APPLICATION OF INNOVATIVE PEDAGOGIES FOR ONLINE TEACHING/LEARNING OF TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN TERTIARY INSTITUTIONS IN NORTH-CENTRAL STATE OF NIGERIA

[1]*Agada, A. M*, [2]*Adaga D*, [3]*Ibu F. &* [4] *Okoh, M.*

Department of Vocational and Technology Education, Abubakar Tafawa Balewa University, Bauchi
E-mail: agadaamehmichael42@gmail.com **Phone:** +2349031309662.

Abstract

The study was designed to identify application of innovative pedagogy for online Teaching/Learning TVET in Tertiary institutions in North - Central State of Nigeria. Online teaching and learning is one of the major ways of achieving teaching/learning in the face of the current pandemic of Corona Virus (COVID 19) ravaging the entire world. Descriptive survey research design was employed for the study. 420 TVET lecturers and computer experts were used as the population of study, while 210 respondents sampled for study through stratified random sampling technique. An instrument titled successful online TVET Teaching/Learning Questionnaire (SOTTLQ) was developed and used for data collection. Two TVET teachers and one computer experts from Department of Vocational and Technology Education Abubakar Tafawa Balewa University, Bauchi validated the instrument, and the index of 0.79 was obtained. Cronbach alpha method was employed to determine the reliability of the instruments Descriptive statistics of means and standard deviations were used to answer research questions while inferential statistics of Chi-square was used to test the formulated hypotheses at 0.05 level of significant. The result from the study identifies items for online Teaching/Learning of TVET available for TVET teachers and computer experts for innovative pedagogy. While the types of online innovative pedagogy for teaching/learning of TVET were also identified. One the recommendation is that TEVT teachers to be allowed to go for refresher courses on online innovative pedagogy to update their knowledge on Teaching/Learning

Keywords: *TVET, Innovative Pedagogy, Online Teaching/Learning and Tertiary Institution.*

Introduction

Teaching/learning are two major activities that are geared towards the attainment of educational goals. In the views of Ayeni and Ogunbaru (2013) teaching and learning refers to an organized instructional process that is consciously geared towards transforming and developing students' intellectual ability, skills, ethics and values to enable individuals function effectively and become self-reliant, at the same time contribute positively to societal development. Provision of quality education to the citizenry at all levels of education is the ultimate goal of education in all countries of the world. The only limiting challenges in the attainment of this ultimate goal are resources, crises or outbreak pandemic. Adamu (2020) pointed out that schools and all teaching/learning facilities were closed as a result of the outbreak of the COVID-19 pandemic in Nigeria in order to safeguard the health and general wellbeing of children, youths, teachers, and educational personnel, the author further stressed out that a framework for comprehensive and coordinated actions to mitigate the COVID-19 pandemic's immediate, medium, and long-term impact on the nation's education sector are identified with a strengthen programs that will guarantee the recovery of teaching/ learning gaps resulting from the pandemic.

Efforts are on in different parts of the world to discover the appropriate innovative pedagogy that would achieve quality education through online teaching/ learning while plans for the strengthen programs that will guarantee the recovery of teaching/learning gaps resulting from the pandemic are put in place. Online learning can be described as the idea of using online tools for learning. Basically, an online course implies a distance between you and your teachers. Lectures, assignments, tests are all enabled by virtual platforms. Alexandru (2020) held that distance learning has become a more established pathway to a degree. Online teaching/ learning can be described as the idea of using online tools for learning; this involves a distance between leaner and teacher and the Lectures, assignments, tests are all carried out through virtual platforms. Mohammed, Tsado and Hassan (2018) asserted that in online teaching/learning, the key element is the use of internet, while E-Learning is the learning ways conducted through electronic media, such as CD, auxiliary software, interactive TV. Basically, teaching/learning is becoming a more established pathway to acquiring

attitudes skills and knowledge. However several terms are connected to teaching/learning which described the different ways it can be achieved and this includes: online learning blended learning, e-learning, distance learning.

Online learning can easily be described as an idea of using online tools for teaching/learning. This entails an online distance course delivery between leaner and teachers, lectures and assignments tests are all enabled by virtual platforms. Alexandru (2020) refers to Blended learning as a combination of learning at a distance and the traditional on-campus learning (in a classroom) and points out that more or less schedule are fixed for both to attend a part of the classes on campus. However, most courses are still online and allowing coursework and assignments online.

