



An Evaluation of the Effectiveness of TETFund Intervention on Virtual Learning Environment (VLE) In Colleges of Education in Southeast of Nigeria: A Covid-19 Perspective. (Case Study of Anambra and IMO States)

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ABSTRACT

This research work was carried out to evaluate the effect of TETFund intervention on virtual learning environment in colleges of education in south eastern region of Nigeria. The study adopted the descriptive survey research design. Five research questions were formulated to guide the study termed the 'Effectiveness of TETFund Intervention on Virtual Learning Environment in Colleges of Education' (ETIVLECE). The targeted populations were teachers and students in Nwafor Orizu College of Education, Nsugbe Anambra State and Alvan Ikoku College of Education, Owerri. The sample used in the study comprised of 200 teachers and 1000 students selected from the educational zone. The instrument used for data collection was a questionnaire. The face and content validity of the instruments were ensured. The items of the questionnaire were reshuffled and re-arranged and then administered to the same teachers and students two weeks later. These were collected and tested using the test-retest reliability method. The scores of data collected were correlated using Pearson Product Moment Correlation, and it gave rise to 0.75. This shows that the internal reliability of the items were high. 1,200 copies of questionnaire were administered to the selected respondents. The questionnaires were collected from the respondents almost immediately. The results of the findings showed that inability of some students and teachers' to acquire data, smart and android phones has limited their use of internet to create collaboration groups. The finding also revealed that desktops are available for teaching and learning in the colleges. Conclusion was drawn and it was recommended that adequate fund should be allocated for the development of Virtual Learning Environment; stipulated amount should be allocated yearly to colleges for procurement of Wi-Fi, and the usage should be adequately monitored by TETFund. Staff and students should be adequately trained at cheaper or no cost for proper utilization of ICT facilities.

Key words: TETFund Intervention, Virtual Learning Environment, Colleges of Education, COVID-19 PANDEMIC

INTRODUCTION

With the widespread use of technology in many fields of life, the traditional methods of teaching could be considered as non-effective methods in teaching and learning process. In the conventional methods, the students rely mainly on their textbooks and the teacher is the only source of the information. The role of students is just to sit and write what they have been taught and they have no chance to participate or express whatever they want. Traditional methods are no longer responding to the needs of the students nor increasing their cognitive progress. Learners need to master different scientific knowledge. Modern methods depend basically on technology based teaching and learning system.

The closure of schools, colleges and universities by the Federal and State government during COVID-19 was an urgent need which prevailed in all States in Nigeria. The Nigeria Government took the preventive decision on COVID-19 just after WHO recognized it as a pandemic disease. However, the shutdown of schools in which the academic year was interrupted, has tremendous effect on the academic syllabus. The closure of schools during the pandemic affected drastically the education system in the country, even, till present and the government is yet to put in place alternative measure for future reoccurrences of school closure.

Considering this, the study would evaluate the effectiveness of TETFund intervention on virtual learning environment (VLE) in Colleges of Education in the south eastern region of Nigeria. It would provide verification about the effects of TETFund intervention on virtual learning environment have on teaching and learning processes in colleges of education in the south eastern Nigeria using Anambra and Imo states as case studies. The study would adopt the descriptive survey research design in which validated questionnaires (for Lecturers and students) termed the 'effectiveness of TETFund Intervention on Virtual Learning Environment in Colleges of Education' (ETIVLECE) 1&2 would be developed in line with research questions, and used to extract information from lecturers and students in these states. The Statistical Model of Impact Measuring, a combination of multivariate regression

methods and statistical inference would be used in analyzing data generated from the study. Along with the main research question evaluating the effectiveness of TETFund intervention on virtual learning environment, it is expected that the research results will give significant evidence over the impact on teaching/learning process. Findings from the study would be generalized to the entire south east, Nigeria.

