

Artificial Intelligence on The Literacy Level Of Undergraduates In Nigerian Universities

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ABSTRACT

Technology has taken over the 21st century in order of evolving intelligence and practice. Artificial Intelligence (AI) is rapidly transforming global education, yet limited empirical research has examined its influence within Nigerian teacher-training institutions. This study investigates the impact of AI tool usage on academic performance among. A quantitative survey design was employed, involving 480 distributed questionnaires, of which 412 valid responses were returned, yielding an 89.96% response rate. Data were analyzed using descriptive statistics, Pearson correlation, multiple regression, and moderation analysis. Findings reveal a remarkably high AI adoption rate of 84.95%, with ChatGPT as the most widely used tool (66.1%). AI usage demonstrated significant positive correlations with key academic performance indicators, particularly research project outcomes ($r = 0.378$, $p < 0.01$). Regression results show that AI self-efficacy ($\beta = 0.298$, $p < 0.001$) is the strongest predictor of academic performance, followed by usage frequency ($\beta = 0.189$, $p < 0.001$) and digital literacy ($\beta = 0.156$, $p = 0.001$), collectively explaining 38.7% of the variance (Adjusted $R^2 = 0.379$). Digital literacy, academic level, and gender significantly moderated the AI-performance relationship. The study concludes that AI tools, when used confidently and effectively, enhance literacy level and support research-driven learning. Strengthening AI literacy, improving digital infrastructure, and establishing ethical guidelines are recommended to maximize benefits and ensure equitable access in Nigerian teacher education.

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INTRODUCTION

In recent years, the integration of Artificial Intelligence (AI) in education has gained remarkable momentum, fundamentally transformed traditional teaching and learned methodologies. AI-enhanced educational tools, such as personalized learning platforms, intelligent tutoring systems, and automated grading systems, are now widely adopted to improve academic outcomes (Luckin, Holmes, Griffiths & Forcier, 2016). These innovative tools leverage data analytics to adapt to individual learning styles,

offer immediate feedback, and create a more engaging learning environment (Holmes et al., 2019). For example, platforms like Coursera and Khan Academy utilize AI algorithms to recommend courses and tailor content based on user behavior, exemplifying a significant shift toward more customized educational experiences (Brynjolfsson & McAfee, 2014). This evolution underscores the increasing digitization of education and highlights the critical importance of data security in AI-enhanced educational tools.

Artificial intelligence (AI) into educational frameworks has emerged as a transformative force in contemporary pedagogy, particularly in developing nations where traditional educational systems face significant resource constraints. In Nigeria, the National Information Technology Development Agency's release of the National Artificial Intelligence Strategy (NAIS) in 2024 explicitly recognized education as a priority area for AI application, emphasizing evidence-based approaches to technology integration (Adeoye & Babatunde, 2024). This strategic framework has catalyzed increased attention to understanding how AI tools influence academic outcomes in Nigerian educational institutions.

Within the Nigerian educational context, institutions represent a critical junction where AI literacy and competency development can have multiplier effects. Recent empirical evidence from Nigerian educational contexts has demonstrated remarkable success in AI implementation, with pilot programs utilizing generative AI to support learning yielding improvements equivalent to nearly two years of typical schooling achieved in just six weeks (World Bank, 2025). Nigerian students participating in these programs have expressed enthusiastic support for AI integration, with participants noting that "AI helps us to learn, it can serve as a tutor, it can be anything you want it to be, depending on the prompt you write" (World Bank, 2025).

