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Research/Technical Note

Imperatives of Technology Integration into Vocational Education Workspace and Environment of Universities of Education in South West, Nigeria

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Abstract

This study is designed to investigate the imperatives of integrating technology into vocational education workspace and environments in universities of education in south west, Nigeria, with reference to the current state of technology use, identified challenges, prospects and strategies for effective technology integration into vocational education workspace and environments. Two research questions and two hypotheses tested at 0.05 level of significance was used for the study. The population of the study was 130 Part Two vocational education students and 25 teachers from Tai Solarin University of Education, Ijagun, Ijebu Ode, Ogun State and Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State in the south west, Nigeria made up the sample size. No sampling technique was used in the study. The instrument for the data collection was a self-constructed questionnaire titled "Imperatives of technology integration into vocational education workspace and environment in universities of education'. The instrument was designed in a 5-point like scale of requirement. The questionnaire underwent face validation by three experts: two from the Department of Vocational and Technical Education, Faculty of Education, Ekiti State University Ado Ekiti, Ekiti State and one additional expert used to collect data. The internal consistency of the instrument was determined using the Cronbach-Alpha method, and its reliability was further established through the test-retest technique. A trial test was conducted with vocational and technical educators from University of Lagos, Akoka, Lagos State, Nigeria. The reliability coefficient was calculated to be 0.84, indicating that the instrument was reliable and valid for the study. The instrument was administered by the researchers. *Data collected were analyzed using mean and standard deviation for the research questions, while t-test was used to test the hypotheses.* Findings revealed that there are significant gaps in technology integration, influenced by funding, modern equipment, lack professionally competent teachers, regular training and poor methodology, in order to promote technology integration in vocational education workspace and environment. It is

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recommended that policy makers, educational administrators, national universities commission and other stakeholders such as Tertiary Education Trust Fund (Tetfund) among others to enhance technology integration, thereby improving the quality and relevance of vocational education in universities of education south west, Nigeria and beyond.

Keywords

Technology Integration, Vocational Education, Workspace, Environment

1. Introduction

The integration of technology into vocational education has become an essential focus for educational development globally where technology plays a pivotal role in shaping various sectors, including education. The rapid technological advancements necessitate an overhaul in the traditional teaching and learning methods, particularly in vocational education where practical skills are paramount (Ubani, Attah & Ubani, 2021) [18]". Universities of education in South West Nigeria are not exempt from this trend. The creation of these universities was a response to the increasing recognition of education as a key driver of national development. They are designed to provide specialized, high-quality training in pedagogy, curriculum development, and educational leadership. The first of such universities, Tai Solarin University of Education, was established in 2005, setting the stage for more institutions to emerge, further enhancing the quality of education across Nigeria. The imperative to integrate technology into vocational education environments stems from the need to prepare students for the technologically driven workforce of the 21st century (Ogunmola, 2023) [13]".

Globally, the incorporation of technology into educational settings has been recognized as a critical factor in enhancing the quality of education. According to Mishra and Koehler (2006), Technological Pedagogical Content Knowledge (TPACK) framework highlights the complex interplay between technology, pedagogy, and content knowledge in educational settings. This framework underscores the importance of educators being adept at integrating technology into their teaching practices to improve learning outcomes. "In Nigeria, the National Policy on Education (NPE, 2023) underscores the importance of integrating Information and Communication Technology (ICT) at all educational levels to foster digital literacy and enhance learning outcomes [6]". This policy outlines the necessity for vocational education to incorporate technology to remain relevant and effective in equipping students with practical skills that meet industry standards.

"According to Abubakar and Idris [1] a Vocational Education workspace refers to an educational environment focused on equipping students with practical skills and knowledge that are directly applicable in various trades and professions [1]". This workspace is essential in preparing students for the workforce where vocational training can address local employment needs. The environment includes not only the physical infrastructure but also the cultural and organizational learning experiences.

Universities of Education in South West Nigeria are at the forefront of implementing educational reforms that incorporate technology into vocational training programs. These institutions recognize that modern technologies can facilitate innovative teaching methods, improve student engagement, and provide access to a wide range of resources and tools.

"Ghosh and Ravichandtan (~~2024)~~ noted that the adoption of modern technologies in vocational education can transform the learning environment, making it more interactive and conducive for skill acquisition [7]".

