Information and Communication Technology in Universities in Nigeria: Challenges for Teaching and Learning

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Abstract

Information and Communication Technology (ICT) has opened a new visage to globalisation in education. The deployment and integration of ICT facilities into university for internet access and a web portal implementation that enable the university to carry out most of its activities ubiquitously on the internet is steadily growing in the developing nations. In Nigeria quite a large number of universities have either developed their portal or have had one deployed for the purpose of ICT-related activities. This development has had tremendous impact on university management, teaching and learning. It now provides faculty and students with opportunities for e-learning and literature search for teaching and research. The purpose of the study therefore was to review the deployment and implementation of information and communication technology in the universities in developing nations with emphasis on Nigeria. The historical development, the problems and the present status were highlighted by the study. The study looked at the challenges facing universities in integrating information and communication technology into teaching and learning. Five questions were raised to guide the study. The study employed the survey research design because a sample was drawn from the population using the stratified sampling technique. The stratified random sampling technique was preferred because of the inherent heterogeneous nature of the population. The population for the study consisted of university teachers in all the 45 public universities in Nigeria. The universities were stratified into six zones following the country's geo-political structure. One university each was randomly selected from each of the zones. 40 respondents were randomly selected from each of the six universities. This gave a total of 240 respondents in the study.

Introduction

Information and communication Technology (ICT) has grown tremendously around the globe particularly in the developed nations of the world. This growth however appears to be relatively slower in the developing nations including African nations. The Partnership for Higher Education in Africa (2007a) in a recent workshop survey indicated that while some governments have produced national policies on ICT, many others are yet to do so. The report further indicated that although many universities in the partnership have been ICT leaders in many ways, they have not always played roles in the articulation of national ICT planning. ICT developments in some African countries and some other developing nations have reached the level of having their own home pages, with details on the university's admission, faculties and departments. Some others have in addition to having a website provided detailed information on ICT strategic planning and implementation. Some of the countries covered by the report that have ICT implemented in its higher educational institutions in one form or the other are Tanzania, Uganda, South Africa, Mozambique, Nigeria and Ghana. In Ghana for example, ICT development in universities started in the mid 90's, but the growth has been slow and difficult (The Partnership for Higher Education in Africa, 2007b). Until 2002, Ghana's public universities (with the exception of University of Development Studies (UDS)) shared bandwidth for internet connectivity through a Research Education Network (REN). However, with the failure of REN, internet access is now handled independently by each university. From the East Africa sub region, countries like Tanzania, Uganda, and Mozambique have internet access in at least one of their universities. With a link with South Africa form Eduardo Mondale University in 1995, Mozambique became the second university in sub-Saharan Africa outside South Africa to have full internet connectivity.

The history of internet in Nigeria is patchy. The first experiment on internet services started about 1990 with university of Ilorin through assistance with McMaster University in Canada. Currently, many individual staff members of universities in Nigeria have e-mail accounts and over forty four universities have registered domain names. Some of these have VSAT while some others have different educational networking projects at various levels of conception, planning and implementation (The Partnership for Higher Education in Africa, 2007b). Quite recently the Federal Ministry of education signed an MOU with a private firm to provide staff of tertiary institutions with personal computers under the Computerise Nigeria Project (CNP) initiated by the former President, Chief Olusegun Obasanjo. This project will give a boost to computer acquisition and usage in universities.

ICT in University Teaching

Recently the integration of ICTs into university teaching has been the topic of much debate. Since the second half of the 90s and particularly since the explosion of accessibility to the World Wide Web network one notes the rapid development in the scientific literature dealing with the integration of ICT in the pre-service

curriculum (Larose, David, Dirand, Karsenti, Grenon, Lafrance & Cantin, 1999). Nothing before seems to have captured the imagination and interest of educators simultaneously around the globe more than the World Wide Web. The web is now causing educators to re-think the very nature of teaching, learning and schooling. In the general context of globalisation, and with ever-increasing demand for higher education, especially in developing countries, universities are faced with the challenge of providing education for such growing population of students. The only possible solution is to resort to distance education and ICT-based learning, provided such technologies are properly mastered and necessary investments made in hardware and software as well as in human skill and training (Loing, 2005).

