LEVEL OF AWARENESS AND UTILIZATION OF ARTIFICIAL INTELLIGENCE TOOLS IN THE IMPLEMENTATION OF UNIVERSAL BASIC EDUCATION PROGRAMME IN JUNIOR SECONDARY SCHOOLS IN SOUTH EAST, NIGERIA

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ABSTRACT

This study assesses the level of awareness and utilization of Artificial Intelligence (AI) tools in the implementation of the Universal Basic Education (UBE) Programme in public secondary schools in Southeast Nigeria. Three research questions guided the study. A descriptive survey research design was adopted. The population comprised 33,250 respondents, including 1,620 principals and 31,630 teachers from 1,620 public secondary schools in Southeast Nigeria. A sample of 1,238 respondents, consisting of 162 principals and 1,076 teachers, was drawn using a multistage sampling procedure. The instruments for data collection were a structured questionnaire titled: "Awareness and Utilization of Artificial Intelligence Tools Questionnaire" (AUAITQ) and a checklist on the Availability of AI tools and facilities for UBE implementation (CAAITQ). Both instruments were validated by three experts in the University of Nigeria, Nsukka. Reliability testing using Cronbach's alpha yielded coefficients of 0.84 and 0.82 for the questionnaires, indicating good internal consistency. Data were analyzed using mean and standard deviation to answer the research questions. The findings of the study revealed that the level of awareness of AI tools for UBE implementation in public secondary schools in Southeast Nigeria was moderate, indicating a growing but still limited understanding among principals and teachers. Additionally, the utilization of AI tools for UBE program implementation was found to be low, highlighting significant barriers to effective integration of AI technologies in teaching and administrative processes. The study contributes to knowledge by providing empirical evidence on the current status of AI awareness and utilization in public secondary schools in Southeast Nigeria, emphasizing the urgent need for capacity building and infrastructural support to enhance AI adoption for educational development. Based on the findings, it is recommended that the Ministry of Education and school administrators should prioritize regular training and workshops on AI tools for principals and teachers to improve their knowledge and skills, thereby enhancing the effective utilization of AI in the UBE program implementation.

Keywords: Artificial intelligence(AI), awareness, integration, UBE, policy

Introduction
The introduction of Artificial Intelligence has brought innovative solutions and a wide range of technologies that are transforming the educational sector in unprecedented ways. Whether in educational administration, accessibility, inclusivity, or teaching and learning, Artificial Intelligence has become a topical subject not merely because it is relatively new, but due to the transformative impact it has had on traditional instructional delivery and administrative practices. According to Luckin, Holmes, Griffiths, and Forcier (2016), the integration of Artificial Intelligence technologies has

initiated a significant shift from traditional face-to-face classroom instruction to modern digital delivery methods. These innovations have made learning more interactive and engaging by providing real-time feedback, automating administrative tasks, and enabling personalized learning tailored to students' learning pace, as affirmed by Holmes, Bialik, and Fadel (2021). Traditional instructional methods tend to be teacher-centered, in contrast to modern Artificial Intelligence-based approaches which facilitate personalized learning experiences designed to meet the specific needs of individual students, as noted by Zawacki-Richter, Marín, Bond, and Gouverneur (2019). Empirical evidence suggests that students who utilize Artificial Intelligence-assisted tools demonstrate higher levels of engagement and retention compared to those in conventional classroom settings (Zawacki-Richter, Marín, Bond, and Gouverneur, 2019).

Artificial Intelligence technologies and platforms hold considerable promise for improving teaching, learning, and administrative efficiency. Ogunode and Ukozor (2023) define Artificial Intelligence as computer systems and technologies capable of performing complex tasks that were traditionally reserved for human beings, such as reasoning, decision-making, and problem-solving. In line with this, Chen, Xie, and Hwang (2020) listed Artificial Intelligence tools to include intelligent tutoring systems, teaching robots, learning analytics dashboards, adaptive learning systems, and human-computer interactions. Similarly, Ogunode, Idoko, and ThankGod (2024) identified machine learning and robotics as key Artificial Intelligence components with broad applications and transformative potential for education. Artificial Intelligence represents a culmination of developments in computer science, machine technologies, and information communication technologies, enabling systems to perform tasks that approximate human cognitive functions, as explained by Chen, Chen, and Lin (2020). Mureșan (2023) emphasized that the fundamental goal of Artificial Intelligence is to enable machines to exhibit characteristics traditionally associated with human intelligence. This includes tasks such as speech recognition, decision-making, and pattern identification. Artificial Intelligence, as an umbrella concept, encompasses a variety of technologies such as machine learning, deep learning, and natural language processing. Examples include Chat Generative Pre-trained Transformer, computer vision, and data analysis systems that can generate written content, drive vehicles, or make real-time recommendations. Within this study, Artificial Intelligence is conceptualized as a set of technologies that enable computers to perform advanced functions including data analysis, natural language translation, and decision-making.

