Teaching and Research among Polytechnic Lecturers in Nigeria

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Abstract

This study assesses the utilization of Artificial Intelligence (AI) for teaching and research among Polytechnic lecturers in Nigeria. It examines the influence of lecturer awareness, individual characteristics, institutional support, perceived benefits, and existing challenges on AI adoption. Adopting a quantitative research design, a structured online questionnaire was administered to lecturers nationwide, resulting in 97% valid responses. Data were analyzed using SPSS, employing descriptive statistics, Pearson correlation, and multiple regression analysis at a 0.05 level of significance. Reliability analysis confirmed the internal consistency of the constructs, with Cronbach's Alpha values ranging from 0.666 to 0.883. Findings reveal that while lecturers possess a moderate level of awareness and recognize the benefits of AI, actual utilization remains moderate to low. Correlation analysis indicates that all independent variables relate positively to AI use; however, multiple regression reveals that institutional support and prevailing challenges are the only significant predictors of AI utilization, accounting for 39.6% of the variance in adoption. The study concludes that awareness and individual effort are insufficient for technology integration without systemic support and concerted efforts to mitigate the prevailing challenges to AI utilization such as inadequate infrastructure, limited funding, poor internet connectivity, and insufficient training. It recommends that the government and Polytechnic management should prioritize funding for ICT infrastructure, establish

AI policy frameworks, and provide structured capacity-building workshops to bridge the gap between awareness and practical application.

Keywords: Artificial Intelligence (AI), Polytechnic Education, Nigeria, Institutional Support, Teaching and Research, Technology Adoption.

Introduction

The advent of Information and Communication Technology (ICT) in the 21st century has become a driving force for global economic growth, innovation, societal transformation and digital revolution. This is characterized by unprecedented technological advancements, with Artificial Intelligence (AI) standing out as a pivotal force reshaping global landscapes, including education (Russell & Norvig, 2010. The integration of AI into various sectors like healthcare, finance, agriculture and tourism, underscores its transformative potential thereby prompting educational institutions to explore how it can be utilized to enhance teaching, learning, and research.

In the field of education AI appears to be a versatile tool which revolutionizes traditional educational practices offering innovative solutions for personalized learning, adaptive assessment, intelligent tutoring systems and collaborative research, thereby satisfying diverse student needs and improving educational efficiency (Agbo, Sanusi, & Onyeka, 2023; Chen, Chen, & Lin, 2020). Outside the classroom, AI's utility extends to academic research where it significantly enhances productivity through advanced data analysis, comprehensive literature reviews, academic writing assistance and sophisticated plagiarism detection (Azevedo, Mendes, & Santos, 2024; Gaber et al., 2023).

The Polytechnic sector in Nigeria plays a significant role in technical and vocational training essential for industrial growth and economic diversification. Therefore, the need to embrace Artificial Intelligence by the management, staff and students in the Polytechnics is not merely an academic adventure but a strategic move to ensure that students possess the competencies demanded by a rapidly evolving, technology-driven global economy (Edema, 2025). The National Board for Technical (NBTE) has consistently emphasized the need for digital literacy and the integration of cutting-edge technologies into the Polytechnics curricula (IIARD, 2025). Consequently, equipping polytechnic lecturers with adequate knowledge and skills to utilize AI in their teaching and research is paramount to achieving this goal, hence the need for the study.

Statement of Problem

The integration of Artificial Intelligence (AI) into educational practices has emerged as a transformative force, reshaping traditional methodologies and enhancing teaching and research efficiencies. Polytechnic institutions represent a significant segment of the higher education landscape in Nigeria providing vocational training and practical skills to prepare students for the workforce. However,

there exists a crucial gap in understanding how AI technologies are currently utilized by Polytechnic lecturers in their teaching and research activities. Various challenges, including lack of infrastructure, insufficient training resources, and limited awareness of AI's potential, may hinder effective utilization. Moreover, the extent to which AI can augment pedagogical techniques, improve research outcomes and benefit students appear to be largely unexamined. In addition, while there is a growing recognition of AI's potentials in addressing persistent educational challenges in Nigeria (Idowu & Iyabode, 2024; Wajim & Ajayi, 2024), its integration into the higher education system remains nascent and faces significant hurdles (Ogunyemi, 2020; Gaber et al., 2023). This is further compounded by challenges such as inadequate infrastructure, limited funding, poor internet connectivity and lack of comprehensive training programs for educators (Owolabi, Adeleke, Aderibigbe, Owunezi, Oluwaseun, and Okorie, 2022; IIPRDS, 2024). In essence, there is an urgent call for AI integration in the Polytechnic sector in order to equip students with future-ready skills and boost national development. However, the practical assessment of how lecturers are currently utilizing AI in their pedagogical and research practices seems to be largely unexplored (Gaber et al., 2023).

