ASSESSMENT OF THE SKILLS REQUIREMENT AND NEED FOR IMPLEMENTING TECHNOLOGY-ENHANCED AND ACTIVITY-BASED LEARNING ENVIRONMENTS BY TECHNICAL TEACHERS IN SOUTH SOUTH NIGERIA

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Abstract

This study determined the current skills requirement for implementing technology enhanced and activity-based learning environments by vocational technical teachers in South South Nigeria. The descriptive survey research design was utilized for the study. The population of the study is 168 respondents, comprising of educational technologist experts (Lecturers), TVET lecturers and lectures in curriculum planning and management. Simple random sampling technique was used to sample 97 respondents for the study from the population. The researcher developed questionnaire titled ‒Technology Enhanced and Activity-Based Learning Environment Indices (TEABLEI)‖ was used for data collection. The developed instrument was then face and content validated by seven (7) experts. The instrument was further assessed for reliability using the split half method by 20 experts. Cronbach alpha was used to compute the reliability index which gave a value of .85. The instrument was then administered to the respondents. The experts rated the instrument and ascertained the required skills level in technology enhanced and activity-based tasks for technical teachers. The technical teachers on the other hand, rated their skills level to determine skills possessed. The difference between skills required and skills possessed gives the skills need. The collated data was analysed using mean and standard deviation. The outcome of the study was the development of items that assessed the skills level of technical teachers in implementing technology enhanced and activity-based learning environment. The findings of the study also revealed that teachers have skills need in implementing technology enhanced and activity-based learning environment in technical colleges. It was recommended that there should be a structured training of technical teachers on activity-based classroom implementation by the State technical schools boards.

Keywords: skills need, technology enhanced learning, activity-based classrooms, vocational technical education, active learning

Introduction

Vocation Technical courses offer a variety of technological tools and provide opportunities to learn and practice technical skills. However, mere exposure to technical tools does not necessarily mean that technical teachers possess the abilities to design successful, problem-solving, technology and activity-based integrated lessons, nor does it mean that it is student centered. There must be a conscious effort to design lessons integrating technological tools into learning activities. The emerging classrooms are technology-based and activity-driven, leaving the teacher with no option but to blend both. Moreover, focusing solely on pedagogical issues without an attempt to link learning with authentic tasks, as found in real life, may lead to difficulties in designing and delivering activity-based integrated instruction (Mehlinger & Powers, 2002, Caleb, 2019). Taken together, these observations indicate that there is a need to understand how technical education programmes could be designed and implemented to provide teachers with a balance in pedagogical knowledge, technological knowledge as well as knowledge about emerging industrial environments. This calls for new teaching methods beyond demonstration and lecture methods (Caleb, 2019).

Technology and activity-based classrooms are innovative approaches to education that aim to enhance students' learning experiences by integrating technology and active learning strategies. In a technology-based classroom, teachers use various forms of technology to engage students and facilitate learning. This may include interactive whiteboards, tablets, laptops, projectors, and educational software. These tools can be used to deliver lectures, present multimedia content, facilitate group work, and provide access to online resources as well as educational games. The technological tools themselves might also be the object of learning.

In an activity-based classroom, students engage in hands-on learning activities that promote critical thinking, problem-solving, and collaboration. This may involve group projects, experiments, simulations, and other interactive activities that encourage students to apply what they have learned in a practical way. By combining technology and active learning strategies, technology and activity-based classrooms can create a dynamic and engaging learning environment that promotes student-centered learning and helps students develop the skills they need to succeed in the workplace.

