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Availability and Utilization of e-Learning Infrastructures in Federal University Of Technology, Minna

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Abstract
Although the Government is committed to implementing ICT in education, the process seems to be hindered by a number of barriers hence this study investigated the availability and utilization of e – learning infrastructures in Federal University of Technology, Minna to determine the level of ICT implementation. Four research questions guided the study. The population of the study was made up of 382 students and 182 lecturers randomly selected from the four schools of the institution. Data obtained was analysed using mean and t-test. Some of the findings revealed that e- learning infrastructures are not adequate in the university for teaching and leaning and management's efforts towards the development of Information and Communication Technology (ICT) is mainly for administrative purposes. In addition, lecturers and students both have computers and laptops and can access the internet but, they do not use them for teaching and learning. Based on the findings of the study, recommendations were made to encourage the use of e – learning infrastructures to foster teaching and learning in the university. The university should as matter of urgency organise in house training for lecturers on the use of ICT for teaching and learning. Government should release the necessary funds to enable universities put in place necessary ICT infrastructures that will facilitate teaching learning.

Keywords: e – learning, infrastructure, availability, utilization and ICT

1. Introduction

Information and Communication Technology (ICT) have become key tools in educational methodology and curriculum delivery globally. It has been identified as an indispensable instrument for the development of quality teaching and learning in the education system. ICT is fundamental for the preparation of students in meeting the innovations in the global arena (Ololube, 2006). The growth of information and communication technologies has dramatically reshaped teaching and learning processes in higher education (Pulkkinen. 2007 & Wood.1995). The application of ICT in higher institutions is more critical today than ever before since its growing power and capabilities are triggering a change the learning environments in education (Pajo & Wallace, 2001). The use of ICT offers powerful learning environments and can transform the learning and teaching process so that students can deal with knowledge in an active, self directed and constructive way (Volman & Van Eck, 2001; de Corte et al 2003). At present ICT is considered as an important means of promoting new methods of instruction (teaching and learning). It should be used to develop student's skill for cooperation, communication, problem solving and lie long learning (Plomp, 1996 &Vogot. 2003).

The application of ICT to education has given rise to a new set of vocabularies used to describe new approaches to learning and curriculum delivery. Such terms include e – teaching, e – learning, and so on, which are facilitated via the internet. The availability of the internet provided the channel for the use of electronic approach to education known as electronic learning or e – learning. Simply put, e – learning is the process of teaching and learning using the computer via internet. It involves passing structured instructional materials from a repository to a learner. According to Erah (2006), e- learning refers to computer – enhanced training as opposed to the computer – based training of the 1980s. It is usually delivered in a personal computer and includes learning delivered by other communication technologies. To him, e – learning is an approach to facilitate and enhance learning through both computer and communication technologies. Rosenberg (2001) see

e- learning as the appropriate application of the internet to support the delivery of skills and knowledge in a holistic approach not restricted to a particular courses, technologies or infrastructure.

Communication technologies include all media employed in transmitting audio, video, data or multimedia such as cable satellite, fibre optics, wireless (radio, infra – red, Bluetooth, Wi-Fi). Network technologies on the other hand include: Personal Area Networks (PAN), Campus Area Network (CAN), intranets, extranets, Local Area Networks (LANs), Wide Area Networks (WANs) and the internet. Computer technologies include all removable media such as optical discs, disks, flash memories, video books, multimedia projectors, interactive electronic boards, and continuously emerging state-of-the art personal computers (PCs). Mobile technologies such as mobile phones, Personal Digital Assistants (PDAs), palmtops, etc which have information as their material object are also used in e – learning (Freedman, 2001).

ICT, according to Newhouse (2002b) promote active learning as it develops an appropriate level of capability in students making it possible for them to become more engaged with their own learning, and to achieve learning outcomes across the curriculum. He went on to point out that it support pedagogical practices that provide learning environments that are more learner-centred, knowledge-centred, assessment-centred, and community-centred. PT3 (2002) see ICT as a tool that facilitates learning and enhance student achievement and teacher learning if appropriately used. This is because e – learning is learner – centred and supports New Learning Environments (NLE) which is a departure from the Traditional Learning which is teacher centred.