Furthermore, existing literature broadly acknowledges the transformative potential of AI in education and identifies common barriers to its adoption. However, there is a distinct gap in empirical studies that specifically assess the extent and nature of AI utilization among polytechnic lecturers in Nigeria for both teaching and research. While general studies on AI awareness among Nigerian educators exist, a comprehensive assessment that delves into the specific types of AI tools used, the frequency of their use and the specific benefits experienced in polytechnic settings is limited. Such assessments can provide empirical data for targeted policy interventions, curriculum reforms, professional development programs and infrastructural investments necessary to fully harness AI's transformative potential in Nigerian polytechnic education and ensure that lecturers are adequately prepared for the evolving demands of the digital age.

This study, therefore, aims to fill this critical gap by providing empirical data on the current state of AI utilization among polytechnic lecturers in Nigeria, thereby identifying current practices and challenges associated with AI utilization in educational context. By critically analyzing these factors, the study hopes to bridge the knowledge gap and provide actionable insights that can lead to more effective strategies for embracing AI in the Technical and Vocational Education and Training (TVET) sector in general.

Research Objectives

The main objective of this study is to assess the current utilization of Artificial Intelligence (AI) for teaching and research among Polytechnic lecturers in Nigeria. Specifically, the study attempts to:

1. Ascertain the level of awareness of AI tools and applications among Polytechnic lecturers in Nigeria for teaching and research.

2. Determine how lecturers' characteristics affect AI utilization among Polytechnic lecturers in Nigeria.
3. Examine the influence of institutional supports on AI utilization among Polytechnic lecturers in Nigeria.
4. Identify the perceived benefits of AI utilization in teaching and research among Polytechnic lecturers in Nigeria.
5. Recognize the challenges and barriers hindering the effective utilization of AI for teaching and research among polytechnic lecturers in Nigeria.
6. Proffer recommendations for enhancing AI utilization among polytechnic lecturers in Nigeria for improved teaching and research outcomes.

Research Hypotheses

Based on the foregoing problem statement and research objectives, the following null hypotheses are formulated for this study:

H01: There is no significant relationship between level of awareness of AI tools and its applications among Polytechnic lecturers in Nigeria for teaching and research.

H02: There is no significant relationship between lecturers' characteristics and AI utilization by Polytechnic lecturers in Nigeria.

H03: There is no significant relationship between institutional supports and AI utilization by Polytechnic lecturers in Nigeria.

H04: There are no significant relationship between perceived benefits of AI and its utilization for teaching and research by Polytechnic lecturers in Nigeria.

H05: There are no significant relationship between challenges of AI and its utilization for teaching and research among Polytechnic lecturers in Nigeria.

Research Questions

Drawing from the research objectives, the following research questions will guide the study:

i. What is the current level of awareness of AI tools and applications among polytechnic lecturers in Nigeria for teaching and research?
ii. To what extent do lecturers' characteristics affect AI utilization among Polytechnic Lecturers in Nigeria?
iii. How do institutional support and context affect AI utilization among Polytechnic lecturers in Nigeria?
iv. What are the perceived benefits of AI utilization for teaching and research in by Polytechnic lecturers in Nigeria?
v. What are the major challenges and barriers hindering the effective utilization of AI for teaching and research among Polytechnic lecturers in Nigeria?
vi. What recommendations can be offered to enhance AI utilization among Polytechnic lecturers in Nigeria for improved teaching and research outcomes?

Literature Review

This section provides a comprehensive overview of existing literature relevant to Artificial Intelligence (AI) utilization in education, with a specific focus on its application in teaching and research in the context of Nigerian Polytechnics. It synthesizes findings on AI's potential, current adoption trends, perceived benefits, and the challenges hindering its widespread integration among lecturers.