The two methods of learning in the classroom are active and passive methods of learning. In passive learning, the teacher presents knowledge and taught content, and students are expected to internalize it. The teacher takes the centre stage in passive learning, presenting knowledge and experience, while the students observe and imitate the teacher while also internalizing learning. Passive learning as used in traditional classrooms also does not prepare students to work with others in collaborative team situations. These methods are based on the learning theory of behaviorism. They thus, encourage students to be passive, direction followers, and product oriented. Furthermore, continued reliance on these methods by instructors and the lack of expertise in developing new instructional methods will lead to the production of student-workers, who are skill-deficient and lack the practical skills to adapt to new work patterns and contribute to social development (Ogundola, et al, 2010). Employers are looking for workers who are adaptable to change, can multitask, and are proactive and initiative takers but also good team players. These skills can be developed in formal and informal ways, both directly and indirectly. the classroom through appropriate instructional methods. Emerging pedagogy like the activity-based methods which arouse students' motivation, and develop critical, analytical, problem-

solving as well as collaborative work skills is one viable option in the present globalized knowledge economy for instruction in Technical Colleges.

Activity-based teaching is an instructional method adopted by an instructor to facilitate learning through the accomplishment of tasks by students. The tenets of activity-based teaching are that students are engaged, mentally and physically. This is supported by (Prince, 2004) in Albadi and David (2019) who reiterated that engagement in the learning process and students' participation are the role elements in activity-based learning. Activity-based learning involves reading, writing, discussion, practical activities, and engagement in solving problems, analysis, synthesis, and evaluation (Hansraj, 2017). The application of activity-based teaching in vocational-technical education would not only make learning more engaging and inspiring for students, it support authentic learning advocated in vocational-technical education. Students can develop both generic and technical skills in activity-based classrooms.

The emerging classrooms are also technologically driven. Technology is applied for professional and personal development as well as for instructional delivery. The use of technology for instruction enhances student interest and maximizes the learning experience. Technology also supports all forms of learning, whether virtual or actual. It enriches the classroom by allowing the teacher to present learning through the introduction materials, environments, and contexts that would have been impossible to bring into the classroom.

In linking activity-based teaching and technology-enhanced learning, Sen and Leong (2020) averred that activity-based learning can be viewed as a process in which the learner accesses concepts and ideas while also assimilating these through practice and ultimately demonstrating mastery. Enhancements of learning seek to improve parts of this practice and process. With the progress of technologies, such enhancements are achieved through the facilitation of fundamental activities of learning by technology in various forms. Thus, what technology-enhanced learning ultimately offers are scalability, flexibility, and new methods of facilitating learning by offering support for different forms of activity-based instructional models. There are different models of activity-based teaching, however, the underlying principles remain the same. The focus is for teachers to apply the principles of learner-centered pedagogy and reinforce this with available technologies for instruction. However, It has been observed that teachers might need skills in creating activity-based learning environments. Hence, the a need for this study. This study determines the skills required by vocational-technical lecturers in the utilization of technology-enhanced learning cum activity-based learning classrooms in South-South Nigeria.

Statement of the Problem

An essential function of the teacher is to arouse and maintain students‘ motivation and interest. When students are unmotivated, classes are almost always become dull and uninteresting. This is most often attributed to the teaching method applied by the teacher. The effect of student-lowered motivation is that performance will most likely dip and their connection to the course/subject will most likely suffer as they lose interest. Classes may become dull as the excitement and motivation of Learners are reduced. According to Albadi and David (2019), changing the method of teaching by the teacher is an effective method of bringing excitement to the learning process and, hence, increasing the motivation of students. There are different methods of teaching, however, the activity-based method is suitable for vocational-technical education. The use of technology and activity-based learning not only supports interaction and skills development but also deep learning. It engages students in thinking about the lesson

activities while also getting involved in solving practical problems. More supportive of real work situations, technology, and activity-based learning aligns with the goals of technical education that students are to be taught in the same environment as the work environment in which they will eventually find themselves. The challenge, however, is that technical teachers themselves are grappling with the implementation and didactics of technology-driven and activity-based classrooms. Teachers seem to lack the requisite skills in planning and implementing technology-driven and activity-based classrooms. Where the teachers themselves are unable to recreate classroom conditions to support emerging educational paradigms, they fall back to traditional methods, which produce the same undesirable results. Teachers must develop skills in the utilization of technology-driven and activity-based classrooms. When educators fail or struggle to adapt emerging instructional paradigms, students' motivation and by extension, academic achievement will suffer. More so, the efforts of researchers to reinvent vocational-technical education will take a hit and hinder progress and reforms.

