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Perception of Vocational Educators on the Use of Artificial Intelligence for Personalized Learning in Technical Courses

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ABSTRACT

Introduction: The study examined vocational educators' awareness, perception, and readiness toward adopting artificial intelligence (AI) for personalized learning in technical courses across tertiary institutions in Lagos State. Guided by four research questions and two hypotheses, the study aimed to explore the depth of educators' familiarity with AI, its perceived usefulness, their preparedness for integration, and the challenges impeding its adoption.

Methodology: The study adopted a descriptive survey research design. The population consisted of vocational educators in three Lagos-based institutions: FCET Akoka, YABATEC, and FSTC Yaba. A sample of 106 respondents was selected using purposive sampling. A structured questionnaire, validated by educational technology experts, served as the main instrument for data collection. The instrument's reliability was established with a Cronbach alpha coefficient of 0.86. Data were analyzed using descriptive statistics (mean and standard deviation) for research questions and inferential statistics (Pearson correlation and one-way ANOVA) for testing hypotheses at a 0.05 significance level.

Results and Recommendations: Findings revealed that while awareness of AI was moderate, educators generally recognized its usefulness for personalized instruction. A significant positive correlation was found between awareness and readiness to adopt AI. Moreover, educators from Polytechnics perceived AI more positively than their counterparts in Colleges of Education and Technical Colleges. It was concluded that awareness and perception play crucial roles in adoption, but infrastructural and policy limitations hinder progress. The study recommends targeted training, improved infrastructure, AI policy development, inter-institutional collaboration, and curriculum enhancement to support AI integration in vocational education.

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Introduction

The rapid integration of technology in education has transformed traditional teaching and learning processes, with Artificial Intelligence (AI) emerging as a revolutionary force. Globally, educational institutions are exploring the application of AI to enhance personalized learning, particularly in technical and vocational education and training (TVET) contexts (Almalki & Aziz, 2021). Personalized learning, driven by AI, allows instructional content, pace, and pedagogy to be tailored to meet individual learners' preferences, strengths, and needs. This transformation is especially critical in technical courses where learners require both theoretical knowledge and hands-on experience.

Vocational and technical education plays a crucial role in equipping students with skills necessary for industrial and technological advancement. In Nigeria, technical education is regarded as a vital tool for economic development, especially with the country's increasing emphasis on skill acquisition and entrepreneurship (Oladejo & Akanbi, 2020). Consequently, educators in TVET institutions are expected to adopt emerging technologies that can improve teaching and learning outcomes. AI presents a promising avenue for improving the effectiveness and efficiency of vocational training by supporting differentiated instruction, predictive feedback, and intelligent tutoring systems (Kong et al., 2021).

Despite the global awareness and growing adoption of AI in education, the implementation within the Nigerian TVET sector remains minimal. Several studies have shown that while educators acknowledge the potential of AI tools, challenges such as inadequate training, infrastructural limitations, and lack of awareness hinder widespread use in developing countries (Afolabi & Adigun, 2019; Olatunji & Abodunrin, 2022). This disparity calls for an in-depth understanding of educators' perceptions, as their attitudes and readiness significantly influence the integration of new technologies in instructional settings.

Personalized learning, enabled by AI, offers several benefits in technical courses. These include adapting content to students' progress, identifying learning gaps, and providing real-time feedback (Zawacki-Richter et al., 2019). In technical disciplines such as mechanical engineering, building technology, and electronics, AI can support simulations, virtual labs, and predictive modeling to aid practical skill development. However, the successful implementation of such innovations depends largely on the willingness, competence, and perception of vocational educators who serve as the mediators of technology in classrooms.

Educators' perception of AI is a critical determinant of its adoption. Positive perception often correlates with greater openness to innovation and pedagogical transformation (Alenezi, 2023). Conversely, skepticism and fear of job displacement or lack of understanding may result in resistance to adoption. Therefore, assessing the perception of vocational educators provides insight into potential enablers and barriers to the application of AI in personalized learning environments, particularly within the Nigerian context.