Despite the recognized benefits, the integration of technology into vocational education in South West Nigeria faces several challenges. These include inadequate funding, lack of infrastructure, and insufficient training for educators on the effective use of new technologies. "Gbadegbe, Amewu and Krampa (2023) highlighted that one of the major obstacles to effective technology integration in Nigerian vocational education is the limited availability of resources and the insufficient capacity building for teachers [8]". The integration of technology in vocational education bridges the gap between theoretical knowledge and practical application, thereby producing more competent and industry-ready graduates. The imperative to integrate technology into vocational education workspace and environments in universities of education in South West Nigeria is evident. Olaniyi, Adeola and Ige (2017) as technological advancements continue to shape the global workforce, it is essential for vocational education to adapt and evolve [11]". By addressing the challenges and leveraging the opportunities presented by technology, universities of education can enhance the quality of vocational education and produce graduates who are well-prepared for the demands of a technologically driven world.

2. Statement of the Problem

Vocational education plays a crucial role in equipping students with practical skills necessary for the workforce. The challenges associating with the study include poor automation

technology curriculum implementation, incompetent professionals to handle automated machines, lack of practical skills and applied knowledge in automation education that can enhance the integration of technology in vocational workspace and environment in universities of education in south west, Nigeria. The integration of technology into vocational education is imperative for several reasons, including enhancing learning outcomes, improving skill acquisition, and aligning educational programs with industry standards (Olaoye, 2014) [14]". However, universities of education in South West Nigeria face significant challenges in effectively integrating technology into their vocational education workspace and environments. Firstly, there is a lack of adequate technological infrastructure in many vocational education institutions. "Adekunle and Akinola (2018), asserted that most universities in South West Nigeria struggle with outdated equipment and insufficient digital resources, which hampers the ability of students to gain hands-on experience with modern technologies [2]". Secondly, there is a notable deficiency in the training and professional development of educators in the use of technology for vocational training. "According to Adebayo (2019), many instructors lack the necessary skills and knowledge to effectively incorporate technological tools into their teaching methodologies [3]". This gap in competency prevents the full utilization of available technologies, thus limiting the potential benefits for students (Nwonkwo 2020) [10]". Moreover, the curriculum in many vocational education programs has not been updated to reflect the current technological advancements in various industries. "As argued by Ogunleye (2020), the outdated curriculum fails to prepare students for the rapidly evolving job market, leaving them with skills that are no longer relevant or in demand [12]". Furthermore, there is a cultural and attitudinal barrier among both students and educators towards the adoption of new technologies. "As noted by Eze and Eze (2021), resistance to change and a preference for traditional teaching methods continue to be significant obstacles in the integration of technology into vocational education [4]". Addressing these challenges is crucial for the effective integration of technology into vocational education in South West Nigeria. Enhancing infrastructure, providing professional development for educators, updating the curriculum, securing adequate funding, and shifting cultural attitudes are essential steps to ensure that vocational education in universities is aligned with contemporary industry standards and technological advancements (Serumu, 2014) [16]".

3. Purpose of the Study

The main purpose of the study is to investigate the imperatives of technology integration into vocational education workspace and environment in universities of education in south west, Nigeria.

Specifically, the study sought to:

1) know the current state of technology integration in vocational education workspace and environment in universities of education in South West Nigeria.
2) find out the major challenges faced in integrating technology into vocational education workspace and environment in universities of education in south west, Nigeria.

4. Research Questions

1) What is the current state of technology integration in vocational education workspace and environment in universities of education in South West Nigeria?
2) What are the major challenges faced in integrating technology into vocational education workspace and environment in universities of education in south west Nigeria as perceived by students and lecturers?

5. Hypotheses

The null hypotheses formulated for the study were tested at 0.05 level of significance.

H1: There is no significant difference between technology integration and the quality of vocational education in universities of education in South West Nigeria.

H2: There is no significant difference between the major challenge faced in integrating technology into vocational education workspace and environment in universities of education in south west Nigeria as perceived by students and lecturers.