Objectives of the Research

The objective of this study is to determine the current skills requirement for implementing technology enhanced learning and activity-based learning environments by vocational technical teachers in South South Nigeria. Specifically, the study sought to

1. Determine the skills needed by vocational technical lectures for utilization of activity-based learning instructional strategies in classrooms.
2. Determine the skills needed by vocational technical lectures for utilization of technology enhanced learning tools in classrooms.

Research Questions

The following research questions are stated for the study

1. What are the skills needed by Vocational technical lectures for utilization of activity-based learning instructional strategies in classrooms?
2. What are the skills needed by Vocational technical lectures for utilization of technology enhanced learning tools in classrooms?

Literature Review

Technology-Enhanced Learning (TEL)

Technology-enhanced learning (TEL) can be broadly defined as contexts that incorporate ICT technologies in support of learning (Kyza, 2017). Technology-based classrooms are classrooms where teachers use various forms of technology to enhance the learning experience for students. Some common examples of technology-based classrooms include:

Interactive whiteboards: These are digital whiteboards that allow teachers to project content from their computer screen onto the board, and then manipulate the content using a stylus or their finger. Interactive whiteboards can be used for presentations, collaboration, and interactive activities.

Tablets and laptops: These devices can be used to access educational software, online resources, and digital textbooks. They can also be used for note-taking, research, and collaborative projects.

Projectors: These devices can be used to display multimedia content from a computer onto a large screen or wall. Projectors are commonly used for presentations, videos, and interactive activities.

Educational software: There are a variety of educational software programs available that can be used to enhance learning in the classroom. These programs can provide interactive activities, simulations, and games that help students engage with and understand the material.

Online resources: The internet provides a wealth of resources that can be used to supplement classroom learning. Teachers can use online resources, such as videos, articles, and educational websites to provide additional information and context for the material being taught.
Overall, technology-based classrooms can be an effective way to engage students and provide them with a more interactive and dynamic learning experience

Technology Integration is the intentional repurposing and incorporation of technology in the classroom to enhance instruction. In to Rosales (2021), it is the utilization of technological gadgets and software supported by the business world for real-world applications, for students to learn to use computers flexibly, purposefully, and creatively. He further explained that technology integration is about applying the curriculum to drive technology usage, not having technology drive the curriculum. Finally, it is when the goals of curriculum and technology are well-coordinated and harmonious whole (Rosales, 2021).

Technological advances are revolutionizing education, a revolution that has caused a multitude of changes, not only in the way students learn but also in the way that teachers are able to teach their students. This has also impacted the perception of education, where the focus now is on developing new teaching methodologies, which have radically changed the way teachers now approach the practice of teaching (Peris-Ortiz, et al, 2014). Ertmer (2005) maintained that technology is not a cure-all for improving classroom instruction. Furthermore, within the classroom, instructor is expected to use a variety of technologies and connect it to the content (Pierson, 2001; Stobaugh & Tassell, 2011). A deficiency in either area can lead to failure (Rosales, 2021). Yet, content and pedagogical knowledge are often seen as precursors to successful technology integration - a good teacher should be able to use technology in a pedagogically-sound way. Research over the last decade suggests that for technology integration to be fully accepted in the classroom, the teacher needs to be a key stakeholder in the adoption process and help create the active learning process that will allow technology to take root and grow as an indispensable tool of education (e.g., Arrowood et al., 2010; Ertmer et al., 2012; Rosales, 2021).

Activity-Based Learning

Activity-based learning is an instructional process that actively involves learners in the learning process. This often follows all cycles of the learning process, from knowledge formation to task performance. The learning environment is task-oriented, requiring students to not just perform tasks, but think about the tasks. According to Hansraj (2017) and Kapur (2019), it is based on the core premise that learning should involve the implementation of experiments and activities as well, rather than just listening to lectures. The main factors that are taken into account in activity-based learning are, reading, writing, discussion, practical activities, solving problems, analysis, synthesis and evaluation. It is also defined as any strategy that involves students in doing a variety of tasks and thinking in terms of the tasks that they need to perform(Hansraj, 2017).