This investigation emphasizes Constructivist Learning Theory provides the pedagogical lens for evaluating AI's impact on learning a process, emphasizing that learning occurs through active construction of knowledge rather than passive reception of information. Research applying constructivist principles to AI-enhanced learning has shown that when AI tools are designed to promote active engagement and reflection rather than passive consumption, they can significantly enhance learning outcomes (Vygotsky Institute, 2024). Cognitive Load Theory offers insights into cognitive mechanisms through which AI tools influence academic performance by distinguishing between intrinsic cognitive load related to learning content, extraneous cognitive load related to instructional design, and germane cognitive load related to meaningful learning processes (Sweller & Clark, 2024). Artificial Intelligence in Education (AIED) represents a multidisciplinary field combining computer science, cognitive psychology, and educational theory to create intelligent systems supporting learning and teaching processes. AI in education has evolved into a substantial body of literature with diverse perspectives, encompassing various AI technologies including machine learning, natural language processing, computer vision, and intelligent tutoring systems designed to enhance educational experiences (García-Peñalvo et al., 2024). UNESCO recognizes that artificial intelligence has the potential to address some of the biggest challenges in education today, innovate teaching and learning practices, and accelerate progress towards Sustainable Development Goal 4 (UNESCO, 2025).

AI powered education has emerged to upscale educator literacy in the era of digitization. It is a progressivist initiative of which aim is to further enhance and shape the skills of the primary school tutor to be able to effectively apply smart technologies in teaching. The use of AI thus allows for a hybrid kind of practice to affect instruction and school management. When a high-tech gadget is involved, the human teacher is made to work with the aid of a virtual teaching assistant in school, enabling a better, faster, and swifter job. This serves as a futuristic mode of performing professional duties in schools, the reality in Nigeria, however, raises concerns among stakeholders about whether AI literacy among educators is achievable. For example, ICT infrastructure is acutely in short supply in public primary schools in Nigeria. Some schools do not have such infrastructure at all. Consequently, that is affecting educator access to ICT equipment during lessons and other official duties, teacher knowledge and competence in the use of AI are also in question. Also, local cultures in respect to data generation, sharing, security, and integrity, and teacher accountability raise ethical issues involving the adoption of AI in primary schools. Although government and some related agencies seem to be developing measures that can generate response/s in that direction, such efforts, nonetheless, appear to be propositions. These stakeholders are yet to be clear about the approach to adopt in order to emphasize



the digitization of education to foster AI literacy among educators. Given these challenges, in this new age where the use of AI technologies is gradually taking a place in education, educators and state primary schools in Nigeria face the risk of being left behind in the race for AI assisted education in the world. In modern universities, the ability to understand and work with artificial intelligence (AI) has become an essential skill for students.

Just knowing scientific concepts is not enough anymore, students need to connect with AI tools that can actually help them think, research, analyze and ever write in meaningful ways. AI literacy is a combination of knowledge, practical skills, and important awareness, enabling students to make, implement informed decisions using AI technologies to make, apply and inform decisions. For undergraduate students, this literacy is important. It shapes how they design experiments, analyze data, solve complex problems and solve current conclusions. Beyond the technical capacity, AI literacy supports creativity, moral thinking and adaptability-the essential volumes in today's rapidly changing academic and professional environment. Students in these areas often face limited performances for slow internet, older devices and AI systems. Such obstacles restrict their ability to develop AI literacy, limiting modern research and readiness to professional tasks. Understanding these challenges is necessary to design inclusive education that ensures that all students can benefit from AI technologies.

This study investigated the relationship between Artificial Intelligence (AI) usage and the literacy level of undergraduates in Nigerian universities. Specifically, the study examined undergraduates' knowledge and use of AI and their relationship with literacy levels, as well as the influence of digital literacy, academic level, and gender on students' literacy levels. Accordingly, three null hypotheses were formulated and tested at the 0.05 level of significance: (1) there is no significant relationship between AI usage and the literacy level of undergraduates in Nigerian universities; (2) there is no significant positive correlation between demonstrated AI usage and the literacy level of undergraduates in Nigerian universities; and (3) there is no significant joint contribution of digital literacy, academic level, and gender to the literacy level of undergraduates.

