International Journal of Research Publication and Reviews

An Evaluation of the Effectiveness of TETFund Intervention on Computer Assisted Instruction (Cai) in Colleges of Education in Southeast of Nigeria: (Case Study of Imo and Anambra States)

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ABSTRACT

This research work was carried out to evaluate the effect of TETFund intervention on computer assisted instruction (CAI) 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 computer assisted instruction in Colleges of Education' (ETICAICE). The population comprised two hundred teachers (200) and one thousand students (1000) in the two zones as shown in appendix I. The targeted populations were teachers and students in Nwafor Orizu College of Education, Nsugbe Anambra State and Alvan Ikokwu 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 computer assisted instruction; 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, Computer Assisted Instruction, Colleges of Education,

GENERAL BACKGROUND

Background of the Study

The advent of the computer has opened up possibilities for teachers and learners which is different from the scope of commercial enterprise for which it was earlier targeted. Computer has come to be credited with advantages in education, to the extent that in some cases it has eventually replaced the chalkboard and traditional instruction (T.I) (Din, 1996). Developing nations like Nigeria that places premium on its educational development, cannot ignore this instructional medium called computer assisted instruction (CAI). Merrell & Tymms 2001; Hussen, 2011 both highlighted the advantages and supported the adoption of computer assisted instruction (CAI) in Nigerian Educational System. Teachers" preparation and practices most often do fall short in the area of computer assisted instruction (CAI) for students with dyslexia or dyscalculia making them to be more prone to the learning difficulties than others. Therefore, the need for effective and proper concentration of teachers on the trainees should be more focused on CAI to sponge poor concentration, attention deficits by students and perhaps to achieve the instructional objectives (LuiM, 2007). Computer assisted instruction (CAI) appears to be a promising intervention for both teachers" and students who have attention problems or those who have identified disabilities such as dysgraphia, acaculia, romxgraphia and dyscalculia (Orim & lgwe, 2017). Unfortunately, teachers" use of CAI for students appears limited and may not be utilized in ways that are of maximal benefit for at-risk learners (Desiree, Murray & David, 2014). This article is aimed at supporting their clamour by presenting the prospects and most especially justifies the implementation of computer assisted instruction (C.A.I) in Nigerian colleges of education.

Considering this, the study would evaluate the effectiveness of TETFund intervention on computer assisted instruction (CAI) in Colleges of Education in the south eastern region of Nigeria. It would provide verification about the effects of TETFund intervention on computer assisted instruction 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 computer assisted instruction in Colleges of Education' (ETICAICE) 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 computer assisted instruction, 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.

Statement of the Problem/Justification

There is a lack of empirical evidence on the impact of TETFund-supported CAI on teaching and learning in Colleges of Education in Nigeria, particularly in the Southeast region. While CAI has the potential to enhance student learning, there is a need to better understand the factors that influence its effectiveness and identify areas for improvement. Many scholars in the field of EduTech believed that using CAI 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 CAI in teaching and learning. Majority of the lecturers are novice to Computer Assisted Instruction (CAI), 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 increase in class sizes, low teacher-to-student ratios, and a shortage of qualified teachers. It is, therefore, worthy to evaluate the effectiveness of TETFund intervention on Computer Assisted Instruction (CAI) in colleges of education in south east of Nigeria rather than the Normal methods of teaching.

Purpose of the Study

This study would determine the effectiveness of TETFund intervention on Computer Assisted Instruction (CAI) in Colleges of Education in the south eastern Nigeria.

Specifically the study was designed to investigate the.

1. Virtual learning technologies available for teaching and learning.

2. Extent to which teachers use virtual learning technologies in teaching.

3. Extent to which students use virtual learning technologies in learning.

4. Problems encountered in using virtual learning technologies in teaching and learning.

5. Strategies to solve the problems encountered in using virtual learning technologies in teaching and learning in secondary schools in Onitsha Educational zone of Anambra State.

Research Questions

The following research questions were formulated to guide the study:

1. What are the computer assisted technologies available for the teaching and learning in the colleges within the zone?

2. What are the components of computer assisted instruction needed in the colleges?

3. To what extent do schools apply computer assisted technologies in teaching/learning in their colleges?

4. What are the challenges in the application of computer assisted technologies in the teaching and learning process?

5. What are the strategies to counter challenges in the use of computer assisted technologies in teaching and learning in the colleges?

