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## Accessing the Availabilities, Utilization and Attitude of Teachers in E-learning Technologies for the Teaching and Learning of TVET Programmes in the North-west Nigeria

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### **Abstract:**

*The study focused on Accessing the Availabilities, Utilization and Attitude of Teachers in E-learning Technologies for the Teaching and Learning of TVET Programmes in the North-west Nigeria Two research questions were developed and answered in line with what the study sought to find out. Also two null hypotheses were formulated and tested at the probability of 0.05 levels of significance. The study made use the questionnaire consists of fifty questions, divided into four sections with five printed pages. The questions included close-ended as well as open-ended questions to capture respondents' experiences regarding the application of the e-learning technologies in their core business of teaching in the Nigerian COEs. The instrument was face validated by the researcher's senior colleagues in the school of Technical Education and to ensure reliability of the items, they were pilot tested in two (2) Colleges outside the selected COEs within the study area. The entire population for the study was 98,377 Students across the colleges 2000 obtained from the sampled colleges selected from the study area. Three hundred and twenty (100) respondents were sampled out of the total population using stratified simple random sampling technique. The data collected for the study were analyzed using descriptive statistics (mean and Standard deviation) to answer the research questions raised where t-test statistical analysis was employed by the researcher to test the null hypotheses. The findings of the study revealed that the potentials for real adoption of e-learning technologies for the teaching and learning of TVET programmes in the Nigerian COEs are great, also revealed that the level of e-learning technologies utilization varies among the research participants, and over 75% of participants are happy to use e-learning technologies for educational purposes.*

**Keywords:** Accessing, availabilities, utilization, attitude of teachers, e-learning, technologies, teaching and learning

### **1. Introduction**

In the recent time, e-learning has become an integrated part of our lives and the educational process; it is now a necessary tool for preparing people to participate in the technologically driven global environment. E-Learning is a very broad term for electronic method of learning such as computer-based training, web-based training or Internet-based training. It is the use of Information and Communication Technologies (ICTs) to enhance and/or support learning in tertiary education (OECD, 2005). It has become predominant in both secondary and post-secondary education, as well as in corporate learning in most countries (e.g. USA, India, and Canada). E-learning has been widely accepted as it is seen as a form of knowledge transfer which is independent of time and location. Students, teachers, lecturers, entrepreneurs, policy makers and e-learning practitioners have been able to use technology to make progressive change at both institutional and system-wide levels.

In Nigeria today, the integration of e-learning technologies to support the traditional form of classroom teaching and learning has been given much prominence of recent as both private and government are taking initiatives to integrate e-learning technologies into the learning system. Policy initiatives since 1988, according to Yusuf (2007) have been targeted to integrate and explore the opportunities that ICT can offer through e-learning in the Nigerian school system at a variety of levels (e.g., policy emphasis, curricular emphasis, teacher development plans in ICT and institutional investment, etc.). Similarly, a number of initiatives according to Lawal, et al., (2017) have been set up to integrate e-learning technologies in the nation's school system, including National Policy on Computer Education, National Policy on Information Technology, Establishment of National Information Technology Development Agency (NITDA).

However, for almost two decades since then, little impact of e-learning technologies has been felt in the Nigerian school system (Lawal, 2017 and Yusuf, 2007). Since 1988, the policy initiatives to encourage the use of e-learning technologies in the Nigerian schools have not yielded the needed results of improving teaching and learning that will produce a better educated work force. The changes noted through e-learning technologies in the Nigerian school are much smaller than expected, in spite of the fact that potentials for real change are great (Lawal, 2017 and Yusuf, 2007). Furthermore,

initiatives and the rising investment in e-learning technologies to teach TVET programmes in technical colleges do not guarantee its effective use or what impact it will have (Lawal, et al., 2017). Even in the Nigerian COEs where the commitment has been significant and e-learning technologies are seemingly ubiquitous, its use in classrooms is highly variable and often underwhelming (Ajayi and Lawal 2014). Indeed, Ajayi and Lawal survey of lecturers and students of Nigerian COEs found no correlation between student - computer ratio and use of e-learning technologies in classrooms. Teachers differ on whether they feel e-learning technologies makes their jobs easier or adds to their workloads. While teachers may recognize the positive potential that e-learning technologies can offer in the classroom, that potential is rarely realized (Onu, 2011).