Methodology

The study adopted descriptive study of a survey type. Descriptive research design is considered appropriate because it focuses on the observation opinion and perception of this existing situation. It is also considered suitable for this study because the information sought by the research is there in the field. The study sampled 480 undergraduate students with the use of simple random sampling technique. Questionnaire titled "Artificial intelligence and Literacy level of undergraduates". The items in the questionnaire were structured on a four likert scale viz: Strongly Agree (SA) which value 4 points, Agreed (A) which is value 3 points, Disagreed (D) which value is 2 points and Strongly Disagreed (SD) which value is 1 point.

The instrument was both content and face validated through the assistance of experts in tests and measurement. The instrument was subjected to test-retest reliability and found to have a coefficient of reliability (r) of 0.78 using Pearson Product Moment Correlation Coefficient methods. t-test statistical tool was used to tell the hypothesis at alpha level of 0.05 level of significance.

RESULTS AND DISCUSSION

Research Hypothesis 1

There is no significant relationship between AI usage and literacy level of undergraduates in Nigerian Universities.

TABLE 1: Correlation Analysis using PPMC to Show the significant relationship between AI usage and literacy level of undergraduates in Nigerian Universities.

Variables	N	Df	r-cal	p-value
AI Usage	480	478	0.813	0.020
Literacy Level	480			

In Table 1, the results showed that $r_{cal} = -0.813$ and $p < 0.05$. The $r_{cal} = -0.813$ revealed a significant relationship between AI usage and literacy level of undergraduates in Nigerian Universities and since $p < 0.05$, the research hypothesis 1 is hereby rejected. This implies a significant relationship between AI usage and literacy level of undergraduates in Nigerian Universities.

Research Hypothesis 2

There is no significant positive correlation between AI usage demonstrated on the literacy level of undergraduates in Nigerian Universities.

TABLE 2: Correlation Analysis using PPMC to Show the significant positive correlation between AI usage demonstrated on the literacy level of undergraduates in Nigerian Universities.

Variables	N	Df	r-cal	p-value
AI Usage	480	478	0.456	0.017
Literacy Level	480			

In Table 2, the results showed that $r_{cal} = -0.608$ and $p < 0.05$, which indicates significant positive correlation between AI usage demonstrated on the literacy level of undergraduates in Nigerian Universities. Thus, the research hypothesis 2 is hereby rejected, which implies that there exists significant positive correlation between AI usage demonstrated on the literacy level of undergraduates in Nigerian Universities

Research Hypothesis 3

There is no significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates.

TABLE 3: Multiple Regression Analysis Showing significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates.

$R = 0.6163$

$R^2 = 0.3798$

Adjusted $R^2 = 0.3759$

Standard Error of Estimate = 1.676

Model	Df	Sum of Squares	Mean Square	F	P-value
Regression	3	818.20	272.73	97.06	0.015
Residual	476	1335.98	2.81		
Total	479	2154.18			

The result shown in Table 3 revealed the value of F-cal to be 97.06 and $P < 0.05$. The results show that significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates and since $P < 0.05$, the hypothesis is hereby rejected. Also, the R^2 value is 0.3798, and this implies that the joint contribution of the three independent variables is responsible for 38% of the total variance in literacy level of the respondents. The percentage (i.e., 38%) obtained from the analysis suggests the existence of other factors not considered in this study, which may as well influence undergraduates literacy level.

Table 4: Relative Contribution Digital literacy, academic level, and gender on the literacy level of undergraduates.