Owston (2000) observed that claims have been made that web can free teaching and learning form the physical boundaries of classrooms and time restraints of class schedules. Under the circumstance, traditional lectures and demonstration can become Web based multimedia learning experiences for students. In integrating ICT into university teaching, learning resources can be augmented by learning resources of the world via the web. Moreover, Owston observes that the web can help us to re-focus our institutions from teaching to learning, from teacher to student. In the view of Loing, to face the issues of challenges of the ever-increasing demand for higher education, particularly in the developing countries, and the diversification of learner population linked to the ongoing change in contemporary societies, the presence and role of ICT appears as a recurring - and probably unavoidable – component which higher education institutions have to deal with. Universities according to him, are challenged to integrate those technologies into there strategies, their organisation and educational processes.

Developments around the globe today tend to indicate gradual migration to integrating ICT into teaching and learning processes particularly in the developed nations of the world. There is however, the need here to ask ourselves these questions once asked by Davies (1995):

- Does ICT make learning more accessible?

- Does it promote improved teaching?

- Does it accomplish the above while if not reducing the unit costs of education?

In the area of accessibility, ICT via the web has opened opportunities for access to education for those unable to attend school or college for economic or cultural reasons. Most countries of the world including Nigeria and some other Africa countries now have open universities providing education via the internet and other telecommunication devices for people in different environmental settings. There is an indication that the web is a viable means to increase access to education. On the issue of improved learning, Owston (2000) observes that there is debate in the instructional design literature about whether there are any unique attributes of media that can promote improved learning. He proceeded to show that the web appeals to students' learning mode, provides for flexible learning and enables new kinds of learning. The position that ICT can bring about improved learning has also been alluded to by Larose *et al.* (1999), Luboobi (2007) and Librero (2001). On cost reduction, this may appear possible in the developed world particularly in the USA where web resources are sometimes available for schools at no charge.

In the developing countries, particularly Africa, this may not be the case. Notwithstanding assistance from some donor agencies, the issue of hardware and bandwidth provision still remain hard nuts to crack. ICT can enhance effective teaching, learning and research. It can reduce distances, virtually if not physically, thus providing scholars with easier access to and input into the world of international scholarship – nationally, across the continent and internationally (The Partnership for Higher Education in Africa, 2007b). In the hands of able teachers, the web can play a prominent role in fostering development of such skills as critical thinking, problem solving, written communication, and ability to work collaboratively in students. With the web all imaginable kinds of information can be found and thus teachers can encourage students to explore such opportunities with the view of having sufficient data to weigh evidence, judge the authenticity of data, compare different view points on issues, analyse and synthesis diverse sources of information (Owston, 2000). However, the issue of integrating ICT into teaching is yet to be given serious considerations by many developing nations of the world, particularly Africa. Until this is done, the unimaginable benefits of ICT will still remain an illusion to many nations.

Problems and Challenges Facing ICT Implementation in Universities

Cognisant of the substantial opportunities that ICT can provide universities, there are a number of problems and challenges that tend to present themselves. Universities are confronted with outside problems coming from their environment, as well as with inside problems coming from their own structure and culture (Loing, 2005). In Africa for instance, there are issues that have to do with national policies and plans. Many of the countries do not have national ICT policies. This leads to situation where each university has to do what it knows best to do without a central coordinating document. The presence of an ICT policy in a country cannot be overemphasised as it goes a long way to streamline ICT implementation across institutions – private or public. The problem of ICT policy brings to the fore the issue of restrictive regulatory framework. Luboobi (2007) observes that the regulatory frameworks for the telecommunications, ICT and intellectual property rights are still restrictive in most African countries.

Another major outside issue that seems to have plagued ICT implementation in universities is the problem of Bandwidth. The high cost of bandwidth, inadequate and unreliable telecommunication services and applications still remains a major challenge. There is also the problem of insincerity on the part of service provider. Many universities are being made to pay for an amount of bandwidth that is never supplied to them. Until they come to the point of having a dedicated pipe for direct supply the issue of surcharging them may never end. It is hoped however, that with the launching of NIGCOMSAT – 1 by Nigeria the cost of securing bandwidth might be brought down particularly for Nigeria universities. There is also the problem of political instability. Luboobi (2007) observes that Africa is the most unstable continent and its countries are still young democracies. According to him political unrest is a major threat to staff retention and institutional stability. Such instability frustrates policies and plans, and therefore, stagnates developments with all its ramifications.