Learning with ICT, also known as e-learning, enrich learning content and enhance wider access to information resources. When the potential of e-learning is fully harnessed, it could advance knowledge by expanding and widening access, improving the quality of education and reducing cost (Newhouse, 2002a). When the needs are huge, fully online learning can be crucial and possibly the only realistic means of increased and widened access to tertiary education. For developing countries like Nigeria which has many young people craving for tertiary education and limited number of tertiary institutions to meet demand, e-learning has the potential to accommodate every candidate to study .Meeting increasing demand for tertiary education by employing e-learning has its own implications. Pirani (2004) stated that for an institution to be able to adopt e-learning it must provide adequate and reliable technical infrastructure to support e-learning tools and instructors and students must possess the technical skills to use e-learning. Instructors must also redesign their courses to incorporate e-learning effectively into their pedagogy. This has to be supported by relevant policy and legislature from government in order to merit wide acceptability.

In Nigeria, this was achieved by the approval of the National Information Technology Policy (NITP) in March 2001 and the subsequent establishment of the National Information Technology Development Agency (NITDA) to implement NITP in April 2001 (Wodi, 2009). The policy stipulated the relevance of ICT to tertiary education. To further strengthen the impact of the policy, the National Universities Commission (NUC), which is the government agency responsible for the regulation of universities in Nigeria prescribed PC ownership for universities as follows: one PC to every four students, one PC to every two lecturers below lecturer I; one PC per senior lecturer, and one notebook per reader/professor (Agyeman, 2007).

According to Agyeman (2007), only few universities such as Nnamdi Azikwe University have achieved a better ratio for their faculty but not for PC-to-student ratio. He pointed out however that some universities have made giant strides in campus-wide area networking and e-learning deliveries. A campus like Obafemi Awolowo University (OAU) has its own VSAT and has embarked on progressive application of ICT to all its functions. Similarly, University of Jos (UNIJOS) has an e-learning web site for the Department of Anatomy that permits students to undertake virtual electronic dissections. Despite these laudable achievements by some universities the story can not be said to be the same across all university campuses in Nigeria. It is against this background that this study aims at investigating the availability and utilization of e-learning infrastructures for teaching and learning in Federal University of Technology Minna.

2. Statement of the Problem

Research have shown that computers enhance teaching and learning by providing opportunities to practice and to analyze, offering better access to relevant articles, teaching and learning materials. Above all Rosswall, (1999) while stressing the importance ICT in a tertiary institution said ICT enhances higher education in a number of ways: It enables the effective storing/ sorting of information, and can offer new fast ways of communication; the reduction of information quantity towards a higher quality and better structure; it can be integrated into teaching and learning strategies – and used to support relative learning theories and ICT (computers, Inter and Intranet) can be used to create new types of interactive learning media for improved quality., equity and access in higher education. Despite the obvious and enormous advantages that comes with using ICT in teaching and learning. Shahadat, Muhbub and Clement (2012) observed with great concern that several higher educational institutions are finding it difficult to even implement basic of ICT.

ICT revolution is yet to attain that critical mass required for it to register the necessary impact in the teaching of students and civilian population nationwide (Agyeman, 2007). He pointed out that while Universities such as Obafemi Awolowo University (OAU) and University of Jos could be said to be ahead in the use of ICT in teaching and learning, the majority of other universities lack computers and reliable internet connectivity.

Many lecturers and students in Federal University of Technology, Minna (FUTM) have to go to commercial cyber cafés to have access to a computer. Consider a situation where the lecturer or student owns a laptop, he/she have to use a modem before they can access the internet. This hampers the use of e-learning as there is no equal opportunity for staff and students to have access to the internet due to inadequate number of computers and few hours of connectivity due to constant power outage. It is important to state here that despite the readiness of very few lectures in the use of ICT facilities in teaching and learning these ICT facilities are no where to be found. This coupled with limited infrastructure to support e-learning and ICT application in FUTM prompted this study.