Hence, with continued advancements in computing and information processing, Artificial Intelligence has been widely integrated into educational practices, especially in developed countries, as documented by Chen, Xie, and Hwang (2020), and Luckin, Holmes, Griffiths, and Forcier (2016). A range of Artificial Intelligence technologies are suitable for incorporation into educational programme implementation. According to Luckin, Holmes, Griffiths, and Forcier (2016), these technologies can be categorized as adaptive learning systems, intelligent tutoring systems, automated grading tools, and virtual assistants. Each technology includes specific hardware and software components designed to execute targeted educational functions. Holmes, Bialik, and Fadel (2021) explained that adaptive learning systems such as Squirrel AI and EdTech dashboards adapt instructional content to individual students' learning speeds and help monitor the success of educational reforms. Selwyn (2022) expanded on this by describing intelligent tutoring systems as virtual software tutors including Artificial Intelligence

chatbots like Chat Generative Pre-trained Transformer, grammar-checking tools like Grammarly, and gamified platforms such as Duolingo, Photomath, and Socratic, which support students through customized and interactive academic experiences. Other Artificial Intelligence tools, such as Test Driller, Quizizz, and Kahoot, are used to prepare students for examinations by offering instant feedback, clarifying errors, and promoting academic improvement (Ogunleye, Owolabi, and Osakuade, 2020). In administrative contexts, platforms like Edves and PowerSchool have been used to help school leaders analyze student performance data and make data-informed decisions concerning curriculum development and the outcomes of academic interventions, as explained by Alam and Weerakkody (2021).

The relevance of Artificial Intelligence to the successful implementation of educational programmes cannot be overstated. Zawacki-Richter, Marín, Bond, and Gouverneur (2019) found that Artificial Intelligence-enhanced learning significantly improves student engagement and retention. Luckin, Holmes, Griffiths, and Forcier (2016) asserted that these technologies enable learners to go beyond traditional boundaries by providing personalized, real-time instructional support. Miao, Holmes, Huang, and Zhang (2021) supported this view, indicating that adaptive platforms tailor content based on learners' strengths and weaknesses, allowing them to progress at their own pace. Furthermore, Zawacki-Richter, Marín, Bond, and Gouverneur (2019) emphasized that machine learning algorithms embedded in adaptive platforms assess student performance and adjust instructional strategies accordingly. Adedokun (2021) highlighted that such approaches are especially effective in overcrowded classrooms, such as those in Nigeria, where teachers face challenges in delivering individualized instruction. In addition, Artificial Intelligence analytics tools like Tableau for Education and IBM Watson Education assist school administrators in tracking critical performance metrics, including dropout rates and academic proficiency, thereby enhancing strategic decision-making. Hence, in light of these advancements, it is imperative to explore the level of awareness and utilization of Artificial Intelligence tools in the implementation of the Universal Basic Education programme. This study focuses on junior secondary schools in South-East Nigeria, where the integration of Artificial Intelligence technologies holds the potential to improve educational outcomes and institutional efficiency in alignment with global educational trends.

With the application of Artificial Intelligence (AI) in education, teaching and learning have significantly transcended the traditional method of a teacher standing before students to dictate notes or give instructions, often with limited student participation. In schools that have implemented AI-driven teaching methods and technologies, there has been a noticeable increase in student motivation and participation in learning activities. Holmes et al. (2021) reported that in developed nations such as the United States, China, and Finland, AI-driven educational platforms like Squirrel AI, Knewton, and IBM Watson Education have been effectively deployed to enhance student learning outcomes. These developments underscore that the myriad benefits of AI in education can only be realized when these technologies are properly integrated and utilized. Utilization, according to the Cambridge Dictionary (2024), is defined as "the act of using something in an effective way." Hornby (2001) described it as the process of using something for practical purposes. In this context, the utilization of AI devices refers to the deployment and practical application of artificial intelligence systems to perform tasks that traditionally require human intelligence, thereby enhancing efficiency and decision-making across various educational domains.

Teachers' capacity to integrate AI into their instructional practices is fundamental for its successful adoption. However, Popenici and Kerr (2017) assert that many Nigerian secondary school teachers lack exposure to AI technologies and thus require targeted training to use them effectively. Ogunleye et al. (2020) echo this concern, emphasizing that professional development programs and AI literacy training are essential to boost teachers' confidence and readiness to adopt AI tools in implementing the Universal Basic Education (UBE) program.