The Emergence and Potential of AI in Education

Artificial Intelligence, defined as the simulation of human intelligence processes by machines, especially computer systems, has emerged as a transformative force across various sectors, including education (Russell & Norvig, 2010). AI's capacity to process vast amounts of data, learn from patterns and automate tasks holds immense promise for revolutionizing traditional pedagogical and research practices (Popenici & Kerr, 2017). The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2022) highlights AI's potential to personalize learning, enhance accessibility, automate administrative tasks and provide intelligent tutoring systems, thereby addressing diverse learner needs and improving educational outcomes.

AI tools assist lecturers in generating dynamic lesson plans, creating interactive content, providing adaptive learning paths and offering instantaneous feedback to students (Agbo et al., 2023). It encompasses a range of capabilities such as learning, reasoning, problem-solving, perception, and language understanding (Popenici & Kerr, 2017). For instance, AI-powered writing assistants like Grammarly and content creation tools can significantly reduce the time spent on routine tasks, allowing lecturers to focus more on higher-order pedagogical functions (Al-Bashayreh, Al-Khateeb, Abdo, & Al-Zoubi, 2023). Intelligent tutoring systems can also adapt to individual student paces and learning styles, offering personalized support that would be impossible in traditional large classrooms (Chen et al., 2020).

In the field of research, AI offers powerful capabilities for data analysis, literature review, hypothesis generation, and even academic writing support. AI-driven platforms can rapidly scan and synthesize vast academic databases, identify emerging trends and assist researchers in structuring their arguments and refining their language (Azevedo et al., 2024). At the same time, the use of AI for plagiarism detection, data visualization and statistical modeling are becoming indispensable for efficient and rigorous research (Gaber et al., 2023). The ability of AI to automate tedious tasks such as data cleaning and transcription frees up researchers to focus on interpretation and critical thinking (Idowu & Iyabode, 2024).

Furthermore, the adoption of AI in higher education is increasing globally. This is perhaps driven by technological advancements and the increasing demand for digitally competent graduates. Universities in developed nations are actively investing in AI infrastructure, developing AI-powered learning management systems and integrating AI literacy into their curricula (Huang, Li, & Chang, 2022), as many institutions are utilizing AI for students support services and personalized career guidance (Popenici & Kerr, 2017). However, while the pace of AI adoption is varied in Africa, there is a growing recognition of its potential to

leapfrog traditional educational challenges. Initiatives are emerging to leverage AI for improving access to quality education, particularly in remote areas, to remedy teacher shortages (UNESCO, 2022). Nevertheless, its implementation often faces significant contextual barriers (Ogunyemi, 2020) largely due to lack of infrastructure, level of acceptance, internet accessibility, hardware and software availability, among others.

AI Utilization in Nigerian Higher Institutions

Nigeria, as Africa's most populous nation, faces unique educational challenges including large student populations, limited resources and varying quality of instruction (Idowu & Iyabode, 2024). This development has prompted a strong national discourse on the need to integrate technology in order to enhance educational quality and prepare a future-ready workforce (Wajim & Ajayi, 2024). In spite of this effort, the utilization of AI among lecturers in Nigerian higher institutions, particularly Polytechnics, remains largely under explored. While there is a growing awareness of AI and its perceived benefits, it does not necessarily translate into widespread application in routine teaching and research activities (Gaber et al., 2023). This gap between awareness and utilization is a critical area for investigation. However, specific data on how polytechnic lecturers are currently using AI, or the extent of its integration into their core functions, is apparently scarce. Therefore, since polytechnics are specifically saddled with the responsibility of producing skilled graduates for industrial development, integrating AI into their curriculum and leveraging it in teaching and research is crucial so as to produce graduates that are competitive and relevant in the global job market (Edema, 2025).

Conceptual Framework

The conceptual framework for the study illustrates the key variables and their relationships in understanding AI utilization among polytechnic lecturers. It considers AI utilization in teaching and research as the dependent variable, while lecturers' level of AI awareness, their characteristics, perception of AI benefits, institutional supports and the challenges/barriers they encounter as independent variables.