Singal et al. (2018) see activity-based learning as student-centered, providing challenging learning tasks, and an engaging and flexible learning environment for all students. Deci and Ryan (2000) opined that activity based learning provides scaffolding to students and helps them make connections to their classmates which enhances effort and motivation. This is possible as it balances challenge and support offered to students, while also supporting teamwork and generic skills acquisition. According to Quin (2012), different modes of activity-based learning include cooperative learning, collaborative learning, Problem-based learning, or inquiry-based learning,

typically defined as any educational strategy that engages students actively in the learning process. It includes a wide range of interesting activities.

Empirical Review

Andiema (2022) investigated how activity-based learning is implemented in public pre-primary schools in Kenya. It was done on the premise that the implementation of the new curriculum in the country demanded the activity-based learning approach. The mixed research method was applied for the study. The target population comprised 1677 teachers and 417 headteachers drawn from 417 Pre-primary entrées in West Pokot County. Stratified random sampling technique was employed in selecting the 168 respondents for the study. Data collection was done using questionnaire administered to pre-primary teachers, interview was conducted for sampled head teachers and the researcher also collected secondary data through observation method. Data collected was analysed qualitatively and quantitatively using descriptive statistics and thematic content analysis. The study found that activity-based learning was occasionally used by teachers in public pre-primary schools in the study area. Teachers failed to use the recommended methods because of the non-availability of adequate and quality instructional resources.

An and Reigeluth (2011) explore teachers‘ beliefs, perceptions, barriers, and support needs in the context of creating technology-enhanced, learner-centered classrooms. The researcher used an online survey to collect data, and 126 teachers participated in the survey. The findings of this study provide practical insights into how to support teachers in creating technology-enhanced, learner-centered classrooms.

Urbanc (2017) examined technology-enhanced inquiry approaches and benefits in secondary science classrooms. The qualitative research methodology was employed for the study. This also included semi-structured interviews. From thematic analysis, the themes that emerged were practices related to technology-enhanced inquiry, benefits of technology and, challenges of technology-enhanced inquiry. The study developed a questionnaire that measures technology integration in classrooms. The study found that patterns of technology use supports steps in the inquiry process and aids students‘ metacognitive skills development.

Methodology

This study utilized the descriptive survey research design method. This allowed the researcher to sample the opinion of experts. The study was conducted in South South Nigeria, using experts. The population of the study is 168, comprising of 37 educational technology experts and 13 computer education Lecturers, 56 TVET lecturers and 62 lectures in curriculum planning and management from federal universities in South South Nigeria. Simple random sampling technique was used to sample 97 respondents for the study from the population. The researcher developed instrument titled ―Technology Enhanced and Activity-Based Learning Environment Indices (TEABLEI)‖ was used for data collection. The instrument was developed with expert consultation and literature review using a 4-point rating scale. The developed instrument was then face validated by seven (7) experts. The instrument was further assessed for reliability using the split half method. This involved 20 experts. Cronbach alpha was used to compute the reliability index which gave a value of .85. The instrument was then administered to the respondents. The experts rated the instruments and ascertained the skills technology enhanced and activity based tasks of technical teachers. They then rated the instrument to determine the skills level appropriate and required. The technical teachers on the other hand, rated their skills level. Ther difference between skills required and skills possessed gives the skills need. The

collated data was analysed using mean and standard deviation.

Presentation of findings

Research Question 1: What are the skills needed by Vocational technical lectures for utilization of activity-based learning instructional strategies in classrooms?

