
AVAILABILITY AND UTILIZATION OF ELECTRONIC LEARNING TECHNOLOGIES FOR IMPROVING TEACHING AND LEARNING IN TERTIARY INSTITUTIONS IN SOKOTO STATE, NIGERIA

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Abstract

The study investigated the availability and utilization of e-learning technologies for improving teaching and learning of Computer Science program in Tertiary Institutions in Sokoto State. Three research questions were formulated to guide the study. The target population was 332 comprising 26 lecturers and 306 students from the Department of Computer Science in Tertiary Institutions in Sokoto State. Sample size was 181 randomly selected using simple random sampling techniques. The descriptive survey design was adopted for the study. A structured questionnaire was used to gather data for the study using a two-point rating scale and four-point rating scale. Cronbach Alpha reliability formula was used to ascertain the internal consistency of the instrument. A reliability coefficient of 0.89 was obtained. The data obtained was analyzed using Statistical Packages for Social Sciences (SPSS). Percentage, mean and standard deviation were employed to answer the research questions. The findings of the study revealed that some e-learning technologies are available and some are utilized by both lecturers and students in Computer Science program in high extent. It was therefore recommended among others that lecturers should be encouraged to utilize fully, the available e-learning resources in teaching all Computer Science courses and prepare e-books so as to encourage students in the reading of e-books and e-journals.

Keyword: E-Learning, tertiary institutions, computer science

Introduction

Technology has greatly impacted on education and training globally by improving teaching and learning. The process of education, especially the manner in which teachers and learners have access to information and knowledge in the 21st century has been modified tremendously by technology, particularly ICT. The incorporation of ICT into instructional delivery has launched a novel system of learning known globally as e-learning. Institutions are now witnessing a paradigm shift from teacher-centered to learner-centered learning with the development to e-learning technologies. According to Evarest and Laura (2011), Electronic learning, also referred to as e-learning, is increasingly becoming popular in tertiary institutions all over the world. This is as a result of the opportunities provided by various institutions and the fact that more students are making use of e-learning technologies (Organization of Economic Co-operation and Development (OECD, 2005). Electronic learning is basically the use of information and communication technologies (ICTs) to enhance and support teaching/learning and research (Eteng and Ntui, 2009). The application of ICT in education has given rise to a new set of vocabularies used to describe new approaches to learning and curriculum delivery. Such terms include - teaching and e-learning, among others which are facilitated via the internet. The availability of the internet provides the channel for the use of electronic approach in education known as electronic learning or e-learning. Simply put, e-learning is the process of teaching and learning using the computer via the internet. It involves passing structured instructional materials from an instructor (lecturer) to a learner (student) through the use of ICTs. E-learning also refers to computer-enhanced training as opposed to the computer-based training of the 1980s (Erah, 2006). Erah further stated that, e-learning is an approach that facilitates and enhance learning through both computer and other communication technologies. Rosenberg (2001) sees e-learning as the application of the internet to support the delivery of skills and knowledge in a holistic manner.

E-learning is learner-centered which is like a shift from the Traditional Learning which is teacher-centred. E-learning, enriches learning content and enhance wider access to information resources. When the potential of e-learning is fully harnessed, it would advance knowledge by expanding and widening access, improving the quality of education and reducing cost (Newhouse, 2002a). E-learning technology has the potential to transform how and when learners learn. The use of these e-learning facilities involves various methods which include systematic feedback system, computer-based operation network, video conferencing and audio conferencing, internet world wide websites and computer assisted instruction (Ajayi, 2008). This delivery method increases the possibilities for how, where and when learners can engage in lifelong learning. Both lecturers and students are especially excited about the potential of e-learning for just-in-time learning delivery. Electronic learning (e-learning) technologies are becoming increasingly popular in tertiary institutions as they are used for tutoring, managing courses, providing simulations, enriching existing courses, programming and problem solving.

Objectives of the Study

The broad objective of this study was to assess the availability and utilization of e-learning technologies for improving teaching and learning of Computer Science program in Tertiary institutions in Sokoto State. Specifically, the study aims to determine the;

1. Availability of e-learning technologies for improving teaching and learning of Computer Science program in Tertiary institutions.
2. Extent of utilization of e-learning technologies by lecturers for improving teaching and learning of Computer Science program in Tertiary institutions.

