

Assessment of the Application of ICT IN TVET Programmes in Technical Colleges in Niger State, Nigeria

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Abstract

This study assessed the application of ICT in TVET programmes in Technical Colleges in Niger State, Nigeria. It investigated the utilization of ICT in TVET's pedagogy and the TVET teacher's competency level. The study was guided by two research questions and one hypothesis. A descriptive survey design was used. The population consists of 122 TVET teachers. A 4-point scale validated questionnaire was used to collect data. For data analysis, Mean, standard deviation and t-test were utilized. Findings showed that, internet search engines (Goggle, Opera mini), are the only ICT resources applied in the teaching and learning process of TVET and TVET teachers are not competent in using majority of the items. Furthermore, there is no significant different between the mean response of TVET teachers with 5-10 years of experience and 11 years and above on the level of ICT competency. It is therefore concluded that ICT resources are grossly inadequate and therefore not applied in the teaching and learning process of TVET programmes in technical colleges. Hence, recommended that Government and other stakeholders should regularly and adequately train and motivate TVET teachers in the use of ICT to help improve the quality of ICT enabled TVET programme. Government should ensure adequate funding for the needed functional ICT resources and infrastructure in TVET programmes are put in place for the teaching and learning process.

Keywords: TVET programmes, TVET teachers, ICT, Teaching, Learning

1. Introduction

Our world is increasingly evolving thanks to technology and all facets of life continue to experience rapid changes as a result. Effective teaching and learning now depend on the usage of internet in the classroom. The internet enables interaction in the digital environment by providing access to information via telecommunications technology (Akturk 2020). Therefore, it is not surprising to observe an increase in the need for ICT applications in technical and vocational education and training (TVET) globally.

ICT is crucial for the modernization of education in every country, according to Madaki et al (2021). By enhancing the pedagogy and delivery methods of instruction, the accessibility of educational resources, and the promotion of fruitful interaction among students, ICT continues to enhance access to instruction. ICT modifies how concepts and procedures are conveyed to students during the teaching and learning process. It also gives students increased access to information, fostering a more positive attitude and sense of confidence in both teachers and students. Jaji (2020).

A key component of the Nigerian educational system is TVET. It was introduced in Nigeria with the mind to impart technical abilities for the country's economic, agricultural, industrial, and

commercial development (Okoye & Michael, 2015). TVET differs from other kinds of education in that it focuses on teaching and acquiring practical and applicable skills as well as fundamental scientific information for the advancement of the nation and the global community. According to Diao et al. (2021), TVET strives to support social development and promote employment, cultivate students' professional talent and spirit, and equip them with the skills necessary to behave appropriately in a variety of settings and take on personal and social obligations.

The use of ICT in TVET programs can be understood as a wide range of hardware and software that are used in teaching and learning systems, including multimedia systems, computer-based training systems, telecommunications systems, electronic performance support systems, as well as the internet with World Wide Web systems. According to Altakhneh and Abumusa (2020), the integration of ICT into the educational system creates a dynamic and proactive teaching-learning environment that can enhance the caliber and accessibility of the instruction given to students. The majority of TVET institutions in developing nations use traditional methods for delivering instruction and learning, requiring that students be physically present in the classroom and that the teacher serve as the primary source of information while the students merely act as consumers of it. A deviation from the norm is necessary given the present dynamics of education and the workplace.

By revitalizing both teachers and students in the classroom, ICT integration creates a dynamic learning environment, according to Saidu and Abubakar (2020). With the aid of ICT, teachers may effectively communicate abstract material, increasing efficacy and improving understanding. The adoption of various ICTs into the educational system and the subsequent understanding of the possible educational benefits are not, however, automatic processes. Teachers need to be adept at using ICT to provide lesson plans in order for this integration and use of ICTs in pedagogy to be successful. According to Paudel (2021), the process of applying ICT in teaching can be quite complicated and challenging when teachers are not equipped with competencies for teaching practices. Computer training enables teachers to acquire more knowledge, which in turn increases their confidence and improves their competency in using ICT for teaching. Computer use will be challenging and frustrating without the necessary expertise and understanding to complete fundamental tasks.

