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PERCEPTIONS OF ARTIFICIAL INTELLIGENCE AND DIGITAL SKILLS DEVELOPMENT IN TECHNICAL AND VOCATIONAL EDUCATION IN PLATEAU STATE, NIGERIA

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ABSTRACT
Education is changing as a result of artificial intelligence (AI), Technical and Vocational Education and Training which is aimed at competency development need embrace these changes. This study investigated the perception of how AI can support the growth of digital skills in TVET institutions in Plateau State, Nigeria. It looked into how AI-driven tools and systems might enhance teaching, learning, and TVET students' employability. One hundred respondents were chosen from the population using the stratified random sampling technique. Teachers, administrators, and students from the study area were the target population. A structured questionnaire was the main instrument for data collection. All the items were subjected to reliability for internal consistency, where Cronbach's Alpha coefficient of 0.704 was obtained. The data was analyzed using a descriptive survey approach in order to calculate the mean and standard deviation in SPSS software. A Likert scale with five points was used. As a decision rule, a mean score of 3.00 was accepted, while a score lower than that was rejected.

Keywords: Artificial Intelligence, Technical and Vocational Education, Digital Skills, TVET.

Introduction

The world of education is changing due to the rapid development of artificial intelligence (AI), which opens up new opportunities to improve learning outcomes, particularly in technical and vocational education and training (TVET). Artificial intelligence is a rapidly developing technology with the potential to transform the way vocational education is delivered. The use of this technology has increased year after year (Suparyati et al., 2023). AI integration in TVET has the potential to close digital skill gaps, foster innovation, and equip graduates with the skills required to succeed in the twenty-first century workforce in Plateau State, Nigeria.

A tech-driven future is being established through reforms being implemented by the State Ministry of Science, Technology, and Innovation. One such change is the possibility of forming partnerships for specialized manufacturing facilities. For disciplines like electronics and mechanics, technical training institutions in Plateau State were forced to teach theoretical subjects since they lacked workshops, equipment, and qualified teachers.

To address the demands of the contemporary job market, the state is updating its curriculum, emphasizing subjects like information technology, welding, and car mechanics. In order to deliver training that will endure, TVET institutions in Plateau State must address two major issues: hiring technical instructors with up-to-date skills and updating workshop facilities to suit labor market expectations.

To address the demands of the contemporary job market, the state is updating its curriculum, emphasizing subjects like information technology, welding, and car mechanics. In order to deliver training that will endure, TVET institutions in Plateau State must address two major issues: hiring technical instructors with up-to-date skills and updating workshop facilities to suit labor market expectations.

TVET is an important framework for preparing young people to succeed in the rapidly growing global industry workforce. Because industries are undergoing digital transformation and shifting toward knowledge-based economics, the modern world requires the highest level of technological skills combined with extensive expertise (Hassan, 2021). The education system must be modified to satisfy new skill demands as industries change as a result of automation and digitization. AI-powered solutions that can improve instructional efficiency and personalize learning include intelligent tutoring systems, adaptive learning platforms, and predictive analytics.

AI has the potential to revolutionize both the teaching methods and customized classroom instruction (Harry, 2023). Teachers can analyze data using AI tools like machine learning, which helps them identify student learning trends and forecast learning needs (Harry, 2023). A variety of AI-powered educational instruments, including simulations as well as virtual laboratories together with intelligent tutoring systems have proven able to enhance both student interest and educational outcomes within technical domains (Familoni 2024).

The development of digital skills becomes crucial by unlocking the potential for economic growth, since Nigeria is one of the nations with a fast-growing population and a high proportion of young workers (Bolou, Yusuf, Ugbogbo, & Chukwudi, 2022). Many individual-owned firms in Nigeria are becoming more and more reliant on digital capabilities, which promote creativity, productivity, and economic growth. Recent research indicates that digital skills training, and AI-driven assessment are changing vocational education in a variety of ways (Deckker & Sumanasekara, 2025; Rosyadi et al., 2023). Leveraging this assertion, in order to support the socioeconomic development and youth empowerment on the Plateau, it is pertinent to look at the fundamentals of artificial intelligence and how they might be applied to improve the teaching of digital skills in TVET institutions in Plateau State.

Statement of the Problem

Technical and vocational education and training, is crucial for equipping students with the practical skills required for employment and economic development. However, many of Plateau State's TVET institutions continue to employ outdated teaching methods and lack the digital infrastructure needed to effectively prepare students for the demands of the modern workforce.