3. Extent of utilization of e-learning technologies by students for improving teaching and learning of Computer Science program in Tertiary institutions.

Research Questions

The study answered the following research questions:

1. What are the e-learning technologies available for improving teaching and learning of Computer Science program in Tertiary institutions in Sokoto State?
2. What is the extent of utilization of e-learning technologies by lecturers for improving teaching and learning of Computer Science program in Tertiary institutions?
3. What is the extent of utilization of e-learning technologies by students for improving teaching and learning of Computer Science program in Tertiary institutions?

Methodology

The study adopted descriptive survey design. Descriptive survey research design in the opinion of Owens (2002) is that in which the same information is gathered from an unbiased representation group of interest using questionnaire, interview and observation. The design is considered appropriate for this study because questionnaire was used to collect data from respondents on the availability and utilization of e-learning technologies for improving teaching and learning of Computer Science programme. The target population was 332 comprising 26 lecturers and 306 students from the Department of Computer Science in Tertiary institutions in Sokoto State (POS and SSCOE). Sample size was 181 derived from Yaro Yamane's formula for a finite population consisting of the 26 lecturers and 155 students who were randomly selected using simple random sampling technique. The lecturers and students were chosen because they should have information on the availability and utilization of e-learning technologies. The lecturers and students use e-learning technologies for the teaching and learning process. The instrument for data collection was a 40 item structured questionnaire. The questionnaire is structured on a two and four point rating scale, and the response options for sections A is Available and Not Available. The response option for section B and C is: Very High Extent (VHE)-4points, High Extent (HE)-3points, Moderate Extent (ME) – 2 points, Low Extent (LE) -1 point. The questionnaire was subjected to face-validation by three experts from the Department of Computer Science, Polytechnic of Sokoto State (POS) and Shehu Shagari College of Education (SSCOE) Sokoto State. Cronbach Alpha reliability for mula was used to ascertain the internal consistency of the instrument. A reliability coefficient of 0.89 was obtained. Out of the 181 copies of the questionnaire that were administered, 176 were returned representing 97% return rate. The questionnaire was administered and collected by the researcher with the help of two research assistants. The research assistants were earlier briefed by the researcher on how to administer the instrument to the respondents. This reduced the unnecessary delays associated with the completion of questionnaire and also enhanced the return rate. The data obtained was analyzed using Statistical Packages for Social Sciences (SPSS). Percentage was used to answer the research question for section A while mean and standard deviation were used to answer the research questions for section B and C. The mean rating of 2.50 was used for decision regarding the research questions. This was calculated based on the 4 point rating interval used for the study. Items with mean values of 2.50 and above were considered as agreed while items with mean values below 2.50 were considered as disagreed.

Results

Table 1: Mean Ratings of Respondents on Availability of E-Learning Technologies for Improving Teaching and Learning of computer science Programme in Tertiary institutions in Sokoto State

S/N	Items	A	N/A	Remarks
1	Internet and web	75%	25%	Available
2	browser E-journals	71%	29%	Available
3	Interactive white	62%	38%	Available
4	board Compact disk	83%	17%	Available
5	Digital	23%	77%	Not
6	library E-	45%	55%	Available
7	book	21%	79%	Not
8	Computer simulation	65%	35%	Available
9	Multi-media	82%	18%	Not
10	projectors Power	15%	85%	Available
11	Point	90%	10%	Available
12	Video/Teleconferenci	92%	8%	Available
13	ng Computers	28%	72%	Not
14	Smart phones	91%	9%	Available
15	Learning Management	73%	27%	Available
	System E-mail			Available
	Blog			Not
				Available
				Available
				Available

A = Available, N/A = Not Available

The result in Table 1 shows that out of 15 items, 10 items (1, 2, 3, 4, 8, 9, 11, 12, 14, and 15) had a percentage between 62%-92%, indicating that most of the respondents agree they are e-learning technologies available in Computer Science programme in Tertiary institutions in Sokoto State. It was also discovered that the remaining five items (5, 6, 7, 10, and 13) had a percentage between 55%-85% indicating that most of the respondents agree that those items are not available in computer science programme in Tertiary institutions in Sokoto State.