In terms of *competencies required* to use the e-learning technologies for teaching, researches (e.g. Lawal, et al., 2017 & Ajayi and Lawal, 2014) have shown that most teachers educators in the Nigerian COEs lack, Technological Pedagogical Content Knowledge (TPCK) i.e. the skill and knowledge on how to adopt the e-learning technologies into their classrooms for teaching and learning purposes. Ajayi and Lawal also claim that, traditional teaching methods have dominated the lecture delivery and have been the adopted practices in the Nigerian COEs and that, pre-and in-service teachers have insufficient access to digital technologies and the internet in their classrooms and other centres within their schools premises in the Nigerian teacher training institutions.

### 1.1. Problem Statement

The teaching and learning of TVET programme in the Nigerian COEs are intended to produce teachers with relevant technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in the sectors of economic and social life. For this reason, effective TVET education programmes within the purview of curriculum delivery of the World Council for Curriculum and Instruction (WCCI, 2012), which calls for a paradigm shift in the delivery system to match the new knowledge, attitudes, skills and technologies that are emergent to meet the demands of the knowledge economy and global competitiveness are highly important.

Since curriculum is a vehicle through which educational goals are attained and methods of delivery are a component of the curriculum, there is need for employment of effective delivery systems of TVET related programmes in the Nigerian COEs so as to produce efficient TVET teachers who are locally and globally competent, effective and relevant. E-learning which is electronic learning is one of such effective curriculum delivery systems that have been identified by researchers. In fact, e-learning in Nigeria tertiary institutions has recently continued to grow at unprecedented rate but with a lot of challenges. Researchers (e.g. Ekesionye & Okolo, 2011) have proven that e-learning approach of curriculum delivery is superior to the traditional classroom method of teaching and learning. Other researchers (Onwuagboke et al., 2014; Yusuf, 2014; Ajayi and Lawal 2014; Owolabi et al, 2013;) affirm that though, e-learning approach is not a substitute but a supplement to the traditional classroom teaching and learning. They prove that the inclusion of e-learning technologies in education can very well improve student achievements. They added that the levels of improvement largely depend on the accessibility and utilization of the e-learning technologies; the way the technology is infused into the teaching methods and the design of instruction (Lawal, 2017 and Ekesionye & Okolo, 2011).

However, owing to the importance of the TVET education highlighted above, little has been done to investigate and assess the level of availability, accessibility and utilization of these e-learning technologies in the teaching and learning of TVET programmes in the Nigerian COEs. Additionally, the factors identified by various research listed above may not apply to all COEs in Nigeria, as different tiers of tertiary institutions in Nigeria have varied policy and curricular emphasis, teacher development plans and institutional investment. That is the problem this research is designed to tackle.

### 1.2. Objectives

- Determine the extent to which e-learning technologies are available and utilized for the teaching and learning of TVET programmes in the Nigerian COEs across the North-West geopolitical zone of the country
- Determine the extent of attitude to which e-learning technologies are utilized for the teaching and learning of TVET programmes in the Nigerian COEs across the North-West geopolitical zone of the country

### 1.3. Research Questions

- In what extent are the e-learning technologies available and utilized for the teaching and learning of TVET programmes in the Nigerian COEs?
- What is the influence of TVET educators' attitude towards the utilization of e-learning technologies for the teaching and learning of TVET programmes in the Nigerian COEs?

## 2. Literature Review

### 2.1. Concept of E-learning

E-Learning is a very broad term for electronic method of learning which is closely associated with internet -based learning in general. E-learning education is the wholesome integration of modern telecommunication equipment and ICT resources, particularly the internet, into the education system. Various concepts of e-learning have been given. E-learning refers to the use of information and communication technologies (ICTs) to enhance and/or support learning in tertiary education (OECD, 2005).