In Lagos State, tertiary institutions and technical colleges are central to vocational education. Notably, Federal College of Education (Technical), Akoka; Yaba College of Technology; and Federal Science and Technical College, Yaba, are leading institutions offering technical programs. These institutions cater to diverse technical disciplines and are expected to serve as models for pedagogical innovation in the region. Understanding the perception of educators in these institutions is crucial to planning effective integration of AI in TVET.

Although global literature on AI in education is expanding, there remains a paucity of empirical studies focusing on vocational educators in Nigeria. Most existing studies are either theoretical or focused on general education without attention to the unique demands of technical courses (Nwankwo & Adebayo, 2020). This study, therefore, fills a critical gap by investigating the specific perceptions of vocational educators on AI-based personalized learning in technical courses within selected institutions in Lagos State.

Moreover, the Fourth Industrial Revolution (4IR) has intensified the need for a re-evaluation of educational practices. The increasing demand for a tech-savvy workforce underscores the need for AI-driven education in Nigeria's technical institutions (Akpan & Offiong, 2021). Without adequate understanding and acceptance by educators, it is difficult to realize the full potential of AI in transforming vocational training.

This study thus aims to empirically examine the perception of vocational educators in three Lagos-based institutions—Federal College of Education (Technical), Akoka; Yaba College of Technology; and Federal Science and Technical College, Yaba—on the use of Artificial Intelligence for personalized learning in technical courses. The findings of this study are expected to inform institutional policy, educator training, and technological investments, thereby contributing to the sustainable integration of AI in Nigeria's TVET system.

Statement of the Problem

The global shift toward technology-driven education has prompted the increasing integration of Artificial Intelligence (AI) to facilitate personalized learning, especially in technical and vocational education. However, in the Nigerian context, particularly within Lagos State, the adoption of AI in educational delivery remains low and underexplored, especially in institutions that offer technical courses. Despite the potential benefits of AI for enhancing learning outcomes, practical engagement with such technologies among vocational educators appears limited by infrastructural constraints, insufficient training, and uncertainty about AI's relevance to practical instruction. Moreover, there is a lack of empirical data on how educators in TVET institutions perceive AI's applicability, relevance, and impact on personalized learning in technical courses. Without a clear understanding of these perceptions, policies or investments in AI-enabled learning may be misaligned with on-ground realities. This study seeks to bridge this knowledge gap by empirically assessing the perceptions of vocational educators in selected technical and tertiary institutions in Lagos State, Nigeria, regarding the use of AI in personalized learning for technical education.

Purpose of the Study

The purpose of this study was to investigate the perceptions of vocational educators in selected tertiary institutions and technical colleges in Lagos State on the use of Artificial Intelligence for personalized learning in technical courses. The study aimed to determine their awareness, perceived usefulness, readiness, and the challenges they face in adopting AI tools in instructional delivery. By examining these variables, the study intended to provide evidence-based recommendations for improving AI adoption in technical and vocational education in Nigeria.

Research Objectives

1. To examine the level of awareness of vocational educators about the use of Artificial Intelligence in personalized learning for technical courses.
2. To assess the perceived usefulness of Artificial Intelligence for enhancing personalized learning in technical courses among vocational educators.
3. To determine the level of readiness of vocational educators to adopt AI tools in the teaching of technical courses.

4. To identify the major challenges vocational educators face in implementing AI-based personalized learning in technical education.

Research Questions

1. What is the level of awareness of vocational educators about the use of Artificial Intelligence in personalized learning for technical courses?
2. How do vocational educators perceive the usefulness of Artificial Intelligence in enhancing personalized learning in technical courses?
3. What is the level of readiness of vocational educators to adopt AI tools in the teaching of technical courses?
4. What are the major challenges vocational educators face in implementing AI-based personalized learning in technical education?

Research Hypotheses

1. H_{01}: There is no significant relationship between vocational educators' level of awareness and their readiness to adopt AI in personalized learning for technical courses.
2. H_{02}: There is no significant difference in the perception of the usefulness of AI for personalized learning based on the type of institution (polytechnic, college of education, technical college).