The Universal Basic Education program in Nigeria aims to provide free, compulsory, and universal access to basic education for all Nigerian children, thereby ensuring equitable learning opportunities, reducing illiteracy, and fostering national development (Federal Ministry of Education, 2019). Specifically targeting children aged 6–15, including those in rural and underserved communities; the objectives of the UBE program are numerous. UNESCO (2020) outlines goals such as ensuring equitable access to quality basic education, particularly for children in disadvantaged areas, and improving teaching and learning through curriculum reforms, teacher training, and infrastructure development. World Bank (2021) and Nwogu and Ibe (2022) stress enhancing literacy, numeracy, and digital skills to prepare students for higher education and the workforce, while Okonkwo (2018) and Adesina (2021) highlight the importance of reducing dropout rates and leveraging AI-driven innovations to enhance education accessibility and learning outcomes. Interestingly, TO achieve these objectives, the implementation of the UBE program focuses on five critical areas: primary and junior secondary education, teacher training, curriculum development, and technology integration (Adesina, 2021). The anticipated outcomes of this program include increased school enrollment, improved learning outcomes, reduced educational disparities, and the cultivation of a more skilled workforce to drive national development (FRN, 2014). The realization of these expected outcomes necessitates the integration of AI tools and associated technologies. Uwakwe (2020) defines implementation as the process of putting a planned decision, proposal, or policy into effect. Fullan (2007) and Durlak and DuPre (2008) reinforce that implementation in education involves orchestrating resources, training personnel, and developing instructional materials while ensuring sustained stakeholder engagement. Ogunleye et al. (2020) elaborate that implementing AI tools in education entails integrating such technologies to enhance teaching, learning, and administrative processes facilitating personalized instruction, automating administrative tasks, and improving educational outcomes.

AI tools offer promising solutions to challenges currently plaguing the Nigerian education system. For instance, Uwakwe (2020) and Adesina (2021) observe that Nigeria, particularly in its rural regions, faces issues such as limited access to learning materials, high dropout rates, teacher shortages, and poor infrastructure. AI technologies can play a transformative role in mitigating these problems. Nigeria's linguistic diversity with over 500 languages poses another barrier to education, as most materials are presented only in English. Mbah (2022) notes that Google's BERT AI is capable of translating and contextualizing educational content into local African languages, suggesting that Nigeria could adopt such tools to develop content in Hausa, Yoruba, and Igbo, thus enhancing access for non-English-speaking students. In Kenya, the AI-powered mobile platform M-Shule delivers personalized SMS-based lessons to students in low-income areas, according to Nguyen et al. (2021). A similar initiative in Nigeria could make quality education more accessible in rural communities by

delivering customized lessons via USSD or SMS to students who lack internet access or smartphones. This would promote inclusive education and provide a scalable approach to education delivery. Woolf (2020) highlights the use of personalized AI tutors and pre-recorded lessons in Tanzania, which help teachers in overcrowded classrooms by offering AI-powered chatbots and voice-based tutors. These tools provide automated quizzes and explanations, reduce teacher workload, and ensure continuous learning for students even without internet access.

AI also has the potential to revolutionize student assessment and administrative efficiency. Mbah (2022) asserts that AI can automate record-keeping and grading processes, track student performance, and provide real-time feedback. Gradescope in the United States exemplifies this with its AI-assisted grading of handwritten assignments. Schmidt and Cohen (2020) further note that AI-driven school management systems can streamline tasks such as attendance, performance monitoring, and data analytics. Predictive analytics tools powered by AI allow school leaders to make data-informed decisions to identify at-risk students and provide timely interventions (Luckin et al., 2018; Oluwatobi & Ogunleye, 2021). AI technologies offer tailored educational experiences by analyzing student data and adapting instruction to individual needs and learning preferences. This enhances student engagement and learning efficiency. The automation of routine administrative tasks allows educators more time for meaningful student interaction, while AI-generated insights facilitate targeted instructional strategies. Mobile-based AI assessment systems, which allow students to upload images of their work for instant feedback, further support student learning by enabling timely self-correction. Despite these advances, a survey of many schools reveals limited evidence that AI tools have been meaningfully integrated into the implementation of the UBE program. This study thus aims to investigate the extent of awareness and utilization of AI tools in this context. Ajibola (2020) identifies the lack of continuous professional development as a significant barrier to educational reform in Nigeria. AI technologies can be used to offer virtual simulations, personalized coaching, and real-time feedback for improving teaching methods (Chen et al., 2022). Selwyn (2019) supports the use of digital AI platforms to cultivate digital literacy among teachers and better prepare them for modern classrooms. However, numerous challenges continue to impede AI adoption in Nigeria's secondary education sector. These include inadequate technological infrastructure, poor internet connectivity, insufficient funding, and resistance to change among educators (Adedokun, 2021). The absence of these foundational elements may severely hinder teachers' exposure to and utilization of AI tools in instructional practices.