E-learning is the online interaction between learners and the teachers, teaching/ learning is received through training using an online medium. Elke and Patrick (2010) also described E- learning as the learning ways conducted through electronic media, such as CD, auxiliary software, interactive TV, and further explained that online learning is conducted through the Internet to achieve the interaction among learner, course, and teacher. Therefore, the e-learning is called online learning or web-based learning in face of present pandemic. E-learning for training and instruction in Nigeria has not been adopted widely in the teaching and learning especially in the North-central State.

California Distance Learning Project (CDLP, 2011) defines Distance Learning *(DL) as an instructional delivery system that connects learners with educational resources. DL provides educational access to learners not enrolled in educational institutions and can augment the learning opportunities of current students. The implementation of DL is a process that uses available resources and will evolve to incorporate emerging technologies.* Distance learning is understood and is often used as a synonym with online learning. DL was introduced to attract learners from all over the world. DL has made possible for learners to become an international student without travelling to that country to study. An example is a Nigerian to easily attend an American college through DL.

The success of online teaching/learning depends a lot on the teaching environment; the teaching methods developed or used play a key role in the learner's development. Alexandru (2020) observed that both online and blended learning programmes are designed to make better use of the real potential of digital technology and enhance learning experiences through innovative approaches. Elke and Patrick (2010) points out some of the disadvantages of e- learning which includes high implementation cost and limited IT familiarities are issues for a large part of teaching/learning. Also, availability of appropriate internet access, the need for computer literacy and a willingness to accept e-learning are issues for the learners.

Innovation is simply the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services. Lorenzo (2010) describe innovation as the introduction of something new and useful. The author further explained that innovation can also be seen as the successful implementation of creative ideas within an organization. This means, creativity by individuals or organization is a starting point for innovation; innovation begins with creative ideas, where all the teaching/learning strategies involve innovation to survive. Agada and Ochepo (2018) asserted that innovation is the lifeblood of any organization and without it, growth is reduced and inevitably a slow death occurs. Therefore Nigeria system of education needs innovative touch for development. Abubakar (2018) maintained that, with the social, economic, political and technological distraction, there is the need for a sound pedagogical practice for a meaningful learning to occur in our lecture rooms.

Quality education can only be realized for the populace if the instructional strategy affects the learners' attitude positively. This calls for the utilization of innovative and interactive instructional strategy. In other word, innovative Pedagogies for online teaching/learning leads to quality education. Most learners need to dedicate time to interacting with mentors, peers in practicing and applying newly acquired skills and knowledge. New learning must be assessed and shared with peers through well designed collaborative encounters that support individuals in adapting their learning to new

problems and contexts. Without opportunities to practice and apply new knowledge in a variety of contexts, adaptation and integration, new knowledge cannot be developed.

Therefore it is important to identify the online innovative pedagogy for teaching/learning TVET. This will equip teachers/learners with the skills and competencies to function in a digital world/culture, using media and informal pathways to enrich their teaching/learning and develop essential forms of online literacy and reduce the level of physical contact (outside the school setting)in teaching/learning in these tertiary institutions. in presence of the ongoing pandemic called Covid -19. This is the gap that the study intends to fill.

Statement of the problem
Online teaching/learning embraces less physical contact between the teacher and learners but with much reliance on e-communication. The teacher gives and learner receives the formalized learning in their remote or urban locations (outside the school setting) irrespective of time differences and geographical location. Online courses are acquired through distance/online medium which can accommodate large numbers of TVET applicants. In North-central state of Nigeria the demand for teaching/learning of TVET education is becoming high. This is because of prevailing benefit of TVET which includes provision of knowledge, skills, employment, and job security. But the problem is that most teaching/learning facilities, instructional material, accommodations and of recent the pandemic called COVID -19 reduce the level physical contact in teaching/learning in these tertiary institutions. Again Tertiary institutions North-central state has the opportunity to only admit between 30-40% learners each year and policy remained unchanged.