Concept of Virtual Learning: virtual Learning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. In most cases, it refers to a course, program or degree delivered completely online. There are many terms used to describe learning that is delivered online, via the internet, ranging from Distance Education, to computerized electronic learning, online learning, internet learning and many others. This study define virtual learning as courses that are specifically delivered via the internet to somewhere other than the classroom where the teacher is teaching. It is not a course delivered via a DVD or CD-ROM, video tape or over a television channel. It is interactive in that you can also communicate with your teachers, professors or other students in your class. Sometimes it is delivered live, where you can “electronically” raise your hand and interact in real time and sometimes it is a lecture that has been pre-recorded (Ayo, 2011)

Concept of Technology: Technology is defined as the application of scientific knowledge for practical purposes, especially in industry. It is the branch of knowledge dealing with applied sciences. Technology therefore is the sum of techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation (Liddell and Scott, 2010). Technology can be the knowledge of techniques, processes, and the like, or it can be embedded in machines to allow for operation without detailed knowledge of their workings. Systems (e.g. machines) applying technology by taking an input, changing it according to the system's use, and then producing an outcome are referred to as technology systems or technological systems (Bain, 2017).

TETFund Intervention

The Tertiary Education Trust Fund (TETFund) was established as an Intervention Agency under the Education Tax Act No. 7 of 1993. Tertiary Education Trust Fund (Establishment, Et.c) Act, 2011 repeals the Education Tax Act Cap. E4, laws of the Federation of Nigeria, 2004 and Education Tax Fund Act No. 17, 2003 and establishes the Tertiary Education Trust Fund charged with the responsibility for managing, disbursing and monitoring the education tax to public tertiary institutions in Nigeria. To enable the TETFund achieve the above objectives, TETFund Act, 2011 imposes a 2 percent (2%) Education Tax on the assessable profit of all registered companies in Nigeria.

The Federal Inland Revenue Service (FIRS) is empowered by the Act to assess and collect Education Tax. The fund administers the tax imposed by the Act and disburses the amount to tertiary educational institutions at Federal and State levels. It also monitors the projects executed with the funds allocated to the beneficiaries.

The mandate of the fund as provided in section 7 (1) (a) to (e) of the TETFund Act, 2011 is to administer and disburse the amount in the fund to Federal and State tertiary educational institutions, specifically for the provision and maintenance of the following:

- 1) Essential physical infrastructure for teaching and learning;
- 2) Instructional material and equipment;
- 3) Research and publication;
- 4) Academic Staff Training and Development;
- 5) Any other need which, in the opinion of the Board of Trustees, is critical and essential for the improvement of quality and maintenance of standards in the higher educational institutions.

From the above, it would have been clear that TETFund cardinal objective was to generate additional income to support tertiary education, provide scholarship and grants for the needy but promising students, attempting not only to strengthen and diversify the economic base of higher institutions in Nigeria but also redirecting their resources towards improving the productivity and quality of higher education.

Virtual Learning Environment

Virtual learning environments have been associated with formal learning and with relationships between teachers, students and school. There is an increasing interest in the virtual learning environments supported by the internet, namely among education institutions, students and teachers. The concept of virtual learning environment (VLE) could be considered as a dynamic concept due to the constant evolution of digital technologies, to its features and potentialities, and to the importance that such environments have within the learning processes. Educational systems based on the web are being used by an increasing number of universities, schools and companies, not only to incorporate web technology into their courses, but also to complement their traditional face-to-face courses. These systems gather a great quantity of data which is valuable to analyze the course contents and students' use learning environments based on the use of technology and digital resources are mediators in the learning process through the activities they allow. This is due to the fact that they facilitate interaction and interrelation within a continuous communication process, thus enhancing the construction and reconstruction of knowledge and meanings as well as the formation of habits and attitudes within a framework that is common to all the ones involved in the educational process.

Colleges of Education

Colleges of Education in Nigeria have played a vital role in our national development, especially in the education sector. The teaching function of colleges of education in Nigeria for instance, has contributed immensely to national development particularly in the development of middle-level manpower for the nation's primary and junior secondary schools. Over the years, colleges of education have produced a large number of non-graduate professional (NCE) teachers that teach in our primary and junior secondary schools, thus alleviating the manpower problems of the nation at those levels. These teachers have also laid the foundation of whatever formal education that is received later in life by that now appear in different forms as accountants, teachers, lawyers, economists, engineer, doctors, agriculturalists, architects, etc. The ideas of these people put into productive use have enhanced the nation's development.