The current state of the art in AI application in education indicates a global shift from traditional methods toward more interactive, personalized, and data-driven learning environments. In developed and emerging economies, AI-driven platforms like Squirrel AI, Knewton, M-Shule, and IBM Watson Education have been successfully implemented to boost learning outcomes and bridge educational inequities (Holmes et al., 2021; Nguyen et al., 2021; Woolf, 2020). AI tools now offer capabilities ranging from real-time translation of learning content into local languages (Mbah, 2022), automated grading (Schmidt & Cohen, 2020), predictive analytics (Luckin et al., 2018), to mobile-based adaptive learning for remote learners. In contrast, the literature on AI in Nigerian education largely emphasizes the potential rather than the practice of these tools. While the UBE program incorporates a vision for technology integration (FRN, 2014), research indicates that actual AI adoption remains low, especially in rural and

underserved communities (Adesina, 2021; Ogunleye et al., 2020). Teachers' digital competence is often inadequate, and access to infrastructure such as electricity, internet, and devices is inconsistent (Ajibola, 2020; Adedokun, 2021). Moreover, little empirical data exists on the actual level of awareness and utilization of AI tools in the implementation of the UBE program across Nigerian schools. The gap, therefore, lies in the lack of empirical studies examining the current awareness and practical utilization of AI tools by Nigerian teachers in the UBE context. Most studies focus on AI's potential rather than actual implementation, and few explore teachers' readiness, accessibility to tools, or the infrastructural realities of integrating AI technologies. This study seeks to fill that gap by evaluating not just theoretical prospects, but the real-world application, awareness, and usage patterns of AI in the execution of Nigeria's Universal Basic Education program.

Statement of the Problem

The integration of Artificial Intelligence (AI) in education has emerged as a transformative approach to enhance teaching learning and educational administration across the globe. AI powered systems are designed to provide personalized learning experiences automate administrative tasks track student performance and support decision making processes that improve learning outcomes. Ideally in a well functioning educational system particularly one implementing the Universal Basic Education (UBE) programme teachers' administrators and stakeholders should leverage AI technologies to ensure inclusive equitable and quality basic education. AI tools should be actively used to address challenges such as overcrowded classrooms limited teacher student interaction inadequate teaching resources and disparities in learning achievements. These tools when utilized effectively are expected to enhance access to real time learning materials personalize instruction to cater to individual learners reduce teacher workload and improve data driven planning and evaluation within schools. However the reality in many Nigerian public schools paints a contrasting picture. There is limited awareness and utilization of AI tools in the implementation of the UBE program. Many teachers lack the requisite knowledge skills and exposure to AI driven educational technologies. Infrastructure needed to support AI such as consistent electricity internet access and digital devices is either unavailable or insufficient especially in rural and underserved communities. Furthermore professional development programs tailored to building teachers competence in AI integration are sporadic or nonexistent making the adoption and sustainability of AI based educational practices difficult. Therefore the problem of this study is that despite the recognized potential of Artificial Intelligence to enhance the implementation of the Universal Basic Education program in Nigeria its actual utilization remains significantly low with inadequate teacher awareness poor infrastructural support and minimal integration into instructional and administrative practices.

Purpose of the Study

The general purpose of the study was to determine the level of awareness and utilization of AI tools in the implementation of the UBE program in public junior secondary schools in Southeast Nigeria. Specifically, the study sought to:

1. determine the level of availability of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria.
2. ascertain the level of utilization of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria.

3. identify strategies to enhance the utilization of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria.

Research Questions

The following research questions guided the study:

1. What is the level of availability of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria?
2. What is the level of utilization of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria?
3. What strategies can be adopted to enhance the utilization of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria?

Methodology

This study aimed to determine the extent of awareness and utilization of artificial intelligence (AI) tools for implementing the Universal Basic Education (UBE) program in junior secondary schools in Southeast Nigeria. A descriptive survey research design was employed, which involves systematically collecting and describing data about the characteristics and features of a given population (Nworgu, 2015). This design was chosen because data were collected from a defined population and analyzed to represent the entire group. The study was guided by three research questions. The population consisted of 33,250 individuals, including 1,620 principals and 31,630 teachers from 1,620 public junior secondary schools in Southeast Nigeria. A sample of 1,238 respondents, comprising 162 principals and 1,076 teachers, was selected using a multistage sampling procedure that incorporated purposive, stratified, proportionate, and simple random sampling techniques. Data collection instruments included a checklist on the availability of AI tools and facilities for UBE implementation (CAAITQ) and a structured questionnaire titled "Extent of Utilization of Artificial Intelligence Tools Questionnaire" (EUAITQ). Both instruments were validated by three experts, two from the Department of Educational Foundations and one from the Department of Science Education (Research. Measurement and Evaluation Unit), Faculty of Education, University of Nigeria, Nsukka. Reliability testing using Cronbach's alpha yielded coefficients of 0.84 and 0.82 for the questionnaires, indicating good internal consistency. The questionnaires were administered by the researcher with assistance from five trained research assistants who were teachers familiar with data collection protocols. The checklist and questionnaire were used to assess the availability and utilization of AI tools for UBE implementation. Data were analyzed using mean and standard deviation to answer the first two research questions.