Table 1: Mean responses of experts and technical teachers on the Skills required and possessed in creating activity-based Learning environment

S/N	Steps in Creating activity-based Learning environment	Skills required		Skills possessed		Skills need = mean difference = (Skills possessed-skills required)	Remarks
		Mean	Std dev	Mean	Std dev		
1	Provide structure beginning with explanation of lessons	3.54	0.59	1.99	1.03	-1.55	*SN
2	Use of Task-Based Learning- provide learning activities or tasks that stimulate students‘ higher-order thinking and self-regulated learning skills	3.93	0.28	3.90	0.34	-0.03	SN
3	Create an environment conducive for discussions and idea generation	3.46	0.85	3.22	0.98	-0.24	SN
4	Sustain an environment conducive for discussions and idea generation	3.52	0.53	1.77	0.87	-1.74	SN
5	give students increasing responsibility for the learning process.	3.49	0.50	2.51	1.20	-0.98	SN
6	help students in developing and using effective learning strategies.	3.62	0.49	1.93	1.03	-1.70	SN
7	Facilitate instruction/discussion in class	3.60	0.56	1.96	1.16	-1.64	SN
8	Develop group cohesiveness	3.70	0.46	2.54	1.12	-1.16	SN
9	Manages group- involvement processes	3.92	0.27	2.81	0.92	-1.11	SN
10	Promotes the development of action and follow-up plans	3.46	0.85	1.64	0.98	-1.82	SN
11	Use a variety of questioning techniques to generate discussion and facilitate a deeper level of thinking.	3.52	0.53	2.89	1.00	-0.62	SN
12	include students in decisions about how and what they learn and how that learning is assessed	3.89	0.45	3.83	0.55	-0.06	SN
13	Support the scaffolding process by presenting information in a just-in-time manner	3.88	0.44	3.82	0.54	-0.06	SN
14	Motivation skills through Encouragement- provide positive	3.58	0.50	1.87	1.19	-1.71	SN

	emotional support and encouragement to students						
15	provide activities that are personally challenging to each student	3.94	0.23	3.93	0.26	-0.02	SN
16	Share experiences that enhance credibility.	3.45	0.97	3.36	1.02	-0.09	SN
17	Maintain a positive, professional demeanour	3.60	0.66	1.71	0.94	-1.89	SN
18	Intervention skills when discussion is being derailed	3.93	0.25	2.29	1.22	-1.64	SN
19	Problem solving skills	3.52	0.76	2.07	1.08	-1.45	SN
20	Active Listening skills	3.53	0.62	1.93	1.10	-1.59	SN
21	Planning skills- organisation and structure of tutorial	3.91	0.43	2.63	0.96	-1.28	SN
22	Designing lesson plans- help students with learning plans, develop strategies	3.63	0.48	2.73	1.18	-0.90	SN
23	Engaging in learning activities- guidance to ensure that students are on track with their learning	3.96	0.21	1.83	1.07	-2.12	SN
24	Track student progress and provide feedback	3.38	0.88	2.74	1.10	-0.64	SN
	Average Mean	3.66		2.58		-1.09	SN

*SN- Skills Needed

Table 1 gives the summary of the responses of experts and technical teachers on the activity-based learning environment tasks. The experts rated the required skills level, while the technical teachers rated their skills level. The difference between the teachers skills level and the required skills level gives the skills need. The result shows that all the items have a negative mean difference. This indicates that teachers need skills in the identified activity-based learning tasks. The cumulative mean difference is -1.09, indicating that technical college teachers need skills in implementation of activity-based learning environment in technical colleges.

Research Question 2: What are the skills needed by Vocational technical lectures for utilization of technology enhanced learning tools in classrooms?

Table 2: Mean responses of experts and technical teachers on the Skills required and possessed in implementing technology-enhanced Learning environment