Distance education has made e-learning more popular as it has become a veritable way to bridge the distance between the teacher and the learner, between the writer and the speaker (Obuh, 2010). Obuh also views e-learning as

comprising all forms of electronically supported teaching and learning. He contends that e-learning is to brick wall classroom learning, what mobile phone is to analogue fixed telephone line. To him, whereas the block wall classroom is situated at a place where teachers and students physically meet and interact, e-learning is diffused, capable of taking place anywhere and anytime, without face-to-face interaction between the teacher and students.

E-Learning has become synonymous with the latest approach to providing high quality educational offerings. E-Learning according to Seufert et al., (2001) is defined as technology - supported learning and the delivery of content via all electronic media. E-Learning places greater emphasis on interaction and communication. Interaction with the instructor and with other students which may occur through internet-channels, videoconferencing or teleconferencing, in asynchronous (email or bulletin board) sessions or synchronous (e. g., chat room, whiteboard, application sharing) sessions. E-learning is a term applied to systems for distance learning, software to support students taking a campus-based course, or simply online documentation for teaching (Seufert et al., 2001).

In summary, e-learning is viewed by various authors according to their personal knowledge and perspectives, but they all seem to agree that e-learning comprises all forms of electronically supported learning and teaching which are procedural in character and aim to effect the construction of knowledge with reference to individual experience, practice and knowledge of the learner. This view is supported by Ravichandra (2005), who said that E-learning in the broadest sense concerns itself with learning that occurs on line through the internet, off the using the CD-ROM or other facilities such as radio, television and telephony. E-learning encompasses learning at all levels, both formal and non-formal that uses an information network, the internet, an intranet (LAN) or extranet (WAN), whether wholly or in part, for course delivery, interaction, evaluation and facilitation which Salawudeen (2010) explained, uses network technologies to create, deliver and facilitate learning any time, and anywhere.

## *2.2. Forms of E-learning Approach*

E-learning has evolved since technology was first used in education. There is a trend to move towards blended learning services, where computer-based activities are integrated with hands-on, face-to-face, or classroom-based situations. Various methods in e-learning include:

### 2.2.1. Classroom 2.0

This refers to using an online multi-user virtual environment (MUVE) to connect schools across geographical frontiers. Known as 'e-Twinning', computer-supported collaborative learning (CSCL) and the Internet allow learners in one school to communicate with learners in another that they would not get to know otherwise, enhancing educational outcomes and cultural integration.

### 2.2.2. E-learning 2.0

E-learning 2.0 is a type of computer-supported collaborative learning (CSCL) system that developed with the emergence of Web 2.0. From an e-learning 2.0 perspective, conventional e-learning systems were based on instructional packets, which were delivered to students using assignments. Assignments were evaluated by the teacher. In contrast, the new e-learning places increased emphasis on social learning and use of social software such as blogs, wikis, podcasts, virtual worlds and social networks.

Technologies including blogs, collaborative software, e-Portfolios, virtual classrooms, audio, video and tools like computers, laptops, tablets are increasingly used to support e-learning. With the increased use of mobile phones, a new method in e-learning being explored is the use of mobile phones for different types of learning and this is referred to as Mobile learning or m- Learning.

## *2.3. Prospects and Benefits of using E-Learning Technologies in the COEs System*

According to Ogboji (2011:340):

- E-learning makes teaching and learning easy and reduces stress for both lecturers and students.
- It is convenient for students to review their course materials anytime and get result faster than it used to be with the traditional system.
- It provides opportunity for a course designer to present to students through a single interface all the requirements and components of a course of training.
- It provides additional resources including reading materials and links to outside resources in internet and libraries.
- It provides examination and self-assessment quizzes which can be scored automatically.
- It provides electronic communication such as e-mail and threaded discussions for both lecturers and students.

Mole (2011) adds that e-learning has a capacity to address the scarcity of teaching and research materials in the libraries of institutions of higher learning. It would allow students, lecturers and researchers to share their own research outputs with the global community and improve the provision of current e-books, e-journals and other library resources, enhance access of academic libraries to global library and information resources; enhance scholarship, research and life-long learning through the establishment of permanent access to shared virtual archival collections. We can also that e-learning equips students with the digital skills for the job market.

Furthermore, e-learning makes the learner to be dependent and accessible to learning experiences locally and globally through the internet by the best universities and research institutions in the world. Administratively, e-learning project offers the university opportunity to publish information on the internet, such as latest events on campus, list of newly

admitted students, online registration of students and course and payment of fees.

