

Utilization of E-Learning Facilities by Science Teacher Educators for Teaching Pre-Service Teachers in Nigerian Colleges of Education

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ABSTRACT---- *E-learning facilities are necessary to meet the challenges of the contemporary world education competitiveness in scientific and technological advancement. This study investigated the availability and utilization of e-learning facilities by science teacher educators in teaching pre-service teachers in South-East Nigerian Colleges of Education. One hundred and sixty-seven (167) science teacher educators participated in the study. A researcher-developed fifty five-item questionnaire with reliability co-efficient of 0.87 was used to collect data. Four research questions guided the conduct of the study. Data were analyzed using mean and standard deviation. Results show that some of the listed e-learning facilities were available for teaching science in Nigerian Colleges of Education to a high extent. Some of these include computer, printer, computer laboratory and public address system. On the average however, most e-learning facilities were available to a moderate extent. Results also revealed that science teacher educators use e-learning facilities to a moderate extent. High cost of computer units, lack of prior knowledge on the part of the students on usage of computers, low browsing speed resulting to wastage of payer's money and unavailability of some e-learning facilities due to poor funding are some of the factors that contribute to poor usage of e-learning facilities. The researchers recommended (among others) that schools should be provided with e-teaching and e-learning facilities and science teacher educators should undergo regular in-service training and re-training programs.*

Keywords--- Availability, utilization, e-learning facilities, colleges of education, science teacher educators

1. INTRODUCTION

E-learning according to Hollow and ICWE (2009) is used to refer to a wide variety of activities that incorporate Information Communication and Technology (ICT) within education. These activities consist of a wide variety of terms that describe educational technology that electronically or technologically supports teaching and learning. These include, technology-enhanced learning (TEL), computer-based instruction (CBI), computer-managed instruction(CMI), computer-based training (CBT), computer-assisted instruction or computer-aided instruction (CAI), internet-based training (IBT), web-based training (WBT), online education, virtual education, virtual learning environment (VLE), m-learning and digital education. These terms are similar and overlapping and their usage depends on which particular digitization approach, component or delivery method is given emphasis. E-learning can itself be seen as an education subject in which case it is called “computer studies” or “information and communication technology (ICT)”.

The rapid development in ICTs has made tremendous changes in the 21st century as well as affected the demands of modern societies. Education is the most important instrument of change. Colleges of education are tertiary institutions for teacher education. Therefore the importance of e-learning in institutions of higher education where prospective teachers are trained cannot be over emphasized. Such institutions are colleges of education and faculties of education in the universities. Teacher education is very fundamental in the advancement of education system since it is at this level that the would-be teachers are prepared for their job. Teacher education is a professional discipline aimed at training prospective teachers to acquire skills, dispositions, knowledge, habits, attitudes, values and norms that will enable them enter the occupation of teaching (Kankz in Fagbemi, 2011). The professional teachers in teacher education institutions entrusted with the responsibility of training the would-be teachers are called teacher educators.

Teacher educators as used in this study are those teaching science subjects and are referred to as science teacher educators. They are limited to those teaching biology, chemistry, physics, mathematics, integrated science and computer science.

The importance and/or advantages of e-learning in promoting quality education are not in doubt. Some of these advantages as revealed by a survey carried out by Hollow and ICWE (2009) are that e-learning provides access to quality open educational resources, fosters information exchange and sharing, enables teachers to invest in more innovative teaching, students are active on their own learning, bridges the gap between learner and facilitator and improves the teaching methods. To harness these benefits, the resources and facilities for e-learning must be on ground and properly utilized. These facilities are necessary to meet the challenges of the contemporary world education competitiveness in scientific and technological advancement.

Available literature shows that many studies have been carried out on availability and use of e-learning facilities in teaching and learning. Most of these studies however, were carried out mainly at secondary and primary school levels and not much related work has been done at tertiary levels. Examples include Ayebi-Arthur (2011), Nwana (2012), Okoli and Osuafor (2013) and Akpan (2010). Results from these studies indicated inadequate facilities in schools as well as low utilization of those available. Ushie, Okworo and Ukpanukpong (2009) asserted that this situation was worse in Colleges of Education where resources were not only grossly inadequate but access to centres for educational technology was also minimal. To support this assertion, they cited a study carried out by Ugwanyi and Olokun (2004) which revealed that out of the 66 Colleges of Education in the nation, only 15 (22.73%) had internet service and e-mail facility was found in 7 (0.6%) of the colleges with as many as 59 (89.39%) not having facility at all.

