EARLY CHILDHOOD UNIVERSITY STUDENTS' KNOWLEDGE AND UTILIZATION OF ARTIFICIAL INTELLIGENCE TOOLS IN LEARNING IN SOUTH-WEST, NIGERIA

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Abstract
This study examined early childhood university students' knowledge and utilization of AI tools in learning in South-west, Nigeria. The objective was to determine their level of knowledge and use of AI tools and examine gender-based differences. The research questions and hypotheses were in line with the objectives. The descriptive research design was adopted. The population comprised seven hundred and twenty-three 300 and 400 level students across six public universities in South-West, Nigeria. 253 students were sampled using multistage and proportionate techniques. Researcher-developed and experts validated instruments were used to collect data. Reliability coefficients from test-retest over two weeks were 0.76 for the Knowledge Assessment Test (KAT) and 0.93 for the Utilization Questionnaire (UQ). Data were analyzed using mean and MANOVA at 0.05 significance level. Findings indicated high student knowledge (mean = 56.60) and high usage (mean = 2.95). MANOVA analysis showed no gender difference in knowledge $F(1,251) = 0.172$; $p > 0.05$) and use $F(1,251) = 0.294$; $p > 0.05$). It was concluded that early childhood university students in South-west, Nigeria possess high knowledge of AI and use them in learning. The study recommended that universities should integrate structured AI literacy modules into the curriculum to deepen engagement and ethical use among students.
Keyword words: Early childhood Students, Knowledge, Utilization, Artificial Intelligence Tools.

Introduction

Artificial intelligence (AI) has made a big difference in how people live and carry out their activities in every sector of society, especially in the past few years. In the education sector, the integration of artificial intelligence has already begun, and it is gradually becoming

an integral part of teaching and learning processes, which Early Childhood and Primary Education is not left out of. As this technology continues to find its way into the sector, there is a need to consider the potentials that lie ahead as far as the future of education is concerned with the use of artificial intelligence. However, despite these possibilities, the integration of artificial intelligence in teaching and learning by Early Childhood educators should not be overemphasised in the field of Early Childhood Education. By doing this, it will appear to be in line with the global advancements in AI and its practical implementation within tertiary institutions in Nigeria. This reality raises concerns about whether the education sector is adequately prepared to harness the transformative capabilities of artificial intelligence and thus warrants the need for further investigation.

Many artificial intelligence tools can be used for learning, such as adaptive learning platforms, automated grading systems, and speech recognition software. In its simplest definition, artificial intelligence is about making computers do things that are usually done by human beings. However, this definition barely scratches the surface of its vast potential and implications. The growing presence of AI in education has introduced tools like adaptive learning platforms, automated grading systems, speech recognition software, predictive analytics and so on (Habib, Jelani, & Najla, 2022). Artificial Intelligence can be extremely beneficial in helping young children develop their language and speech skills because it can offer accurate, instant feedback and assessment on pronunciation, vocabulary, comprehension, and fluency. In the classroom, Artificial Intelligence could support and benefit early childhood development by personalising learning, providing one-on-one tutoring, and supporting language development.

In a bid to promote and scale up the integration of artificial intelligence tools in education, the federal government of Nigeria has also put forward different technological initiatives for higher institutions to imbibe the culture of embracing modern technologies in learning. Some of these initiatives, according to Alabi and Mutula (2017), are the Nigerian Universities Network (NUNet), and other higher institutions in Nigeria. The Federal Ministry of Education also stated that the Nigerian Universities Electronic Teaching and Learning (NUETAL) platform has been established in some Federal and State Universities as a technology-enabled interactive teaching and learning tool (Federal Ministry of Education, 2019). These show that the integration of modern technologies in education, including those based on artificial intelligence, is an issue of national interest. However, despite these technological initiatives and strategies, little or no favourable outcomes have been achieved, and full integration has not been realized.