COVID-19 Pandemic

Throughout history, infectious diseases have caused havoc among societies. Emerging and re-emerging infectious diseases are now occurring at unprecedented speed. According to the World Health Organization (WHO), the world has witnessed the emergence of several disease outbreaks and epidemics caused by more than 20 infectious agents over the past decade. Some of these epidemics were caused by novel infectious agents such as H1N1 and MERS. Over the past two decades, the emergence of corona virus-associated diseases (SARS and MERS) inflicted global challenges to public health systems. SARS-CoV-2 (the causative agent for corona virus disease COVID-19) is the latest addition to this growing list of unwelcomed novel agents. The WHO declared COVID-19 a public health emergency of international concern on 30 January and a pandemic on 11 March 2020. This led to the closure of academic activities in most countries of the world, Nigeria inclusive. After few periods, majority of European countries introduced online teaching and learning, due to lack of adequate/absence of relevant tools and equipment, academic activities were completely shut down.

Emerging technologies in Virtual learning

For over a decade educational technologies are emerging at exponential rates, but many schools and educational institutes fall short on understanding and utilizing these technologies. Lechner (2019) examined emerging technologies in virtual learning that educators and school management must know/understand for providing quality education for the children.

The Role of Virtual Learning Environment on Academic Performance

Attitudes concerning Virtual Learning Environment, echoed by scholarly and academic reviews, range from neutral to positive. On one hand, it is noted that Virtual Learning Environment is at least as effective as traditional instructional strategies (Rosenberg, Grad and Matear, 2013), and that there are no major differences in academic performance between the more traditional and more technology-oriented modes of instruction. On the other hand, many reviews go further, reflecting a principally positive attitude towards the impact of Virtual Learning Environment (Mayer, 2013). The current piece sought to demystify virtual learning by concentrating on how specific v-learning factors (socio-demographic characteristics, hours spent on-line and prior computer skills) influence individual academic performance. There is a considerable body of evidence to suggest that different teaching delivery styles can have different degrees of success; as measured in terms of academic results (Emerson & Taylor, 2014). In relation to online teaching, some studies indicate that this medium of delivery has a positive impact on performance, for example, Smith and Hardaker (2010). Other studies however, find that greater online teaching has a negative impact on performance (Johnson, 2015). Benefits include offering a variety of new possibilities to learners (Breuleux, Laferrière, & Lamon, 2012), in addition to having a positive effect on students' achievement in different subject matter areas (Chambers, 2013). Other benefits of electronic education include increases in enrollment or time in school as education programs reach undeserved regions, broader educational opportunity for students who are unable to attend traditional schools, access to resources and instructors not locally available, and increases in student-teacher communication.

According to Barker & Wendel (2011) students in virtual schools showed greater improvement than their conventional school counterparts in critical thinking, researching, using computers, learning independently, problem-solving, creative thinking, decision-making, and time management. A study by Calderoni (2018) revealed that academic advantages over traditional classroom instruction were demonstrated by students in Mexico's Telesecundaria program, who were "substantially more likely than other groups to pass a final 9th grade examination" administered by the state; by students taking a chemistry by satellite course and by students learning reading and math via interactive radio instruction (Yasin & Luberisse 2018). Electronic education is not the most effective choice in all situations. Students may feel isolated, parents may have concerns about children's social development, students with difficulties may experience a disadvantage in a text-heavy online environment, and subjects requiring physical demonstrations of skill may not be practical in a technology-mediated setting. Bond (2012) found that distance between tutor and learner in an online instrumental music program has negative effects on performance quality, student engagement, and development and refinement of skills and knowledge. Virtual school students show less improvement than those in conventional schools in listening and speaking skills (Barker & Wendel 2011). Highly technical subjects have also proven to be difficult to teach well online. The Alberta Online Consortium evaluated student performance on end-of-year exams among virtual school students across the province, and found that virtual school student scores in mathematics, and the sciences lagged significantly behind scores of non-virtual school students (Schollie, 2011).

Kearsley (2010) notes that given instruction of equal quality, groups of students learning online generally achieve at levels equal to their peers in classrooms. Equality between the delivery systems has been well documented over decades for adult learners. Evidence to date convincingly demonstrates

that when used appropriately, electronically delivered education—‘virtual-learning’— can improve how students learn, can improve what students learn, and can deliver high-quality learning opportunities to all children. A primary characteristic that sets successful distance learners apart from their classroom-based counterparts is their autonomy and greater student responsibility as is noted by Wedemeyer (2011). A second characteristic that differentiates successful distance learners from unsuccessful ones is an internal locus of control, leading them to persist in the educational endeavor (Rotter 2019).