The question now is, has the situation improved? In spite of the obvious advantages of e-learning, it is not certain whether the facilities for its implementation are now available in schools especially in teacher education institutions where the would-be teachers are trained and prepared for the job ahead. It is against this background that the researchers investigated the extent of availability and use of e-learning facilities by science teacher educators in colleges of education in teaching pre-service teachers also called student teachers.

2. REVIEW OF RELATED LITERATURE

Functional and qualitative education, which is viewed as a necessary condition for national development cannot be achieved without sound knowledge and application of e-learning. Thus, all educational systems all over the world today are under increasing pressure to use e-learning to teach students the knowledge and skills they need in the 21st century (Ezeugbo and Asiegbo, 2011).

Educational institutions, in recognition of the impact of new technologies on the work place and everyday life, are making effort to restructure their educational programmes and classroom facilities and instructional strategies in order to minimise the teaching and learning technology gaps between developed and developing nations. Thus, Ushie et al. (2009) stressed that the new work force of teacher educators and student teachers must be capable of locating, accessing, analysing and synthesizing information to generate new knowledge and products. This demands that teacher educational institutions like Colleges of Education become increasingly involved as engines of scientific and technological development of the Nigerian society.

According to Nwana (2012), e-learning in education is the wholesome integration of modern telecommunication equipment, particularly the internet into the education system. Furthermore, the main purpose of e-learning is to transform the old methods and approaches of curriculum implementation in order to bring about certain changes in the behaviour of the learners and the extent to which the changes take place.

Obodoegbulam and Ogbonnaya in Ezeugbo and Asiegbo (2011) enumerated e-learning facilities needed for effective teaching to include computer, internet, e-mail, satellite, multi-media, network, telephone, wireless technology, mobile phone and CD-ROM. Similarly, Steve in Ushie, Okworo and Ukpanukpong (2009) identified the information communication technology applied in instructional communication to include computers, internet, electronic mail (e-mail), teleconferencing, worldwide web (www), electronic white boards and satellites. Nwana (2012) also listed ICT resources as computer, scanner, printer, intranet, internet, e-mail, videophone systems, teleconferencing devices, wireless application protocols (WAP), radio and microwaves, television and satellites, multimedia computer and multimedia projector.

The importance of teachers in any curriculum implementation can never be overemphasized. This is because teachers are the pivot of the teaching profession and the education of any nation cannot grow above the knowledge of its teachers (Federal Republic of Nigeria, 2009). Studies, (Ezeugbo and Asiegbo 2011, Nwana 2012), have shown that there are constraints to the successful utilization of e-learning and e-learning facilities for curriculum implementation in schools. Otuka in Ezeugbo and Asiegbo (2011) expressed that computer literacy in Nigeria is still at its lowest ebb mainly

because e-learning is faced with a lot of challenges some of which include inadequate e-learning facilities, lack of skilled manpower to manage the available resources, inadequate funding of higher education and reluctance/inability on the part of the lecturers to fully integrate new technologies in their pedagogical practices. Ezeugbo and Asiegbu (2012) identified major e-learning challenges as inadequate funding, lack of technical background and inadequate facilities and noted that the application of e-learning in teaching will thrive only if these challenges or constraints were properly addressed. Owolabi in Nwana (2012) was of the opinion that dearth of trained teachers for e-learning, lack of facilities, infrastructures and equipment were among the factors that militate against effective utilization of e-learning. These challenges may be part of reasons why most teachers, including science teacher educators appear to still stick to the old traditional method of lecture in delivering their lessons.

According to Ushie et al. (2009), the World Bank had expressed stated that the new direction to technological and economic development is no longer in extensive manual labour, but in knowledge building and application of systematic information in the design and production of goods and services. The goods and services in this case are the student teachers who are well equipped with the knowledge and skills of e-learning and computer literacy to be able to flow with the technology-driven world. Consequently, teaching now requires teacher educators who are capable of applying the enabling capacity of e-learning instructional communication technology to solve instructional problems, design new approaches and techniques with the sole aim of improving teaching and learning.