Results

Table 1: Mean Ratings of Principals and Teachers on Availability of AI Devices and Accessories for UBE Implementation in Public Junior Secondary Schools in Southeast Nigeria

S/N	AI Devices and Accessories	Principals Mean	Principals SD	Principals Level	Teachers Mean	Teachers SD	Teachers Level
1	Smart Tablets with AI	1.06	0.22	Very	1.18	0.24	Very

	Learning Assistants			Low Extent			Low Extent
2	AI-Enabled Laptops	2.07	0.46	Low Extent	2.04	0.44	Low Extent
3	Interactive Smartboards with AI Features	1.86	0.64	Low Extent	2.48	0.54	Low Extent
4	E-Readers with AI-Based Content Adaptation	1.04	0.58	Very Low Extent	1.68	0.74	Low Extent
5	AI-Powered Educational Robots	2.64	0.64	High Extent	2.58	0.38	High Extent
6	AI-Based Projectors for Smart Classrooms	2.84	0.54	High Extent	1.68	0.58	Low Extent
7	Noise-Canceling Headphones	2.14	0.44	Low Extent	2.28	0.28	Low Extent
8	Digital Pens & Styluses	1.08	0.24	Very Low Extent	1.86	0.46	Low Extent
9	AI-Powered Language Translation Devices	1.04	0.44	Very Low Extent	1.06	0.28	Very Low Extent
10	Voice-to-Text Microphones	1.58	0.54	Low Extent	1.68	0.38	Low Extent
11	Adaptive Learning Platforms with AI Tutors	2.68	0.74	High Extent	1.24	0.28	Very Low Extent
12	AI-Based Student Performance Analytics Tools	1.68	0.28	Low Extent	2.07	0.64	Low Extent
13	Virtual Reality (VR) & Augmented Reality (AR) Educational Kits	2.86	0.42	High Extent	1.86	0.58	Low Extent
14	AI-Powered Automated Grading & Assessment Software	1.66	0.20	Low Extent	1.04	0.64	Very Low Extent
15	Speech Recognition & Text-to-Speech Software	3.28	0.48	High Extent	3.34	0.24	High Extent
16	Secure Cloud Storage Solutions for Educational Data	2.68	0.48	High Extent	2.84	0.24	High Extent
17	AI-Powered Cybersecurity Software for Online Safety	1.24	0.22	Very Low Extent	1.08	0.44	Very Low Extent
18	Biometric Attendance & Access Control Systems	0.92	0.86	Very Low Extent	1.04	0.54	Very Low Extent
19	AI-Enhanced Classroom Management Systems	1.08	0.48	Very Low Extent	1.58	0.74	Low Extent

20	Digital Learning Management System (LMS) with AI Features	2.56	0.34	High Extent	2.68	0.64	High Extent
21	High-Speed Internet Routers & Hotspots	1.76	0.64	Low Extent	1.68	0.58	Low Extent
	Overall Aggregate Mean	**1.89**	**0.47**	**Low Extent**	**1.74**	**0.64**	**Low Extent**

Data in Table 1 indicates the availability of AI devices and accessories for implementing the UBE program in public junior secondary schools in Southeast Nigeria is generally at a low level. The overall aggregate mean ratings for principals (1.89) and teachers (1.74) fall below the midpoint benchmark of 2.5, confirming low extent availability. Specifically, principals reported high availability only for 7 out of 21 items (33.3%), including AI-powered educational robots, projectors, adaptive learning platforms, VR/AR kits, speech recognition software, secure cloud storage, and LMS with AI features. Teachers, however, perceived only 4 items (19%) to be highly available: AI-powered educational robots, speech recognition software, secure cloud storage, and LMS with AI features. The majority of AI tools such as smart tablets, AI-enabled language translation devices, biometric systems, and cybersecurity software were rated by both groups as available to very low or low extent, highlighting significant gaps in AI infrastructure supporting the UBE program.