6. Methodology

The study adopted a survey research design, which was suitable as it collected data from a sample of respondents using a questionnaire, and the results were generalized to the entire population. The study was conducted at Tai Solarin University of Education, Ijagun, Ijebu Ode, Ogun Sate and Bamidele Olumilua University of Education, Science, and Technology, Ikere Ekiti, Ekiti State both located in South-West Nigeria. The target population comprised 130 Part Two industrial vocational and technical Students and 25 lecturers from both the Tai Solarin University of Education in Ogun State and Bamidele Olumilua University of Education, Science, and Technology in Ekiti State, South-West Nigeria. Since the population was small and manageable, the entire population was included in the study, and no sampling technique was employed. A 20-item questionnaire on the imperatives of technology integration into the vocational education workspace and environment of universities of education in South-West Nigeria was developed by the researchers, based on reviewed literature, for data collection. The questionnaire was structured to align with the two research questions designed to elicit responses from the respondents. The study used a 5-point Likert scale with the following response options: Strongly Agree (5), Agree (4), Fairly Agree (3),

Disagree (2), and Strongly Disagree (1). The questionnaire underwent face validation by three experts: two from the Department of Vocational and Technical Education, Faculty of Education, Ekiti State University Ado Ekiti, Ekiti State and one additional expert. The internal consistency of the instrument was determined using the Cronbach-Alpha method, and its reliability was further established through the test-retest technique. A trial test was conducted with vocational and technical educators from University of Lagos, Akoka, Lagos State, Nigeria. The reliability coefficient was calculated to be 0.84, indicating that the instrument was reliable and valid for the study. The instrument was administered by the researchers. Data from the questionnaire items were analyzed using mean and standard deviation to answer the research questions and establish the imperatives of technology integration into the vocational education workspace and environment of universities of education in South-West Nigeria.

7. Results

Research Question 1. What is the current state of technology integration in vocational education workspace and environment in universities of education in South West Nigeria?

Table 1. *Mean and Standard Deviation Responses on Current State of Technology Integration in Vocational Education Workspace and Environment in Universities of Education in South West, Nigeria.*

S/N	STATEMENT	STUDENTS			LECTURER		
		X	SD	DEC	X	SD	DEC
1.	Vocational education workspace in my university are equipped with up-to-date technological tools	1.52	0.84	DISAGREE	2.20	1.15	DISAGREE
2.	Teachers in vocational education actively integrate technology into teaching practices	2.12	1.09	DISAGREE	2.20	1.15	DISGAREE
3.	Students in vocational education have access to sufficient technology resources	1.62	0.49	DISAGREE	1.52	0.96	DISAGREE
4.	The university provides regular training on technology usage in vocational education	1.54	0.64	DISAGREE	2.24	1.20	DISAGREE
5.	Technology integration has enhanced the efficiency of vocational training processes	2.08	1.21	DISAGREE	2.92	1.12	DISAGREE
6.	There are adequate internet and network facilities for technology-based vocational education	1.58	1.56	DISAGREE	2.08	1.12	DISAGREE
7.	My university has policies supporting technology integration in vocational education	1.46	0.64	DISAGREE	2.16	1.25	DISAGREE
8.	Modern learning management systems are used in vocational education programs	1.62	1.08	DISAGREE	1.44	0.71	DISAGREE
9.	Smart classroom facilities are available for vocational education purposes	1.62	0.74	DISAGREE	1.56	1.91	DISAGREE
10.	The university allocates sufficient funding for technology in vocational education workspace	1.94	0.88	DISAGREE	2.08	0.91	DISAGREE
Cluster Total		17.10	9.17		20.40	11.48	
Cluster Mean		1.71	0.92		2.04	1.15	

Table 1 shows the results of the current state of technology integration in vocational education workspace and environment in universities of education in South West Nigeria, from the results all the items has mean scores below the criterion mean of 2.5, indicating that all the items 1-10 listed to answer the research question 1 were rejected by the respondents. The standard deviation values of 0.49-1.91 indicates that the respondents are homogeneous in their responses to the items raised. This implies that both students and lecturers unanimously disagreed on all the items listed.

Research Question 2: What are the major challenges faced in integrating technology into vocational education workspace and environment in universities of education in south west Nigeria as perceived by students and lecturers?