#### 2.4. E-Learning in the Context of TVET

Due to the flexibility, simplicity and affordability of ICT facility in all areas of human endeavour, its application in the field of education is gaining popularity among educational organisations and their stakeholders (Tondeur, van Keer, van Braak, & Valcke, 2008). TVE in this context is not an exception too; the use of ICTs to foster employability skills is highly recommended (Saud, et-al, 2011).

However, the use of ICTs toward the preparation of TVE graduates; and in their mode of training should also incorporate the use of e-learning in teaching learning process. E-learning (ICT based learning environment), enables students, trainees and teachers/instructors interact virtually without physical contact (Bappa-Aliyu, 2012). The consensus among educational practitioners is that e-learning is 'the use of processes and technologies to create, distribute, manage, and enable learning via an electronic network.

By the implication of the above definition, one may wonder how e-learning environment that is similar to distant learning in designed and presentation can support the nature of courses offered in TVE, considering the fact that majority of the courses require hands-on activities (practical activities). But above definition offered some explanation to that effect, as to e-learning environment and its flexibility to allow for the development of course content by lecturers/instructors, in order to give both teacher and student an opportunity to upload and download course material (interaction) and of course the material dealing with practical (hands-on) activities; such as machining, measurement and so on. E-learning in the delivery of hands-on activities has found application in engineering education (Gupta, 2002).

#### 2.5. E-learning Technologies in the Nigerian Tertiary Institutions

Most tertiary institutions in Nigeria were cognizant of the special educational needs of learners with disabilities in their institutions. E-learning has been encouraged for the purpose of making learning easier for students with special needs. Closed circuit television (CCTV), overhead projectors, slides, transparencies and magnifiers were made available to students for reading purposes. Computers with special devices for operating complex functions were made available to students and staff with visual impairments in Departmental and College offices. How adequate were the e-learning equipment and materials?

The major problems of e-learning faced by students in Nigeria's tertiary institutions were:

- Inadequate supply of e-books to enhance their studies. After listening to lectures through radio broadcast, e-books should complement the lectures. Students with visual impairments particularly require e-books.
- Universities and COEs in most cases do not have enough computers and special reading devices for students to use.
- Tertiary institutions in Nigeria were yet to incorporate Television conferencing. In most continents like the USA, Europe and Asia, lectures and examinations may be arranged and conducted on-line. Examination results are released to individual students almost immediately. Nigeria's tertiary institutions are not yet there.

To fill the above identified gap, this research is aimed at assessing the availability and utilization of e-learning technologies and investigating the obstacles to the successful adoption of the e-learning technologies in teaching and learning of TVET programmes from lecturer's perception across the Nigerian COEs in the North-Western Zone of the country.

### 3. Methodology

In this research, a mixed methodology was applied where both quantitative and qualitative methods is used to address the research questions, the researchers collected data from respondents through a survey method, to ascertain the level of availability and utilization of the important e-learning technologies that will improve the teaching and learning of TVET programmes in the Nigerian COEs. The researchers used some selected COEs across the North-Western part of the country that offers TVET programmes as case study.

The questionnaire consists of fifty questions, divided into four sections with five printed pages. The questions included close-ended as well as open-ended questions to capture respondents' experiences regarding the application of the e-learning technologies in their core business of teaching in the Nigerian COEs. The close-ended questions were statistically analyzed by means of descriptive statistics while answers to the open-ended questions were analyzed using comparative analysis.

The questionnaires were constructed using relevant information from the web and the reviewed academic literature concerning the importance and application of e-learning technologies into teaching and learning of TVET programmes at COEs level. Questions from the questionnaire were closely examined by the researchers and other senior colleagues at the COEs level, and changed until the questions clearly stressed an answer. Two TVET chief lecturers of a COE in Nigeria reviewed the questionnaires to see if they were understandable and meaningful. The questionnaires were pilot tested by four other TVET lecturers of different ranks of the same institution before the actual distribution. The reliability of the data depends mainly on the design quality of the questionnaire and its administration. The validity was ascertained via facial validity by the TVET lecturers that reviewed the questionnaire.