If implemented, the use of ICT in TVET programs would help to enhance the standard of instruction and training in technical and vocational programs and would be extremely advantageous to TVET teachers as it would enable them to quickly and easily produce and modify resources while preparing for their instruction process. Additionally, it would make it possible to differentiate instructional delivery strategies effectively and facilitate the provision of feedback. Thus, the class would be more pleasurable and engaging as a result of the students' increased engagement with and motivation for learning.

In schools with overcrowded student populations and inadequate facilities and classroom design, the traditional teaching approach struggles to keep up. Therefore, it is clear that the traditional educational setting does not appear to be appropriate for educating students to operate or to be productive in the workplaces of today's society, which is why ICT applications

have been incorporated into TVET programs. Therefore, study's aim is to ascertain the degree to which ICT is employed in teaching and learning and how the level of ICT competency of TVET teachers affects the use of ICT in TVET programs at technical colleges in Niger State, Nigeria.

2. Research Questions

The study was guided by the following research questions:

1. To what extent is ICT applied in the teaching and learning process of TVET programmes in Technical Colleges in Niger State?
2. What is the level of TVET teachers' ICT competency in TVET programmes in Technical Colleges in Niger State?

3. Hypothesis

For the study, a null hypothesis was formulated and tested at 0.05 level of significance:

H_{01} There will be no significant difference between the mean response of TVET teachers with 5-10 years of experience and TVET teachers with 11 years and above experience on the level of ICT competency in TVET programmes in Technical Colleges in Niger State.

4. Methodology

Descriptive survey research design was chosen for the study as recommended by Check and Schutt (2012) for studies that use questionnaire to explore attitude and opinions of a specific population or representative sample on existing phenomena. The area of study was Niger State which has three senatorial districts /zones namely; Zone A, B and Zone C with seven technical colleges across the zones, six (6) of which are State technical colleges and one (1) Federal technical college: Government technical college Minna, Suleman Barau technical college Pandogari, Government technical college, Eyagi Bida, Mamman Kontagora technical college, Pandogari, Government technical college, New Bussa, Government technical college, Kontongora and Federal science and technical college, Shiroro. The research was conducted in each State technical colleges.

There are 122 TVET teachers in state technical colleges across Niger State who make up the study population. The entire population was studied as it was small to be sampled. The researchers and two research assistants who had been briefed on the purpose and details of the instrument, distributed copies of the instrument (validated questionnaires) to the respondents. 108 copies (88%) were retrieved after one week. To assess whether or not respondents were homogeneous with respect to the mean and research questions, the data were analyzed using arithmetic mean and standard deviation. While t-test was used to test the null hypothesis at a 0.05 level of significance. Items with a mean response less than 2.50 suggests that respondents use them less frequently or dispute that they are in use, whereas items with mean responses more than 2.50 indicates that respondents use them more frequently or agree that they are in use. For testing hypothesis ± 1.67 will be the critical value, any item that has its t-value equal or below t-critical was considered not significant, and any item that has its calculated t-value over t-critical was considered significant.

5. Results

Research Question I: To what extent is ICT applied in the teaching and learning process of TVET programmes in Technical Colleges in Niger State?

Table 1: Mean response on the application of ICT in teaching and learning process of TVET programmes in technical colleges in Niger State. N1=46, N2=62.

S/N	ITEMS	X ₁	X ₂	X _t	Remark
1	Audio clips are used for teaching and learning	2.4	2.1	2.3	Unutilized
2	Video clips for teaching and learning	1.6	1.8	1.7	Unutilized
3	Digital library for teaching and learning	1.4	1.9	1.7	Unutilized
4	Internet search engines (Google, Opera mini) to achieve self-directed learning	3.3	2.9	3.1	Utilized
5	Online group discussions/ forums	2.3	2.2	2.3	Unutilized
6	Online tutorial for self- learning	2.3	1.5	1.9	Unutilized
7	Online dictionary (Wikipedia) for teaching and learning	2.1	1.8	2.0	Unutilized
8	Computer simulation (simulating real world phenomenon in 3-D to demonstrate difficult, complex concepts) for teaching and learning	1.2	1.7	1.4	Unutilized
9	Educational games/video games in the classroom to improve manipulating skills and creative thinking	2.0	1.5	1.8	Unutilized
10	Online drill and practice session for mastery	1.8	1.6	1.4	Unutilized

KEY: X₁= average mean responses of TVET teachers with 5-10 Years' experience in technical colleges, X₂= average mean responses of TVET teachers with 11 years and above experience in technical colleges, N1= number of TVET teachers with 5-10 years' experience in technical colleges, N2= number of TVET teachers with 11 years and above experience in technical colleges.