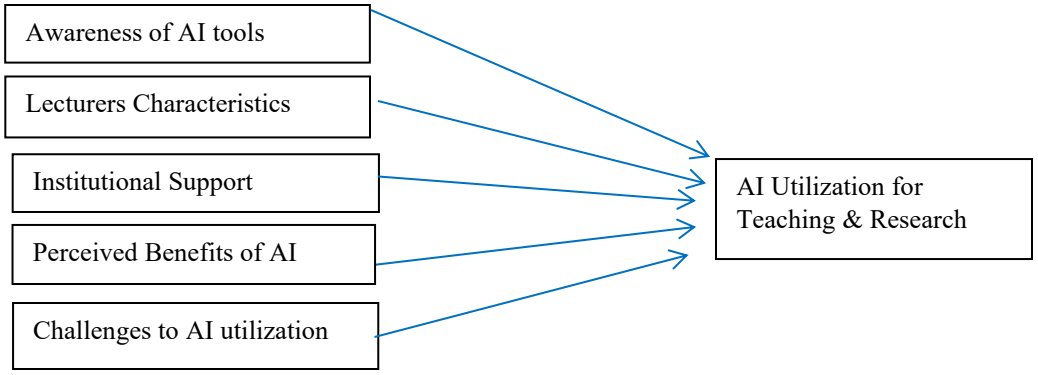


Figure 1 Visual Representation of the model
Source: Developed by the Researcher for the study, 2025.

The framework emphasizes the importance of awareness and perceived benefits of AI for lecturers, which are essential for its effective use. However, even when lecturers are aware and have positive perception about AI, their characteristics and institutional challenges may hinder actual utilization.

Key components include:

i. Awareness of AI tools, which is crucial for understanding and implementing AI in education.
ii. Lecturer characteristics, like age and qualifications, can influence openness to AI technologies.
iii. Institutional support, involving internet access, training, and policies, is vital for effective integration.
iv. Perceived benefits highlight how AI can enhance teaching and research.
v. Challenges such as poor infrastructure, digital literacy gaps, and ethical concerns hinder utilization.
vi. AI utilization refers to how often lecturers integrate AI in their teaching and research activities.

Theoretical Framework

This study is based on two main theories in technology adoption: the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Diffusion of Innovations (DOI) theory. UTAUT was created by Venkatesh and colleagues in 2003 to explain why users intend to use an information system and how they behave after using it. It combines elements from eight different technology acceptance theories. UTAUT includes four key factors that affect usage intention: performance expectancy (perceived usefulness), effort expectancy (perceived ease of use), social influence, and facilitating conditions. For lecturers, these factors relate to the perceived benefits of AI for teaching, the ease of learning AI tools, the influence of peers and departments and the organizational support available.

In addition, the DOI theory, developed by Rogers in 2003, explains how new ideas and technologies spread within cultures. It highlights five attributes of innovations that impact adoption: relative advantage, compatibility, complexity, trialability and observability, as well as characteristics of adopters and social systems. Integrating UTAUT and DOI provides a comprehensive understanding of AI adoption among lecturers, considering both individual perceptions and broader social dynamics within the polytechnic system in Nigeria.

Previous Studies on AI Utilization

Empirical studies on AI utilization among lecturers in Nigerian higher education institutions are emerging, reflecting the growing interest in the area. While a significant body of literature discusses the potential of AI and general challenges to technology adoption, studies directly quantifying and detailing the extent of AI utilization for both teaching and research among

polytechnic lecturers are still relatively nascent. Thus, a review of existing empirical work provides valuable insights into awareness levels, perceived benefits, and the inherent barriers. Several studies have investigated the awareness levels of AI among Nigerian lecturers, often finding a moderate but not comprehensive understanding. For instance, Gaber et al. (2023) conducted a study on lecturers' level of awareness of Artificial Intelligence as correlate of their digital competence at Federal University Wukari. Their findings indicated a moderate level of AI awareness among lecturers, suggesting that increased awareness can contribute to better digital skills needed for AI utilization. Similarly, another study has established a medium level of awareness among lecturers in Faculty of Arts in Nigerian universities (Kwara State University, 2024). This implies that while the concept of AI is somewhat familiar, the depth of knowledge about its specific applications in pedagogy and research may still be limited.

Therefore, the actual utilization of AI tools for teaching and research among Nigerian lecturers appears to be relatively low, despite growing awareness. A study by Ukeh, and Anih (2024) which investigated the utilization of AI tools for teaching and research among lecturers at Federal University Otuoke, Bayelsa State, Nigeria, revealed a relatively low adoption of AI tools for both purposes. The study posited that although different AI-based tools exist for teaching and research, lecturers' actual engagement with these tools is limited. This resonates with the findings of Emiri, Ijiekhuamhen & Nwankwo, (2024), which showed that while lecturers' digital literacy concerning AI was slightly above average, their actual use of AI tools remains low. Another study on business education lecturers in Nigerian universities indicated that educational AI tools like ChatGPT and QuillBot are extensively utilized by vocational education lecturers for academic activities, even though the pertains to student usage or basic AI literacy rather than its integration into teaching methodologies (Bamiro, & Olabode, 2025). This highlights a potential difference between general awareness or basic use and a deep, pedagogical integration of AI.