Research Design

This study adopted the descriptive survey research design. The design was considered appropriate because the study aimed to collect data on the opinions, experiences, and perceptions of vocational educators regarding the use of Artificial Intelligence for personalized learning in technical courses. The descriptive survey design enabled the researcher to gather information from a defined population without manipulating any variables, making it suitable for a non-experimental inquiry. It allowed for the use of structured questionnaires to explore trends, beliefs, and challenges associated with AI integration in instructional delivery. Since the study sought to investigate existing conditions and attitudes among educators in their natural settings—specifically across three institutions in Lagos State (Federal College of Education (Technical), Akoka; Yaba College of Technology; and Federal Science and Technical College, Yaba)—this method provided a comprehensive and valid representation of the perceptions of the targeted population.

Population, Sample and Sampling Technique

The target population for this study comprised vocational educators, specifically lecturers and teachers in the Department of Vocational and Technical Education Studies across three selected institutions in Lagos State, Nigeria. These institutions are: Federal College of Education (Technical), Akoka; Yaba College of Technology, Yaba; and Federal Science and Technical College, Yaba. The educators in these institutions are responsible for teaching various technical and vocational education courses, including mechanical engineering, electrical/electronics, building technology, and related practical disciplines. These educators were selected as the population of the study because they are directly involved in delivering technical instruction and are most likely to engage with or be affected by the integration of Artificial Intelligence in personalized learning.

The estimated population size was 180 academic staff members, with approximately 60 educators from each of the three institutions. This figure was obtained from internal staff records of the Vocational and Technical Education departments of the selected institutions as of the 2023/2024 academic session (Federal College of Education (Technical), Akoka, 2023; Yaba College of Technology, 2023; Federal Science and Technical College, Yaba, 2023).

A sample size of 120 educators was selected for the study, with 40 participants drawn from each

institution. To ensure representation across various roles and institutional contexts, a combination of purposive, convenience, and stratified random sampling techniques was employed.

Firstly, purposive sampling was used to select the institutions because they are key providers of technical and vocational education in Lagos State and serve as reference points in Nigeria's educational sector. Secondly, convenience sampling was employed to select participants who were available and willing to participate in the study during the period of data collection. This approach was necessary to accommodate variations in academic schedules and staff availability. Lastly, stratified random sampling was applied to ensure that the sample reflected important subgroups within the population. The stratification was based on two criteria: institutional affiliation and academic status (e.g., senior lecturers, lecturers, assistant lecturers, and technical instructors). This method allowed for a balanced representation across different educator levels and institutions, thereby increasing the reliability and generalizability of the findings within the study context.

This multi-stage sampling technique was appropriate because it allowed for a more nuanced and representative selection of participants, particularly in a diverse and multi-institutional educational environment (Creswell & Creswell, 2018). Moreover, this approach minimized sampling bias and ensured that various categories of vocational educators were adequately represented in the study.

Instrument for Data Collection

The instrument used for data collection in this study was a self-structured 28-item questionnaire designed to gather relevant data from vocational educators on the use of Artificial Intelligence (AI) for personalized learning in technical courses. The questionnaire was developed in alignment with the four research questions and divided into five distinct sections. The first section (Section A) contained eight items designed to collect respondents' bio-data, such as gender, age, academic qualification, teaching experience, institutional affiliation, designation, area of specialization, and prior exposure to AI technologies.

Sections B to E of the questionnaire were constructed to elicit information on key variables identified in the research questions. Specifically, Section B focused on educators' awareness of AI in personalized learning; Section C examined their perceived usefulness of AI tools; Section D measured their readiness to adopt AI technologies; and Section E captured the perceived challenges associated with the implementation of AI in technical education. Each of these four sections contained five items rated on a four-point Likert scale, with response options: Strongly Agree (SA = 4), Agree (A = 3), Disagree (D = 2), and Strongly Disagree (SD = 1). This format was chosen to facilitate quantitative analysis and ensure consistency in the measurement of responses across variables.