Table 2. *Mean and Standard Deviation Responses on major challenges faced in integrating technology into Vocational Education Workspace and Environment in Universities of Education in South West, Nigeria as perceived by students and lecturers.*

S/N	STATEMENT	STUDENTS			LECTURER		
		X	SD	DEC	X	SD	DEC
11.	Limited access to modern technological tools and equipment hinders effective vocational education in my institution	3.99	0.83	AGREE	4.40	1.21	AGREE
12.	Insufficient funding affects the integration of technology into vocational education workspace	4.27	0.80	AGREE	4.32	0.80	AGREE
13.	There is a lack of adequate training for students and lecturers on how to use new technologies in vocational education	4.27	0.77	AGREE	3.84	1.03	AGREE
14.	Poor internet connectivity and unreliable power supply disrupt the use of technology in vocational education	4.28	1.03	AGREE	4.44	0.65	AGREE
15.	The cost of acquiring and maintaining technological equipment is a significant challenge in vocational education	4.35	0.78	AGREE	3.72	1.34	AGREE
16.	The curriculum for vocational education does not adequately incorporate modern technological advancements	4.32	0.88	AGREE	3.16	1.46	AGREE
17.	There is resistance to adopting new technologies among some lecturers and students	4.17	1.04	AGREE	4.24	0.83	AGREE
18.	Some lecturers and students are acquainted with available technologies and are adopting them	4.46	0.64	AGREE	4.44	0.71	AGREE
19.	Collaboration with industries and technology providers is insufficient for enhancing technology integration in vocational education.	4.17	0.57	AGREE	3.72	1.24	AGREE
20.	Government policies and institutional regulations do not adequately support the integration of technology into vocational education workspace.	4.46	0.64	AGREE	4.48	0.77	AGREE
Cluster Total		42.78	8.38		40.76	10.04.	
Cluster Mean		4.27	0.84		4.08	1.00.	

Table 2 revealed that all the items on the major challenges faced in integrating technology into vocational education workspace and environment in universities of education in south west Nigeria as perceived by students and lecturers had their mean scores above the real limits of 2.50. it depicts that all the items were agreed. The standard deviation values of 0.57 – 1.46 indicates that the respondents are homogeneous in their responses to the items raised. This implies that both students and lecturers unanimously agreed on all the items listed.

Hypothesis 1

H1: There is no significant difference between technology integration and the quality of vocational education in universities of education in South West Nigeria.

Table 3. *T-test analysis on mean responses of students and lecturers on technology integration and quality of vocational education in universities of education in south west, Nigeria.*

Source of Variation	N	Mean	SD	Df	t-cal	t-crit	Decision
Students	130	2.23	1.01	153	0.76	1.98	NS
Lecturer	25	2.05	1.10				

Table 3 shows the t-test result on positive relationship between technology integration and the quality of vocational education in universities of education in South West Nigeria. The result for students' response yielded a mean score of 2.23 with standard deviation of 1.01 and the lecturers mean score was 2.05 with standard deviation of 1.10. The result further reveals that df (153) = 0.76, p> 0.05. Since the p- value of 1.98 is greater than 0.05 level of significance, the null hypothesis was retained, it can be inferred that there was no significant positive relationship between technology integration and the quality of vocational education in universities of education in South West Nigeria.

Hypothesis 2

H2: There is no significant difference between the major challenge faced in integrating technology into vocational education workspace and environment in universities of education in south west Nigeria as perceived by students and lecturers.

Table 4. *T-test analysis on mean responses of students and lecturers on the major challenges faced in integrating technology into vocational education workspace and environment in universities of education in south west, Nigeria as perceived by students and lecturers.*

Source of Variation	N	Mean	SD	Df	t-cal	t-crit	Decision
Students	130	4.24	0.84	153	0.75	1.96	NS
Lecturer	25	4.08	1.00				

Table 4 shows the t-test result on mean responses of students and lecturers on the major challenges faced in integrating technology into vocational education workspace and environment in universities of education in south west, Nigeria as perceived by students and lecturers. The result for students yielded a mean score of 4.24 with standard deviation of 0.84 and the lecturers mean score was 4.08 with a standard deviation of 1.00. The result further reveals that df(153) = 0.75 p>0.05. Since the p-value of 0.75 is greater than level of significance, the null hypothesis was retained, it can be inferred that there was no significant major challenge faced in integrating technology into vocational education workspace and environment in universities of education in south west Nigeria as perceived by students and lecturers.