Furthermore, studies in Nigeria often show that lecturers who engage in AI generally acknowledge its numerous benefits in enhancing teaching and learning outcomes (Nwile, Amaewhule, & Ezeugo, 2025; Abubakar, Falade, & Ibrahim, 2024), boosting research productivity (Ukeh & Ani, 2024) and automating administrative tasks such as grading and content organization (Anyanwu, Okoroafor, & Ikedimma, 2025). These perceived benefits lead to positive attitude towards AI's potential, even if actual utilization fall short of its expectation.

Moreover, empirical studies consistently identified several significant challenges hindering the effective utilization of AI by lecturers in Nigerian higher education. These barriers include infrastructural deficiencies such as lack of reliable internet connectivity, unstable power supply, lack of training and digital literacy (Emiri, et al., 2024), cost of AI tools associated with AI software, hardware, licensing fees and specialized training (Isiyaku, Ernest, Chiugo & Uzuagu, 2025), ethical concerns and academic integrity (Ibrahim, Taura, Iliyasu, Shogbesan, & Lukman, 2024; IIPRDS, 2024), lack of institutional policy and support as well as resistance to change in adopting new technologies (Isyaku, et al., 2025).

Therefore, while the reviewed studies provide insights into AI awareness, perceived benefits, and challenges, specific empirical research focusing mainly on AI utilization for both teaching and research among polytechnic lecturers in Nigeria is scanty. Most existing studies either focus broadly on university lecturers, address AI from a student perspective, or concentrate on specific aspects like awareness or barriers, without a holistic quantitative assessment of actual utilization patterns across teaching and research functions in Polytechnics. Consequently, this study aims to fill this specific empirical gap by providing a targeted assessment of AI integration within the Nigerian Polytechnic sector.

Research Methodology

This section describes the research methodology employed to study the awareness, use, benefits, and challenges of AI in teaching and research among Polytechnic lecturers in Nigeria. A descriptive survey research design was used to gather quantitative data, with polytechnics selected from different regions of Nigeria to ensure a comprehensive view of AI utilization. The study targeted all academic staff in accredited public Polytechnics, which includes 87 institutions in total: 38 federally owned and 49 state-owned. It is noted that precise numbers of academic staff are hard to find, so the study adopted a reasonable assumption of an estimated population of 150 lecturers.

For sampling, a multi-stage technique was used, starting with a purposive sample of two polytechnics from each of the six geopolitical zones, totaling 12 institutions. From these, a simple random sampling method was employed to select approximately 108 lecturers across the public polytechnic using Krejcie & Morgan (1970) table with a confidence level of 95% and a margin of error of 5%.

Data was collected using a structured questionnaire designed to elicit responses to assess various aspects of AI utilization based on a 5-point Likert scale, ranging from strongly agree to strongly disagree (1-5). The questionnaires were administered virtually on Google form shared online via email and WhatsApp for better accessibility. To ensure validity, the questionnaire was reviewed by three experts in fields related to education and technology, while reliability was measured using Cronbach's Alpha coefficient.

Finally, data was analyzed using descriptive and inferential statistics in SPSS software. Mean score was applied to summarize responses on the survey, while multiple regression analysis explored the relationships between variables. The five hypotheses were tested at a 0.05 significance level to ensure that data is reliable and relevant to the research objectives.

Data Presentation and Analysis

This section presents the results of the statistical analysis carried out to assess the utilization of Artificial Intelligence (AI) for teaching and research among Polytechnic lecturers in Nigeria. The analysis was conducted using the Statistical Package for the Social Sciences

(SPSS). A total of 89 valid responses were analyzed, representing 82% usable response rate after data screening.