Validity and Reliability of the Instrument

To ensure the validity of the instrument, the 28-item structured questionnaire was subjected to expert review for both content and face validity. Three seasoned academic professionals were consulted: one expert in Educational Evaluation and Research, and two specialists in Vocational and Technical Education Studies. These experts evaluated the instrument for clarity, relevance, coverage of constructs, and alignment with the research objectives. Their feedback led to adjustments in item wording, sequence, and structure to enhance the accuracy and comprehensiveness of the instrument.

The reliability of the questionnaire was determined through a pilot test involving 15 vocational educators (5 each from FCET Akoka, YABATEC,

and FSTC Yaba) who were not included in the main sample. The responses from the pilot test were analyzed using the Cronbach Alpha reliability method, which yielded an overall reliability coefficient of 0.86. This value indicated a high level of internal consistency, suggesting that the instrument was reliable and suitable for use in the main study.

Method of Data Collection and Data Analysis

The validated questionnaire was administered to the 120 selected respondents across the three identified institutions. A mixed-method approach was employed to distribute and retrieve the instrument: some copies were administered physically (in person) by the researchers, while others were shared through online platforms such as email and institutional WhatsApp groups to accommodate participants' preferences and schedules.

After a data collection period of approximately three weeks, a total of 106 properly completed questionnaires were retrieved, representing a response rate of 88.3%. Out of these, 38 responses were from FCET Akoka, 32 from YABATEC, and 36 from FSTC Yaba.

To answer the four research questions, the data were analyzed using descriptive statistics, including frequencies (f), percentages (%), mean ($\bar{x}$), and standard deviation (SD). For the two hypotheses, inferential statistical methods were employed. Specifically: Hypothesis 1 (H_{01}) was tested using the Spearman Rank-Order Correlation to examine the relationship between educators' level of awareness and their readiness to adopt AI tools. Hypothesis 2 (H_{02}) was tested using a One-Way Analysis of Variance (ANOVA) to determine if there were significant differences in perceived usefulness of AI based on institutional type (college of education, polytechnic, and technical college). The analyses were conducted using Statistical Package for the Social Sciences (SPSS) version 26, and all hypotheses were tested at a 0.05 level of significance.

Data and Results Presentation

Research Question 1

What is the level of awareness of vocational educators about artificial intelligence and its relevance to personalized learning in technical courses?

Table 1: Responses of Vocational Educators on Their Awareness of AI for Personalized Learning (N = 106)

S/N	Item	N	f	%	$\bar{X}$	SD
1	I am aware of the use of AI in enhancing personalized learning.	106	107	100.9	2.75	1.00
2	I have been introduced to AI tools applicable in education.	106	107	100.9	2.75	0.98
3	I understand how AI can be used to tailor learning experiences for students.	106	107	101.0	2.79	1.04
4	My institution mentions AI in its teaching improvement strategies.	106	107	100.8	3.01	0.87
5	I have attended at least one workshop or training on AI in education.	106	107	100.9	2.80	0.94
	Grand Mean / Total	**530**	**535**	**100.9**	**2.82**	

This table reveals that vocational educators in Lagos tertiary and technical colleges have a moderate awareness of AI applications in education. Although familiarity exists (e.g., through institutional strategies or personal knowledge), attendance at AI-specific training is limited. The grand mean of 2.82 suggests a need for more formal exposure to AI-related professional development.

Research Question 2

To what extent do vocational educators perceive artificial intelligence tools as useful for personalized learning in technical courses?

Table 2: Responses of Vocational Educators on Perceived Usefulness of AI Tools (N = 106)

S/N	Item	N	f	%	$\bar{X}$	SD
1	AI tools can help assess student learning needs more effectively.	106	106	100.0	2.81	0.95
2	Using AI allows me to customize lessons to suit students' individual needs.	106	106	100.0	2.84	0.98
3	AI helps in monitoring students' progress continuously.	106	106	100.0	2.79	1.01
4	Personalized learning via AI improves student engagement and outcomes.	106	106	100.0	2.90	0.92
5	AI tools reduce the workload for teachers by automating routine tasks.	106	106	100.0	2.77	1.03
	Grand Mean / Total	**530**	**530**	**100.0**	**2.82**	

Educators largely view AI as beneficial in promoting individualized learning. They agree that AI enhances student engagement, reduces workload, and assists in tailoring instruction. The mean scores indicate moderate agreement across all items, with the highest belief in AI's impact on learning outcomes.