The aforementioned shows that more work needs to be done, and this has prompted the need for continuous exploration of ways to improve the situation (Chen, Chen, & Lin, 2020). Madu and Musa (2024) argued that when students possess adequate knowledge about AI, they are more likely to engage with its applications effectively, whether through adaptive learning platforms, automated grading systems, or data-driven insights that enhance personalised

learning. On the other hand, a lack of knowledge might hinder their willingness to adopt and integrate these technologies into teaching and learning processes.

How students use artificial intelligence tools in learning has the potential to influence the extent to which these tools are integrated into educational systems. Students who actively use AI tools to support their learning, such as through virtual tutors or predictive analytics for academic planning, may experience improved academic outcomes. On the other hand, limited or inappropriate use of these tools might hinder the integration process, as underutilization could result in missed opportunities to enhance teaching and learning. Furthermore, reliance on traditional methods or inconsistent application of AI tools might create gaps in the learning process, thereby impeding the realisation of AI's full potential in education. For example, Aithal, Prabhu and Aithal (2024) suggest that while AI tools hold significant promise, their successful integration requires consistent and meaningful use students alike to create a cohesive and technology-driven learning environment. These dynamics underscore the importance of exploring how the actual usage of AI technologies by students shapes their integration into educational systems, particularly in regions like South-Western Nigeria, where this research focused.

The selection of knowledge and use as key areas of focus in this study is driven by their important role in the integration and application of artificial intelligence in learning. Knowledge is essential because it serves as the baseline for understanding what artificial intelligence entails, how it functions, and its potential applications in the educational context (Cope, Kalantzis, & Searsmith, 2021). Without sufficient knowledge students are unlikely to recognise the value AI can add to learning processes, let alone adopt its tools effectively and knowledge provides the foundation. Additionally, use is a practical extension of knowledge as it reflects the actual engagement with AI tools in learning. The degree to which AI tools are utilised offers a tangible measure of how well they have been integrated into the educational process (Grájeda et al., 2024). All these make knowledge and use worthy of consideration when examining the integration of AI in education. Furthermore, knowledge and use cannot be considered alone; it is also necessary to determine gender as a moderating variable in the study if this varies among male and female individuals.

Gender is a variable of interest in this study because it provides a unique lens to investigate how societal expectations shape the adoption and utilisation of AI in education. This focus is especially relevant in the context of Nigeria, where cultural and social constructs surrounding gender can sometimes influence technological exposure and participation in digital innovation (Umukoro et al., 2021). Gender disparities in technology use and digital literacy, as highlighted by researchers like Stöhr, Ou and Malmström (2024), suggest that male and female students might engage with AI tools differently. Likewise, in fields like early childhood and primary education, which have been historically described as female-dominated, it becomes pertinent to investigate whether this gender dynamics influences how AI tools are perceived and utilised by lecturers and students (Taniavska, 2024; Wu, 2023). By examining

gender as a moderating variable, this study seeks to uncover whether and how gender dynamics impact the knowledge and use of artificial intelligence in teaching and learning processes.

By exploring these variables, the study provided more clarity and shed light on the preparedness of students in early childhood education to embrace AI-based technologies. Thus, it is against this background that the researcher considers it essential to examine early childhood students' knowledge and use of artificial intelligence tools in learning in South-Western Nigeria.

Statement of the Problem

The integration of artificial intelligence (AI) into learning processes has gained considerable attention globally. However, in Nigeria, its practical application in learning remains a growing area of concern. A few researchers have made valuable insights on this subject matter; however, there are still gaps in the literature. From the literature reviewed by the researcher, available data shows that there was no significant difference in the mean rating of respondents on the need for artificial intelligence in learning among universities students in Southern part of Nigeria such as study of Iddrisu et al. (2025), who surveyed 320 undergraduates at the University for Development Studies and found no gender difference in frequency or breadth of AI writing-tool use.

Although some scholars have examined technology integration in Nigerian tertiary institutions, there is limited research specifically addressing Artificial Intelligence's role in Early Childhood Education. This gap is particularly critical given the unique pedagogical approaches required in early childhood education. This is a field of study that focuses on helping children learn and develop skills that prepare them for primary school and future life; thus, addressing this gap is essential to understanding how artificial intelligence can be effectively leveraged to support foundational learning and development.