Reliability Analysis of the Research Instruments

The reliability of the research instruments was evaluated using the Cronbach Alpha coefficient for five independent variables and one dependent variable. The first variable, awareness of AI, had a Cronbach's Alpha of 0.666, indicating moderate internal consistency for measuring lecturers' awareness of AI in education. The second variable, lecturer characteristics, showed a low reliability with an Alpha of 0.578, attributed to its varied nature, yet it was retained due to its relevance. The third variable, institutional support, achieved a good reliability score of 0.794, confirming that the items accurately reflect available support for AI. The fourth variable, perceived benefits of AI, had an Alpha of 0.743, showing acceptable consistency. The fifth variable, challenges of AI utilization, achieved a reliability score of 0.755. Lastly, AI utilization as the dependent variable received an excellent reliability score of 0.883, indicating strong measurement consistency among Polytechnic lecturers.

Summary of Reliability Results

Table 1

Construct	Number of Items	Cronbach's Alpha	Interpretation
Awareness of AI	5	0.666	Acceptable
Lecturer Characteristics	8	0.578	Low but retained
Institutional Support	8	0.794	Good
Perceived Benefits	8	0.743	Acceptable
Challenges	8	0.755	Good
AI Utilization	10	0.883	Excellent

Descriptive Statistics and Graphical Presentation

Descriptive statistics were used to summarize respondents' perceptions of the study variables using mean and standard deviation.

Table 2

Variable	Mean	Std. Deviation
AI Awareness	2.30	0.86
Lecturer Characteristics	2.47	0.68
Institutional Support	2.43	0.86
Perceived Benefits	2.60	0.82
Challenges	2.67	0.81
AI Utilization	2.26	0.89

The results show that AI awareness and utilization are moderate, while perceived benefits and challenges recorded relatively higher mean scores. A bar chart comparing mean scores of all

constructs was generated in figure 2 to visually compare the levels of each variable. The chart shows that challenges and perceived benefits recorded the highest mean values, while AI utilization recorded the lowest, indicating a gap between awareness/benefits and actual utilization.

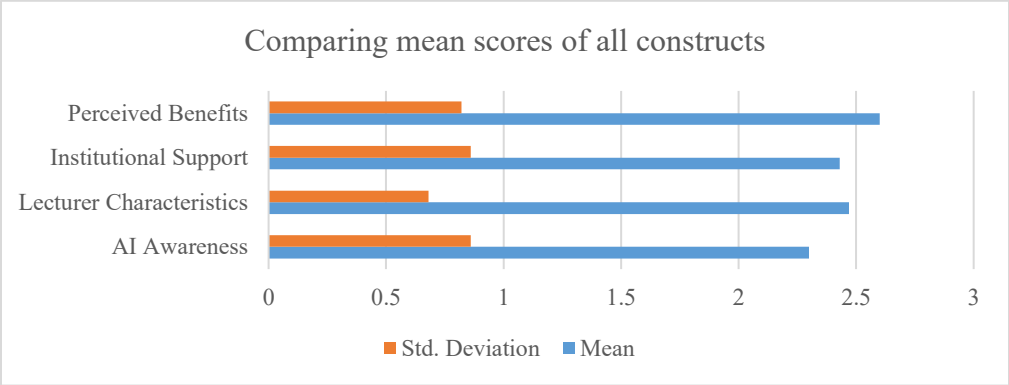


Figure 2 Correlation Heat Map (or matrix table)

Correlation Analysis

Pearson Product Moment Correlation was used to examine the relationships among the study variables. The correlation matrix shows that all independent variables have positive relationships with AI utilization as follows: AI Awareness and AI Utilization ($r = 0.359$, $p < 0.01$), Lecturer Characteristics and AI Utilization ($r = 0.444$, $p < 0.01$), Institutional Support and AI Utilization ($r = 0.481$, $p < 0.01$), Perceived Benefits and AI Utilization ($r = 0.388$, $p < 0.01$) and challenges and AI Utilization ($r = 0.540$, $p < 0.01$). A correlation heat map (or matrix table) in figure 2 was used to visually depict the strength of relationships, with darker shades indicating stronger correlations.

Multiple Regression Analysis

Multiple regression analysis was conducted to determine the combined and individual effects of the independent variables on AI utilization.

Model Summary

The model yielded an R value of 0.629 and an R^2 value of 0.396, indicating that 39.6% of the variance in AI utilization is explained by AI awareness, lecturer characteristics, institutional support, perceived benefits, and challenges. A model summary table was complemented with a line graph showing observed versus predicted values of AI utilization. In addition, the Analysis of Variance (ANOVA) result shows that the regression model is statistically significant ($F = 10.877$, $p < 0.05$), indicating that the independent variables jointly predict AI utilization.