Table 2: Mean Ratings of Principals and Teachers on the Extent of Utilization of AI Devices and Accessories for the Implementation of the UBE Program in Junior Secondary Schools in Southeast Nigeria

S/N	Extent of Utilization of AI Devices for UBE Implementation	Principals Mean	Principals SD	Principals Level	Teachers Mean	Teachers SD	Teachers Level
1	AI-Enabled tablets preloaded with educational learning apps	1.36	0.32	Very Low Extent	1.18	0.24	Very Low Extent
2	AI-Enabled Laptops used by students and teachers	2.27	0.56	Low Extent	2.04	0.44	Low Extent
3	Interactive Smartboards with AI Features for lessons	1.96	0.64	Low Extent	2.28	0.54	Low Extent
4	E-Readers with AI-Based Content Adaptation for customizing lessons	1.14	0.58	Very Low Extent	1.38	0.74	Very Low Extent
5	AI devices assigning exercises based on learning pace	2.44	0.64	Low Extent	2.28	0.38	Low Extent
6	AI Smart Classrooms used for adaptive personalized learning	2.34	0.54	Low Extent	1.68	0.38	Low Extent
7	AI noise-canceling headphones for noisy environments	2.14	0.44	Low Extent	2.28	0.28	Low Extent
8	Digital Pens & Styluses for tablet and smartboard interactions	3.08	0.44	High Extent	3.26	0.46	High Extent
9	AI language translation devices for Nigerian languages	1.24	0.24	Very Low	1.16	0.28	Very Low

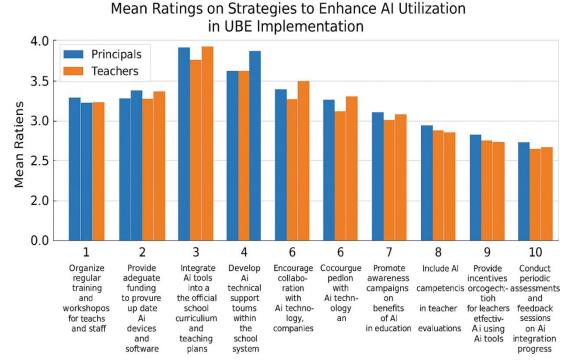|							
				Extent			Extent
10	AI speech-to-text and text-to-speech software for students with disabilities	1.28	0.54	Very Low Extent	1.38	0.38	Very Low Extent
11	AI Tutors for adaptive and engaging learning	2.38	0.34	Low Extent	2.24	0.48	Low Extent
12	AI performance analytics for tracking school metrics	1.28	0.28	Very Low Extent	1.07	0.64	Very Low Extent
13	AI automated grading software reducing teachers' workload	2.16	0.42	Low Extent	1.86	0.58	Low Extent
14	AI VR and AR kits for real-time instructional materials	1.56	0.20	Low Extent	1.04	0.64	Very Low Extent
15	Speech recognition and text-to-speech software usage	1.28	0.48	Very Low Extent	1.34	0.24	Very Low Extent
16	Secure Cloud storage for educational data	2.68	0.52	High Extent	2.84	0.24	High Extent
17	AI-Cybersecurity software for online safety	3.24	0.32	High Extent	3.08	0.44	High Extent
18	AI biometric attendance & access control systems	0.98	0.66	Very Low Extent	1.04	0.54	Very Low Extent
19	AI Classroom Management Systems for customizing lessons	1.38	0.48	Very Low Extent	1.58	0.74	Low Extent
20	Digital LMS with AI Features for real-time performance reports	2.16	0.34	Low Extent	2.38	0.64	Low Extent
21	High-Speed Internet Routers & Hotspots for connectivity	2.76	0.64	High Extent	2.68	0.28	High Extent
	Overall Aggregate Mean	**1.96**	**0.38**	**Low Extent**	**1.91**	**0.44**	**Low Extent**

Data in Table 2 shows the overall utilization of AI devices and accessories for the implementation of the UBE program in Southeast Nigeria's public junior secondary schools is at a low extent, with aggregate mean scores of 1.96 (principals) and 1.91 (teachers), both below the 2.5 benchmark. Most AI tools (items 1-7, 9-15, and 18-20) are utilized to a very low or low extent according to both groups. However, digital pens & styluses (item 8), secure cloud storage (item 16), AI cybersecurity software (item 17), and high-speed internet routers & hotspots (item 21) are the only tools reported as utilized to a high extent by principals and teachers. This suggests a significant underutilization of many AI technologies critical for enhancing educational delivery under the UBE program.