According to Table 1, the respondents agreed with item 4 with a mean score above 2.50 as being utilized. While item 1, 2,3,5,6,7,8,9 and 10 disagreed with a mean score below 2.50 as being unutilized. This indicates that item 4 is being utilized in the teaching and learning process of TVET programmes in technical colleges in Niger State. While item 1, 2,3,5,6,7,8,9 and 10 are not used.

Research Question II: What is the level of TVET Teachers ICT competency in TVET programmes in technical colleges in Niger State?

Table 2: Mean response on the level of TVET teachers ICT competency in TVET programmes in technical colleges in Niger State. N1=46, N2=62.

S/N	ITEMS	X ₁	X ₂	X _t	Remark
1	I know how to download and view PDF file	3.2	3.0	3.1	Agreed
2	I know how to create document using Microsoft word	2.7	2.9	2.8	Agreed
3	I can save documents in the desired location on the desktop	1.5	1.8	1.7	Disagreed
4	I know how to retrieve documents from the place of storage on the desktop.	1.2	1.5	1.4	Disagreed
5	I know how to use web browsers to get access to information (Google, Opera mini among others)	3.6	2.8	3.2	Agreed
6	I can use Microsoft PowerPoint to present data	1.6	1.9	1.8	Disagreed
7	I know how to use spreadsheet software (Microsoft Excel)	1.2	1.8	1.5	Disagreed
8	I know to use a printer to print materials by myself	1.6	1.9	1.8	Disagreed
9	I know how to access educational materials from online libraries	1.4	1.5	1.5	Disagreed
10	I know how to send E-mails	3.6	3.0	3.3	Agreed

KEY: X₁= average mean responses of TVET teachers with 5-10 years' experience in technical colleges, X₂= average mean responses of TVET teachers with 11 years and above experience in technical colleges, N1= number of TVET teachers with 5-10 experience in technical colleges, N2= number of TVET teachers with 11 years and above experience in technical colleges.

Table 2 shows that the respondents agreed with items 1, 2, 5 and 10 with a mean score above 2.50 respectively. While items 3, 4, 6, 7, 8 and 9 disagreed with a mean score below 2.50. Which implies that items 1, 2, 5 and 10 agreed to the level of TVET teachers' ICT competency in TVET programmes in technical colleges in Niger State. While item 3, 4, 6, 7, 8 and 9 disagreed. Indicating a lack of ICT competency among TVET teachers.

Hypothesis I

There will be no significant difference in the mean response of TVET teachers with 5-10 years' experience and TVET teachers with 11 years and above experience on the level of ICT competency in TVET programmes in Technical Colleges in Niger State

Table 3: Analysis of the respondent's t-test results on the level of TVET teachers' ICT competency in TVET programmes in technical colleges in Niger State

S/N	ITEMS	SD ₁	SD ₂	t-test	Remark
1	I know how to download and view PDF file	0.92	0.85	1.15	A
2	I know how to create document using Microsoft word	1.10	0.92	-1.00	A
3	I can save documents in the desired location on the desktop	0.75	0.80	-1.99	NA
4	I know how to retrieve documents from the place of storage on the desktop.	0.51	0.74	-2.49	NA
5	I know how to use web browsers to get access to information (Google, Opera mini among others)	0.75	0.95	4.89	NA
6	I can use Microsoft PowerPoint to present data	0.83	1.11	-1.61	A
7	I know how to use spreadsheet software (Microsoft Excel)	0.42	0.74	-5.33	NA
8	I know to use a printer to print materials by myself	0.91	1.51	-1.51	A
9	I know how to access educational materials from online libraries	0.80	0.57	-0.72	A
10	I know how to send E-mails	0.88	0.69	3.83	NA

Key

SD₁= Standard deviation of TVET teachers with 5-10 years' experience in technical colleges

SD₂= Standard deviation of TVET teachers with 11 years and above experience in technical colleges

A= Accepted

NA= Not Accepted

The result shown in Table 3 indicates the comparison between the TVET teachers with 5 to 10 years' experience and TVET teachers with 11 years and above experience in technical colleges. Data showed that items 1,2,6,8 and 9 has a calculated t-value less than the t-critical value of ± 1.66 , hence hypothesis for these items were upheld at 0.05 level of significance. Expect for item 3,4,5,7 and 10 which has a t-calculated value above the t-critical value ± 1.66 , H₀ was therefore rejected for these items.