Regression Coefficients

Table 3

Predictor	Beta	t-value	Sig.
AI Awareness	0.069	0.661	0.510
Lecturer Characteristics	0.083	0.691	0.491
Institutional Support	0.265	2.435	0.017
Perceived Benefits	0.006	0.059	0.953
Challenges	0.378	3.691	0.000

The results indicate that institutional support and challenges significantly predict AI utilization, while the other variables do not independently predict AI utilization when combined in the model. A standardized beta coefficient bar chart was used to visually compare the relative contributions of each predictor.

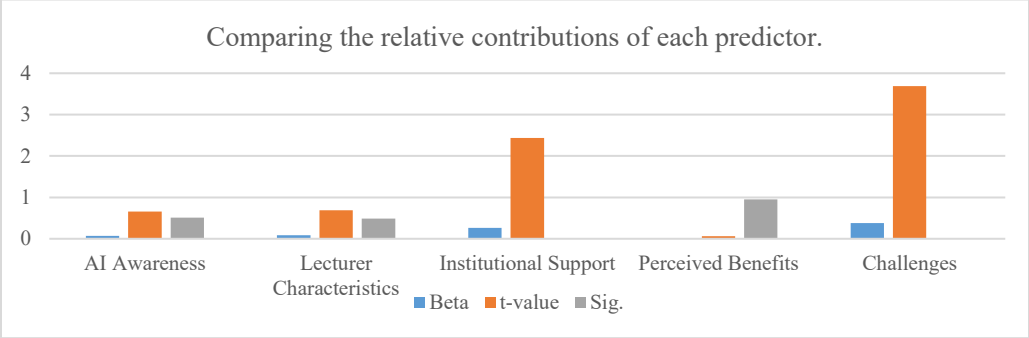


Figure 3 Beta Coefficient Bar Chart

Results and Discussion

The analysis shows that most lecturers have a moderate awareness of AI and recognized its advantages. They see AI as beneficial for improving teaching and research but the actual use of AI is only minimal or moderately low, even as positive relationships were found between AI utilization and various independent variables. The findings reveal that AI utilization among Polytechnic lecturers in Nigeria is influenced by multiple factors especially their level of awareness, characteristics, perception, institutional support and challenges of infrastructure. The key findings of the study are summarized below.

i. Polytechnic lecturers in Nigeria exhibit a moderate level of awareness of AI tools and their applications for teaching and research.
ii. Lecturer characteristics such as experience, skills, and exposure to technology showed a positive but non-significant independent effect on AI utilization when other variables were controlled.
iii. Institutional support; including availability of infrastructure, training opportunities and administrative encouragement was found to be a significant predictor of AI utilization.

iv. Lecturers generally perceived AI as beneficial for enhancing teaching effectiveness, research productivity and academic efficiency. However, perceived benefits alone did not significantly predict utilization.
v. The inherent challenges such as inadequate infrastructure, limited funding, poor internet connectivity and insufficient training significantly influence AI utilization.
vi. The regression model explained 39.6% of the variance in AI utilization, indicating that institutional and systemic factors play a substantial role in determining AI adoption among Polytechnic lecturers.

Based on the above findings, it can be conveniently inferred that although lecturers demonstrate moderate awareness and positive perception of AI benefits, actual utilization remains limited due to institutional and infrastructural challenges. Institutional support and challenges emerged as the strongest predictors of AI utilization because they significantly hinder effective use of Artificial Intelligence. Thus, while awareness of AI exists among Polytechnic lecturers, the actual utilization is limited by institutional support and key challenges. Consequently, based on the correlation and regression results, HO3 (institutional support) and HO5 (inherent challenges) were rejected because it has been established that the two factors have significant relationships with AI utilization, while HO1, HO2 and HO4 were accepted.

In another perspective, the study reveals that there is a non-significant relationship between lecturers' perception and AI utilization, which may be due to some mediating or moderating variables such as infrastructural deficits (Sayari, 2025), cost of access to AI, lack of technical skills and the perceived ease of use. For example, lecturers who are conservative and personally inclined to their traditional teaching and research methods for decades may likely perceive AI as a threat to their job security and therefore may be reluctant to utilize it. Similarly, while lecturers may have a positive perception of AI's utility, empirical observations suggest that this does not automatically translate into teaching or research utilization due to systemic and individual barriers. In fact, research conducted in Rivers State Polytechnic, Nigeria, revealed that while AI awareness was high (95.8%), its utilization was markedly low, with only 23.2% of lecturers reporting moderate or high usage (Bekee, 2026). In the same vein, another study at University of Calabar, Nigeria, showed that while academic staff are generally aware of AI's potential for research, their utilization for effective instruction remains inadequate (Idika, Arikpo, Ekpo, Idika, & Okeke, 2025). Based on the foregoing submission therefore, it can be inferred that AI utilization does not usually depend on the level of awareness of perception of its benefits, but on some other important individual and systemic factors.