In order to be sure of the research validity before the questionnaire was launched and distributed to target respondents, appropriate sampling techniques was devised. A purposive sampling technique would be employed to select the TVET teacher educators to participate in the research.

The purposive sampling method used in this regard is described below:

- The COEs to be selected from the North-Western part of Nigeria must have two – third of all obtainable TVET

programmes therein fully accredited by the National Commission for Colleges of Education (NCCE) or any other accreditation agency recognized by the Federal Ministry of Education.

- Participants (i.e., the TVET educators) to participate in the survey must be academic staff of a COE in the North-West part of Nigeria for at least three years from date of research.
- By these specialized sampling techniques, the researchers were able to distribute the questionnaires to the target respondents and established a balanced view point across board.

#### 4. Discussion

The quantitative and qualitative data collected using the 'Status of E-learning Technologies for the Teaching and Learning of TVET Programmes in the Nigerian Colleges of Education' questionnaire from the survey. It also presents its corresponding analysis and interpretations.

##### 4.1. Perception of TVET Educators on the Level of Availability of the Studied E-Learning Technologies for the Teaching and Learning of TVET Programmes in the Nigerian Coes

S/N	Facilities	Available		Not Available		Missing		Total	
		F	%	F	%	F	%	N	%
1	Computer System	90	96.8	3	3.2	0	0	93	100
2	Laptop	88	94.6	4	4.3	0	0	93	100
3	College email Account	20	21.5	70	75.3	3	3.22	93	100
4	Power Point Package	90	96.8	3	3.22	0	0	93	100
5	Moodle	3	3.22	67	72	23	24.7	93	100
6	iPod & Apps	10	9.3	52	56	31	33.3	93	100
7	Learning objects (LOs)	19	20.4	47	50.5	27	29	93	100
8	Skype	12	12.9	36	38.7	45	48.4	93	100
9	Wikipedia	44	47.3	22	23.7	27	29	93	100
10	Smart Board	54	58.1	12	12.9	27	29	93	100
11	Google Scholar	67	72.0	12	12.9	14	15.1	93	100
12	Edublogs	39	41.9	33	35.4	21	22.2	93	100
13	Social Network	89	95.7	4	4.3	0	0	93	100
14	Computer Laboratory	93	100	0	0	0	0	93	100
15	LCD Stand	78	83.9	6	6.4	9	9.7	93	100
16	Google search	89	95.7	4	4.3	0	0	93	100
17	Bulletin Board	18	19.4	43	46.2	32	34.4	93	100
18	Digital satellite Channel	12	12.9	22	23.7	60	64.5	93	100
19	Video Player/TI	79	84.5	14	15.1	0	0	93	100
20	Digital Camera	83	89.2	5	5.4	5	5.4	93	100
21	e-library	69	74.2	12	12.9	2	2.1	93	100
22	Internet Facilities	79	85	13	14	0	0	93	100
23	Ethernet	87	93.6	5	5.4	0	0	93	100
24	Open MS Office apps	92	98.9	1	1.1	0	0	93	100
25	Web Browser	83	89.2	1	1.1	9	9.7	93	100

Table 2: Level of Availability of E-Learning Technologies for the Teaching and Learning of TVET Programmes in the Nigerian Coes

The availability of the studied e-learning technologies for the teaching and learning of TVET courses in the Nigerian COEs was presented in Table 2. Analysis of the results from the table revealed that majority of enquired TVET educators reported higher percentage availability of e-learning infrastructure and technologies in their institutions such as: computer laboratory (100%), computer systems (96.8%), laptop (94.6%), power point package (94.6%), social network (95.7%), LCD projector and stand (95.7%), video player/TI (84.5%), digital camera (89.2%), internet facilities (85%),

Ethernet (96.3%), open MS office app (98.2%) and web browser (89.2%). There were moderate availability of smart board (58.1), and Edublogs (41.9%) as perceived by the enquired TVET educators.

However, low availability was reported for Wikipedia (24.1%), Learning Objects (20.4%), bulletin board (19.4%), Moodle (3.22%), iPod and apps (9.3%), Skype (12.9%), and Digital satellite channel (12.9%) as against the high percentage of non-availability of these digital equipment.