Likewise, this study considered the interplay between knowledge and use of artificial intelligence tools among students of early childhood education as a whole in a single study. This is part of the gaps this study intends to explore factors that have the potential to contribute to this subject matter, and gender is not a fully researched area in this context. Understanding the moderating role of gender is crucial for identifying potential barriers to AI integration and designing targeted interventions that promote equitable adoption across all groups.

Observations made from the present researcher's interactions with some students in the South-Western part of Nigeria also suggest that the integration of artificial Intelligence in education has sparked both excitement and concern. While AI holds great potential to revolutionise educational practices, there are growing concerns about its implications, especially in the field of Early Childhood and Primary Education. The concern is that reliance on AI might lead to people losing their jobs and might contribute to a reduction in individualised intervention that is essential for effective learning in Early Childhood and Primary Education, where understanding the emotional and psychological aspects of learning is critical. The present study addresses these identified gaps and contributes to the body of

knowledge in the literature. Therefore, this study investigates early childhood students' knowledge and use of artificial intelligence tools in learning in South-Western Nigeria.

Objectives of the Study

The main objective of the study was to determine early childhood university students' knowledge and utilization of artificial intelligence tools in learning in South-west, Nigeria.

The specific objectives of the study were to:

1. determine the level of Early childhood education university students' knowledge of artificial intelligence tools in learning in South-west, Nigeria
2. examine the level of Early childhood education university students' utilization of artificial intelligence tools in learning in South-west, Nigeria
3. ascertain the difference between Early childhood education university students' knowledge, and utilization of artificial intelligence tools in learning in South-west Nigeria based on gender.

Research Questions

The following research questions were raised for the study

a. What is the level of early childhood education university students' knowledge of artificial intelligence tools in learning in South-west, Nigeria?

b. What is the level of early childhood education university students' utilization of artificial intelligence tools in learning in South-west, Nigeria?

Hypotheses

This null hypothesis was formulated and tested at 0.05 level of significance.

$H_0$1: There is no significant difference of early childhood education university students' knowledge and utilization of artificial intelligence tools in learning in South-western, Nigeria, based on gender.

Methodology

A descriptive survey research design was adopted for the study. The population of the study comprises all 300-level and 400-level students in public Universities that offer Early Childhood Education in South-Western Nigeria. The sample size for this study consists of 253 early childhood students through the use of simple random sampling technique from Lagos, Ondo, and Ekiti states. The researcher makes use of Students' Knowledge of Artificial Intelligence Tools Assessment Test (SKAITAT) and Students' Use of Artificial Intelligence Tools Questionnaire (SUAITQ) subjected to face and content validity method to ascertain that the instruments measure what they are intended to measure.

The reliability of the research instruments was determined through a pilot study using 25 copies of instruments were administered using test-retest method within the interval of two weeks, it was analysed using the Pearson Product-Moment Correlation Coefficient (PPMC). Reliability coefficients of 0.76 for Students' Knowledge of Artificial Intelligence Tools Assessment Test and 0.93 for Students' Use of Artificial Intelligence Tools Questionnaire. The data obtained were analysed using mean and standard deviation for research questions, while the hypothesis was tested using Multiple Analysis of Variance (MANOVA) at 0.05 level of significance.

Results

Research Question one: What is the level of early childhood education university students' knowledge of artificial intelligence tools in learning in South-west, Nigeria?

Table 1: Mean on students' knowledge of AI

Dispersion	**Score**	**N**	**Mean Score**	**Remark**
Minimum	25			Students' knowledge of artificial intelligence tools level was high
Maximum	90	253	56.60	

Key: 0.00 – 49.99 = Low **High: 50.00 – 100.00**

Table 1: shows the level of students' knowledge of artificial intelligence tools in learning in South-Western Nigeria. Apparently, the minimum score was 25 while the maximum score was 90. Then the mean score was 56.60, which indicated that students' knowledge of artificial intelligence in learning in South-West, Nigeria was high.

Research Question Two: What is the level of early childhood education university students' utilization of artificial intelligence tools in learning in South-west, Nigeria?