Lack of infrastructure and resources to deploy AI, a lack of skilled trainers and AI experts, and worries about the ethical implications of AI are some of the major obstacles to AI integration in TVET in Africa, according to Shuaibu (2024).

AI is still not widely used in Nigerian TVET institutions, particularly in Plateau State. There is a lack of understanding about how AI tools can be effectively integrated into TVET to enhance the development of digital skills, and many educators and institutions are unprepared to use these technologies.

In order to prepare students for the quickly changing demands of the workforce, artificial intelligence (AI) plays a critical role. As economies and job markets evolve, higher education institutions must adopt AI-driven technologies to equip students with essential technical skills (Alotaibi, 2023). Many universities deal with issues including antiquated teaching techniques and little exposure to new technologies. The current body of research on AI in Nigerian TVET is still dispersed, frequently descriptive, and devoid of thorough synthesis. The state, difficulties, and potential directions of AI integration in TVET are critically evaluated in a dearth of empirical and systematic reviews (Abdullahi, Kabiru, & Shuaibu, 2025).

In order to provide practical solutions for successful integration, this study will investigate the perception of artificial intelligence (AI) in the development of technical and vocational education through digital skills in Plateau State.

Objectives of the Study

The main objective of this study is to look into how artificial intelligence can improve technical and vocational education and help Plateau State develop digital skills. Specifically, the objectives are to:

1. Find out the degree of AI awareness and expertise in Plateau State's educational programs.
2. Examine the potential applications of artificial intelligence in technical and vocational education to enhance the development of digital skills.
3. Find out the benefit of AI in TVET.
4. Identify the obstacles to integrating AI into TVET schools in Plateau State's teaching and learning process.

Research Questions

1. What is the level of awareness and knowledge of AI in educational programs in Plateau State?
2. How might artificial intelligence be used in developing digital skills in technical and vocational education?
3. What are the benefits of AI in TVET
4. What are the challenges facing the adoption of AI in the teaching and learning process in Plateau State's TVET institutions?

Review of Literature

Artificial Intelligence in Education

Artificial intelligence (AI) has become a disruptive force in education with tools and systems that can automate administrative tasks, assist in decision-making, and personalize learning (Luckin et al., 2016). Artificial intelligence (AI) technologies such as machine learning, natural language processing, and expert systems are increasingly being integrated into educational

platforms to enhance student performance and engagement. Additionally, AI technologies have been used more and more to support education and training in a variety of fields, such as language, STEM, and medicine, since its introduction in the middle of the 1950s (Perrotta & Selwyn, 2020). Literature revealed that AI educational apps are now being developed to assist with teaching and learning tasks like performance evaluation, interactions and collaboration, and the creation and distribution of information (Chassignol et al., 2018; Perrotta & Selwyn, 2020). Since learning and teaching are knowledge-intensive cognitive tasks, the field of education is particularly well-suited to AI technologies. AI applications, which are designed for cognitive and problem-solving processes based on algorithms and knowledge bases, can effectively support and enhance educators' and students' skills in both teaching and learning.

Artificial Intelligence in Technical and Vocational Training (TVET)

Technical and Vocational Education and Training (TVET) is crucial for students to gain employable skills. Despite its early stages, AI integration in TVET has the potential to enhance simulation-based training, smart assessments, and real-time skill development (UNESCO-UNEVOC—2021). According to Dinesh Deckker and Subhashini Sumanasekara (2025), artificial intelligence (AI) has produced a number of creative solutions that significantly improve skill-based learning structures in Technical and Vocational Education and Training (TVET). AI could support experiential learning through industry-relevant training modules that mimic real-world technical problems, virtual labs, and predictive analytics (Zawacki-Richter et al., 2019). According to the World Economic Forum (2020), jobs in the future will require both technical know-how and digital fluency. Despite efforts to promote digital literacy in Nigeria, many Technical and Vocational Education and Training (TVET) institutions still face challenges such as outdated curricula, inadequate infrastructure, and inadequate teacher preparation (Adebayo & Salami, 2022).

A study titled Artificial Intelligence Adoption for Skills Development in Nigeria: A Systematic Review and Roadmap for TVET Transformation was conducted by Abdullahi; Bawa, and Shuaibu in 2025. The results show that stakeholders are very interested in AI, but they also highlight serious deficiencies in infrastructure, instructor knowledge, policy coordination, and ethical governance. The report also emphasizes how crucial relative advantage, compatibility, trial-ability, complexity, and observability are in determining how AI technologies are adopted and spread throughout the TVET sector. Similar to this, Nja et al. (2023) discovered in his study that while stakeholders are enthusiastic about integrating AI into the TVET teaching and learning process, this enthusiasm does not always translate into readiness, primarily because of low levels of digital literacy and a lack of organized capacity-building initiatives. These results demonstrate that, despite AI's vital role in advancing knowledge in the modern era, stakeholders do not fully appreciate its significance for TVET. Hence, the necessity for this study.