Scope of the Study

The study will adopt a descriptive survey design and will be carried out in colleges of education in Anambra and Imo States. The population of the study will comprise both lecturers and students in Anambra and Imo State. One thousand two hundred (1200) respondents (1000 students and 200 lecturers) will randomly be selected across two eastern states in Nigeria; Anambra and Imo States. Two sources of data collection would be used in this study in order to answer the research questions. The instrument will be administered to the students and lecturers with the help of three research assistants who are postgraduate from each of the participating schools. They will be briefed on the administration procedure. A validated questionnaire titled the

effectiveness of TETFund intervention on computer assisted instruction in colleges of education (ETICAICE), (for students and lecturers) designed by the researchers, and constructed in a 4-point Likert scale format will also be administered. The reliability of the questionnaire would also be established before use. The Statistical Model of Impact Measuring, a combination of multivariate regression methods and statistical inference would be used in analysing data generated from the study. Data analysis will be 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).

Result

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

S/N	Items	SA	A	D	SD	Total	∑X	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 CAI 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.

Table 2: Mean and standard deviation on the components for CAI needed in secondary schools

S/N	Items	SA	A	D	SD	Total	∑X	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	CAI creates cost effective off-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 Computer Assisted Instruction can be encouraged when	280	400	130	190	1000	277	2.77	0.98	Accepted

	the instructor explicitly sets clear expectations surrounding participation									
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, CAI creates cost effective off-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 0.98were accepted respectively, while item10 with mean score of 2.11 and standard deviation of 1.01 was rejected.

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

S/N	Items	SA	A	D	SD	Total	∑X	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 interactive visual aids for use in the classroom	120	130	480	270	1000	210	2.10	0.93	Rejected
14	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.

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

S/N	Items	SA	A	D	SD	Total	∑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.

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

S/N	Items	SA	A	D	SD	Total	∑X	Mean	Std Dev	Decision
21	Provision of free WiFi and internet access in the school environment alleviates the problems encountered in using CAI 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 CAI 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 CAI 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 CAI 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	280	450	170	100	1000	291	2.91	0.92	Accepted

encountered in using CAI facilities in teaching and learning

The result in table 5 revealed that regular maintenance of ICT equipments and facilities alleviates the problems encountered in using CAI 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 CAI 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 CAI facilities in teaching and learning (2.91). The respondents agreed that regular supply of electricity alleviates the problems encountered in using CAI 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.

Discussion of Findings

Research question 1 sought to find out the CAI technologies available for the teaching and learning in the college. Based on the findings, it was on my school. This finding is in agreement with (Blatch, 2013), who argued that computer and other Information and Communication Technology facilities are expensive to purchase and as such not all school can offered the purchase of Information and Communication Technology facilities. The respondents agree that interactive smart boards are available for teaching and learning in the college. This finding is in agreement with Lechner (2019), who revealed that computer and other Information and Communication Technology facilities are expensive to purchase and as such not all school can afford the purchase of Information and Communication Technology facilities. Also, printers and digital output devices, multimedia projectors and are available for students and lecturers use in department. Considering the availability of ICT in teaching and learning, teachers and students need to acquire these skills as the use of ICT facilities could motivate learners and make teaching easier and more interesting. To Musbah and Mohammed (2013), it encourages critical thinking and offers unlimited means of achieving educational goals.

Research question 2 dealt with the components for CAI needed in the college. The findings revealed participation in Computer Assisted Instruction can be encouraged when the instructor explicitly sets clear expectations surrounding participation. CAI allow learners to take control over the learning process, engage in social interaction and dialogue, develop multiple modes of representation and become more self aware (Oliver and McLoughlin, 2018). However, 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. To explain this phenomenon, Cavanaugh (2011) who opined that group brainstorming sessions are a great way to bring your students together to engage with whatever it is they're learning. Instead of thinking about the topic alone at their desk, they get to expand their ideas with other students, which will help them be more engaged and gain a new perspective into the lesson. Meanwhile, CAI creates cost effective off-line communities of practice which bring learners and teachers together to share ideas and good practice. For example, Barker & Wendel (2011) concluded that, visual enables learners to become self-learners. Given the speed with which a learner learns with CAI tools, the learner gets more time to pursue their hobbies or talents. CAI creates cost effective off-line communities of practice which bring learners and teachers together to share ideas and good practice.