Table 3: Mean Ratings of Principals and Teachers on Strategies to Enhance Utilization of AI in UBE Implementation in Junior Secondary Schools, Southeast Nigeria

S/N	Strategies to Enhance AI Utilization in UBE Implementation	Principals Mean	Principals SD	Principals Level	Teachers Mean	Teachers SD	Teachers Level
1	Organize regular training and workshops on AI tools for teachers and staff	3.56	0.52	Very High Extent	3.48	0.46	Very High Extent
2	Provide adequate funding to procure up-to-date AI devices and software	3.42	0.48	Very High Extent	3.34	0.54	Very High Extent
3	Integrate AI tools into the official school curriculum and teaching plans	3.12	0.56	High Extent	3.06	0.62	High Extent
4	Establish strong internet connectivity and IT infrastructure in schools	3.68	0.44	Very High Extent	3.62	0.38	Very High Extent
5	Develop AI technical support teams within the school system	3.28	0.48	High Extent	3.10	0.52	High Extent
6	Encourage collaboration with AI technology companies and educational partners	3.14	0.42	High Extent	3.00	0.60	High Extent
7	Promote awareness campaigns on benefits of AI in education	2.96	0.54	High Extent	3.04	0.48	High Extent
8	Include AI competencies in teacher performance evaluations	3.02	0.38	High Extent	2.94	0.46	High Extent
9	Provide incentives and recognition for teachers effectively using AI tools	2.84	0.62	High Extent	2.78	0.58	High Extent
10	Conduct periodic assessments and feedback sessions on AI integration progress	2.78	0.60	High Extent	2.72	0.54	High Extent
	Overall Aggregate Mean	**3.18**	**0.51**	**High Extent**	**3.09**	**0.52**	**High Extent**

Data in Table 3 shows that the principals and teachers agreed that strategies to enhance AI utilization for UBE implementation are adapted to a high extent, with overall mean ratings of 3.18 and 3.09, respectively, both above the 2.5 benchmark. Key strategies with very high endorsement include improving IT infrastructure and regular training/workshops. Other strategies such as funding, curriculum integration, and technical support also received high ratings, indicating a consensus on these as essential steps to boost AI adoption in junior secondary schools in Southeast Nigeria.

Mean Ratings on Strategies to Enhance AI Utilization in UBE Implementation

 The chart above illustrates the comparative mean ratings of principals and teachers on strategies to enhance the utilization of Artificial Intelligence (AI) in the implementation of the Universal Basic Education (UBE) programme in junior secondary schools across Southeast Nigeria. The visual representation reveals a consistent pattern in the perceptions of both groups, with most strategies receiving similar ratings, indicating a shared understanding of the key components necessary for effective AI integration. Notably, the strategy establish strong internet connectivity and IT infrastructure in schools received the highest mean ratings from both principals (3.68) and teachers (3.62), signifying its perceived importance as a foundational requirement for AI adoption. Similarly, organize regular training and workshops on AI tools for teachers and staff was rated very highly by both groups (3.56 and 3.48 respectively), suggesting that continuous professional development is considered a critical enabler of AI-based instructional practices. The provision of adequate funding and the integration of AI tools into the school curriculum also recorded high mean values, with principals rating these strategies at 3.42 and 3.12, and teachers at 3.34 and 3.06 respectively. This reflects the respondents' recognition of the need for systemic support and curriculum alignment to enhance AI utilization in teaching and learning processes. In contrast, strategies such as provide incentives and recognition for teachers effectively using AI tools and conduct periodic assessments and feedback sessions on AI integration progress* were rated relatively lower, with mean scores ranging between 2.72 and 2.84. Although these still fall within the "High Extent" category, the lower scores may indicate a lesser emphasis placed on motivation and evaluative mechanisms, or perhaps reflect challenges in their current implementation. The overall aggregate mean of 3.18 for principals and 3.09 for teachers confirms a high extent of agreement that the proposed strategies are effective in enhancing AI utilization. The close proximity of the standard deviation values (0.51 and 0.52) further supports the consistency of responses, suggesting a reliable consensus across the respondent categories. Taken as a whole, the chart demonstrates that for AI to be effectively integrated into the UBE framework

there must be a strong focus on infrastructure development, staff training, curriculum integration, and institutional support. The findings underscore the urgency for stakeholders to implement these strategies comprehensively to foster innovation and improve educational outcomes in junior secondary schools.

Discussion

The findings of the study revealed that the availability of AI in education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria is notably inadequate. Many schools face significant challenges such as insufficient AI-enabled devices, lack of stable internet connectivity, and limited access to AI-driven learning platforms. This scarcity undermines the potential to harness AI for enhancing educational delivery under the UBE framework. The findings are in consonance with the study of Oladejo and Adeyemi (2021), who posited that infrastructural limitations, including low supply of digital tools and poor technological readiness, hamper the availability of AI educational resources in Nigerian secondary schools. Similarly, Eze and Okoro (2020) found that the lacks of AI infrastructure and resource constraints are prevalent in developing regions, thereby limiting the deployment of AI innovations in education. Moreover, the inadequate availability of AI tools in these schools reflects broader systemic issues, such as limited funding and policy attention to technology in education. This scenario presents a critical barrier to achieving the full objectives of the UBE program, which emphasizes access and quality education.

