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An Assessment of Availability, Adequacy and Utilisation of Information and Communication Technology in Universities in South-West, Nigeria

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Abstract

The study examined the assessment of availability, adequacy, and utilisation of information and communication technology (ICT) in universities in South-West, Nigeria. The ex-post facto design was adopted, to collect information in which three states and three federal universities were purposively selected from South- Western, Nigeria. One hundred students and ten lecturers were randomly selected from each of the three federal universities in the zone. Two validated instruments: Information and Communication Technology Facilities Checklist (ICTFC) and Lecturers' Questionnaire (LQ, r = 0.82) were used for data collection. Data collected were analysed using descriptive statistics. Between 84% and 100% of the respondents indicated that ICT facilities were available, while between 85% and 100% of them indicated that they were inadequate. The level of utilisation of the ICT facilities is low as indicated by 57% to 100% of the respondents. Irregular power supply 100%, poor funding 90% and lack of internet facilities 83.33%, were identified as some of the major constraints militating against the use of ICT facilities. It was, therefore, recommended that there should be adequate provision of ICT facilities and resources in our tertiary institutions. The National Universities Commission (NUC) should of a necessity review the course contents of university education, to compulsorily incorporate ICT utilisation as a standard for teaching and learning, while university authorities should support lecturers to utilise ICT facilities while teaching.

Keywords: Information and communication technology, Tertiary institutions, Utilisation, National policy on education.

Introduction

The rapid expansion in technology is a push for organizations such as schools, businesses, and government to keep up with the technological growth. The tremendous development witnessed in technology has resulted in faster communication, e-government and e-education. Modern day businesses are conducted by making use of

telephone, internet, and other forms of telecommunication technology. Lecturers would not be able to deliver maximally during teaching and learning process if the school setting lacks the appropriate facilities for them to translate their ideas into reality, no matter how well trained and experienced. Education has been greatly revolutionised as a result of the advent of technology. ICT has been referred to as a total range of technologies involved in the processing of information and electronic communication.

Ofodu (2007) sees ICT as electronic or computerized gadgets, assisted by human and interactive materials that can be used for a wide scope of educating and learning just as for private business. ICT refers to processing, sharing of information and having access to data effortlessly utilising a wide range of electronic gadget which incorporates all technologies for the manipulation and communication of information. ICT facilities are educational materials which teachers use alternative ways of conversation to transfer course contents to learners. In the school setting, a wide range of ICT facilities utilised in the teaching and learning process in schools are radio, television, computers, overhead projectors, optical fibers, fax machines, public address system, CD-Rom, internet, interactive electronic whiteboard, slides, computerised interactive media, video or VCD machine (Ofodu, 2007).

With the impact of technology, assessment and research are now done differently. Aribisala (2006) affirmed that ICTs are progressively assuming a significant role in organisations and in society's capacity to produce access, become accustomed and apply information. ICT is being proclaimed as the apparatus for the post-modern age and the foundation for information economy due to its capacity to enable the transmission and procurement of knowledge. Highlighting the significance of the utilisation of ICT in schools, Olorunsola (2007) asserted that through ICT, instructive requirements have been encountered; it changes the goals of education just as the plausible procedures. Messages can be imparted through the e-mail, telex or telephone, especially the portable ones. The inescapability of ICT has achieved speedy technological, social, political and monetary transformations (Yusuf, 2005).

The availability and effective use of ICT facilities should enhance teaching and learning. To achieve positively, therefore, students need to be motivated through the effective use of ICT facilities by university lecturers and it is also likely to improve teaching effectiveness (Aina & Adedo, 2013). The use of ICT for lecturers' teaching effectiveness becomes imperative in situations where a lecturer has to teach over three hundred students at once without facilities like public address system, slides or projectors to deliver lectures. Only very little effectiveness may be achieved by the lecturer. Olulobe (2006) affirmed that a lecturer no longer has to stress himself to the extent of being no longer useful to his or her family after the teaching and learning process should have taken place.

Ajayi, (2008) affirmed that with the help of ICT, teachers can take students past the regular levels and guarantee their lively involvement in the teaching and learning process. Cheung and Huang cited in Adavbiele (2016) confirmed the use of ICT as an effective teaching tool as many university lecturers currently have their course materials on the

web. Though, however, in Nigeria, many lecturers still depend on the conventional "chalk and talk" technique of teaching instead of grasping the utilisation of ICT. Numerous studies have revealed the multifaceted issues militating against the powerful utilisation of ICT in the teaching and learning process in schools. These include: irregular power supply (Yusuf, 2005; Ofodu, 2007), inadequate computer literate teachers (Kwache, 2007) and inadequate fund (Nwite, 2007).