3. RESEARCH QUESTIONS

The following research questions guided the study:

1. To what extent are e-learning facilities available for teaching science in south-east Nigeria Colleges of Education?
2. To what extent are e-learning facilities utilized for science teaching and learning?
3. What are the factors militating against the application of e-learning facilities in teaching/learning of science subjects?
4. What are the measures to be adopted for the enhancement of the utilization of e-learning for science education?

4. METHODOLOGY

The design was a descriptive survey involving all science teacher educators teaching in South-East colleges of education. All formed the sample except a few who could not be reached at the point of data collection that lasted for two weeks. A total of 167 science teacher educators responded to the questionnaire. A 55-item questionnaire developed by the researchers was used for data collection with the help of research assistants. The questionnaire was divided into four sections, A to D. Section A sought information on the extent to which e-learning facilities are available in the respondents' institution; section B sought information on the extent to which available facilities are utilized by the science teacher educators; sections C and D sought the opinion of the respondents on factors militating against the effective utilization of e-learning facilities in teaching science subjects and strategies which could be adopted to enhance the utilization of the facilities respectively. Sections A and B of the questionnaire were rated on a 5-point rating scale of High Extent (HE), Moderate Extent (ME), Not Sure (NS), Low Extent (LE) and Not Available (NA). Sections C and D were rated on a 5-point rating scale of strongly agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD).

The reliability of the instrument was determined using test-retest method. Copies of the instrument were administered on 2 science teacher educators in two Colleges of Education not used for the study. An interval of two weeks was allowed between the first and second administration. Pearson Product Moment correlation coefficient was used to correlate the data which yielded a reliability coefficient of 0.87 indicating that the instrument was reliable enough for the study.

Data were analysed using mean and standard deviation. For purposes of interpretation, for sections A and B, items with mean values below 2.5 were interpreted as low extent, those with the values of 2.5 to 2.99, moderate extent and those with mean values of 3.0 and above, high extent. For sections C and D, items with mean values below 3.0 were regarded as disagree while those with mean values of 3.0 and above were regarded as agree.

5. RESULTS

Research question one

To what extent are e-learning facilities available for teaching science in south-east Nigerian Colleges of Education?

Table 1: Mean ratings of science teacher educators on the extent of availability of e-learning facilities

	N	Mean	Std. Dev	Decision
1. Computer	167	4.09	1.03	High
2. Scanner	167	2.90	1.25	Moderate
3. Printer	167	3.51	1.21	High
4. Projectors	167	2.72	1.22	Moderate
5. Digital Library	167	2.35	1.28	Low
6. Fax machine	167	2.09	1.16	Low
7. Computer Laboratory	167	3.41	1.39	High
8. Internet	167	3.42	1.32	High
9. Radio	167	2.83	1.38	Moderate
10. Audio tapes	167	2.71	1.19	Moderate
11. Assistive software	167	2.54	1.20	Moderate
12. Interactive whiteboard	167	3.10	1.32	High
13. Digital Camera/Camcorder	167	2.44	1.13	Low
14. Mobile Phones	167	4.04	1.27	High
15. Public Address system	167	3.48	1.24	High
16. Webcam	167	2.64	1.18	Moderate
17. CD-ROMs	167	3.06	1.33	High
18. Wide Area Network (WAN)	167	2.56	1.12	Moderate
19. Metropolitan Area Network (MAN)	167	2.32	1.06	Low
20. Local Area Network (LAN)	167	2.76	1.23	Moderate
21. Audio/Conferencing Hall	167	2.84	1.55	Moderate

As shown in table 1, eight out of the 21 e-learning facilities were available to a high extent in the colleges of education. These include; computer, printer, computer laboratory, internet, interactive whiteboard, mobile phones, public address system, CD-ROMs. Furthermore, nine out of the 21 were available to a moderate extent. These are; scanner, projectors, radio, audio tapes, assistive software, webcam, wide Area network (WAN), Local Area Network (LAN) and Audio-conferencing hall. On the other hand, such e-learning facilities as digital library, fax machine, digital camera/camcorder, and Metropolitan Area Network (MAN) were available to a low extent. Therefore, greater proportion of the e-learning facilities was available to a moderate extent.