Methodology

This study employed descriptive survey approach to examine how artificial intelligence could enhance digital skills in Technical and Vocational Education and Training (TVET) institutions in Plateau State. The method is effective in obtaining data on attitudes, understanding, and readiness regarding the integration of AI. The sample was drawn from a target population consisted of TVET instructors, administrators, and final-year students from Plateau State's governments and commercial TVET institutions. The study used a stratified random sampling technique to select 50 final-year TVET students, 40 instructors, and 10 administrators. Stratified sampling is appropriate because subjects of different characteristics were involved in the study. This sampling is adequate considering the few numbers of TVET institutions in the state. The main data collection tool was a structured questionnaire with five components. The questionnaire

was validated by experts in TVET institutions, and experts with knowledge of artificial intelligence. The data was subjected to analysis on SPSS for internal consistency to assess its reliability where the Cronbach Alpha coefficient obtained.

Results

The complete 24-item questionnaire was run through SPSS for reliability and internal consistency. The value of the Cronbach's Alpha coefficient was 0.704. This number shows a strong reliability between the items. The Cronbach's Alpha coefficient SPSS result output is displayed in

Table 1: Reliability Index

Cronbach's Alpha	Cronbach's Alpha	N of Items
.704	**.704**	**24**

Research Question 1

What is the level of awareness and knowledge of AI in educational programs in Plateau State.

According to the study's mean and standard deviation, all the participants agreed that AI is crucial for improving TVET in Plateau State's educational programs. Despite not deviating too much from one another, the respondents' mean scores are all above the 3.00 decision threshold.

Table 2. Mean score and standard deviation of Respondents on the level of awareness and knowledge of AI in educational Programs in Plateau State

S/N	ITEMS	$\bar{x}$	ð
1	I am aware of the use of Artificial Intelligence (AI) in Education	**3.19**	**1.41**
2	I have adequate knowledge of how AI function in teaching and learning	**3.161**	**1.18**
3	I am familiar with AI-driven tools such as chatbots virtual labs, and online assessments	**3.16**	**1.47**
4	I believe teachers and students in Plateau State have sufficient awareness of AI	**3.00**	**1.44**

Research Question 2. How might artificial intelligence be used in developing digital skills in technical and vocational education?

The mean values for all five of the items in Table 3, which deals with the potential use of AI to enhance digital skills in TVET, were higher than the acceptable threshold of 3.00. Because of this, the respondents indicates a strong positions on the importance of AI to TVET for the development of digital skills in technical and vocational education.

Table 3. Mean Score and Standard Deviation of Respondents on how artificial intelligence might be used in developing digital skills in TVET

S/N	ITEM	$\bar{x}$	ð
5	AI can improve digital literacy among TVET students	**3.12**	**1.32**
6	AI enhances practical and hands-on simulations for vocational training	**3.09**	**1.35**
7	AI supports the development problem-solving and critical thinking skills	**3.01**	**1.34**
8	AI applications prepare students for future careers in the digital economy	**3.20**	**1.34**
9	AI contributes to innovation and creativity in vocational education	**3.34**	**1.24**

Research Question 3. What are the perceived benefits of AI in TVET

The respondents' perceptions of the benefits of AI in TVET are displayed in table 4. The respondents' mean score demonstrates their consistency across the items, which is within the acceptable ranges. However, because the mean value is below the acceptable threshold, the

respondents disagreed about how AI can improve teaching and learning and make it more engaging and effective. They also disagreed about how AI can help teachers and students save time. Regarding the advantages of AI in TVET, however, the respondents did not significantly deviate from one another.

Table 4. Mean and Standard Deviation on the perceived benefits of AI in TVET

S/N	ITEM	$\bar{x}$	ð
10	AI makes teaching and learning more effective and engaging	**2.98**	**1.47**
11	AI improves students' employability through digital skills acquisition	**3.11**	**1.27**
12	AI helps bridge the gap between theoretical knowledge and practical application	**3.04**	**1.34**
13	AI saves time and increases efficiency for both teachers and students	**2.95**	**1.40**
14	AI provide personalized learning experiences for students	**3.09**	**1.34**

Research Question 4. What are the challenges facing the adoption of AI in the teaching and learning process in TVET in Plateau State's TVET institutions?

