

EXPLORING ACADEMIC STAFF PERCEPTIONS AND ACCEPTABILITY OF AI IN INSTRUCTIONAL DELIVERY IN TVET PROGRAMMES IN FEDERAL UNIVERSITIES IN SOUTH-SOUTH NIGERIA

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Abstract

This study looked at the perception and acceptability of TVET academic staff in instructional delivery using AI in Federal Universities in South-South Nigeria adopting a descriptive survey research design. A structured questionnaire validated by three lecturers was administered to a sample of 158 TVET academic staff randomly selected across Federal Universities in South-South Nigeria. The reliability coefficient utilizing the Cronbach alpha was $\alpha=.79$. A quantitative approach was used in the study using standard deviation to assess the degree to which participants' responses were clustered around the mean. The results indicated that using AI enhances teaching, enhances research, enhances learning practice, and helps to manage classrooms among others. Furthermore, the results showed that TVET academic staff accept using AI in instructional delivery in TVET programmes due to adequate content knowledge, effective tools in teaching practical lessons, enables learners to learn effectively among others. Based on the finding, the following recommendation was made, it will be beneficial for all major stakeholders of TVET programmes to collaborate to inculcate using AI in their instructional delivery in TVET programmes among others.

Keywords: Academic Staff Perceptions, AI, Instructional Delivery, TVET

Introduction

Instructional delivery encompasses the multifaceted methods and strategies educators employ to impart knowledge and foster student learning (Audu et al., 2023). It is the art of teaching that shapes a student's intellectual, economic, and social trajectory (Ogbebor & Osagiede, 2024). This encompasses a spectrum of modalities, from conventional in-person instruction to online platforms and hybrid models. Agina-Obu and Onwugbuta-Enyi (2017) framed instructional delivery as a dynamic and inventive process, where educators leverage past experiences to integrate content, methodologies, concepts, and media in both novel and established ways, thus solidifying student comprehension.

Teacher's instructional delivery stands out as a critical factor influencing students' long-term learning and employment prospects (Chika & Ebeke, 2007). Effective instructional delivery may be the key to imparting skills, reducing unemployment, stimulating economic growth, alleviating poverty, and reshaping individuals' career perspectives. The advent of technology, particularly artificial intelligence (AI), has further enhanced the capabilities of educators, facilitating task execution with heightened efficiency and effectiveness. These technological advancements extend their influence across diverse academic disciplines, promising elevated levels of productivity.

Pokrivcakova (2019) defined artificial intelligence in education as the culmination of extensive interdisciplinary efforts aimed at creating intelligent systems. These systems are designed to augment both educators and learners by fostering knowledge acquisition and adaptable skill sets crucial for navigating an evolving global landscape. The incorporation of AI into Technical Vocational Education and Training (TVET) aligns with the worldwide trend of leveraging AI to optimize learning outcomes and cultivate essential skills. AI's potential within TVET lies in its capacity to individualize learning pathways, thereby equipping students with targeted competencies demanded by the modern job market and ultimately transforming the educational paradigm. This personalized

approach enhances skill development, leading to improved employability and workforce preparedness.

Furthermore, the incorporation of virtual reality and simulation technologies enhanced by AI could improve TVET programmes' educational experience, provide hands-on, intensive training experiences to students. Additionally, by using AI to automate administrative work, teachers may have more time to focus on mentoring and coaching students, raising the overall quality of technical vocational education and training (TVET).

Technical vocational education and training (TVET) is a programmes that is delivered at various institutions with the goal of acquiring practical skills and scientific knowledge for a nation's economic and technical development. TVET, according to Audu et al. (2013), is a work-related education that is tailored to the demands of the workforce and industries. TVET is defined as education, training, and skill development related to a variety of occupations, production processes, services, and means of subsistence (UNESCO/ILO, 2002). Accordingly, TVET is regarded as a crucial tool for giving the workforce the skills needed for the "jobs of tomorrow" (Tether et al., 2005). At the secondary, post-secondary, and tertiary levels, technical vocational education and training are provided. They could have the most potential to create jobs, keep jobs, and lower poverty in a community. Depending on each institution's capacity, TVET programmes in tertiary institutions offer a variety of courses, such as business, home economics, agricultural, and industrial technical education. Academic staff perceptions of AI-powered instructional delivery may influence TVET programmes' efforts to help students acquire global skills and find work upon graduation.