How to make V-Learning technologies more effective:

Provision of the listed points will improve V-Learning technologies effectively.

- Availability of hardware (particularly computers)
- Faster Internet connectivity/improved bandwidth
- Improved software
- Appropriate policies favouring V-Learning technologies
- Provision of technical support for V-Learning technologies at a range of scales
- Lower prices for connectivity
- Availability of reliable electricity
- Appropriate content in appropriate languages
- Awareness raising about the value of V-Learning technologies
- Improved training for teachers in V-Learning technologies at all levels.

Benefits of v-learning technologies

V-Learning technologies is important for education because it can improve the quality of the learning

- Experience, and extend the reach of every lecturer and tutor. V-Learning technologies can help remove barriers to achievement, by providing new and creative learning,
- Ways of motivating and engaging pupils and learners of all abilities, enabling and inspiring everyone to attain their educational potential. V-Learning technologies can support learning by offering differentiated learning,
- Particularly for those who need support in literacy, numeracy and ICT. V-Learning technologies offers a wide range of tools to enable teachers and learners to be innovative,
- Creative and resourceful in all learning activities. Teachers and learners can easily customize digital learning resources to suit pace and level, appropriate to any learning style and ability. V-Learning technologies create on-line communities of practice. The Internet can bring learners,
- Teachers, specialist communities, experts, practitioners and interest groups together to share ideas and good practice. V-Learning technologies can provide an individualized learning experience for all learners, including
- Those who are disadvantaged, disabled, exceptionally gifted, have special curriculum or learning needs or who are remote or away from their usual place of learning. V-Learning technologies can facilitate wider participation and fairer access to further and higher
- Education by creating the opportunity to start learning and to choose courses and support according to the learners’ needs. V-Learning technologies provides personalized learning support through information, advice, and
- Guidance services. It can help learners find the course they need, with a seamless transition to the next stage of their learning, including online application or enrolment and an electronic portfolio of their learning to take with them. V-Learning technologies provides virtual learning worlds where learners can take part in active and
- Creative learning with others through simulations, role-play, remote control of real world tools and devices, online master classes, or collaboration with other education providers.

Statement of the Problem/Justification

Traditional methods of teaching and learning are no longer responding to the needs of students nor increase their cognitive progress. Major stakeholders in education believe that using the traditional ways in teaching is the main reason of the backwardness, weakness, low interest and lackadaisical attitude of many students. Many scholars in the field of EduTech believed that using virtual learning environment will promote academic achievement and connect students with real life; encourages and motivates them to prepare and communicate in the class. Hardly can one see lecturers and students in colleges of

education from the south eastern Nigeria competes with their counterparts from Europe in the area of online teaching and learning. Majority of the lecturers are novice to Virtual Learning Education (VLE), thus affecting teaching and learning process. Therefore, the researcher decided to investigate this issue and apply it in the colleges of education in south eastern part of Nigeria. The researcher as an Educational Technology lecturer noticed massive decline in the skills of learners understanding the facilitator, learning zeal and their academic achievement. It is, therefore, worthy to evaluate the effectiveness of TETFund intervention on Virtual Learning Environment (VLE) in colleges of education in south east of Nigeria rather than the traditional methods of teaching.

Research Questions

The following research questions were formulated to guide the study:

1. What are the virtual learning technologies available for the teaching and learning in the colleges within the zone?
2. What are the components for virtual learning needed in the colleges?
3. To what extent do schools apply virtual learning technologies in teaching/learning in their colleges?
4. What are the challenges in the application of virtual learning technologies in the teaching and learning process?
5. What are the strategies to counter challenges in the use of virtual learning technologies in teaching and learning in the colleges?

Theoretical Framework

Constructivism Theory: Constructivism is the theory that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When learners encounter something new, they reconcile it with previous knowledge and experience. They may change what they believe, or they may discard the new information as irrelevant. To be active creators of their knowledge however, they must be able to ask questions, explore and assess what they know. In the classroom, the constructivist view of learning means encouraging students to use active techniques such as experiments and real-world problem solving using authentic data if possible, and to create knowledge and reflect on their understanding. Constructivism modifies the role of the teacher so that teachers help students to construct knowledge rather than reproduce a series of facts. The constructivist teacher provides tools such as problem-solving and inquiry-based learning activities like in v-learning setup so that students can formulate and test their ideas, draw conclusions and inferences, and convey their knowledge in a collaborative learning environment. The teacher must understand the students' pre-existing conceptions and guide the activities to address this knowledge and then build on it. Constructivist teachers encourage students to assess how the activity is helping them gain understanding. By questioning themselves and their strategies, students become expert learners as they learn how to learn, with the use of computers online and/or offline. The students then have the tools necessary to become life-long learners.