Table 5 shows the mean score and standard deviation of respondents' perceptions of the challenges of implementing AI in TVET teaching and learning in Plateau State's TVET institutions. The respondents' mean values acknowledge that these issues must be addressed if AI is to have a positive impact. The low score for item 22 clearly demonstrates that these issues must be addressed if a curriculum is to improve students' digital skills. Considering the deviation values, the respondents provided consistent responses.

Table 5. Mean and standard deviation of the respondents on the Challenges facing the adoption of AI in teaching and learning process in TVET in Plateau state

S/N	ITEMS	$\bar{x}$	ð
20	More training programme are needed for teachers and students on AI integration	**3.13**	**1.38**
21	Government should provide policies and funding to support AI in TVET	**3.34**	**1.14**
22	The curriculum strengthens digital skills	**2.99**	**1.28**
23	Schools and vocational centers should partner with tech companies for AI support	**3.08**	**1.36**
24	I am willing to adopt AI tools if provided with training and resources	**3.21**	**1.33**

Discussion of Results

This study's findings provided important insights into the current state of Artificial Intelligence (AI) adoption, digital skill integration, and readiness among TVET institutions in Plateau State. This section discusses the implications of the findings in terms of the research questions and existing literature.

The study discovered that AI technologies are poorly integrated into TVET institutions. Most respondents said their schools lacked AI tools like intelligent tutoring systems, automated feedback mechanisms, and virtual simulations. This confirms earlier research by UNESCO-UNEVOC (2021), which found that the adoption of AI in TVET, particularly in developing countries, is still in its early stages due to infrastructure and policy gaps.

Although basic digital skills like typing, internet browsing, and the use of Microsoft Office tools are relatively common among students and educators, advanced digital competencies—such as data analysis, coding, and use of AI applications—are largely absent. This is consistent with the findings of Adebayo and Salami (2022), who discovered that Nigerian

technical students are frequently underprepared for employment in the digital economy due to a lack of access to cutting-edge technologies.

The gap between knowledge and comprehension of AI was quite noticeable. Although many participants were familiar with AI, few were able to describe its uses in education. Teachers also said they had not received much professional development in this field. This is in line with the worries expressed by Luckin et al. (2016), who contend that teachers are unlikely to implement AI in the classroom in a significant way without specialized training.

Both students and teachers saw the potential advantages of AI despite their lack of experience. The findings revealed that AI could boost vocational training, personalize instruction, and increase learning efficiency. As long as the proper support systems are in place, this favorable opinion suggests that people are willing to embrace AI. The results corroborate those of Zawacki-Richter et al. (2019), who pointed out that perceived utility and acceptance are important elements in the adoption of AI in education.

Unreliable electricity, poor internet connectivity, and a lack of institutional funding were found to be major barriers to the integration of AI. The slow adoption rate of AI in TVET is also a result of the lack of a formal policy or roadmap. This is in line with the findings of Nwogu and Ezeani (2020), who discovered that policy and infrastructure constraints frequently impede the adoption of technology in Nigerian classrooms.

The study's encouraging findings indicate that administrators and teachers are very eager to use AI provided they have the necessary infrastructure and training. This offers a chance for donor organizations, private sector partners, and education authorities to work together to increase TVET's capacity for integrating AI.

Conclusion

This study investigated the role of artificial intelligence (AI) in advancing Technical and Vocational Education and Training (TVET) through digital skill development in Plateau State, Nigeria. The findings show that, while awareness of AI is increasing, actual implementation in TVET institutions is still very limited. Educators and students have basic digital skills, but there is a significant gap in advanced competencies and knowledge of AI applications in education. Despite these limitations, stakeholders are very interested in using AI tools to improve teaching, learning, and employability. However, infrastructural deficiencies, insufficient professional training, and the lack of a policy framework all pose significant barriers to effective integration. The study concludes that unless deliberate efforts are made to systematically introduce AI into TVET systems, Plateau State students may be unprepared for the demands of a digital and AI-driven workforce.

Recommendations

Based on the findings and conclusion, the following recommendations are proposed:

i. Institutional Strategy for Effective AI Integration in TVET Institutions' Teaching and Learning Process

ii. To successfully navigate the use of AI in TVET, educators must build their capacity.

iii. Improving the infrastructure of all TVET institutions in Plateau State would improve AI instruction and learning in TVET.

iv. Curriculum innovation would change TVET training to reflect the latest technology developments.

v. Students' engagement and awareness of AI resources would enable them to handle challenging TVET development assignments with ease.

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