The way faculty members perceive their jobs, duties, and workplace could be referred as academic staff perception. Perceived Paedagogical Affordances (PPA), which measures whether instructors think AI offers advantages like individualized learning, increased student engagement, or more efficient assessment techniques, indicates how lecturers in educational institutions view how AI-powered tools may improve teaching practices. It may also involves evaluating the lecturers' enthusiasm, nervousness, self-efficacy, and emotional reactions to issues or problems related to AI, such as data privacy or job security. Teachers' views and behaviors about AI could be shaped by a variety of social and cultural elements, including professional networks, school leadership, coworkers, and educational regulations. The desire and preparedness of lecturers and instructors to embrace and incorporate AI technologies into their teaching practices could be referred to as academic staff acceptance.

Academic staff acceptability may be influenced by several factors, including technological pedagogy, content knowledge, understanding of artificial intelligence, subject matter, administrative support, workshops and technical assistance, incentive, and organizational climate, age, experience, attitude toward technology outcome, student engagement, and job security. The topic of technology adoption and use by academic staff in TVET programmes continues to be of great interest to researchers and practitioners, regardless of the technology available and the benefits that are promised. This study specifically focuses on how to optimize the advantages of emerging technologies, such as artificial intelligence (AI), for students by comprehending and maybe promoting its acceptance within the framework of TVET programmes.

It is on this premises that the researchers sought to investigate academic staff perceptions and acceptability of AI in instructional delivery in TVET programmes in Federal Universities in South-South Nigeria. The specific objectives of the study were to:

1. Investigate academic staff perceptions of AI in instructional delivery in TVET programmes in Federal universities in South-South Nigeria.
2. determine the factors that influence academic staff acceptance of AI in instructional delivery in TVET programmes in Federal universities in South-South Nigeria.

Literature Review

Across all educational levels, there are several AI prospects to improve research, teaching, and learning methods. AI has the potential to completely change education by improving classroom management, encouraging faculty cooperation, and delivering instruction using cutting-edge AI-

powered teaching strategies (Ghnemat et al., 2022). Numerous studies have shown that AI technology can improve students' cognitive and learning capacities and increase the effectiveness of teaching and learning procedures through individualized learning experiences (Huang et al., 2021). In the context of higher education institutions (HEIs), artificial intelligence (AI) can be particularly helpful in promoting the growth of soft skills (Kohnke et al., 2023) and improving students' overall educational experiences in several ways. For instance, giving students instant access to information, accommodating their unique learning preferences and needs, helping them with their research, and even helping students with disabilities by offering text-to-speech capabilities. In their meta-review of 14 research papers on the implementation of AI curricula in the Asia-Pacific region, Su et al. (2022) discovered that learning outcomes, models, activities, platforms, tools, and content knowledge are all crucial for AI acceptance.

Additionally, from 2016 to 2022, Ng et al. (2021) carried out an extensive review that covered AI education at all levels, from kindergarten to university. They looked at teaching resources, learning materials, assessment techniques, and pedagogical approaches. Additionally, they suggested using P21's framework for 21st century learning to identify the fundamental knowledge and abilities in AI literacy that students need to succeed in their academic and personal endeavors. This demonstrates unequivocally that user acceptance of AI is essential to its advancement in higher education. Adoption and acceptance are essential if AI is to fulfill its promised advantages for a broad spectrum of users. To the detriment of instructors and students, low adoption rates can result in a decrease in the use of AI, wasting money, creating an excess of AI gadgets, and possibly slowing down technological advancement (Choi et al., 2023).