Therefore to provide for high demand of teaching/learning TVET education North-Central State of Nigeria is one area which the studies intend to fill. The numbers teachers /learners willing to acquire TVET education cannot sustain as a result of teaching/learning facilities, instructional material, accommodations and of recent the pandemic called COVID -19 that reduce the level physical contact in teaching/learning in these tertiary institutions. The problem of this study hinged on the need to increase and provide alternate means of teaching/learning through online to acquire the TVET education and reduce this problem physical contact in the face of the current pandemic COVID 19. Therefore this paper is the innovative Pedagogies for online teaching/learning of TVET in tertiary institutions in North - Central State of Nigeria.

Purpose of the Study
The purpose of this study is to identify the innovative Pedagogies for online TVET teaching/learning in tertiary institutions in North - Central State of Nigeria. Specifically the study sought to:
   (i)   Identify innovative Pedagogies for online teaching/learning of TVET.
   (ii)   Identify types of online innovative Pedagogies to be applied for teaching/learning TVET.
Research Questions
The following research questions guided the study:
   (i)   What are the identified online innovative Pedagogies for teaching/learning TVET in North Central Nigeria?
   (ii)   What are the identified types of online innovative Pedagogies that can be applied for TVET teaching/learning in North Central Nigeria?
Research Hypothesis
The hypothesis was tested at 0.05 level of significance.
Ho1: There is no significant between the responses of TVET lecturers and computer experts on identified online innovative Pedagogies for teaching/learning TVET in North Central Nigeria.
Methodology
Descriptive survey research design was employed to elicit information on from TVET lecturers and computer experts on online innovative pedagogies for teaching/learning TVET in tertiary institutions in North - Central States of Nigeria. The population for this study comprised 420 respondents, with 210 sampled using stratified random sampling techniques from two tertiary institutions each in Benue, Kogi, Kwara, Niger, Plateau, Nasarawa States. An instrument titled successful online TVET Teaching/Learning Questionnaire (SOTTLQ) was developed and used for data collection. The instrument contains two sections. Section A: collected information's on the identified online innovative Pedagogies for teaching/learning TVET from the respondent. Section B: contains the items on

identified types of online innovative Pedagogies for teaching/learning TVET. The instruments were validated by two experts from Faculty of Vocational and Technology Education, Abubakar Tafawa Balewa University Bauchi and the index of 0.79 was obtained. Cronbach alpha method was employed to determine the reliability of the instruments Descriptive statistics of means and standard deviations were used to answer research questions while inferential statistics of Chi-square was used to test the formulated hypotheses at 0.05 level of significant. The data were weighted using a 4 point modified rating scales in which strongly agree (SA) rated 4 points, Agree (A) rated 3 points, Disagree (D) rated 2 points and Strongly Disagree (SD) awarded 1 point. In taking decision from the analyzed data, an average mean of 2.50 above were considered as Agreed, while a mean of 2.49 below was considered disagreed with respect to the research questions. A mean of 2.5, according to David (2014), is suitable for use as a criterion to judge mean scores for a modified four point item format. The mean of 2.5 was calculated from the sum of 4+3+2+1 divided by 4. Mean and Standard Deviation were used to analyse the data collected and obtained from the research questions. The data were weighted using a 4 point modified rating scales in which strongly agree (SA) rated 4 points, Agree (A) rated 3 points, Disagree (D) rated 2 points and Strongly Disagree (SD) awarded 1 point. In taking decision from the analyzed data, an average mean of 2.50 above were considered as Agreed, while a mean of 2.49 below was considered disagreed with respect to the research questions.

Results Analysis

Research Question One

What are the identified online innovative Pedagogies for teaching/learning TVET in tertiary institutions in North Central Nigeria?

Table 1: Mean ratings and Standard deviation response by TVET lecturer and computer experts on identified online innovative Pedagogies for teaching/learning TVET in tertiary institutions in North Central Nigeria.

S/N	Items	$\bar{x}$	SD	Remarks
	Identified online innovative Pedagogies for teaching/learning TVET are:			
1	Re-examine strategies for online teaching/learning TVET	3.75	0.76	Strongly Agree
2	Assess online digital advancement in tertiary institutions	3.65	0.67	Strongly Agree
3	Identify digital technology for teaching/learning of TVET	2.55	0.55	Agree
4	Assess e-journals for teaching/learning outcomes of TVET	2.50	0.55	Agree
5	Identify e-books for online teaching/learning of TVET	2.75	0.58	Agree
6	Participation in online social networks	3.80	0.83	Strongly Agree
7	Accessibility to online digital research and learning	2.50	0.55	Agree
8	Working on virtual learning environments for the future	2.65	0.57	Agree
9	Knowledge transfer through virtual learning	2.75	0.58	Agree
10	Develop virtual thinking skills	2.55	0.55	Agree
11	Ability to Exploit virtual technology	2.60	0.56	Agree
12	Faster creativity through virtual learning	2.55	0.55	Agree
13	Structure TVET Content for Virtual Learning	3.87	0.88	strongly Agree
14	Clearly structure TVET Content for Virtual Teaching/ Learning	2.65	0.57	Agree