University lecturers depend on latest and timely information which is for the most part discovered utilising electronic methods. The information is then processed and delivered as instructions to students of higher institutions. The utilisation of electronic methods in teaching and learning gives adaptability in area and time (Ozioma & Offordile, 2001). As tools for presentation, ICT resources can be used to facilitate lecturers' creativity and intellectual development. Learners are able to target patterns and link various portrayals and translations of portrayals (Condie & Munro, 2007). Despite the benefits of ICT in education, most teachers do not have the required experience and competencies to utilisation of ICT for educational functions (Yusuf, 2005).

Ekukinam (2002) stressed that teachers do not seem extrinsically motivated to use ICT resources. These assertions require that proactive measures be taken to facilitate the effective utilisation of ICT in universities. Therefore, an investigation into the teaching and learning process in higher institutions of learning in Nigeria, particularly in the area of lecturers using ICT to improve their teaching effectiveness is long overdue. Pelgrum (2012) asserted that the world of work is changing from labour intensive to technology driven economy. This makes ICT for education more relevant today than it has ever been. The global trend today is the electronic facilitation of almost every aspect of human endeavour, for example, e-banking, e-commerce, and e-government. With automation, ICT has become integrated into knowledge management. Its usefulness especially in the education sector cannot be under estimated. This makes it necessary to ask, 'Are ICT resources available, accessible and adequate both in quality and quantity? "To what extent are the resources utilised in tertiary institutions and what are the challenges faced by lecturers in utilising them for effective teaching and learning?"

Yazidu (2016), Pelgrum (2012) and Nwite (2007) have worked on various aspects of ICT as it affects schools at levels of education, but it seems none of them has combined variables such as availability, adequacy and utilization of ICT facilities in universities in South-West, Nigeria. Therefore, the researcher investigated the assessment of ICT availability, adequacy and utilisation in universities in South-West, Nigeria.

Research Questions

The following research questions were raised to guide the study:

1. To what extent are ICT facilities available, adequate, and utilized for teaching and learning in South- West universities in Nigeria?

2(a) What are the constraints militating against the use of ICT resources for instructional delivery?

(b) What are the possible solutions to these constraints?

Methodology

(i) Research Design

This study adopted the *ex-post* facto design of research because the variables in the study are inherently not manipulable.

(ii) Population

The population of the study comprises 1,900,000 students and 51,229 lecturers in the universities in South-West zone of Nigeria.

(iii) Sampling Technique and Sample

The multi-stage sampling procedure was employed in this study. At the first stage, simple random sampling technique was used to select three states from the six geo-political zones (Lagos, Ogun, Oyo, Osun, Ekiti, and Ondo) from the south-west geo-political zone of Nigeria. At the second stage, three federal universities (Federal University of Agriculture, Abeokuta, Ogun State, University of Ibadan, Oyo State and Federal University of Technology, Akure, Ondo State), were purposively selected. The selection was done on the basis that the federal universities would serve as yardstick for other state and private universities in South-West, Nigeria. In each of the universities, the faculty of science was purposively selected to allow for uniformity and generalisability. Furthermore, simple random sampling technique was employed to select one hundred (100) students each and ten (10) lecturers each from the selected faculty in each university. In all, a total of three hundred (300) students and thirty (30) lecturers participated in the study.

(iv) Instrumentation

Two validated instruments were used to collect information from respondents. These are;

i.) Information and Communication Technology Facilities Checklist (ICTFC): The instrument consists of two sections. Section A is on bio-data of respondents, gender and school name. Section B consists of items measuring availability, adequacy, and utilisation of information and communication technology. It was face-validated by experts in research instrument construction. It was further subjected to statistical reliability analysis using Scott's Pi to determine the reliability co-efficient and a value of 0.77 was obtained.

ii.) Lecturers' Responses on Constraints Militating Against the Use of and Possible Solutions to Information and Communication Technology Questionnaire (LRCMUPSICTQ): This instrument is divided into three sections. Section A elicited respondents' bio-data, Sections B and C collected open-ended responses from lecturers

on constraints militating against the use of ICT facilities in teaching and possible solutions to problems against the use of information and communication technology respectively. The reliability of the instrument was determined using Cronbach Alpha and a value of 0.82 was obtained.

(v) Method of Data Analysis

Descriptive statistics of frequency and percentages were used to analyse the data collected.

Results

Research Question 1: To what extent are the ICT facilities available, adequate, and utilise for teaching and learning process in the South-West universities in Nigeria?