Table 2: Mean on students' utilization of AI

S/N	**ITEMS**	**Mean**	**Std. Deviation**	**Remarks**
1.	I use Artificial Intelligence tools like ChatGPT and/or Deep seek to complete my assignments	3.00	.690	High
2.	I use Artificial Intelligence-powered apps to improve my writing and grammar in my schoolwork	2.65	.888	High
3.	I use Artificial Intelligence-based translation tools (such as Google Translate) to understand difficult words	3.08	.805	High

4.	I use Artificial Intelligence-generated quizzes or tests to prepare for my exams	2.72	.872	High
5.	I use Artificial Intelligence voice assistants like Siri or Google Assistant to find information for my studies	3.11	.750	High
6.	I use Artificial Intelligence-powered plagiarism checkers before submitting my assignments	2.91	.833	High
7.	I use Artificial Intelligence-powered digital libraries to access books and learning materials	3.00	.563	High
8.	I use Artificial Intelligence to create flashcards for memorising key concepts in early childhood	2.89	.592	High
9.	I use Artificial Intelligence in PowerPoint or Canva to create better lecture presentations	3.16	.650	High
10.	I use Artificial Intelligence tools to summarise lengthy textbooks or lecture notes for easier understanding	2.79	.700	High
11.	I use Artificial Intelligence to generate ideas for class discussions and projects	2.57	.636	High
12.	I use Artificial Intelligence to convert my notes into audio to listen and understand better	3.09	.771	High
13.	I use Artificial Intelligence-based tutoring platforms to get help with difficult subjects	2.93	.654	High
14.	I use Artificial Intelligence-powered video learning tools to learn new topics in Early Childhood Education	2.93	.742	High
15.	I use Artificial Intelligence tools to brainstorm ideas for research work	2.92	.477	High
16.	I use Artificial Intelligence-powered reminders to help me plan my study time	3.07	.723	High
17.	I use Artificial Intelligence to organize and analyze learning resources for students	2.67	.859	High
18.	I use Artificial Intelligence to generate images or diagrams to illustrate my assignments	3.24	.599	High
19.	I use Artificial Intelligence tools to find current research materials for my academic work	3.15	689.	High

20.	I use Artificial Intelligence-generated transcripts to review recorded lectures	3.07	.577	High
	Weighted average	**2.95**		

Decision: Low: 1.00 – 2.49 **High: 2.50 – 4.00**

Table 2: shows the level of students' use of artificial intelligence tools in learning in South-Western Nigeria**.** The weighted average is 2.95 which is greater than 2.49 the baseline for positive opinion. This therefore shows a numeric indicator that the level of students' use of artificial intelligence tools in learning in South-Western Nigeria was high.

Hypothesis one: There is no significant difference of early childhood education university students' knowledge and utilization of artificial intelligence tools in learning in South-Western, Nigeria, based on gender.

Table 3: Multivariate Analysis of Variance (MANOVA) on students' knowledge and utilization of AI based on gender

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Knowledge	36.279[a]	1	36.279	.172	.679	.001
	Students' Attitude	2.229[b]	1	2.229	.205	.651	.001
	Students' Use	3.137[c]	1	3.137	.294	.588	.001
Intercept	Knowledge	792004.533	1	792004.533	3759.308	.000	.938
	Students' Attitude	871216.896	1	871216.896	80223.803	.000	.997
	Students' Use	864297.994	1	864297.994	81119.140	.000	.997
Gender	Students' Knowledge	36.279	1	36.279	.172	**.679**	.001
	Students' Attitude	2.229	1	2.229	.205	**.651**	.001
	Students' Use	3.137	1	3.137	.294	**.588**	.001
Error	Knowledge	52669.574	251	210.678			
	Students' Attitude	2714.958	251	10.860			
	Students' Use	2663.669	251	10.655			
Total	Knowledge	859075.000	253				
	Students' Attitude	887853.000	253				
	Students' Use	880705.000	253				
Corrected Total	Knowledge	52705.853	252				
	Students' Attitude	2717.187	252				
	Students' Use	2666.806	252				