##### 4.2. Perception of TVET Educators on the Level of Accessibility of the Studied E-Learning Technologies for the Teaching and Learning of TVET Programmes in the Nigerian Coes

The extent to which the studied e-learning technologies are accessible for the purpose of teaching and learning of TVET programmes in the COEs in Nigerian as perceived by the enquired TVET educators was presented in Table 3.

As evident from Table 3, majority of enquired TVET educators reported higher percentage accessibility of e-learning infrastructure and technologies in their institutions such as: Computer System (77.4%), Laptop (77.4%), Power

Point Package (85%), Google search (95.5%), Computer Lab. (93.5%), Digital camera (72%), Internet facilities (94.6%), Open MS Office apps (93.6%) and Web browser (88.2%). The technologies that have moderate accessibility as perceived by the enquired TVET educators were: Social network (68.8%), E-library (60.2%), LCD-Projector & Stand (52.7%), Video player (56%) and Wikipedia (34.4%).

However, low accessibility was reported for: Learning Objects (3.2%), Ethernet (12.2%), Smart board (23.7%), Edublogs (11.8%), Bulletin board (14%), Moodle (9.7%), Skype (16.1%), and Digital satellite channel (12.9%) as against the high percentage of non – accessibility of these e- learning technologies.

S/N e-learning technologies	Accessible		Not Accessible		Missing		Total	
	F	%	F	%	F	%	N	%
1 Computer System	72	77.4	13	14	8	8.6	93	100
2 Laptop	72	77.4	10	10.8	11	11.8	93	100
3 College-E-mail Acct.	29	31.2	58	62.5	16	17.2	93	100
4 Power Point Package	79	85	9	9.7	5	5.4	93	100
5 Moodle	9	9.7	80	86	4	4.3	93	100
6 IPod & Apps	23	36.5	58	62.4	12	12.9	93	100
7 Learning-Objects (LOs)	3	3.2	62	66.7	28	30.1	93	100
8 Skype	15	16.1	49	52.7	29	31.2	93	100
9 Wikipedia	32	34.4	47	50.5	14	15.1	93	100
10 Smart Board	22	23.7	59	63.4	12	12.9	93	100
11 Google Scholar	21	22.6	38	41	34	36.6	93	100
12 Edublogs	11	11.8	54	58.1	28	30.1	93	100
13 Social Network	64	68.8	13	14	26	28	93	100
14 Computer Laboratory	87	93.5	3	3.2	3	3.2	93	100
15 LCD-Projector & Stand	49	52.7	11	11.8	33	35.5	93	100
16 Google search	89	95.7	1	1.1	3	3.4	93	100
17 Bulletin Board	13	14	21	22.6	69	74.2	93	100
18 Digital-SatelliteChannel	32	34.4	21	34.4	40	43	93	100
19 Video Player/TI	52	56	17	18.3	25	26.9	93	100
20 Digital Camera	67	72	14	15.1	12	13	93	100
21 e-library	56	60.2	14	15.1	23	24.7	93	100
22 Internet Facilities	88	94.6	1	1.1	4	4.3	93	100
23 Ethernet	12	12.9	33	35.5	48	51.6	93	100
24 Open MS Office apps	87	93.6	1	1.1	5	5.4	93	100
25 Web Browser	82	88.2	1	1.1	10	10.8	93	100

Table 3: Level of Accessibility of the Studied E-Learning Technologies for the Teaching and Learning of TVET Courses in the Nigerian Coes

#### 4.3. Difference in Competence or Level of Expertise of TVET Educators on the Use of ELearning Technologies in the Nigerian Coes

Variables	N	Mean	Std. Dev	T-cal	T-tab	Remark
Female	26	15.08	1.26			
Male	67	17.06	1.43	12.702**	1.960	Significant

Table 4: Means, Standard Deviations, and T-Test Comparison of Male And Female TVET Educators' Competence/Level Of Expertise On The Use Of E-Learning Technologies In The Nigerian Coes

\*\*Significant;  $P = 0.05$ ;  $Df = 308$

The second hypothesis ( $H_02$ ) designed for the research was used to answer the research question 4b.