3. Purpose of the Study

The objective of the study was to investigate the availability and utilization of e-learning infrastructures in Federal University of Technology, Minna. Specifically, the study investigated:

1. Adequacy of e-learning infrastructures for effective teaching and learning in FUTM.
2. The proficiency of the use of e-learning infrastructures to facilitate teaching and learning in FUTM by lecturers.
3. The proficiency of the use of e-learning infrastructures to enhance learning by students.
4. Factors that inhibit the use of e-learning infrastructures in FUTM.

4. Research Questions

The following research questions were raised to guide the study:

1. To what extent are e-learning infrastructures adequate in FUT., Minna?
2. How proficient are lecturers in the use of e-learning infrastructures in teaching and learning?
3. How proficient are students in the use of e-learning infrastructures to enhance their learning?
4. What are the factors that inhibit the use of e-learning infrastructure in FUT., Minna?

5. Hypothesis

The following null hypothesis was tested at 0.05 level of significance:

HO_1: There is no significant difference in the mean response of lecturers and students on the availability of e-learning infrastructures.

6. Methodology

The study used a descriptive survey research design. A sample of 182 lecturers and 382 students were sampled randomly and used as respondents for the study. A 64-item structured questionnaire known as Availability and Utilization of E-learning Infrastructures Questionnaire (AU-ELIQ) was used to obtain data from respondents for the study. The instrument was submitted to experts in ICT and Education for both face and content validation. The reliability of the instrument was established using Cronbach Alpha the instrument yielded a reliability coefficient of 0.89. The questionnaire had four sections. Sections one and four were for both lecturers and students; section two for lecturers only and section three for students only. The questionnaire used four-point rating scale. Mean was used to analyze the data collected. The cut-off point for accepting or rejecting an item was fixed at 2.50. Therefore, items with mean rating below 2.50 were rejected and items with mean rating of 2.50 and above were accepted. The hypotheses were tested at 0.05 level of significance using t-test statistic.

7. Results

Research Question 1

To what extent are e-learning infrastructures adequate in FUT., Minna?

Table 1: Adequacy of e-learning infrastructures in FUT., Minna

SNO.	*ITEMS*	X_1	X_2	X_t	*Remark*
1.	Internet services provided by the university (Afrihub, Nunet) are adequate.	1.75	1.67	1.71	Disagreed
2.	Internet services provided by the university are fast.	2.45	2.43	2.44	Disagreed
3.	Internet services provided by the university are reliable.	1.80	1.75	1.76	Disagreed
4.	Internet services can be easily accessed Outside the university (private cyber cafes).	3.68	3.57	3.63	Agreed
5.	The university's digital library is efficient.	1.98	2.23	2.11	Disagreed
6.	Educational materials could be accessed from from the university's website.	1.30	1.25	1.28	Disagreed
7.	Links to educational resources websites and e-journals can be found on the university's website.	1.55	1.89	1.72	Disagreed
8.	Students can easily get access to a computer in the ICT centre or within the university.	1.40	1.90	1.65	Disagreed
9.	Multimedia projectors are available in the university.	1.65	2.00	1.83	Disagreed
10.	Interactive white boards are available in the University.	1.59	1.60	1.60	Disagreed
11.	Computers are adequately provided.	1.24	1.12	1.18	Disagreed
12.	Television sets are available.	1.47	1.51	1.49	Disagreed
13.	Digital Video Disk players are available.	1.39	1.34	1.37	Disagreed
14.	Flash drives/External Hard drives are adequately provided.	1.24	1.22	1.23	Disagreed
15.	E-books are adequately provided.	1.03	1.05	1.04	Disagreed
16.	Software is sufficiently provided.	1.59	1.44	1.52	Disagreed
17.	Printers are adequately provided.	1.56	2.00	1.78	Disagreed

X_1= mean score for lecturers; X_2= mean score for students X_t=mean of teachers and lecturers
The result in table 1 shows that 16 items were disagreed because their mean scores were below 2.50. Only item 4 was agreed with mean score of 3.68 and 3.57 from lecturers and students.