Research question 3 dealt with the extent on how schools should apply CAI technologies in teaching/learning. The findings revealed that teacher and students make use of internet apps to create collaboration groups allowing the whole team to work towards a common goal. This finding is in agreement with Smith and Hardaker (2010), who found that internet has become a major tool for effective teaching as well as a learning tool. Teachers can use it as a teaching tool by posting their teaching materials (notes and videos) on school website or forum. The learning process becomes interesting and diverse with the use of tutorial videos and notes. However, the respondents disagreed that projectors are often used by teachers and students to create bulleted PowerPoint presentations and highly organized notes. To explain this phenomenon, a study of Calderoni (2018), who opined that teachers using the new LCD projectors offer ways of reaching students in different ways, it allow the teacher to interact with students better, to use a multimodal form of teaching and to provide more entertaining ways to teach and get their lesson objectives and facts across. The respondents agree that teachers often utilise laptops in providing curriculum support and additional information to students. The most common role a teacher plays in the classroom is to teach knowledge to children. Teachers are given a curriculum they must follow that meets state guidelines. This curriculum is followed by the teacher so that throughout the year, all pertinent knowledge is dispensed to the students. Meanwhile, printers and digital output devices are used by teachers to create interactive visual aids for use in the classroom, which helps teachers communicate complex concepts to students.

Research question 4 dealt with the challenges in the application of CAI technologies in the teaching and learning process. The findings revealed that irregular supply of electricity has limited the use of projectors by teachers and students. This is in line with Bond (2012) who stated that like most Africa countries, Nigeria as a nation-state came late and is still slow in the use of ICT in almost all sectors of the nation's life. However, the respondents accepted that limited computer literacy by teachers and students has impeded the use of interactive smart boards in classroom. For example, Cavanaugh (2011) declares that those who are designated to use computers in Nigeria do not receive adequate training, and at worst, do not receive any training at all. Also, poor maintenance culture has negatively impacted the use of printers and digital output devices by teachers and students. This result is collaborated by Wedemeyer (2011), who observes that the causes of poor maintenance culture in ICT could be attributed to corruption, attitudinal problem, unfavorable government policies and diversion of funds meant for project implementation. However, 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. In most case, computer viruses can also cause poor Internet

performance. Two of the most frequent causes of poor Internet performance are spyware and viruses. Spyware can slow your system by interfering with your browser and monopolizing your Internet connection. Spyware monitors your Internet use and keystrokes, which adds delays.

Research question 5 sought to find out the strategies to counter challenges in the use of CAI technologies in teaching and learning in the college. Based on the findings, it was observed that provision of free WiFi and internet access in the school environment alleviates the problems encountered in using CAI facilities in teaching and learning. To explain this phenomenon, Rotter (2019) who observed that using Wi-Fi at school, students can quickly and easily share documents, edit presentations in real time, store project files in the cloud, and improve their teamwork skills. Wi-Fi in education even allows students to collaborate with peers from other schools. Consistent with these findings, the respondent agree that regular supply of electricity alleviates the problems encountered in using CAI facilities in teaching and learning. Rosaline Okon, of the computer science department at the University of Calabar, pointed out that providing uninterrupted power supplies to ICT centres alone would not work if other units in universities had no power. "The best option is to develop an energy road map where all the units will gradually have uninterrupted electricity supply for the use of ICT," Okon said. Also, regular in-service computer training for teachers and refreshers course for students alleviates the problems encountered in using CAI facilities in teaching and learning. Rovai (2014) declares that those who are designated to use computers in Nigeria do not receive adequate training, and at worst, do not receive any training at all. In relation to that Agboeze & Agboji, (2012) suggest that seminar and workshops should be organized for teachers to improve their knowledge and skills of Information and Communication Technology.

Conclusion

The study has been able to evaluate the effectiveness of TETFund intervention on computer assisted instruction 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 CAI 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 CAI facilities in teaching and learning. Based on the above, it can easily be concluded that CAI has promising prospects for the near future, as the majority of respondents revealed that the use of computer assisted instruction enhanced students' achievement and retention more than the conventional lecture method. Male and female students taught with computer aided instruction perform better than male and female students taught with the conventional lecture method. There was no significant difference between the mean achievement scores of males and females taught with the computer assisted instruction. Gender has no significant influence on achievement and retention the use of CAI package.

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 in how to use CAI effectively.

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 CAI technologies supplied to colleges by TETFund.

9. Conduct more research on the effectiveness of CAI in different settings and for different types of learners.

10. Evaluate the effectiveness of CAI programs on an ongoing basis.

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