METHODOLOGY

The study adopted a descriptive survey design and was carried out in colleges of education in Anambra and Imo States. The population of the study comprises both lecturers and students in Anambra and Imo State. One thousand two hundred (1200) respondents (1000 students and 200 lecturers) were randomly selected across two eastern states in Nigeria; Anambra and Imo States. Two sources of data collection were used in this study in order to answer the research questions. The instrument was administered to the students and lecturers with the help of three research assistants who are postgraduate from each of the participating schools. A validated questionnaire titled the effectiveness of TETFund intervention on virtual learning environment in colleges of education (ETIVLECE), (for students and lecturers) designed by the researchers, and constructed in a 4-point Likert scale format was also administered. The reliability of the questionnaire was established before use. The Statistical Model of Impact Measuring, a combination of multivariate regression methods and statistical inference was used in analysing data generated from the study. Data analysis was carried out on MS Excel, SPSS 17. Survey design was used in order to gather data at a particular point in time with the intention of describing the nature of existing conditions or identifying standards against which existing conditions can be compared. A survey research is one in which a group of respondents are studied by collecting and analyzing data from items considered to be representative of the entire group (Akuezilo, 2013).

Research Question 1: What are the Virtual learning technologies available for the teaching and learning in the College?

Table 1: Mean rating and standard deviation of V-learning technologies available for the teaching and learning in the College

S/N	Items	SA	A	D	SD	Total	ΣX	Mean	Std Dev	Decision
1	Laptops are available for teaching and learning in the college	600	200	100	100	1000	330	3.30	1.00	Accepted
2	Multimedia projectors are available for students and teacher use in the college	570	130	100	200	1000	307	3.07	1.21	Accepted
3	Printers and digital output devices are available for students and teacher use	300	580	70	50	1000	313	3.13	0.74	Accepted

4	Interactive smart boards are available for teaching and learning	300	150	400	150	1000	260	2.60	1.07	Accepted
5	Internet apps are available for teaching and learning.	250	450	150	150	1000	280	2.80	0.98	Accepted

Table 1 above showed the V-learning technologies available for the teaching and learning in the Colleges. However, multimedia projectors are available for students and lecturers use (3.07). The respondents agreed that interactive smart boards are available for teaching and learning (2.60). It is obvious that internet apps are available for teaching and learning (2.80). Laptops are available for teaching and learning in the institution (3.30). On the whole, items 1, 2, 3, 4 and 5 yield a mean scores of 3.30, 3.07, 3.13, 2.60 and 2.80 corresponding to standard deviations of 1.00, 1.21, 0.74, 1.07 and 0.98 were accepted respectively.

Research Question 2: What are the components for V-learning needed in the College?

Table 2: Mean and standard deviation on the components for V-learning needed in secondary schools

S/N	Items	SA	A	D	SD	Total	ΣX	Mean	Std Dev	Decision
6	Curation and addition of existing resources enabling and inspiring everyone to attain their educational potential	270	480	180	70	1000	295	2.95	0.85	Accepted
7	Supplementing text-heavy environments with other types of resources through the use of interactive and visual resources to engage learners and promote deeper levels of comprehension	510	320	90	80	1000	326	3.26	0.92	Accepted
8	V-learning creates cost effective on-line communities of practice which bring learners and teachers together to share ideas and good practice.	450	330	120	100	1000	313	3.13	0.98	Accepted
9	participation in Virtual Learning Environments can be encouraged when the instructor explicitly sets clear expectations surrounding participation	280	400	130	190	1000	277	2.77	0.98	Accepted
10	Modelling and connecting with all candidates on a regular basis which facilitates wider participation and fairer access to education.	160	90	450	300	1000	211	2.11	1.01	Rejected

The result in table 2 showed that supplementing text-heavy environments with other types of resources through the use of interactive and visual resources to engage learners and promote deeper levels of comprehension (3.26). However, v-learning creates cost effective on-line communities of practice which bring learners and teachers together to share ideas and good practice (3.13). The respondents disagreed that modelling and connecting with all candidates on a regular basis which facilitates wider participation and fairer access to education (2.11). In all, items 6, 7, 8 and 9 yields mean scores of 2.95, 3.26, 3.13 and 2.77 corresponding to standard deviation of 0.85, 0.92, 0.98 and 0.98 were accepted respectively, while item 10 with mean score of 2.11 and standard deviation of 1.01 was rejected.