Within universities themselves, Loing (2005) indicates that the implementation of ICT is not an easy task for faculty and staff members, as decision makers and academics are sometimes reluctant to change curricula and pedagogical approaches. Teaching staff and instructors lack incentives and rewards in a system where professional status and career trajectories are based on research results rather than pedagogic innovation. This obvious lack of incentives, perhaps underlies the unwillingness to implement initiatives related to ICT implementation in teaching and learning. Other problems/challenges relate to infrastructure, staff retention, and computer illiteracy among staff and students. Luboobi observed that the African continent lack a continent wide-wide broadband optical fibre network. However, he points out that under NEPAD, there are plans to establish the broadband ICT network for Africa. Though some universities in the region like Makerere University and University of Jos have optical fibre backbone they are not linked to any national bank ICT. There is a major problem of acquisition of ICT facilities such as computers and printers and undertaking viable networking (LAN & WAN) activities within university campuses. Most universities are grossly under funded and therefore not enabled to sustain the infrastructure required for securing viable ICT facilities in the current ICT-driven world.

Developing and retaining ICT human resource is still a major challenge particularly in African universities. The major reason for this is low salaries and poor conditions of service. This situation has very often resulted in brain drain. Most universities in the developing nations, including Africa nations, are still unable to have its staff and students literate in computer usage. With varying policies over the years, the situation has recorded some improvement. For instance in Nigeria there is on-going programme of the government tagged "Computerise Nigeria Project" (CNP). This programme is aimed at making computers available to Nigerians for use in offices and homes. There is the compulsory computer education course for students in higher institutions. This programme has been on now for close to two decades. On the issue of attitude, specific research dealing with learner or teacher attitudes towards ICT, though few, is a growing field (Brock and Sulsky, 1994; McBride and Nagle, 1996; Aguele, 1997). The stress or anxiety felt by a student faced with the necessity of using computer in a learning or performance context may seems to vary on a number of factors. These factors Larose *et al.* (1999) observes include the students degree of computer literacy, whether or not the student has had previous access to a personal computer and for what length of time.

However, no study appears to be available on the subject of illiteracy stress and anxiety as it relates to computer integration into teaching in universities in Nigeria. There also seems to be no documentation relating to the use of ICT in teaching in universities in the country. If they do exist, they are skeletal and without proper documentation in spite of the array of benefits derivable from the use of ICT in teaching and learning. This study therefore attempts to investigate the attitude of teaching staff to computer, use of ICT

tools in teaching and learning and the challenges of integrating ICT into teaching and learning in Nigeria universities.

Method

The study employed the survey research design. A sample was drawn from the population from whom responses were elicited. The survey enabled information to be obtained from a representation of population. The population for the study include all teaching staff of public universities in Nigeria. There are about 45 public universities owned by the federal and state governments. The sample consists of 240 university teachers. The 45 public universities in Nigeria were stratified into six zones following the country's geo-political structure. One university was randomly selected form each of the zones. 40 respondents were randomly selected across the various cadre of teaching staff form each of the university. This gave a total of 240 respondents. Table 1 shows the distributions of teaching staff according to their status.

Status	Number of staff	%
Professors	20	8.3
Associate professors	30	12.5
Senior lecturers	50	20.8
Lecturer I & II	80	33.4
Others	60	25.0
Totals	240	100

Table 1: Distribution of staff by status

This represents about 5% of the total teaching staff in the universities sampled for the study. In each university, the staffs were stratified according to the status and 5% of each category was randomly selected to arrive at the respondents used for the study. The questionnaire was used to collect data for analysis. This was most convenient as direct contact with some of the respondents was not possible. The questionnaire was constructed by the researcher for the purpose of this study. The instrument had three parts. The first part elicited personal information data such as rank and name of university of respondent. The second part had fifteen items. It was a close ended format with the respondents required to supply their reposes in Yes or No format. The third part was an open ended format. This part had only five items. Respondents were given a structured format to supply their responses freely. The questionnaire was content validated by four experts in computer education and curriculum evaluation. The test-retest reliability yielded a coefficient of 0.82.