- $H_02$ : There is no significant difference between the competence of male and female TVET educators on the use of e-learning technologies in the Nigerian COEs

The result of the independent t-test that compares the competencies or level of expertise on the use of e-learning technologies between the mean values of the female TVET educators and those of the male TVET educators is shown in Table 9 above. The results showed that Female TVET educators obtained a lower mean attitudinal value of 15.08 and a standard deviation of 1.26, while the Male counterpart had a higher mean value of 17.06 and a standard deviation of 1.43.

## 5. Discussion of Findings

To begin with the Research Question (RQ) 1:

- RQ 1: In what extent are the e-learning technologies available and utilized for the teaching and learning of TVET programmes in the Nigerian COEs?

Analysis and interpretations of the results obtained from this study showed that the potentials for real adoption of e-learning technologies for the teaching and learning of TVET programmes in the Nigerian COEs are great. Analysis of the responses to RQ 1 shows that there is reasonable availability of important e-learning technologies across the studied area. Some of the studied e-learning technologies that recorded high percentage of availability are: computer laboratory, computer systems, laptop, power point package, social network, LCD projector and stand, video player/TI, digital camera, internet facilities, Ethernet, open MS office app and web browser. These could be attributed to the government and institutional policy initiatives concerning the adoption of e-learning technologies in their school systems.

This result is not completely in compliance with the findings of Salawudeen (2010) who reported that Nigerian COEs are evidently confronted with extremely inadequate e-learning infrastructures. However, low levels of availability are reported for some technologies (e.g., Moodle, Learning Objects, Skype, etc.) across the studied area. Though, some of these technologies are specialized developed applications that are used to teach specialized courses. The reason for the inadequate availability of these specialized apps could be lack of technical capacity to develop these technologies by the TVET educators themselves for their specific use.

The findings also revealed that the level of e-learning technologies utilization varies among the research participants, and over 75% of participants are happy to use e-learning technologies for educational purposes. Most of the studied e-learning technologies are used occasionally (as shown in the Table 3) owing to irregular supply of electricity across the various institutions. However, some of the e-learning technologies are rarely used (such as: Moodle, iPod and apps, Skype, Google scholar, Edublogs, Wikipedia, smart board and bulletin board) due to TVET educators' resistive attitude to change from traditional to modern method of instructional delivery. Other reasons may not be unconnected with the technicality required for their development, applications and usage. This finding is in compliance with Salawudeen (2010), who stated that e-learning are not used in the Nigerian COEs due to highly deficiencies of lecturers in the area of engineering and technological development.

- RQ 2: What is the influence of TVET educators' attitude towards the utilization of e-learning technologies for the teaching and learning of TVET programmes in the Nigerian COEs?

Analysis of results presented in Table 5 indicated that TVET educators have high (above 75 %) positive attitude towards the utilization of e-learning technologies for their teachings. This positive attitude is an important indicator of willingness and first step in effective e-learning technologies adoption in teaching and learning. As confirmed by the sampled interviewees and other researchers across the world (e.g. Teo, 2008; Lau & Yeah, 2008; Huang & Liaw, 2005), that the teachers attitude towards e-learning technologies can determine the extent to which e-learning technologies are used for teaching and learning purposes. This finding is in agreement with our earlier assertion that the potentials for real adoption of e-learning technologies for the teaching and learning of TVET programmes in the Nigerian COEs are great.

## 6. Conclusion

Equipping the Nigerian COEs with technology that can produce NCE TVET graduate that will meet the needed stuff required for the 21<sup>st</sup> century and be globally competitive is highly imperative. Also, adoption of e-learning approach of curriculum delivery in the Nigerian COEs is highly important to provide and train high quality and efficient classroom teachers, inculcating the spirit of enquiry and innovation in teachers and most importantly instilling skills that can stimulate professional development.

## 7. Recommendations

- Modern e-learning technologies and infrastructure should be made available, assessable and usable for all teacher educators across the Nigerian COEs
- More customized e-learning technologies for the teaching and learning of TVET courses should be made available in the Nigerian COEs and TVET educators be professionally trained on how to use them for their core business.

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