Research Question 3: To what extent do schools apply V-learning technologies in teaching/learning?

Table 3: Mean and standard deviation on how schools apply V-learning technologies in teaching/learning

S/N	Items	SA	A	D	SD	Total	ΣX	Mean	Std Dev	Decision
11	Teachers often utilise laptops in providing curriculum support and additional information to students	300	350	200	150	1000	280	2.80	1.03	Accepted
12	Projectors are often used by teachers and students to create bulleted PowerPoint presentations and highly organized notes	100	150	500	250	1000	210	2.10	0.89	Rejected
13	Printers and digital output devices are used by teachers and students to create	120	130	480	270	1000	210	2.10	0.93	Rejected

14	interactive visual aids for use in the classroom Teachers uses interactive smart boards to embed videos clips that demonstrate the same concepts that are being taught in their course	350	450	100	100	1000	305	3.05	0.92	Accepted
15	Teacher and students makes use of internet apps to create collaboration groups allowing the whole team to works towards a common goal	130	570	120	180	1000	265	2.65	0.92	Accepted

The result in table 3 revealed that teacher's uses interactive smart boards to embed videos clips that demonstrate the same concepts that are being taught in their course (3.05). However, teachers use interactive smart boards to embed videos clips that demonstrate the same concepts that are being taught in their course (3.05). Meanwhile, teachers often utilise laptops in providing curriculum support and additional information to students (2.80). Again, it was rejected that projectors are often used by teachers to create bulleted PowerPoint presentations and highly organized notes for the class (2.10). In all, items 11, 14 and 15 with mean scores of 2.80, 3.05 and 2.65 corresponding to standard deviations of 1.03, 0.92 and 0.92 were accepted respectively, while item 12 and 13 with mean score of 2.10 and 2.10 corresponding to standard deviation of 0.89 and 0.93 were rejected.

Research Question 4: What are the challenges in the application of V-learning technologies in the teaching and learning process?

Table 4: Mean and standard deviation of the challenges in the application of V-learning technologies in the teaching and learning process

S/N	Items	SA	A	D	SD	Total	$\sum X$	Mean	Std Dev	Decision
16	The use of laptops in providing curriculum support by teachers and by students to keep track of their assignments is limited by poor internet connectivity	420	270	170	140	1000	297	2.97	1.07	Accepted
17	Irregular supply of electricity has limited the use of projectors teachers and students	300	490	100	110	1000	298	2.98	0.92	Accepted
18	Poor maintenance culture has negatively impacted the use of printers and digital output devices by teachers and students	200	550	150	100	1000	285	2.85	0.85	Accepted
19	Limited computer literacy by teachers and students has impeded the use interactive smart boards in classroom.	220	500	180	100	1000	284	2.84	0.88	Accepted
20	Inability of some students and teacher to acquire smart and android phones has limited their use of internet apps to create collaboration groups	600	300	50	50	100	345	3.45	0.8	Accepted

Table 4 above showed that poor maintenance culture has negatively impacted the use of printers and digital output devices by teachers and students (2.85). The respondents agreed that limited computer literacy by teachers and students has impeded the use interactive smart boards in classroom (2.84). It is obvious that the use of laptops in providing curriculum support by teachers and by students to keep track of their assignments is limited by poor internet connectivity (2.97). Again, inability of some students and teacher to acquire smart and android phones has limited their use of internet apps to create collaboration groups (3.45). On the whole, items 16, 17, 18, 19 and 20 yield a mean scores of 2.97, 2.98, 2.85, 2.84 and 3.45 corresponding to standard deviations of 1.07, 0.92, 0.85, 0.88 and 0.8 were accepted respectively.

Research Question 5: What are the strategies to counter challenges in the use of V-learning technologies in teaching and learning?