Research Question Two

To what extent are available e-learning facilities utilized by teacher educators for science teaching and learning?

Table 2: Mean ratings on extent of utilisation of available e-learning facilities

	N	Mean	Std. Deviation	Decision
22. I give students lecture in Audio/Conferencing Hall	167	2.87	1.45	Moderate
23. I use projectors for visual transmissions during my lectures	167	2.22	1.15	Low
24. I use networked printers to make materials available to my students	167	2.23	1.26	Low
25. I give my students online based assignments within the school periods/hours	167	2.65	1.43	Moderate
26. My students access the course materials provided online	167	2.76	1.46	Moderate
27. I use public address systems for audibility during my lectures	167	2.45	1.30	Low
28. My students and I use the computer laboratory with internet facilities when the need arises	167	2.86	1.35	Moderate
29. I have access to the Hotspot created by the college to access online materials when needed	167	2.50	1.42	Moderate

Table 2 shows the mean ratings on nine indicators of usage of e-learning facilities. The mean ratings for the use of projectors, networked printers and public address systems by the science teacher educators ranged from 2.22 to 2.45 showing that science teacher educators use them to a low extent. However, the rest of the dimensions of e-learning facilities were used to a moderate extent. On the average therefore, science teacher educators use e-learning facilities to a moderate extent.

Research Question Three

What are the factors militating against the application of e-learning facilities in teaching/learning of science in Nigerian Colleges of Education?

Table 3: Mean responses on factors militating against the application of e-learning facilities in teaching/learning process

	N	Mean	Std. Deviation
30. The high cost of computer units has contributed immensely in reducing their availability and usage by lecturers and students	167	3.85	1.27
31. Lecturers and students hardly bring their computer units to school for fear of losing them	167	3.13	1.42
32. Most students come into higher institutions without any prior knowledge on usage of computer systems and internets; hence they find it difficult to use the e-learning facilities	167	3.97	1.09
33. Lecturers who have computers could hardly afford the monthly subscription for the internet usage	167	3.43	1.27
34. The browsing speed in Nigeria is relatively low compared to the amount paid for the bandwidth, hence it discourages lecturers and students	167	3.92	1.10
35. Most parents consider computers as luxury instead of necessity thereby refusing to equip their children with such provisions	167	3.64	1.28
36. Due to availability of some pornographic sites, most parents rarely allow their wards the access to surf the internet or even use computer system	167	3.50	1.19
37. Underfunding from our Government budgeting has affected the availability of e-learning facilities in our tertiary institutions	167	4.28	1.01
38. Irregular power supply	167	3.92	1.10

Table 3 shows the mean ratings of the problems militating against the use of e-learning facilities by science teachers in teaching. All the nine problems indicated were accepted by science teachers as militating against their use of e-learning in the teaching and learning process as all the mean ratings ranged from 3.13 to 4.28. Foremost amongst the problems as indicated by the mean rating is underfunding by the government while lecturers and students not bringing their computer units to school was least rated of the eight problems.

Research Question Four

What measures can be adopted to enhance of the utilization of e-learning facilities for teaching science in Nigerian Colleges of Education?

Table 4: Mean responses on the strategies for enhancing utilization of e-learning facilities

	N	Mean	Std. Dev.
39. There should be an awareness campaign on the benefits of e-learning within and outside institution	167	4.65	.58
40. Students' examination should be conducted online under their lecturers supervision	167	3.93	1.08
41. The students tutor marked assignment (TMA) should be online-based so as to encourage e-learning usage	167	4.02	.99
42. The unit cost of computer should be subsidized to boost procurement	167	4.49	.68
43. Effort should be made by ministry of education in both federal and state levels to post ICT skilled teachers to tertiary institutions	167	4.43	.73