The findings from this study tallies with that of Ukeh, and Anih (2024) whose findings revealed that numerous AI-based tools exist for teaching and research, but lecturers' actual engagement with these tools was limited. This also resonates with the findings of Emiri, Ijiekhuamhen & Nwankwo, (2024), which established that while lecturers' digital literacy concerning AI was slightly above average, their actual use of AI tools remains low. Similarly,

our finding on institutional challenges is consistent with other empirical studies that identified several significant challenges hindering the effective utilization of AI by lecturers in Nigerian higher education. These barriers include infrastructural deficiencies such as lack of reliable internet connectivity, unstable power supply, lack of training and digital literacy (Emiri, et al., 2024), cost of AI tools associated with AI software, hardware, licensing fees, and specialized training (Isiyaku, Ernest, Chiugo & Uzuagu, 2025) as well as lack of institutional policy and support and resistance to change in adopting new technologies (Isyaku, et al., 2025).

Conclusion

Artificial Intelligence holds significant potential to transform teaching and research in Nigerian Polytechnics. However, realizing this potential requires deliberate institutional commitment, supportive policies and sustained capacity development. Addressing these factors will ensure that Polytechnic lecturers are well positioned to meet the demands of the digital era and contribute meaningfully to national development. The study established that institutional support and prevailing challenges are the most critical determinants of AI utilization among Polytechnic lecturers. Without adequate infrastructure, reliable internet access, institutional policies, and structured capacity-building initiatives, lecturers are unlikely to fully integrate AI into their pedagogical and research practices.

Based on the findings of this study, it is concluded that while Polytechnic lecturers in Nigeria are increasingly aware of Artificial Intelligence and recognize its potential benefits for teaching and research, the actual utilization of AI remains constrained by other personal and institutional factors. Thus, awareness and perceived benefits alone are insufficient to drive effective AI adoption. Therefore, the successful integration of AI in Nigerian Polytechnic education depends largely on system-level interventions rather than individual lecturer effort alone. The focus must shift from telling lecturers why AI is good to providing the tools, training and environment that make its use possible.

Consequently, this study contributes to knowledge by providing empirical evidence on the state of AI utilization among Polytechnic lecturers in Nigeria; an area that has received limited scholarly attention. The study highlights the dominant role of institutional support and systemic challenges in shaping AI adoption, thereby extending existing literature on technology acceptance and adoption to enhance teaching and research in our tertiary institutions.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are proffered:

a. The Federal Government, through the National Board for Technical Education (NBTE), should develop clear policies and frameworks for AI utilization and integration in Polytechnic education.

b. Increased funding should be allocated to Polytechnics for the provision of modern ICT infrastructure, reliable internet connectivity and AI-enabled learning tools.
c. AI-related content should be embedded into Polytechnic curricula to ensure that both lecturers and students acquire future-ready digital and AI skills so as to remain relevant in the dynamic digital age.
d. Polytechnic management should be organizing regular training workshops and professional development programs to improve lecturers' practical skills in using AI tools for teaching and research.
e. Institutions should establish AI support units or innovation hubs to provide technical assistance and encourage experimentation with AI-based instructional materials.
f. Lecturers, on their part, should engage in self-development training by participating in online AI courses, webinars and academic communities to enhance their digital competencies. In addition, they should be encouraged to adopt AI tools incrementally, starting with basic applications such as AI-assisted content development and research support tools.

Suggestions for Further Research

Future studies may employ qualitative methods such as interviews or focus group discussions to gain deeper insights into lecturers' experiences with AI. At the same time, the study can be extended to other tertiary institutions such as universities and colleges of education for comparative analysis. Alternatively, researchers may decide to examine the impact of specific AI tools on teaching effectiveness and student learning outcomes. They can equally investigate longitudinal changes in AI utilization following targeted institutional interventions.

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