Table 1: Response of Students on the Availability, Adequacy and Utilisation of Information and Communication Technology Facilities in Universities

		Availability		Adequacy		Utilisation	
		Available	Not Available	Adequate	Not Adequate	Often Used	Not Often Used
1	Interactive Electronic Whiteboard	251(84%)	49(16%)	21(7%)	279(93%)	49(16%)	251(84%)
2	E-library	299(99%)	1(1%)	0(0%)	300(100%)	99(33%)	201(67%)
3	Projector	300(100%)	0(0%)	0(0%)	300(100%)	20(7%)	280(93%)
4	Computers	300(100%)	0(0%)	28(9%)	272(91%)	98(33%)	202(67%)
5	Public Address System	260(87%)	40(13%)	0(0%)	300(100%)	58(19%)	242(81%)
6	Digital camera	276(92%)	24(8%)	0(0%)	300(100%)	0(0%)	300(100%)
7	Internet server	150(50%)	150(50%)	30(10%)	270(90%)	146(49%)	154(51%)
8	Web Based Modules	108(36%)	192(64%)	0(0%)	300(100%)	108(36%)	192(64%)
9	Radio	242(81%)	58(19%)	0(0%)	300(100%)	40(13%)	260(87%)
10	Very Small Aperture Television (VSAT)	234(78%)	66(22%)	44(15%)	256(85%)	22(8%)	278(92%)

Table 1 reveals that 300(100%) respondents respectively observed that projectors and computers were available, while 251(84%) of them observed that interactive electronic whiteboards were available and 299 (99%) of them indicated that electronic library was available. Also, 260 (87%) of the respondents observed that public address systems were

available, while 276 (92%) indicated that there was digital cameras. Fifty (50%) of the respondents indicated that there was internet server, while 150 (50%) had a contrary opinion, but 192 (64%) indicated that there were no web-based modules. Table 1 shows that 242 (81%) of the respondents agreed that radio was available, but 234 (78%) respondents indicated that very small aperture televisions were available.

Table 1 also reveals that for all the ICT facilities, between 85% and 100% of the respondents are of the view that they are inadequate. Table 1 further reveals that the digital camera 300(100%) were not utilised. Also, between 154 (57%) and 280 (93%) of the respondents indicated that other ICT facilities like the projector, VSAT, interactive white board, public address system, etc. are not often used.

Research Question 2a: What are the constraints militating against the use of ICT facilities in facilitating the teaching-learning process in your institution?

In answering this question, respondents were given free hand to say their views. Some of the verbatim samples of the various reports of the respondents in table 2.

Table 2: Constraints Militating Against the Use of ICT Facilities in Universities

Constraints	Frequency	Percentage (%)
1. Poor internet presence	30	100.00
2. Inadequate investment in ICT for universities in Nigeria	30	100.00
3. Poor funding	27	90.00
4. Irregular power supply	30	100.00
5. High cost of ICT equipment	24	80.00
6. Inadequate technical supportive staff	22	73.33
7. Inadequate personal computers or laptops	28	93.33
8. Low internet speed	25	83.33
9. System failure	30	100.00
10. Outdated ICT tools	29	96.67
11. Vandalisation of ICT tools	29	96.67
12. Inadequate maintenance of ICT equipment	29	96.67
13. Inadequate interactive electronic whiteboard	27	90.00

Table 2 reveals the constraints militating against the use of ICT facilities by lecturers in the selected universities. The constraints as identified by the respondents are poor internet presence 30 (100%), inadequate investment in ICT for universities in Nigeria 30

(100%), irregular power supply 30 (100%), system failure 30 (100%), outdated ICT tools 29 (96.67%), vandalisation of ICT tools 29 (96.67%), inadequate maintenance of ICT equipment 29 (96.67%), inadequate personal computers or laptops 28 (93.33%), poor funding 27 (90%), inadequate interactive electronic whiteboard 27 (90%),low internet speed 25 (83.33%), high cost of ICT equipment 24 (80%) and inadequate technical supportive staff 22 (73.33%).

Research Question 2b: What are the possible solutions to these constraints?

Table 3: Possible Solutions to the Identified Constraints

	Possible solutions	Frequency	Percentage (%)
1.	Periodic organization of workshops and seminars on ICT	24	80.00
2.	All lecture rooms should be adequately equipped with ICT facilities such as projectors, slide screen and video recorder.	29	96.67
3.	Provision of alternative of electricity supply to enhance effective use of ICT	30	100.00
4.	Proper maintenance of available ICT facilities	28	93.33
5.	Adequate provision of public address system	29	96.67
6.	Training of ICT maintenance personnel in the universities	28	93.33
7.	Encouraging and supporting teachers and students to own personal computers or laptops	25	83.33
8.	Lecturers should be encourage to integrate ICT tools with relevant methodology into the teaching-learning process	30	100.00
9.	Better management of ICT facilities	30	100.00
10.	Provision of high internet connectivity for accessing information	30	100.00
11.	Adequate provision of updated educational software for effective teaching	30	100.00
12.	Procurement of updated ICT facilities for the academics staff	30	100.00
13.	Provision of infrastructure for ICT usage towards effective teaching	29	96.67
14.	Development of comprehensive plan for ICT usage towards effective teaching	27	90.00