Table 5: Mean and standard deviation of strategies to counter challenges in the use of V-learning technologies in teaching and learning

S/N	Items	SA	A	D	SD	Total	$\sum X$	Mean	Std Dev	Decision
21	Provision of free WiFi and internet access in the school environment alleviates the problems encountered in using V-learning facilities in teaching and learning	250	100	350	300	1000	230	2.30	1.14	Rejected
22	Regular supply of electricity alleviates the problems encountered in using V-learning facilities in teaching and learning	200	420	240	140	1000	268	2.68	0.95	Accepted

23	Regular maintenance of ICT equipments and facilities alleviates the problems encountered in using V-learning facilities in teaching and learning	500	200	170	130	1000	307	3.07	1.09	Accepted
24	Regular in-service computer training for teachers and refreshers course for students alleviates the problems encountered in using V-learning facilities in teaching and learning	230	480	180	110	1000	283	2.83	0.91	Accepted
25	Provision of grants to college and teacher by TETFund and bursaries to students alleviates the problems encountered in using V-learning facilities in teaching and learning	280	450	170	100	1000	291	2.91	0.92	Accepted

The result in table 5 revealed that regular maintenance of ICT equipments and facilities alleviates the problems encountered in using V-learning facilities in teaching and learning (2.83). However, provision of free WiFi and internet access in the school environment alleviates the problems encountered in using V-learning facilities in teaching and learning was disagreed (2.30). Meanwhile, provision of grants to college and teacher by TETFund and bursaries to students alleviates the problems encountered in using V-learning facilities in teaching and learning (2.91). The respondents agreed that regular supply of electricity alleviates the problems encountered in using V-learning facilities in teaching and learning (2.83). In all, items 22, 23, 24 and 25 with mean scores of 2.68, 3.07, 2.83 and 2.91 corresponding to standard deviations of 0.95, 1.09, 0.91 and 0.92 were accepted respectively, while item 21 was rejected with mean score of 2.30 and standard deviation of 1.14.

Summary of Major Findings

Based on the analysis of data, the following findings were made:

- The finding revealed that laptops are available for teaching and learning
- The finding showed that supplementing text-heavy environments with other types of resources through the use of interactive and visual resources to engage learners and promote deeper levels of comprehension
- The finding also revealed that teachers use interactive smart boards to embed videos clips that demonstrate the same concepts that are being taught in their course.
- The finding also showed that Inability of some students and teacher to acquire smart and android phones has limited their use of internet apps to create collaboration groups
- The result showed that regular maintenance of ICT equipments and facilities alleviates the problems encountered in using V-learning facilities in teaching and learning.

Conclusion

The study has been able to evaluate the effectiveness of TETFund intervention on virtual learning environment in colleges of education in South Eastern Nigeria. The finding has revealed that laptops are available for teaching and learning in the colleges. It has also shown that supplementing text-heavy environments with other types of resources through the use of interactive and visual resources engage learners and promote deeper levels of comprehension. But there are still some challenges such as lack of infrastructure, inadequate financial support, proper training on technology and awareness of v-learning and less student readiness etc. Also, teachers use interactive smart boards to embed videos clips that demonstrate the same concepts that are being taught in their course. However, inability of some students and teachers to acquire smart and android phones has limited their use of internet apps to create collaboration groups. The finding also showed that regular maintenance of ICT equipments and facilities alleviates the problems encountered in using V-learning facilities in teaching and learning. Based on the above, it can easily be concluded that v-learning has promising prospects for the near future, as the majority of respondents revealed that v-learning has helped them to overcome the problem of a shortage of learning resources, and they feel that v-learning will make education generally more effective, and will eradicate e-illiteracy in society and extend the frontiers of knowledge.

Recommendations

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

1. Provision of Information and Communication Technology infrastructure to schools by the government.
2. For efficiency, uninterrupted power supply, networked computers and server, computer and language laboratories should be provided.
3. Seminars, workshops, conferences to be organized for pre-service and in-service teachers.

4. Adequate fund should be allocated for the development of Information and Communication Technology in schools.
5. The staff and students should be adequately trained at cheaper or no cost for proper utilization of ICT facilities.
6. There should be constant supply of electricity to schools or generating plants as alternatives, for effective use of ICT facilities in case of power failure.
7. TETFund should also provide yearly intervention for procurement of Wi-Fi for Colleges of Education.
8. Adequate monitoring, supervision and regular check should be placed on v-learning technologies supplied to colleges by TETFund.

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