Research Question 2
How proficient are lecturers in the use of e-learning infrastructures in teaching and learning?

Table 2: Lecturers proficiency in the use of e-learning infrastructures for teaching and learning.

SNO.	*ITEMS*	*X*	*Remarks*
18.	Lecturers can use the internet efficiently.	2.84	Agreed
19.	Lecturers use the internet to facilitate teaching and learning	3.00	Agreed
20.	Lecturers prefer the internet to books when sourcing for academic information.	2.26	Disagreed
21.	Lecturers are versatile in the use of computer applications in enhancing teaching.	2.15	Disagreed
22.	Lecturers individually or collectively have WebPages.	1.83	Disagreed
23.	Lecturers individually or collectively have Blogs/Wikis.	1.32	Disagreed
24.	Lecturers individually or collectively have e-mail accounts.	3.90	Disagreed
25.	Lecturers individually or collectively have e-journals.	1.10	Disagreed
26.	Online collaboration/teleconference are employed by lecturers to enhancing teaching.	1.06	Disagreed
27.	Computerized diagnostic assessment is used by lecturers in assessing students.	1.10	Disagreed
28.	Lecturers provide educational literature to students in soft		

	copies.	1.31 Disagreed
29.	Lecturers refer students to the internet to solve assignments.	3.04 Agreed
30.	Lecturers refer students to specific sites on the internet for academic information.	1.47 Disagreed
31.	Lecturers provide recorded video or audio lectures to students.	1.29 Disagreed
32.	Lecturers use computer simulations to aid teaching and learning.	1.05 Disagreed
33.	Lecturers use electronic devices to facilitate retention in learning.	1.58 Disagreed
34.	Lecturers source for updated educational materials online.	2.29 Disagreed
35.	Lecturers partner with other scholars online for educational purpose.	1.85 Disagreed
36.	Lecturers have electronic devices that could access, store, send, manipulate and read information.	3.42 Agreed

The result in table 2 shows that fourteen out of nineteen items were disagreed because their mean was below 2.50. Four items were agreed.

Research Question 3:
How proficient are students in the use of e-learning infrastructures to enhance their learning?

Table 3: Students' Proficiency in the use of e-learning infrastructures to enhance learning.

S/N	*ITEMS*	*X*	*Remarks*
37.	Students are aware of the internet.	3.64	Agreed
38.	Students browse the internet frequently.	2.79	Agreed
39.	Students can use the internet effectively.	2.55	Agreed
40.	Students prefer the internet to books when sourcing for academic information.	2.35	Disagreed
41.	Students browse the internet for academic information.	2.51	Agreed
42.	Students browse the internet for school registration purpose.	3.94	Agreed
43.	Students browse the internet to download games/movies/ music.	3.40	Agreed
44.	Students browse to get news/sports/fashion information.	3.38	Agreed
45.	Students partner with other students online for academic information.	1.70	Disagreed
46.	Online chats between students are for academic purposes.	1.55	Disagreed
47.	Students record lectures in class, using electronic devices, for future reference.	1.78	Disagreed
48.	Students have e-mails.	3.39	Agreed
49.	Students prefer reading hard copies of educational Materials to soft copies.	2.71	Agreed
50.	Students have electronic devices (computers, mobile phones, e.t.c) that could access, store, send, manipulate and read audio and visual information.	3.22	Agreed

Table 3 revealed that the mean score rating of the responses of the respondents for four items ranked below the cut-off point of 2.50 while the mean score of the remaining ten items were above 2.50.

Research Question 4:
What are the factors that inhibit the use of e-learning infrastructures in FUT., Minna?