8. Discussion of Results

The findings of the study in Table 1 revealed that the 10 items listed as the current state of technology integration in vocational education workspace and environment in Universities of Education in South West, Nigeria were all disagreed by the students and lecturers. This is because many institutions lack the necessary technological infrastructure, such as modern equipment and reliable internet connectivity, essential for effective technology integration. This deficiency hampers the ability of both students and lecturers to engage with digital tools effectively. "This finding is in line with Tahir and Abdullah (2023) who pointed out that there is a notable gap in professional development opportunities for educators concerning the use of technology in teaching [17]". Eze and Ndu (2021) agreed that without adequate training, lecturers may feel unprepared or resistant to incorporating new technologies into their instructional practices [5]". This finding is in harmony with that of Adebisi, Olagbegi, and Adedoyin (2015) who highlighted that one of the major obstacles to effective technology integration in Nigerian vocational education is the limited availability of resources and the insufficient capacity building for teachers. "In support of this view, UNESCO-UNEVOC (2019) mentioned that there several impediments to the delivery of instructional in vocational education such as lack of access to new pedagogical equipment, reluctant to change pedagogical practices or teaching method, lack of capacity building, policy and implementation gaps among others [19]". This implies that integrating technology in vocational education workspace and environment in universities of education in

south west, Nigeria is being hindered by many factors, which in turn affect students' acquisition of innovative skills for employment upon graduation.

Result presented in Table 2 revealed that the 10 items listed as the major challenges faced in integrating technology into Vocational Education Workspace and Environment in Universities of Education in South West, Nigeria as perceived by students and lecturers were agreed. "This finding is in congruent with Ogbebor & Osagede (2024) that the existing curriculum may not be flexible enough to incorporate technological advancements, leading to a disconnect between educational content and current industry practices [15]". This rigidity hinders the development of relevant skills among students. "Additionally, the finding of this study agrees with that of Investopedia (2024) who opined that by integrating technology into vocational education workspace an environment, the technology integrating allows teachers to dedicate more time to instruction and students' interaction, ultimately enriching the overall educational experience, pre-service teacher education should cover in vocational education instructional delivery employing technology [9]". "Ogunleye (2020) argues that the outdated curriculum fails to prepare students for the rapidly evolving job market, leaving them with skills that are no longer relevant or in demand [12]". Furthermore, there is a cultural and attitudinal barrier among both students and educators toward the adoption of new technologies. "This finding is in line with Eze and Eze (2021), who noted that resistance to change and a preference for traditional teaching methods continue to be significant obstacles to the integration of technology into vocational education [4]".

9. Conclusion

The findings from Tables 1 and 2 underscore the complex challenges facing technology integration in vocational education workspace and environment within South West Nigerian universities of education. Addressing these issues requires a multifaceted approach, including investing in infrastructure, providing targeted professional development, revising curricula to accommodate technological advancements, and fostering a culture that embraces innovation. By tackling these challenges, institutions can enhance the quality of vocational education and better prepare students for the demands of the modern workforce.

10. Recommendations

Based on the findings of the study, the following recommendations are made;

1) Educational policymakers should review and update vocational education curricula to align with industry demands and emerging technologies.
2) Regular professional development programs should be introduced to equip educators with the necessary digital skills and modern teaching methodologies.
3) Vocational training institutions should invest in digital infrastructure, ensuring access to modern technological tools for both students and teachers.
4) Awareness campaigns and workshops should be conducted to address resistance to change and promote the benefits of integrating technology into education.
5) Stronger partnerships between educational institutions and industries should be fostered to ensure that students receive practical, hands-on training in line with current market needs.
6) Policymakers, tertiary education ministries, and private stakeholders should provide adequate funding and resources to facilitate the smooth transition to technology-based vocational education.

Abbreviations

NERDC	Nigerian Educational Research and Development Council
EPRA	Economic Policy Research Association
UNESCO	United Nations Educational Scientific and Cultural Organization
UNEVOC	International Centre for Technical and Vocational Education and Training

Conflicts of Interest

The authors declare no conflicts of interest.

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