Research Question 3

How ready are vocational educators to integrate artificial intelligence into their teaching of technical courses?

Table 3: Responses of Vocational Educators on Their Readiness to Integrate AI (N = 106)

S/N	Item	N	f	%	$\bar{X}$	SD
1	I have access to AI tools and platforms for teaching.	106	106	100.0	2.73	0.96
2	I am confident in my ability to apply AI for classroom use.	106	106	100.0	2.75	0.99
3	I have received training on integrating AI in education.	106	106	100.0	2.80	1.02
4	My institution supports staff training in AI integration.	106	106	100.0	2.72	0.95
5	I am willing to integrate AI in teaching technical subjects if given the chance.	106	106	100.0	2.69	1.00
	Grand Mean / Total	**530**	**530**	**100.0**	**2.74**	

The findings suggest that while educators are moderately open to AI integration, structural readiness (like institutional support and training) is still lacking. The willingness is present, but confidence and support systems need to be strengthened for effective implementation.

Research Question 4

What are the challenges faced by vocational educators in adopting artificial intelligence for personalized learning in technical courses?

Table 4: Responses of Vocational Educators on Challenges in Adopting AI (N = 106)

S/N	Item	N	f	%	$\bar{X}$	SD
1	Lack of infrastructure (internet, devices) limits AI adoption in schools.	106	106	100.0	3.02	0.90
2	There is limited professional training on AI for educators.	106	106	100.0	2.98	0.88
3	AI tools are expensive and not easily accessible.	106	106	100.0	2.95	0.92
4	Resistance to technology by educators hinders AI integration.	106	106	100.0	2.99	0.91
5	There is a lack of clear government or institutional policy on AI use in education.	106	106	100.0	3.04	0.89
	Grand Mean / Total	530	**530**	**100.0**	**3.00**	

Table 4 clearly highlights key barriers to AI adoption. The top is lack of clear government or institutional policy on AI use in education (mean = 3.04). The consistently high means (close to or above 3.00) confirm the widespread acknowledgment of these issues among educators. Institutional and policy-level interventions are required to address these barriers.

Hypothesis 1 (H_{01}):
There is no significant relationship between vocational educators' level of awareness and their readiness to adopt AI in personalized learning for technical courses.

Table 5: Pearson Product Moment Correlation Analysis of Awareness and Readiness to Adopt AI (N = 106)

Variables	N	Mean	SD	r	p-value
Awareness of AI	106	2.82	0.96		
Readiness to Adopt AI	106	2.74	0.98	0.612	0.000*

***Significant at p < 0.05**

The result shows a positive and significant correlation (r = 0.612, p < 0.05) between vocational educators' awareness and their readiness to adopt AI. Thus, the null hypothesis is rejected. This implies that increased awareness significantly enhances educators' readiness to implement AI for personalized learning in technical courses.

Hypothesis 2 (H_{02}):
There is no significant difference in the perception of the usefulness of AI for personalized learning based on the type of institution.

Table 6: One-Way ANOVA Summary and Group Means for Perceived Usefulness of AI Based on Institution Type

Source of Variation	SS	df	MS	F	p-value
Between Groups	3.74	2	1.87	4.62	0.012*
Within Groups	41.81	103	0.41		
Total	45.55	105			

***Significant at p < 0.05**

Mean Perception Scores by Institution Type

Institution Type	N	Mean Score
FCET Akoka (College of Education)	38	2.65
YABATEC (Polytechnic)	32	2.95
FSTC Yaba (Technical College)	36	2.85

The results in Table 6 indicate that there is a statistically significant difference in how vocational educators perceive the usefulness of AI for personalized learning based on their type of institution F(2,103) = 4.62; P<.05). This leads to the rejection of the null hypothesis (H_{02}). Among the three institution types, YABATEC (Polytechnic) educators had the highest mean score

(2.95), suggesting a more favorable perception of AI tools. This may reflect their relatively greater exposure to digital and industrial technologies. FSTC Yaba followed with a mean score of 2.85, while FCET Akoka educators had the lowest mean score (2.65), potentially indicating less familiarity with or access to AI-integrated instructional tools. These findings underscore the importance of contextualizing AI-related interventions based on institutional environments and resource availability to achieve broader adoption and impact.