Table 3 reveals the possible solutions to the identified constraints militating against the use of ICT facilities by lecturers in the selected universities. The possible solutions to the identified constraints as identified by the respondents are: all lecturers 30 indicated 100% possible solution as follows: provision of alternatives of electricity supply to enhance effective use of ICT, encouragement of lecturers to integrate ICT tools with relevant methodology into the teaching-learning process, better management of ICT facilities, provision of high internet connectivity for accessing information, adequate provision of

updated educational software for effective teaching and procurement of updated ICT facilities for the academic staff. Table 3 also shows that the respondents 29 (96.67%), indicated that all lecture rooms should be adequately equipped with ICT facilities such as projectors, slide screen and video recorder, adequate provision of public address system 29 (97%), provision of infrastructures for ICT usage towards achieving effective teaching 29 (96.67%), proper maintenance of available ICT facilities 28 (93.33%), training of ICT maintenance personnel in the universities 28 (93.33%), development of comprehensive plan for ICT usage towards achieving effective teaching 27 (90%), encouraging and supporting teachers and students to own personal computers or laptops 25 (83.33%) and adequate periodic organisation of workshops and seminars on ICT 24 (80%).

Discussion

The findings of this study indicated that the ICT facilities were available but were not utilized probably because they were not adequate. The implication could be that some of the facilities could not be used by the lecturers to enhance teaching effectiveness because they are not skilled in their use. This finding correlates with that of Uwaifo (2008) who observed that technology relies so much upon the teaching of skills and, therefore, demands the skilled or professional use by lecturers. Hence, availability, adequacy and utilization of ICT facilities will help university lecturers to impact students' knowledge needed in their academic pursuits.

The findings indicated that the majority of the needed ICT facilities for effective teaching and learning in the universities are not adequate. These include: projectors, e-library, video conferencing, computer, internet server, television, very small aperture television (VSAT), digital camera, web-based modules, public address system, radio, and interactive electronic whiteboard. It is important to emphasise that, for effective teaching to be attained in the universities, adequate ICT tools have to be made available to both lecturers and students. Therefore, since universities are meant to provide quality education through the use of ICT, there is the need to equip institutions with adequate ICT facilities. This agrees with Umunadi (2012) who reported that technical laboratories should be well equipped so as to make the students obtain the necessary knowledge needed to function effectively in their work places.

The findings additionally indicated that majority of the ICT facilities are not utilised in the teaching and learning process in the universities simply because their adequacy is poor, meaning that universities do not consciously purchase ICT facilities for use. The findings of this study agree with that of Ololube (2006) and Pelgrum (2012) that there are terrible ICT resources integration and usage in the school system. This might be due to lack of fund from the university authorities as enunciated by Nwite (2007).

Furthermore, the findings show that there are constraints hindering the effectiveness of the use of ICT facilities by lecturers in the selected universities. The identified constraints are poor internet presence, inadequate investment in ICT for universities in Nigeria, poor funding, irregular power supply, high cost of ICT equipment, lack of

relevant software, inadequate technical supportive staff, lack of personal computers or laptops, low internet speed, system failure, outdated ICT tools, vandalisation of ICT tools, inadequate maintenance of ICT equipment and inadequate interactive electronic whiteboard (Yusuf, 2005; Ofodu, 2007).

In spite of these, the possible solutions suggested by respondents are periodic organisation of workshops and seminars on ICT, all lecture rooms should be adequately equipped with ICT facilities such as projectors, slide screen and video recorder, provision of alternative electricity supply to enhance effective use of ICT, better management of available ICT facilities, periodic organisation of workshops and seminars on ICT, training of ICT maintenance personnel in the universities, encouraging and supporting teachers and students to own personal computers. They also suggested that lecturers should be encouraged to integrate ICT tools with relevant methodology into the teaching-learning process by provision of adequate ICT facilities, provision of high internet connectivity for accessing information, provision of updated educational software for effective teaching, procurement of updated ICT facilities for the academic staff, provision of infrastructure for ICT usage towards effective teaching and development of comprehensive plan for ICT usage towards effective teaching. These findings are in tandem with Akomolafe (2008) who submits that ICT provides increased opportunities for reflection in any learning process. Use of ICT helps to enhance the educational and pedagogic competency of teachers at all levels.

Conclusion and Recommendations

The findings of this study reveal that the possible solutions suggested by the lecturers in the sampled universities might contribute significantly to the effective use of ICT facilities in the teaching and learning process, therefore, the following recommendations are made:

1. The government should endeavour to provide ICT facilities and adequate funds for the maintenance of these resources in universities.
2. The National Universities Commission (NUC) should review the course contents of university education, with a view to mandatorily incorporate ICT utilisation as a standard for all teaching and learning.
3. Universities authorities should encourage lecturers to utilise ICT facilities while teaching.

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