

REVOLUTIONIZING VOCATIONAL AND TECHNICAL EDUCATION THROUGH ARTIFICIAL INTELLIGENCE, INNOVATION AND CREATIVITY IN SELECTED TECHNICAL AND VOCATIONAL INSTITUTIONS IN KWARA STATE, NIGERIA.

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Abstract

Vocational and Technical Education (VTE) plays vital role in skills acquisition and work force development in Nigeria, however, VTE Institutions in Kwara State face challenges such as inadequate facilities, limited technological integration, and weak alignment with industry needs. This study examines how Artificial Intelligence (AI), innovation, and creativity can revolutionize vocational and technical in vocational institutions in Kwara State, Nigeria. A descriptive survey research design was adopted involving 200 respondents comprising vocational educators, students and industry practitioners. Data were collected using a structured questionnaire and analysed using descriptive and inferential statistics at a 0.05 level of significance; findings revealed that AI-driven instructional tools significantly enhance teaching effectiveness, personalized learning, and practical skills acquisition. Innovation and creativity were also found to improve learning problem-solving abilities and employability. The study concludes that the integration of AI, innovation and creativity is essential for improving Vocational and Technical Education outcomes in Kwara State.

Keywords: Vocational, Education, Artificial Intelligence, Innovation, Creativity, Skills Development.

Introduction

Vocational and Technical Education (VTE) is a critical component of national development on practical skills acquisition, technological competence, and work force preparation. In Nigeria, VTC is designed to equip individuals with relevant skills for empowerment, self-reliance and economic productivity (Federal Republic of Nigeria FRN 2024). At the State level including Kwara State, vocational and technical institutions play a vital role in addressing youth unemployment and supporting local industrial and entrepreneurial development. However, despite its importance, the effectiveness of VTC in Nigeria has been constrained by challenges such as inadequate funding, obsolete training equipment, weak industry collaboration and limited integration of modern technologies (Okorie 2019, Umar 2025).

Globally, rapid technological advancement driven by the fourth Industrial Revolution has transformed the nature of work and the skills required in the labour market. Artificial Intelligence (AI) in particular has enlarge as a powerful tool with the potential to reshape teaching and learning process across all levels of education. AI application such as intelligent tutoring systems, virtual laboratories, simulations and adaptive learning plant forms have been shown to enhance personalized learning, improve learners engagement, and support the acquisition

of complex practical skills (Luck in, Hoymes Griffith and foceder 2016, Rosyadi (2024).

These innovations are especially relevant to vocational and technical education where experiential and skills based learning is fundamental. In Nigeria context, the adoption of artificial intelligence in education remains relatively limited but is increasingly recognized as a strategic opportunity for improving the quality and relevance of technical and vocational education and training (TVET) systems (Adeniyi) and Adeyemi 2021: Rabi, Bawa and Saminu (2025) studies conducted in Nigeria indicate that AI-Driven Instructional tools can help bridge existing gaps in vocational training by providing simulated work environments real time feedback, and data driven instructional support (Eleje, Ezeugo and Ezomonu 2025). Edo and Edo, (2025) these tools are particularly valuable in context such as Kwara state where access to modern equipment and training facilities may be limited.

Beyond technological integration innovation and creativity are increasing emphasized are essential elements of effective vocational education innovation in teaching methods encourage flexible learning problem solving and adaptability, while creativity fostercritic thinking and entrepreneurial competence among learners (UNESCO 2025).

Despite growing recognition of the importance of artificial intelligence, innovation and creativity in vocational education empirical studies focus on their application within specific Nigerian states. Particularly Kwara state remained limited. Most existing studies adopt a national or generalized African perspective with little emphasis on local institutional realities. This study therefore seeks to bridge this gap by examining how intelligence, innovation and creativity can revolutionize vocational and technical and vocational institutions in Kwara state Nigeria. The study focuses on the precipitations of educators, students and industry practitioners regarding the effectiveness of AI-driven and innovative instructional practices in enhancing skills acquisition and employability outcomes.

Review of Related Literature Concept of Vocational and Technical Education

Vocational and technical education (VTE) refers to that aspect of education which equips individuals with practical skills, technical knowledge, and attitudes necessary for gainful employment and self reliance (Federal Republic of Nigeria (FRN), 2014). In Nigeria, VTE is expected o contribute significantly to man power development, industrial growth, and poverty reduction However, studies has shown that vocational education in many Nigerian states including Kwara state is still characterized by out dated curriculum, inadequate facilities and weak link ages with industry (Okorie, Lola, Umar, 2025). These challenges limit the effectiveness of VTE in meeting contemporary labour market demands.

Artificial Intelligence in Vocational and Technical Education

Artificial Intelligence has been identified as a transformative tool capable of enhancing teaching and learning processes through intelligent tutoring systems, adaptive learning platforms simulations and virtual laboratories (Lucky in *etal*, 2016). In vocational Education, AL supports experimental learning by

simulating real-world work environments and providing immediate feedback to learners (Rosyadiet, 2024)

In Nigeria context, research indicates that AI adoption in education remains at an emerging stage but holds considerable potential for improving vocational training outcomes (Adeniyi & Adeyemi, 2021). Eleje *et al* (2025) reported that AI-driven instructional tools enhance personalized learning and instructional efficiency in Nigerian tertiary institutions. Similarly, Edo and Edo (2025) observed that AI integration can reposition technical and vocational education to better support national economic development. Those findings suggest that AI could address key challenges facing institutions in Kwara State, particularly limitations in physical training equipment.