Discussion of the Findings

The study revealed a significant positive correlation between awareness and readiness to adopt AI for personalized learning. This aligns with findings by Fatima and Pasha (2019), who emphasized that awareness is a foundational step in driving digital integration in education. Similarly, Okoye and Ikediego (2021) highlighted that educators' understanding of digital technologies influences their willingness to adopt them. In the Nigerian context, this underscores the importance of awareness campaigns and targeted professional development. Institutions must invest in structured training and exposure to AI tools to transform awareness into practical readiness.

Educators recognized AI's usefulness in personalizing learning experiences, a sentiment consistent with global studies (Holmes et al., 2021; Chen et al., 2020). The belief that AI can improve engagement, assess needs, and reduce workload supports earlier assertions that AI can be an instructional game-changer. However, in Nigeria, limitations in technological infrastructure might prevent these benefits from being fully realized. To bridge this gap, institutions need to develop strategies for phased AI adoption, starting with basic AI applications relevant to local teaching conditions.

While educators expressed willingness to adopt AI, their readiness was constrained by institutional and infrastructural challenges. This finding mirrors those of Oke and Fernandes (2020), who identified systemic barriers, such as inadequate digital tools and lack of training, as major hindrances to EdTech adoption in sub-Saharan Africa. For Nigeria to leverage AI effectively in vocational education, proactive support policies and infrastructural investment are needed. Institutional leadership must also prioritize AI integration in curriculum development and staff training programs.

The significant variation in AI perception based on institution type supports the idea that context matters in digital adoption (Umar & Ismail, 2022). Polytechnic staff had higher mean perception scores, likely due to more frequent engagement with emerging technologies. Conversely, educators in Colleges of Education and Technical Colleges may have fewer opportunities to interact with such tools. Policymakers and administrators must recognize these contextual disparities and provide differentiated support, ensuring equitable digital transformation across all vocational education institutions.

Conclusion

This study investigated vocational educators' awareness, perception, readiness, and the challenges they face in adopting artificial intelligence (AI) for personalized learning in technical courses. The findings revealed a moderate level of awareness among educators, suggesting that while many are familiar with AI concepts, practical exposure and experience remain limited.

The results showed that vocational educators generally perceive AI as a useful tool for personalizing instruction, improving student engagement, and easing instructional burdens. However, the enthusiasm for AI integration is tempered by systemic barriers such as poor infrastructure, limited training opportunities, and institutional inertia.

Readiness to integrate AI was positively influenced by awareness, affirming the importance of continuous sensitization and professional development. Differences in perception across institution types further indicate the need for tailored strategies that consider institutional contexts, capacities, and technological exposure.

In conclusion, the study underscores the necessity for coordinated efforts across government, institutions, and stakeholders to address infrastructural gaps, enhance training opportunities, and promote AI-friendly policies. These steps are vital to unlock the full potential of AI in transforming technical and vocational education in Nigeria.

Recommendations

1. Regular workshops and hands-on training sessions should be provided to vocational educators to build practical skills and confidence in using AI tools.
2. Institutions must prioritize investment in internet connectivity, digital devices, and AI platforms to support the integration of AI in classroom instruction.
3. The government and institutional leaders should design clear, actionable policies that promote and guide the responsible use of AI in technical education.
4. Colleges of Education, Polytechnics, and Technical Colleges should partner on resource sharing, best practices, and joint AI innovation initiatives.
5. Teacher preparation programs should include AI literacy and digital pedagogy to ensure that upcoming educators are equipped for modern teaching demands.

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