Table 4: Factors that inhibit the use of e-learning infrastructures in FUT., Minna

S/N	*ITEMS*	X_1	X_2	X_t	*Remarks*
51.	High cost is a factor that deter the use of the internet by students and lecturers	3.37	3.54	3.46	Agreed
52.	High cost of 'air time' affects the use of internet services.	3.63	3.73	3.68	Agreed
53.	High cost of purchasing relevant materials online discourages internet usage.	3.28	3.51	3.40	Agreed
54.	High cost of maintaining electronic gadgets discourages their use for learning.	2.72	3.01	2.87	Agreed
55.	Funds are insufficient for the development of e-learning infrastructures.	3.08	2.60	2.84	Agreed
56.	Lack of manpower to maintain Information Communication Technology (ICT) infrastructures affects their use.	2.70	2.64	2.67	Agreed
57.	Too many restrictions in accessing relevant educational materials.	2.55	3.23	2.89	Agreed
58.	Poor power supply affects the use of electronic Devices for teaching and learning.	3.86	3.75	3.81	Agreed
59.	Relevant materials are difficult to find on the internet.	2.59	3.14	2.87	Agreed
60.	Lecturers prefer the 'talk and chalk' method of teaching.	2.83	3.88	3.36	Agreed
61.	Use of electronic devices encourages laziness in students.	1.70	1.10	1.40	Disagreed
62.	Unavailability of time affects lecturers tendency to develop educational computer applications to aid teaching and learning.	2.98	3.09	3.04	Agreed
63.	Contention between the school and lecturers on Intellectual property right is a factor that discour-ages the development of computer applications to enhance teaching.	3.00	2.61	2.81	Agreed
64.	Lecturers may lose class control if e-learning is encouraged.	1.60	1.34	1.47	Disagreed

X_1 = mean score of lecturers, X_2 = mean score of students X_t= mean score of lecturers and students

Table 4 shows that the mean score rating of the responses of respondents range from 1.10 to 3.88. All items ranked above the cut-off point except items 61 and 64 which ranked below the cut-off point.

Hypothesis 1:

There is no significant difference in the mean response of lecturers and students on the availability of e-learning infrastructures.

Table 5: t-test analysis of mean responses of lecturers and students on the availability of e-learning infrastructures in FUT., Minna

Respondents	*X*	*N*	*Df*	*t-cal*	*t-table*
Lecturers	1.68	182			
			562	0.78	1.96
Students	1.76	382			

From table 5, the t-cal is less than the t-table value. Hence, the hypothesis is accepted that there is no significant difference in the mean response of lecturers and students on the availability of e-learning infrastructures in FUT., Minna.

8. Findings of the Study

1. There are no adequate e-learning infrastructures for effective teaching and learning in FUT., Minna. However, internet services can easily be accesses outside the university premises.
2. Lecturers have electronic devices and laptops that could facilitate e-learning but cannot effectively use these devices to teach.
3. Students have electronic devices and laptops that could facilitate e-learning but are ineffective in using them for learning purposes.
4. The major constraints to the provision and use of e-learning infrastructures for teaching and learning in FUT., Minna are poverty, poor funding, poor electric power supply in and around the university. Also, resistance to change on the part of lecturers inhibits the use of e-learning infrastructures for teaching and learning.

9. Discussion of Findings

Finding from table 1 showed that internet service is provided by the management of FUT., Minna, however the services are not fast, reliable or adequate. Nonetheless, services can be accessed outside the university in cyber cafes. Further more, the table revealed that the university's website was not designed to promote teaching and learning but to divulge information about the university and enable students to register online. This is in agreement with the findings of Kamba (2009) who stated that Nigerian universities are in the trend of creating web pages which are meant for advertisement of the university and not for e-learning activities. In addition, the findings of this study revealed that e-learning equipments such as interactive white boards, computers, projectors, TV sets, and printers are not adequately provided by the university. This is a reflection of the emphasis being placed on e-learning in the university. Pirani (2004) states that for an institution to be able to adopt e-learning, it must provide adequate and reliable technical infrastructures. From the above, it can be seen that e-learning infrastructures are not adequately provided in FUT., Minna for effective teaching and learning.