Table 2: Mean Ratings of Respondents on the extent of Utilization of E-Learning Technologies by Lecturers for Improving Teaching and Learning of computer science Programme in Tertiary institutions in Sokoto State

S/N	Item Statements	\bar{X}	SD	Remarks
16	Lecturers use the internet to facilitate teaching and learning.	3.69	0.47	HEL
17	Lecturers prefer the use of e-books/e-journals to offline/hard copy books when sourcing for academic information.	1.80	0.75	E
18	Video/teleconference is employed by lecturers to enhance teaching and learning. Lecturers use multi-media projectors to present lessons.	1.31	0.47	LE
19	Lecturers use learning management system to post academic	3.19	0.69	HEL
20	information. Lecturers use blogs for research.	1.27	0.45	E
21	Lecturers employ the use of e-mail in giving and receiving students' assignment. Lecturers use e-journals in the publication of journal	2.77	0.82	HE
22	articles. Lecturers employ the use of digital library in retrieving information Lecturers use inter active white board to record video or	3.58	0.50	HE
23	audio lectures for students.	3.58	0.87	HEL
24	Lecturers use the computer to get information online via the	1.58	0.50	ELE
25	internet. Lecturers use computer simulations to aid teaching and learning.	2.04	0.96	HE
26	Grand Mean	3.92	0.27	
	Lecturers use interactive white board to teach abstract contents	1.27	0.45	LEH
27	Lecturers use interactive white board to coordinate class teaching	2.50	0.16	E

\bar{X} = Mean, SD = Standard Deviation, HE = High Extent, LE = Low Extent.

The findings in Table 2 revealed the responses to items 16-27, the mean ratings as well as the standard deviation. The mean ratings of items 16, 19, 21, 22, 23 and 26 ranged from 2.77 and 3.92 which implied high extent of utilization because it is above 2.50. Items 17, 18, 20, 24, 25 and 27 had mean ratings ranging from 1.27 and 2.04 indicating low extent of utilization. The standard deviation of the items ranged from 0.27 and 0.96. The grand mean of 2.50 implied that the respondents generally agreed that the e-learning technologies are utilized to a high extent.

Table 3: Mean Ratings of Respondents on the Extent of Utilization of E-Learning Technologies by Students

for Improving Teaching and Learning of computer science Programme in Tertiary institutions.

S/N	Item Statements	\bar{X}	SD	Remarks
28	Students use digital library for academic research and further studies. Students use the computer to get information online via internet.	2.00	0.73	LE
29	Students prefer the use of e books to offline books when sourcing for academic information.	3.39	0.61	HE
30	Students use multi-media project or for seminar presentation and project defense.	2.00	0.94	HE
31	Students use smart phones for recording lectures in class for future references.	3.24	0.71	HE
32	Students use blogs to link to academic websites.	3.57	0.54	HE
33	Students use e-mail to submit assignments and receive information from lecturers.	2.65	0.87	HE
34	Students browse the internet for academic information and school registration.	3.41	0.63	HE
35	Students utilize video/teleconferencing for group assignments or projects.	3.68	0.47	LE
36	Students employ the use of compact disk to submit assignments in softcopy.	1.35	0.58	
37	Students utilize e-journals during research.	3.47	0.62	
38	Students use computer simulation to learn abstract ideas	3.51	0.53	
39	Students use learning management system to measure learning activities	1.57	0.65	
	Grand Mean	1.42	0.50	

\bar{X} = Mean, SD = Standard Deviation, HE = High Extent, LE = Low Extent

Table 3, revealed the responses to items 28 – 40 on the extent of utilization of e-learning technologies by students in Computer Science programme in Tertiary institutions. The mean ratings of items 29, 31, 32, 33, 34, 35, 37, and 38 ranged from 2.65-3.68 well above 2.50 which is the real limit on the scale. This implied high extent of utilization. However, Items 28, 30, 36, 39 and 40 had mean ratings of 1.35 and 2.00 respectively. This indicated low extent of utilization. The standard deviation of the items ranged between 0.47-0.94 indicating that the respondent shave similar opinions on the utilization of the e-learning technologies. The grand mean of 2.71 implied that the respondents generally agreed that the e-learning technologies are utilized to a high extent.