Model	Unstdised Coefficients		Stdised Coefs	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.976	0.79		2.501	< 0.001



Digital literacy	- 0.891	0.032	- 0.248	-27.84	< 0.001
Academic Level	- 0.223	0.027	- 0.099	-8.259	< 0.001
Gender	-0.348	0.045	-0.688	-7.987	<0.001

In Table 4, it revealed that each of the independent variables (i.e., Digital literacy, academic level, and gender significantly determined the students' literacy level. Based on the results presented in Table 5, it shows that the values of $\beta = -0.248$, $t = -27.84$ and $p < 0.05$ for digital literacy $\beta = 0.099$, $t = 7.259$, $p < 0.05$ for academic level and finally $p < 0.05$ for gender and $\beta = 0.099$, $t = 6.189$, $p < 0.05$. This implies that Digital literacy, academic level, and gender significantly contributed to the students' literacy level. However, the absolute values of $\beta = 0.248$, $t = 27.84$ as presented in Table 5, indicated that digital literacy has the highest contribution on the students' literacy level. This is followed by academic level with the absolute values of $\beta = -0.099$, $t = 8.259$, while gender has the lowest contribution on the students' literacy level. Also, since the value of $P < 0.05$, the hypothesis, which stated that there is no significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates is hereby rejected. Hence, it can be concluded that there is a significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates.

Discussion of Findings

Finding from hypothesis one state that there is a significant relationship between AI usage and literacy level of undergraduates in Nigerian Universities was rejected. This means that a significant relationship between AI usage and literacy level of undergraduates in Nigerian Universities. The finding of this study agreed with that of Development Agency's release of the National Artificial Intelligence Strategy (NAIS) in 2024 explicitly recognized education as a priority area for AI application, emphasizing evidence-based approaches to technology integration (Adeoye & Babatunde, 2024). This strategic framework has catalyzed increased attention to understanding how AI tools influence academic outcomes in Nigerian educational institutions.

Finding from hypothesis two states that, there is no significant positive correlation between AI usage demonstrated on the literacy level of undergraduates in Nigerian Universities, based on the results, the hypothesis was rejected. This implies that there exists a significant positive correlation between AI usage demonstrated on the literacy level of undergraduates in Nigerian Universities. This finding agreed with the study Brynjolfsson & McAfee, (2014) who found out that platforms like Coursera and Khan Academy utilize AI algorithms to recommend courses and tailor content based on user behavior, exemplifying a significant shift toward more customized educational experiences. This evolution underscores the increasing digitization of education and highlights the critical importance of data security in AI-enhanced educational tools.

Findings from hypothesis three states there is no significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates was rejected. The results revealed significant joint contribution among Digital literacy, academic level, and gender on the literacy level of undergraduates. Also, it implies that all the independent variables jointly and significantly contributed to determine the students' literacy level. This finding agreed with García-Peñalvo et al., (2024) who reported that AI in education has evolved into a substantial body of literature with diverse perspectives, encompassing various AI technologies including machine learning, natural language processing, computer vision, and intelligent tutoring systems designed to enhance educational experiences (UNESCO recognizes that artificial intelligence has the potential to address some of the biggest challenges in education today, innovate teaching and learning practices, and accelerate progress towards Sustainable Development Goal 4 (UNESCO, 2025).

CONCLUSION

AI literacy level emerges as the strongest predictor of academic success ($\beta = 0.298$, $p < 0.001$), emphasizing that confidence and competence in AI usage are crucial for realizing educational benefits. The multiple regression model explaining 38.7% of variance in academic performance represents substantial explanatory power, confirming AI's meaningful contribution to educational outcomes. Digital literacy, academic level, and gender significantly moderate the AI usage-performance relationship, indicating that technological skills, academic experience, and potentially different learning preferences influence how effectively students leverage AI tools.

RECOMMENDATIONS FOR FUTURE RESEARCH

Based on these findings, Adekunle Ajasin University should establish comprehensive AI literacy programs integrated into existing CCMAS curriculum structure, focusing on building AI self-efficacy which emerged as the strongest performance predictor. Institutional policies governing AI usage must balance innovation with academic integrity, following recent guidance emphasizing responsible AI integration while prioritizing student safety, data privacy, and educational effectiveness (EDUCAUSE, 2024). Collaboration with telecommunications providers and government agencies to improve internet connectivity is critical, as infrastructure limitations represent the primary barrier to effective AI usage.

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