Findings in table 2 revealed that lecturers are aware of the internet and can surf the web. But they can not use it in facilitating the teaching and learning. UNESCO (2002) and Pirani (2004) are of the view that instructors need to know when, how and where to use ICT to enhance knowledge acquisition. The table further revealed that lecturers own electronic devices that could manipulate, store, retrieve, send, receive, copy, edit and display information such as television sets, computers, PDAs, e.t.c,. However, these devices are not used for educational purposes. According to UNESCO (2002), the key to the use of ICT for educational purpose is not in ICT itself, but in understanding and strategically and logically employing it to meet educational goals. This proves that lecturers may have idea of ICT but may not be effective in using them to facilitate teaching; which may be attributed to inadequate training in the use of ICT for teaching. Wodi (2009) and Ololube (2006) are of the opinion that since the ICT industry is very dynamic, there is the need for continuous aggressive training programmes to catch up with frontiers of knowledge, creativity and innovation.

Findings in table 3 revealed that students know how to use the internet and frequently surf the web. However, the students use the internet for social purposes and not for sourcing academic information. Despite the fact they have electronic devices that can store, access, send, manipulate and read audio-visual information; they do not use them to record and share lectures. According to Wodi (2009), computer skill is necessary to undergraduates for them to effectively appreciate the benefits of programmed learning and computer assisted instruction. He said this is core aspect of ICT where the learner can manipulate ICT hardware and software gadgets to support their personalized instruction and data gathering. This is in agreement with the findings of this study which shows that students have computer skill but cannot use them for personalized learning. This calls for more training for the students as well.

Table 4 indicates that the high cost of e-learning infrastructures, high cost of 'air time', materials, maintenance of gadgets; insufficient funds, lack of skilled manpower, poor power supply, lecturers preference to 'talk and chalk' as opposed to the use of e-learning facilities, and so on hinder the use of e-learning infrastructures. This is in line with the findings of Nbina, Obomanu and Vikoo (2011) who found that lecturers have no knowledge of ICT facilities and so shy away from utilizing them for teaching. Also, Akinnuwesi, Adedoyin, and Adegoke (2007) are of the view that implementation of e-learning will require major commitment of resources and the support of stakeholders in the public and private sectors. Moreover, sufficient funds are needed to establish and maintain e-learning facilities in schools.

10. Conclusion

It has been noted that e-learning is the application of internet to enhance learning. This study revealed that e-learning infrastructures are not available in FUT., Minna. Therefore, ICT infrastructures should be provided to facilitate effective teaching and learning in order to brace up to present day educational challenges. Efforts should be made towards tackling other factors that are militating against the usage of e-learning infrastructures.

It is safe to conclude here that unless these facts are seriously taken into consideration and acted upon, education in FUT., Minna will only retrogress in a progressive world.

11. Recommendations

Based on the findings of this study, the following recommendations are made to help improve e-learning usage in FUT., Minna.

1. Lecturers should be well trained in specific methods in which they could use electronic devices to enhance teaching. This could be achieved by contracting experts to develop curricular for training process.
2. Curricular for teaching that will inculcate the use of e-learning infrastructures by students should be developed.
3. Adequate power supply should be provided in and around the school to stimulate the use of electronic devices for teaching and learning.
4. The university should enter into contracts with internet service providers such as MTN, Airtel, Etisalat and Glo so that they can have reliable internet services for lecturers and students.
5. The university should liaise or register with organizations that have or publish educational resources or websites for easy access of educational materials from these websites.
6. The university should upgrade her website or launch a website which lecturers and students can use to disseminate or access information. Such website should enable lecturers to upload their course materials. Past projects should also be uploaded on the websites for easy access to both lecturers and students. The website should also freely host wikis/blogs and e-journals of the university.
7. The university should also liaise with private organizations to provide cheap electronic devices for students and lecturers. These electronic devices does not necessarily have to be laptops that are expensive but other electronic devices that could store, copy, display, record information such as MP5, WAP enabled phones, PDAs, e.t.c, In addition, proper orientation should also be given to students on how to use these devices to promote learning.

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