S/N	Current Practices in Creating Technology-based Learning environment	Skills required		Skills possessed		Skills need = mean difference = (Skills possessed-skills required)	Remarks
		Mean	Std dev	Mean	Std dev		
1	Use of Power Points	3.59	0.31	3.93	1.10	0.54	**SNN
2	Google Classroom and G-Suite	3.56	0.21	2.73	0.96	-0.86	*SN
3	E-Learning and Online Courses	3.23	0.82	2.73	1.18	-0.83	SN
4	Software for technical skills development	3.25	0.95	2.83	1.07	-0.40	SN
5	Connected Classrooms	3.53	0.25	2.74	1.10	-1.49	*SN
6	Zoom	3.53	0.74	3.29	0.32	-0.24	SN
7	Internet Homework Assignments	3.54	0.56	3.15	0.21	-0.37	SN
8	Online grading Systems	3.51	0.48	3.19	0.82	-0.35	SN
9	Classroom Tablets	3.42	0.83	3.20	0.96	-0.31	SN
10	Student Progress Tracking	3.65	0.73	2.87	0.85	-0.55	SN
11	Tech-Enabled Student Presentations	3.69	0.62	3.50	0.75	-0.15	SN
12	Video And Multimedia Instruction	3.50	0.60	3.32	0.57	-0.37	SN
13	Virtual Classrooms	3.54	0.59	2.82	0.84	-0.68	SN
14	Online Lesson Reviews	3.43	0.28	3.38	0.84	-0.16	SN
15	Chatbots For Extra Help	3.46	0.85	2.63	0.75	-1.20	SN
16	Digital Textbooks	3.52	0.53	3.67	0.63	0.21	SNN
17	Teacher Websites	3.49	0.50	2.69	1.61	0.17	SN
18	Podcasts	3.62	0.49	1.64	0.98	-1.85	SN
19	Using technology simulation in classrooms	3.60	0.56	2.89	1.00	-0.73	SN
20	Teaching students application of advanced technologies in their occupation	3.51	0.38	3.83	0.55	0.23	SNN
	Average Mean	3.59	0.31	3.15		-0.35	SN

*SN- Skills Needed; **SNN- Skills Not Needed

Table 2 presents the summary of the responses of experts and technical teachers on skills level in creating technology-based learning environment. The difference between the teachers' skills level and the required skills level as given by expert opinion gives the skills need. The result shows that items 1, 16 and 20 have mean difference of 0.54, 0.21 and 0.23 respectively. This means that teachers do not have skills need in use of power points, digital textbooks and Teaching students application of advanced technologies in their occupation. The result shows

that all the other items have a negative mean difference. This indicates that teachers need skills in creating technology-based learning environment. The cumulative mean difference is -0.35, indicating that technical college teachers need skills in creating technology-based learning environment.

Discussion of Findings

The study identified skills in creating activity-based classroom. The teachers' skills level was ascertained and experts also identified required skills level. Findings showed a negative difference between required skills level and acquired skills level of teachers. The findings of the study revealed a low level of the practice of activity-based learning by vocational technical lecturers. This is also indicative of the instructional models utilized by the lecturers, which may not support student centred learning as advocated by experts. The findings of the study indicated that teachers need skills in creating activity-based classroom in technical colleges. This findings is in tandem with Andiema (2022) who studied activity-based learning strategies used by teachers in public pre-primary schools in Kenya. The study also identified activity-based tasks for teachers seeking to implement active classrooms. He also found teachers unwillingness to implement activity-based learning. This might be related to the fact that they may not have the skills needed to implement active learning.

The findings of the study also reveal a similar condition of skills need for technology enhanced learning utilization by lecturers. There was still an observed negative difference between required technology enhancement skills and possessed skills by lecturers. Hence, revealing that teachers need skills in integrating technology into their classrooms. The identified technology enhanced learning procedures is similar to the steps identified by Urbanc (2017), who developed a scale that measured technology use using different indicators. The indicators include use of power pint, google classroom, digital textbooks, podcasts and social media presence.

Conclusion

The outcome of the study reveals that teachers need skills in activity-based and technology enhanced learning implementation in technical education. The study also identified key skills and tasks also essential in measuring activity-based-technology enhanced classroom tasks that will help teachers assess their skills level and adjust performance accordingly.

Recommendations

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

1. There should be a structured training of technical teachers on activity-based classroom implementation by the State technical schools boards.
2. The state technical schools board should review the technical schools technology integration policy in the light of new technologies shaping occupations with a view to expanding the introduction of more technologies into technical training.
3. Technical teachers should be trained on application of technologies for instructional and professional purposes. This is to ease their utilization for instruction as well as professional purposes.

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