The findings of the study revealed that the utilization of AI in education tools for the UBE program in public junior secondary schools is minimal and largely inconsistent. Despite the presence of some AI resources, teachers and administrators do not fully exploit these tools, often due to lack of adequate training, low digital literacy, and insufficient technical support. This underutilization leads to a gap between technology availability and its practical application in classrooms and school management. The findings correspond with those of Nwosu and Chukwu (2022), who posited that many educators underutilize AI technologies owing to inadequate knowledge and reluctance to adapt to new instructional methods. Additionally, Johnson and Musa (2019) reported that even when AI tools are accessible; their effective integration is hindered by limited awareness, lack of motivation, and absence of a clear framework guiding their use. Furthermore, this low utilization diminishes the potential for AI to personalize learning, improve student engagement, and support administrative efficiency—key goals within the UBE policy. The findings highlight the need for strategic interventions to bridge this utilization gap.

The findings of the study revealed that a multi-faceted approach is essential to enhance the utilization of AI in education tools for the UBE program. Key strategies include implementing targeted professional development programs to build teacher competence in AI applications, investing in the expansion and maintenance of digital infrastructure, and fostering supportive policies that incentivize AI adoption. The study highlights that empowering teachers with adequate skills and confidence to use AI tools is crucial to bridging the utilization gap. This finding aligns with Adewale and Oluchi (2023), who emphasized the significance of continuous capacity-building programs to improve educators' digital competencies and promote AI integration in teaching. Furthermore, Amadi and Eze (2021) advocated for increased governmental and institutional investment in ICT infrastructure and the formulation of clear, supportive

policies that facilitate AI-driven innovation in education. In addition, fostering collaboration between stakeholders, including government agencies, educational institutions, technology providers, and communities, can accelerate the acceptance and meaningful use of AI tools. This collaborative strategy ensures that AI integration aligns with local educational needs and the goals of the UBE program, ultimately enhancing the quality and accessibility of education in the region.

Educational Implications of the Study

The findings of this study highlight critical implications for education stakeholders in public junior secondary schools in Southeast Nigeria. First, the limited availability and use of AI tools call for urgent policy reforms to improve technological infrastructure and access. Educators need continuous professional development to effectively integrate AI into teaching and learning processes, which can enhance student engagement and academic performance. Moreover, incorporating AI in the UBE program can promote innovative teaching methods, foster digital literacy among students, and better prepare them for future challenges in a technology-driven world. Finally, the study encourages educational planners to prioritize AI adoption as a strategic step towards improving the quality and equity of basic education in Nigeria.

Contribution to Knowledge

This study contributes to existing knowledge by providing empirical evidence on the current state of availability and utilization of AI education tools in the implementation of the Universal Basic Education (UBE) program in public junior secondary schools in Southeast Nigeria. It highlights critical gaps in infrastructure and teacher preparedness, offering a clearer understanding of the challenges that hinder effective AI integration in this educational context. Furthermore, the study identifies practical strategies that can enhance AI adoption, thus informing policymakers, educators, and stakeholders on how to optimize technology use to improve teaching and learning outcomes. These insights enrich the discourse on educational technology implementation in developing regions, particularly within basic education frameworks, and lay a foundation for future research on sustainable AI integration in schools.

Conclusion

Conclusively, the study revealed that the availability and utilization of AI education tools in public junior secondary schools in Southeast Nigeria are currently low, limiting the effective implementation of the Universal Basic Education (UBE) program. Challenges such as inadequate infrastructure, lack of teacher training, and insufficient technical support significantly hinder AI adoption.The findings underscore the need for targeted strategies, including continuous professional development for teachers, increased investment in AI technologies, and supportive policies to enhance AI integration in education. These measures are essential to improve the use of AI tools, which can transform teaching and learning, thereby boosting the overall success of the UBE program in the region.

Recommendations

Based on the findings of this study, the following recommendations are made to improve the availability and utilization of AI education tools for the implementation of the UBE program in public junior secondary schools in Southeast Nigeria:

1. Schools should invest in upgrading infrastructure to support the effective integration of AI tools.

2. Teachers should receive regular and comprehensive training on the use of AI technologies to enhance their skills and confidence.
3. Government and educational authorities should provide adequate funding and technical support to ensure the sustainability of AI tool implementation.
4. Educational policymakers should develop clear guidelines and policies to encourage and regulate the use of AI in junior secondary schools.
5. Collaboration among schools, technology providers, and stakeholders should be strengthened to facilitate access to updated AI tools and resources.

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