Table 3 shows that there was no significant difference of early childhood students' knowledge of artificial intelligence tools in learning in South-Western, Nigeria, based on gender ($F_{(1; 251)} = .172$, $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significance value (.679) is greater than 0.05. This implies that gender does not significantly influence early childhood students' knowledge of artificial intelligence tools in their learning. The partial eta squared values of students' knowledge were extremely low (.001), suggesting that gender explains only a very small proportion of the variance in students' knowledge of artificial intelligence tools. Table 3 shows that there was no significant difference of the early childhood students' use of artificial intelligence tools in learning in South-Western, Nigeria, based on gender. ($F_{(1; 251)} = .294$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significance value (.588) is greater than 0.05. This implies that gender does not significantly influence early childhood students' use of artificial intelligence tools in their learning. The partial eta squared values of students' use was extremely low (.001), suggesting that gender explains only a very small proportion of the variance in students' use of artificial intelligence tools.

Discussion of Findings

The finding revealed that the level of students' knowledge of artificial intelligence tools in learning in South-Western Nigeria was high. A possible reason for this high level of knowledge among early childhood students could be attributed to the perceived benefits and popularity of AI tools. This finding is in tandem with Iwerima and Bupo (2024), who surveyed 143 Business Education undergraduates in Rivers State and found that over 85% of students were familiar with ChatGPT and Grammarly and contradicts that of Oyawole et al. (2025), who sampled 300 biology students from Oyo State and found that knowledge of AI tools was low.

In another finding of the study, it was revealed that the level of students' use of artificial intelligence tools in learning in South-Western, Nigeria was high. This finding aligns with the study of Nnaemeka and Ogunbadejo (2024), who surveyed 285 undergraduates at Nnamdi Azikiwe University and found that 92 per cent of respondents regularly use AI tools. A possible reason for the consistency in findings is that both studies took place in Nigerian universities and sampled similar on-campus undergraduate students. However, this finding contradicts Ezeanya, Ukaigwe, Ogbaga, and Kwanashie (2024), whose survey of 1,108 National Open University of Nigeria learners found that only 28 per cent had ever used institution-provided AI platforms.

Another finding of the study revealed that there was no significant difference in early childhood students' knowledge of artificial intelligence tools in learning in South-Western, Nigeria, based on gender. This finding aligns with Alimi et al.'s (2021) study of 200 undergraduates across three Kwara State universities, where it was revealed that there was no gender difference in awareness or knowledge of AI for learning. A possible reason for the consistency in findings between this study and that of Alimi et al. could be that both studies

took place in Nigerian universities, sampled undergraduate students who used the same method of data analysis (independent samples t-test). However, is in contrast with study of Aliyu et al. (2025) which examined GenAI-enhanced algebra instruction among students in Katsina State and, using pre-/post-test performance measures, found that male students outperformed females, indicating a gender gap in effectively understanding AI-mediated content.

It was also found that there was no significant difference in early childhood students' use of artificial intelligence tools in learning in South-Western, Nigeria, based on gender. One reason for this finding could be attributed to the fact that widespread availability of AI applications, as many of these tools have a free plan, which both male and female students can access equally in any region in the world. This finding is in line with Iddrisu et al. (2025), who surveyed 320 undergraduates at the University for Development Studies and found no gender difference in frequency or breadth of AI writing-tool use. This disagrees with the study of Møgelvang et al. (2024) where in a survey of higher-education students in Norway was conducted, and results indicated that men engaged more frequently with generative AI chatbots across a broader range of tasks.

Conclusion

It was concluded that early childhood students in South-Western Nigeria possess high levels of knowledge of artificial intelligence tools in learning and use of these technologies was high. Gender comparisons did not produce any significant differences in knowledge and level of use was high

Recommendations

Based on the findings of the study, the following recommendations were made

1. Universities should integrate structured AI literacy modules into the early childhood education curriculum to reinforce and expand the understanding of early childhood students.
2. Universities should also formalise and develop clear usage policies, ethical guidelines, and dedicated support services for students to use AI tools responsibly.
3. Equitable access to AI resources and support services should be provided for every student, regardless of gender.

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