Discussion of Findings

The research study was centered on the availability and utilization of e-learning technologies for improving teaching and learning of Computer Science programme in Tertiary institutions in Sokoto State. The study found out that the internet and web browser, Interactive whiteboard, Compact disk, multi-media projector, power point, computers, smart phones, e-journals, e-mail and blog are e-learning technologies available while computer simulations, learning management system, e-books, video/teleconferencing, digital library are not available. Generally, the collected data indicates that e-learning technologies are available for improving teaching and learning of Computer Science programme in Tertiary institutions.

This finding conforms to the study of Gold (2001) which stated that e-learning technologies are available in all functional areas of Computer Science. Also, Pirani (2004) stated that for an institution to be able to adopt e-learning, it must provide adequate and reliable technical infrastructures. Similarly, the study identified the e-learning technologies utilized by lecturers for improving teaching and learning of Computer Science Programme in Tertiary institutions. E-learning technologies such as PowerPoint, e-mail, e-journals, computers and multi-media projectors are highly utilized by lecturers in Computer Science Programme while Learning Management System, computer simulation, digital library, video/teleconferencing, e-book and interactive whiteboard for recording audio or video lectures for students are not highly utilized. However, the collected data indicates that lecturers utilize e-learning technologies. The findings of this study is in agreement with the study by Ezenwafor (2011) who found that Business Educators in tertiary institutions possess skills in information and communication technology and utilizes them in training students. This finding contradicts the view of Maduabuchi (2008) who posited that most Computer Science lecturers lack computer skills as they only base their knowledge on a computer course referred to as computer appreciation which they took in the course of their academic training.

Furthermore, another finding of the study showed the extent of utilization of e-learning technologies by students for improving teaching and learning of Computer Science programme. E-learning technologies such as smart phones, computers, compact disk, PowerPoint and e-mail are highly utilized while e-books, video/teleconferencing, digital library are not highly utilized. However, with a grand mean of 2.71, this indicates high utilization. The findings of this study support the study of Manir (2009) that there is tremendous growth of computer equipment and internet utilization by staff and students of Nigerian tertiary institutions. This finding updates the findings of Ajadi, Salawu, & Adeoye, (2008) who, at the time of their research, argued that there is gross under utilization of e-learning technologies in Nigerian tertiary institutions.

Conclusion

This study was carried out to determine the availability and utilization of e-learning technologies for improving teaching and learning of Computer Science programme in Tertiary institutions in Sokoto State. In carrying out the study, it was found that e-learning technologies such as internet and web browser, Interactive whiteboard, Compact disk, multi-media projector, power point, computers, smart phones, among others are available and are also highly utilized by both lecturers and students in Computer Science programme while Learning Management System, digital library, computer simulations, electronic books, video/teleconference are not available and therefore utilized to a low extent by both lecturers and students. E-learning has come to stay under the preview of Computer Science and the only option is to fully embrace it because with the information technological breakthrough in the 21st century, e-learning technologies have become in valuable tools for teaching, learning and research.

Recommendations

Based on the findings and conclusion drawn from the study, the following recommendations were made:

1. Lecturers should be encouraged to fully utilize the available e-learning resources in teaching all Computer Science courses, carrying out research and preparing students result.
2. Computer Science lecturers should prepare e-books and e-journals so as to encourage the

students in the reading of e-books and e-journals.

3. The management of tertiary institutions should ensure optimal functioning of platforms like learning management systems, open course ware, Moodle etc, which will create the opportunity for efficient administration, documentation, examination, feedback giving and reporting of class room and online events.
4. The management of tertiary institutions should employ sufficient technologists and technicians to take care of e-learning facilities and to carryout routine repairs.
5. The government should provide fund so that tertiary institutions can setup standby, automatic alternative power supply such as generators and uninterrupted power supply (UPS devices) to tackle the problem of epileptic or in consistent power supply in order to support the use of electronic equipment for-learning.

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