44. Steady power supply should be provided to the colleges by the management	167	4.68	.57
45. There should be virtual courses that are internet-based in the syllabus for science education programme	167	4.28	.68
46. Government should provide tertiary institutions with adequate funds for ICT/e-learning facilities	167	4.60	.56
47. Maximum internet security should be provided by experts to cut off the use of pornography/illegal sites	167	4.43	.67
48. Regular in-service training of lecturers should be provided for them to upgrade their ICT knowledge/skills	167	4.49	.57
49. Regulation of internet subscription should be enforced by the Nigerian Communication Commission (NCC) to encourage users	167	4.46	.73
50. Network providers should make serious effort to improve the bandwidth sizes for more network speed	167	4.48	.55
51. Computer studies should be made compulsory in secondary schools, so that students will appreciate its usefulness better when they move into tertiary institutions.	167	4.58	.61
52. Security should be provided within the school environment to avoid theft	167	4.42	.69
53. Students should be taught basic computer knowledge	167	4.62	.55
54. There is need for provision of WAN, MAN, LAN networks in all the colleges of education	167	4.50	.65
55. The college should establish an online courseware open to student to download course materials when needed.	167	4.50	.64

On measures to be adopted for enhancing the use of e-learning facilities, science teacher educators agreed that all the listed measures will enhance their use of e-learning facilities for teaching in the colleges of education. The mean ratings ranged from 3.93 to 4.68. More specifically, steady power supply (4.68), awareness creation (4.65) and teaching students basic computer knowledge (4.62) were the most positively rated measures while conducting students' examination online under lecturers' supervision received the least positive rating (3.93).

6. DISCUSSION

Results show that only 8 out of the 21 e-learning facilities listed were available to a high extent in the colleges of education in South-east of Nigeria. In other words, 13 items were available only to a low or moderate extent. This situation, though not impressive, can be said to be an improvement on Ugwanyi and Olokun's findings in 2004. While in their studies, 60% of the colleges of education did not have internet services at all, this study shows that internet services are highly available in South-east colleges of education.

On the issue of utilisation of e-learning facilities (table 2), the results show that science teacher educators utilise the facilities only to a moderate extent. Public address system for instance, though available to a high extent in colleges of education, is not fully utilised by the science teachers for audibility. Projectors which could make it easier for students to visualise what it being taught are equally not properly utilised. Again, this is not encouraging. It goes to support Otuka (in Ezeugbo and Asiegbu, 2011) who asserted that one of the challenges facing e-learning in Nigeria is inability of lecturers to fully integrate new technologies in their pedagogical practices. Teacher educators should not only be computer literate, they should also develop the skills in integrating computer into their teaching and learning programmes (Newhouse, 2007). As earlier stated, teaching now requires teacher educators who are capable of applying the enabling capacity of e-learning instructional communication technology to solve instructional problems, design new approaches and techniques with the aim of improving teaching and learning.

7. CONCLUSION

The study attempted to examine the availability and utilization of e-learning facilities in Colleges of Education in South-East Nigeria. It was revealed that most e-learning facilities were available to a low or moderate extent, the available facilities were equally utilised to a low or moderate extent. This situation should not be allowed to continue, or the entire education system in Nigeria and to a large extent its development will continue to lag behind other countries of the world since it is believed that education is an agent of a nation's development. No meaningful development in education can take place without developing teacher education (Garba in Dasha & Paksohot, 2011). It therefore becomes imperative to provide ICT materials in Colleges of Education and more importantly expose the teachers to training on how to use these materials (Abidoeye, Adenele & Adelokun, 2011).

8. RECOMMENDATIONS

From the foregoing, the researchers recommend as follows:

1. Various levels of government, non-governmental organisations and private individuals should deliberately increase their financial contributions to the centre for educational technology in teacher education institutions (Ushie et al., 2009). Funds should be provided, not only to equip these institutions with ICT materials, but also for training the teachers on how to use the materials as well as maintenance of e-learning equipment.
2. The curriculum at all levels of teacher training should be highly enriched with ICT including ICT pedagogy. ICT as a course should not be limited to students whose major area of specialisation is computer. The entire teacher training programme should aim at making the teachers and students computer literate and ICT complaint (Abidoeye, Adenele & Adelokun, 2011).
3. There should be constant supply of electric power in teacher education institution and indeed all education institutions for that matter as no meaningful computer education can be achieved without steady supply of electricity.
4. Students and pupils should be exposed to ICT/computer studies as early as possible. Ayebi-Arthur (2011) reported that in Ghana ICT studies were introduced at primary, junior high schools and senior high schools in 2007. Nigeria should borrow a leaf from them as it is always better to “catch then young”.

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