Despite numerous studies underscoring the importance of AI in education and investigating the interaction between humans and AI, there remains a gap in our understanding regarding academic staff's perception of integrating AI in instructional delivery in TVET programmes in South-South Nigerian Universities for the benefit of students and also the factors that influence their acceptance of AI in instructional delivery in TVET programmes in Federal Universities in South-South Nigeria.

Methods

A descriptive survey research design was adopted for this study. The respondents were 158 academic staff in TVET programmes from Federal Universities in South-South Nigeria.

A self-constructed questionnaire titled Questionnaire for Academic Staff Perceptions and Acceptability of AI (QASPA) developed from the literature, was reviewed as an instrument for the collection of data. The instrument was a four-point scale, ranging from 1 (strongly disagree) to 4 (strongly agree). The instrument consisted of 18 items, where nine items measure the perceptions of academic staff regarding the integration of AI in instructional delivery in TVET programmes. The remaining nine items measure the factors that influence academic staff acceptability of AI in instructional delivery in TVET programmes.

Three lecturers verified the content of the instrument. One of them was from measurement and evaluation, and the two others were from TVET disciplines. The authors analyzed the responses of 20 lecturers, from University in South East Nigeria which was not part of the study sample, to determine the instrument reliability. The results of analyzed responses showed that the instrument for data collection was reliable, with a Cronbach alpha coefficient value of $\alpha=.79$.

Data was analyzed using the mean, and standard deviation. Mean values were used to answer the research questions, and standard deviation was used to determine the degree to which TVET academic staff responses were clustered around or deviated from the mean. A mean score equivalent to, or greater than 2.50 implied that TVET academic staff agreed with the questionnaire items, and mean scores under 2.50 implied that TVET academic staff disagreed with the corresponding questionnaire items. Also, the standard deviation values between .00 and .96 suggested that TVET academic staff reactions were exceptionally close, which implies that their answers were clustered around the mean.

Results

Research Question 1: What are the perceptions of academic staff of AI in instructional delivery in TVET programmes in Federal universities in South-South Nigeria?

Table 1

Mean and Standard Deviation of TVET Academic Staff Perceptions of AI in Instructional Delivery in TVET Programmes

S/N	Item Statement	M	SD	Remark
1.	Using AI to enhance teaching in TVET programmes	3.70	.72	Agreed
2.	Using AI Enhance research in TVET programmes	3.80	.69	Agreed
3.	Using AI to enhance learning practice in TVET programmes	3.34	.84	Agreed
4.	Using AI helps to manage classrooms in TVET programmes	3.29	.65	Agreed
5.	Using AI to foster Faculty Collaboration in TVET programmes	3.51	.76	Agreed
6.	AI-powered teaching methods in TVET programmes	3.47	.82	Agreed
7.	Using AI enhances students' cognitive capabilities in TVET programmes	3.39	.69	Agreed
8.	Using AI to enhance learning processes in TVET programmes	3.57	.78	Agreed
9.	Using AI fosters the development of soft skills in TVET programmes.	3.62	.82	Agreed

N = 158, M = Mean, SD = Standard Deviations

The outcomes of the information presented in Table 1 demonstrates that nine items, with sequential numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9 had mean values that ran from 3.29 to 3.80, and the comparing standard deviation values ran from .65 to .84. The mean values infer that the item statement agreed with the perceptions of academic staff regarding the integration of AI in instructional delivery in TVET programmes. The corresponding standard deviation values indicated that the generality of academic staff perceptions of AI in instructional delivery in TVET programmes were clustered.

Research Question 2: What are the factors influencing academic staff acceptability of AI in instructional delivery in TVET programmes in Federal universities in South-South Nigeria?