Key: $\bar{x}$*=Mean, SD=Standard Deviation, SA= Strongly Agree, A= Agree.*

Table 1 above shows that the mean ratings with a corresponding standard deviation ranges from 3.65 to 3.87 and 0.67 to 0.88 are very high indicating that items 1, 2, 6 and 13 are strongly agreed upon as the identified online innovative Pedagogies for teaching/learning TVET in North Central Nigeria by TVET lecturer and computer experts, while the mean ratings with a corresponding standard deviation ranges from 2.50 to 2.75 indicating that mean rating on items 3,4,5,7,8,9,10,11 and 12 is high which are agreed upon as the identified online innovative Pedagogies for teaching/learning TVET in North Central Nigeria by TVET lecturer and computer experts.

Research Question Two

What are the identified types of online innovative Pedagogies for TVET teaching/learning in tertiary institutions in North Central Nigeria?

Table 2: Mean ratings and Standard deviation response by TVET Teachers and computer experts on the identified types of online innovative Pedagogies for TVET teaching/learning in tertiary institutions in North Central Nigeria.

S/N	Items	$\bar{x}$	SD	Remarks
	Identified types of online innovative Pedagogies includes:			
15	Edmodo	3.54	0.67	Strongly Agree
16	Schoology	3.78	0.77	Strongly Agree
17	Usco virtual	3.88	0.89	Strongly Agree
18	WizIQ	3.90	0.92	Strongly Agree
19	Standard web browsers	2.57	0.56	Agree
20	Virtual Platform	3.68	0.66	Strongly Agree
21	Digital learning strategy	3.87	0.88	Strongly Agree
22	Virtual Learning Environment (VLE)	3.67	0.64	Strongly Agree
23	You Tube	2.57	0.56	Agree
24	Uniform Resource Locator (URL)	2.75	0.58	Agree

Table 2 above shows that items 15,16,17,18,20,21 and 22 totaling 7 items whose mean ratings and corresponding standard deviation ranges from 3.54 -3.90 and 0.92 - 0.64 are very high indicating that all are strongly agreed upon as identified types of online innovative Pedagogies for teaching/learning TVET and they include; Edmodo, Schoology, Usco virtual, WizIQ, Virtual Platform,. Digital learning strategy and Virtual Learning Environment (VLE), while items 19,23and 24 mean ratings with a corresponding standard deviation ranges from 2.50 to 2.75 indicating that mean rating on items is high which are agreed upon as identified types of online innovative Pedagogies and they include; Standard web browsers, You Tube Uniform and Resource Locator (URL).

Testing of Hypotheses

Hypothesis 1: There is no significant between the responses of TVET lecturers and computer experts on identified online innovative Pedagogies for teaching/learning TVET in North Central Nigeria.

Table 3: χ 2 of significant difference between TVET lecturers and computer experts on identified online innovative Pedagogies for teaching/learning TVET in North Central Nigeria.

$N_1 = 160, N_2 = 50$, Total = 210.

Group	N	Mean	SD	df	Level of Significance	χ 2cal	χtab2	Decision
TVET Lecturers	160	2.94	8.75	208	0.05	1.64	1.98	H0 Rejected
Computer Experts	50	2.92	10.7					

Table 3 show the χ 2 -calculated is 1.64 while the χ 2 tabulated is 1.98 at two-tail 0.05 level of significance and df 208. Since the χ 2 calculated is less than the χ 2 tabulated, the null hypothesis is rejected. This implies that there is no significant difference between mean of TVET lecturers and computer experts on identified online innovative Pedagogies for teaching/learning TVET in the North Central Nigeria. This means TVET lecturers and computer experts identified online innovative Pedagogies and should apply them for teaching/learning TVET.