6. Findings of the Study

The following are the key findings of the study.

The research question 1's findings are represented in Table 1, which reveals that just a small portion of the items pertain to how much ICT is used in TVET programs at technical colleges

in Niger State during the teaching and learning process. The results showed that the majority of the application of ICT in the teaching and learning of TVET programs is only through internet search engines like Google and Opera mini, which helps to achieve self-directed learning as this process tends to increase teaching and learning quality, but is glaringly insufficient for effective application of ICT in TVET programs.

The results in table 2 connected to research question 2 showed that the respondents did not agree with the majority of the statements regarding the degree of TVET teachers' ICT competency in TVET programs in Technical Colleges in Niger State. The results indicated that most teachers lack basic ICT skills, including how to save or retrieve documents, present data using Microsoft PowerPoint, use Microsoft Excel, and access online databases of educational resources.

7. Discussion of the Findings

Findings from the study showed that ICT use in TVET programs at technical colleges in Niger State is extremely limited. When available, the TVET teachers lack the necessary skills to use the equipment and ICT resources, which seriously hampers their ability to fully implement TVET in these technical colleges. According to Ezenwanfor et al (2014) research, TVET teachers lack the necessary skills, and ICT infrastructure and equipment are woefully inadequate. This results in a low level of ICT resource utilization in TVET programs. Furthermore, his research showed that the government and administrators of educational institutions still give TVET lip service without actually recognizing its relevance. Given that, according to Igwe et al. (2021), the TVET sector in Nigeria continues to experience a severe lack of certified staff, equipment, and infrastructure, this demonstrates conclusively that there has been no demonstrable increase in the deployment of ICT in TVET programs.

ICT use in the classroom, according to Amin (2013), energizes both teachers and students, fostering an engaging and participatory learning environment. However, the results of this study demonstrate that TVET teachers lack ICT proficiency. Given that these ICT resources are not adequately made available in schools and that there are no training programs put in place by the government or school administrations to teach them to teachers who are willing to learn them, the majority of people do not understand the necessity of acquiring learning context-related competencies that these shifts in teaching and learning paradigms demand. Liverpool and Oti (2011) claimed that ICT in education promotes access to teaching by improving the pedagogy and techniques of instructional delivery and facilitates meaningful engagement among learners. Igwe (2022) added that the use of ICT resources has the potential to improve and widen access to education and training in TVET. When there are no operational procedures for the application of ICT in TVET programs, these advantages cannot be observed.

8. Conclusion

In conclusion, the use of ICT in TVET can be understood as the incorporation of ICT tools into TVET programs' teaching and learning processes. For effective teaching and learning, ICT usage in the classroom has evolved into a non-negotiable constant. Therefore, it is not

surprising to witness an increase in demand for ICT integration into TVET programs across the globe.

ICT resources are essential tools for strengthening and enabling observations, improving memory retention, and ultimately leading to better teaching and learning. ICT not only helps students study more but also supports teachers' efforts to impart knowledge and skills. With ICT, TVET programs' teaching and learning would be engaging rather than time-consuming and demanding.

The study's findings led to the conclusion that TVET teachers have a low degree of ICT competency. Therefore, an ICT training program should be carefully prepared to increase the basic ICT literacy of the current TVET teachers. In order for TVET programs to continue to be relevant and appealing, they must identify and introduce digital skills and capabilities for the evolving world of work and to take advantage of the opportunities presented by digitization. As a result, TVET policy makers, training providers, donors, and funding agencies need to concentrate on improving the overall ICT enablement in TVET programs.

9. Recommendations

The following recommendations were given in light of the study's findings;

1. TVET teachers should pursue acquisition of skills in using ICT resources by attending workshops, training programmes, and seminars for enhanced effectiveness.
2. Government and policy makers should train TVET teachers pre-service and in-service on ICT skills based on the 21st century requirements.
3. Government should ensure adequate funding for the needed functional ICT resources and infrastructure for TVET programmes are put in place for the teaching and learning process.

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