Table 2

Mean Responses on Factors Influencing Academic Staff Acceptability of AI in Instructional Delivery in TVET Programs

S/N	Item Statement	M	SD	Remark
10	AI has adequate content knowledge on the topic of the lesson.	3.61	.79	Agreed
11	There are effective tools for teaching practical lessons using AI in TVET programmes.	3.32	.84	Agreed
12.	AI-enhanced platforms enable learners to learn effectively in TVET programs	3.51	.68	Agreed
13.	Practical activities can be demonstrated using AI in TVET programmes.	3.38	.83	Agreed
14.	AI usage will promote the effective assessment of learners in TVET programmes	3.37	.86	Agreed
15.	Learning outcomes can be achieved effectively using AI tools in TVET programmes.	3.36	.91	Agreed
16.	AI tools can be used as models during teaching and learning in TVET programmes	3.98	.90	Agreed
17.	I am interested in using AI in teaching TVET programmes	3.48	.87	Agreed
18.	If trained, I am open to using AI in promoting TVET programmes.	3.36	.47	Agreed

N = 158, M = Mean, SD = Standard Deviations

The outcomes of the information presented in Table 2 indicates that nine items, with sequential numbers 10, 11, 12, 13, 14, 15, 16, 17, and 18 had mean values that ran from 3.32 to 3.98, and the comparing standard deviation values ran from .47 to .91. The mean values infer that the item statement agreed with the factors influencing academic staff acceptability of AI in instructional delivery in TVET programmes. The corresponding standard deviation values indicated that the generality of the factors influencing academic staff acceptability of AI in instructional delivery in TVET programmes were clustered.

Discussion of Findings

The present study specifically aims to provide empirical evidence on the perceptions and acceptability of academic staff regarding the integration of AI in instructional delivery in TVET programmes. Analysis of research question 1 indicated that academic staff agreed on their perception of AI as it enhances teaching, enhances research programmes, enhances learning practices, helps to manage classrooms, fosters faculty collaboration, empowers teaching methods, enhances cognitive capabilities, enhances the learning process and foster the development of soft skills. This finding is in collaboration with the finding of Ghnemat et al. (2022) who opined that AI is poised to revolutionize education by transforming how we manage classrooms, foster faculty collaboration, and deliver learning through innovative AI-powered teaching methods. Furthermore, the finding is in agreement with that of Kohnke et al. (2023) that AI technology holds the potential to enhance students' learning and cognitive capabilities, as well as elevate the efficiency of teaching and learning processes with personalized learning experiences.

The analysis of research question 2 indicated that academic staff agreed with the factors influencing academic staff acceptability of AI in instructional delivery in TVET programmes such factors include adequate content knowledge on the topic, effective teaching tools for practical lessons, enhanced platform to learn effectively, demonstration of practical activities, and effective assessment of learners, model, interest and open to training. This finding is in collaboration with the findings of Su et al. (2022) their study found that content knowledge, tools, platforms, activities, models, assessment methods, and learning outcomes are essential components of AI acceptance. In addition, the finding of the study by Ng et al. (2021) is that pedagogical methods, teaching tools, learning content, and assessment strategies are among the factors influencing academic staff acceptability of AI in education.

Conclusion and Recommendations

The study aims to provide empirical evidence on exploring academic staff perceptions and acceptability of AI in instructional delivery in TVET programmes. The research questions revealed academic staff perceptions and acceptability of AI in instructional delivery in TVET programmes. Therefore, the authors concluded that all the agreed perceptions and acceptability are needed for the integration of AI in instructional delivery in TVET programmes.

Based on the conclusion, the following recommendations were made:

1. All major stakeholders of TVET programmes should collaborate to inculcate using AI in their instructional delivery in TVET programmes.
2. AI should be incorporated into TVET programmes towards providing adequate content knowledge on the topics, effective teaching tools for practical lessons, enhanced platform to learn effectively, demonstration of practical activities, and effective assessment of learners.
3. All relevant stakeholders of TVET programmes should cooperate towards using AI to develop student's knowledge and skills needed to achieve the goals of TVET programmes.

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