Discussion of Findings

The result from Table 1 in the research work, revealed that TVET lecturer and computer experts rating are very high indicating that all items are strongly agreed and agreed upon as the innovative Pedagogies for online TVET teaching/learning. Therefore the identified innovative Pedagogies stated above indicate that for a successful online TVET teaching/learning in North Central innovative pedagogies is essential as it is in line with *Moran (2010), that points out that* network enables teachers to share content, distribute quizzes, assignments, and manage communication with students, colleagues and parents. With the availability of a strong network, teachers, lecturers,

researchers and computer experts can easily and quickly source for new application software that can enhance performance on their various jobs.

Table 2 outcome of research study, revealed that TVET lecturer and computer experts rating are very high indicating that 7 items are strongly agreed as identified types of online innovative pedagogies for teaching/learning TVET and they include; Edmodo, Schoology, Usco virtual, WizIQ, Virtual Platform,. Digital learning strategy and Virtual Learning Environment (VLE) and 3 items Standard web browsers, You Tube Uniform and Resource Locator (URL) agreed upon. Therefore the Types of online innovative pedagogies for teaching/learning TVET stated above indicate that for a successful online teaching/learning of TVET in tertiary institution in North Central. The finding is essential as it is in line with *Phillip (2014) asserted that* Virtual Learning Environment can be used to teach courses such as technical drawing, biology, chemistry and others.

Conclusion
The objective of this study is to identify application of innovative pedagogies for online teaching/learning TVET in tertiary institutions in North - central state of Nigeria and to identify types of online innovative pedagogies for teaching/learning TVET in tertiary institutions in north central state of Nigeria. Therefore TVET lecturer and computer experts agreed that the innovative pedagogies stated above is essential for a successful online teaching/learning of TVET, while identified types of online innovative pedagogies for teaching/learning TVET were agreed upon by TVET lecturer and computer experts.

Recommendations
The following recommendations were made with respect to the outcome of research work that:
 1.   Online teaching/learning TVET programs should be given special attention for skills development and easy learning in Tertiary institutions in North Central state of Nigeria.
 2.   TVET lecturers/computer experts should lay more emphasis on using identified types of online innovative pedagogies for teaching/learning TVET in tertiary institutions in North Central state of Nigeria.
 3.   Online innovative pedagogies for teaching/learning TVET and the identified types of online innovative pedagogies should be given more priority by TVET lecturers/computer experts in event of any future pandemic.

References

Abubakar, A. S. (2018). Effect of Cooperative Learning Strategy on Attitude and Academic Performance of Biology Students of Different Cognitive Styles in Kaduna State, Nigeria. An Unpublished PhD thesis submitted to the Department of Science Education, Ahmadu Bello University Zaria.

Adamu, A. (2020). *Guidelines for Schools and Learning Facilities Reopening after Covid-19 Pandemic Closures Federal Ministry of Education, Nigeria*. Abuja: Federal Ministry of Education.

Agada, A . M. & Ochepo. I. (2018). Enhancing Quality TVET Education Through Innovative Pedagogy and Continuous Assessment in Tertiary Institution in Benue State. Conference Proceedings of 6th International Conference of School of Science and Technology Education (SSTE), 621-631.

Ahmed, H. M. S. (2010). Hybrid E-Learning acceptance model: Learner perceptions. *Decision Sciences Journal of Innovative Education,* 8(2), 31-34.

Alexandru, P. (2020). *What's the Difference Between Blended Learning, E-Learning and Online Learning?* New York: Josey bass.

David, P. (2014). Coursework and project. *Secondary School Journal Urbana,* 13(24), 12-20.

Elke, W. & Patrick, K, W, Z. (2010). *E-learning for construction safety training in the Australian construction industry*. Australian: Department of Education, Science and Training.

Mohammed, Y. D., Tsado, A. J. & Hassan, K. M. (2018). Construction Safety Training Vie E - Learning In Nigerian Construction Industry in Abuja; Conference Proceedings 6th International Conference of School of Science and Technology Education (SSTE).

Moran, G (2010). The Rise of the Virtual Classroom. Retrieved July 15, 2019 from wwwonlineclass.org.

Phillip, A. (2014). What is Happening with International URL. World Wide Web Consortium. Retrieved 01-01-2014 from wwwonlineclass.org

Selim, H. M. (2017). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education Journal,* 49(2), 396-413.