Innovation and creativity in skills development innovation and creativity are essential for effective vocational training, as they promote problem solving, adaptability, and entrepreneurial skills among learners (UNESCO, 2022).

Empirical Studies and Research Gap

Several studies have examined artificial intelligence, innovation and creativity in education at national and international levels (Ogunlades Ola- Kadir & Ogunlade 2025). However, most Nigerian studies focus broadly on tertiary education or national policy frameworks with limited empirical evidence at state level. There is a noticeable gap in literature addressing the combined influence of AI, Innovation, and creativity on vocational and technical education with in specific Nigerian states such as Kwara State. This study seeks to fill this gap by providing empirical evidence from selected technical and vocational institutions in Kwara State.

Objectives of the study

1. Examine the role of artificial intelligence in enhancing the effectiveness of vocational and technical education in selected institutions in Kwara State.
2. Determine the influence of innovation and creativity on students skill acquisition in vocational and technical education in Kwara state.
3. Assess the perceptions of educators and learners on the integration of AI into vocational and technical training programmes in Kwara state.

Research Questions

1. How does the application of artificial intelligence influence teaching and learning processes in vocational and technical education in Kwara state.
2. What is the influence of innovation and creativity on skill acquisition among vocational and technical education students in Kwara state?

Research Hypotheses

H₀₁ there is no significant relationship between the use of artificial, intelligence the effectiveness of vocational and technical education in selected institutions in Kwara state.

H0₂ innovation and creativity have no significant effect on student's skills acquisition in vocational and technical education in selected institutions in Kwara state.

Methodology

The study adapted a descriptive survey research design, the population consisted of all vocational and technical education students, instructors, and industry partners in selected colleges, polytechnic in Kwara state, Nigeria. Kwara State Colleges of Education Ilorin, Kwara State College of Education, Oro, Kwara State College of Education, Lafiaji. A sample of 200 respondents was selected using random sampling. Data were collected using a structured questionnaire and hypothesis testing at a 0.05 level of significance. Reliability of the instrument was established using the Cronbach Alpha method. The value of the result is 0.05p value.

Results

Analysis of responses from zoo respondent across selected technical and vocational institution in Kwara state revealed positive perception towards the integration of Artificial intelligence (AI) ,Innovation, and creativity in vocational and technical Education.

Table 1: Respondents perception of the influence of Artificial intelligence (N=200)

S/N	Item description	Agree(%)	Disagree
1.	AI improves understanding of practical skills	65	35
2.	AI support personalized learning	72	28
3.	AI enhance teaching efficiency	68	32
4.	AI makes vocational training more industry relevant	70	30

The results indicate that AI supports personalized learning and makes vocational training more industry relevant.

Table 2: Influence of innovation and creativity on skills Acquisition (N=200)

S/N	Item Description	Agree(%)	Disagree
1.	Innovation improves	70	30
2.	Creative Teaching	75	25
3.	Creativity improves learners adaptability	73	27
4.	Innovative instruction increases learners engagement	78	22

The results indicate that innovative instruction increases learners engagement and creative teaching.

Table 3: Chi Square test of relationship between Artificial intelligence and VTE Effectiveness.

Variable	X ²	df	p-value decision
AI usage and VTE effectiveness	8.64	4	0.001H ₀ rejected

The result shows Significant relationship between the use of Artificial intelligence and the effectiveness of vocational education in Kwara state ($p < 0.05$).

Table 4: Chi Square test of influence of innovation and creativity on skills Acquisition.

Variable	X ₂	df	p-value decision
Innovation/creatively and skill acquisition.	21.37	4	0.000 H ₀₂ rejected

The result indicates that innovation and significant influence on students' skills acquisition in vocational and technical education in Kwara state. ($P < 0.05$)

Discussions of Findings

The findings demonstrate that Artificial intelligence significantly enhances the effectiveness of vocational education in Kwara state.

This support earlier studies which reported that AI-driven instructional tools improved personalized learning, engagement and practical skills acquisition (luck in et al, 2016 eleje et al2025). The rejection of the first null hypothesis confirms the relevance of AI in modernizing delivering within Nigeria Context.

Similarly the Significant influence of innovation and creativity on skills acquisition corroborates the assertions of UNESCO (2022) and Edo and Edo (2025) who Emphasized as essential competencies for work force readiness this finding suggest that vocational institutions in Kwara state can enhance graduate employability by adopting innovative and learner- centered instructional approaches.

Conclusion

This study examined the role of Artificial Intelligence innovation, and creativity in transforming vocational and technical education in selected institutions in Kwara state, Nigeria the findings revealed that the integration of AI Significantly enhances teaching effectiveness, personalized learning and practical skills acquisition, innovation and creativity influence students. Problem solving abilities, adaptability and employability these result highlight the importance of modernizing vocational education to align with technological Advancement and Labor market demands. The study concludes that effective integration of AI-driven tools and innovative vocational and technical education out comes in Kwara state.

Recommendation

1. The Kwara state ministry of education should formulate policies supporting the integration of Artificial intelligence in to vocational education curricular.

2. Management of technical colleges and vocational institution in Kwara state should provide regular capacity building programs for instructors on AI based instructional tools.
3. Government and private stake holders should invest in digital infrastructure such as virtual laboratory and simulation technologies in vocational institution across Kwara state.
4. Stronger collaboration should be established between vocational institution in Kwara state and local industries to ensure AI applications reflect labor market needs.
5. Creativity based and innovation –driven teaching strategies should be encouraged to enhance problem-solving and entrepreneurial skills among learners.

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