Two hundred and forty questionnaires were administered. At the time of retrieval only 200 copies were duly filled and returned. This accounted for about 83.3% of the total questionnaire administered.
Five questions were raised to guide the study. The questions are stated below:

1. What is the general attitude of teaching staff to the use of computers?

2. What is the status of ICT implementation and usage in the universities?

3. What is the level of preparedness of staff and students for the use of ICT tools?

4. Are there problems confronting ICT implementations in universities?

5. What re the challenges facing ICT implementation in teaching and learning in universities?

Analysis of Results

The data collected were analysed using the mean, standard deviation, simple percentages and chi-square statistic. The results of data analyses are presented below:

Attitude of Staff to the use of Computers

Five questions were raised to provide insight into the general attitude of staff towards the use of ICT tools. The questions centred on computer usage for day-to-day activities, use of ICT tools, frequency of usage of these tools and use of these tools in teaching and learning. Table 2 presents the responses of the respondents on their attitude to computer usage.

Status	Responses		Responses in %	
	Yes	No	Yes	No
Professors	4	6	40	60
Associate professors	13	7	65	35
Senior lecturers	30	20	60	40
Lecturer I & II	53	14	79	29
Others	46	7	87	13
Totals	146	54	73	27

Table 2: Usage of computer

Table 2 shows that 73% of respondents are favourably disposed to the use of the computer indicating a moderately high positive attitude. The chi-square statistics were used to determine how significant the differences in their attitude were. The chi-square value of 61.34 obtained from the observed responses was higher than the critical value of 2.015 obtained at 5 degrees of freedom for $\alpha = 0.05$. This implies that the attitude of academics towards the use of computer differed significantly. The table further revealed that junior academics appear to be more favourably disposed to the use of the computer than senior academics.

Table 3 shows the disposition of respondents to the use if ICT tools in teaching and learning

Status	Responses		Responses in %	
	Yes	No	Yes	No
Professors	2	8	20	50
Associate professors	5	15	25	75
Senior lecturers	10	40	25	75
Lecturer I & II	10	57	15	85
Others	5	48	10	90
Totals	32	168	16	84

Table 3: Use of ICT tools in teaching land learning

Only about 16% of respondents indicated that they would like the use of ICT tools in teaching and learning. This implies that quite a large percentage (84%) is un-interested in the integration of ICT into teaching and learning.

Table 4 presents responses of respondents on the use of e-mail and other internet services.

ICT tool	Responses		Responses in %	
	Yes	No	Yes	No
e-mail	145	55	72.5	27.5
Internet	140	60	70	30

Table 4: Use of some ICT tools

The responses shows that about 72.5% are familiar with use of e-mail services and about 70% are conversant with other internet activities. When they were asked to indicate the purpose of usage, 73% indicated personal, 65% indicated research, 15% indicated occasional use for teaching and learning, while about 27% indicated that they do not use any of the tools for any of the services indicated.

Level of Usage of ICT Tools in Universities

Five questions were raised to elicit responses related to the level of usage / status of ICT tools in universities. Analysis of responses is presented in table 5.

Items	Responses		Responses in %	
	Yes	No	Yes	No
Presence of website	150	35	72.5	17.5
University has enough digital centres	15	185	7.5	92.5
University has its VSAT & e-portal to handle students' academic records	81	139	40.5	59.5
Internet access provided in personal offices	32	168	16	84
ICT tools fully integrated into teaching & learning	-	195	-	97.5

Table 5: Level of usage of ICT tools in universities

72.5% of respondents indicated that their university has a website, while about 7.5% indicated the presence of sufficient digital centres in their universities. These respondents were mainly from one of the six universities sampled for the study. 40.5% respondents indicated that their university has developed its portal and have a VSAT for its internet services. Only about 16% of respondents indicated that they have internet access in their personal offices and nothing to indicate that any of the universities sampled has integrated ICT into teaching and learning activities.

Level of Preparedness of Staff and Students

Questions were asked relating to the ICT literacy level and readiness to use ICT tools for teaching and learning. Responses to the questions are presented in table 6.

Items	Responses		Responses in %	
	Yes	No	Yes	No
Staff are adequately prepared to use ICT tools for teaching and learning	85	115	42.5	57.5
Students literacy adequate to use ICT tools for teaching and learning	63	137	31.5	68.5

Table 6: Readiness of staff and students for ICT tools in teaching & learning

Results from table 6 shows that the staff are not adequately prepared nor the student's literacy level adequate for the use of ICT tools in teaching and learning.

Problems Confronting ICT Implementation in Universities

Results of data analysis are presented in table 7

Items	Responses		Responses in %	
	Yes	No	Yes	No
Enough fund to implement ICT	53	147	26.5	73.5
Availability of technical expertise to handle ICT	47	153	23.5	76.5
Sufficient bandwidth for ICT implementation	62	138	31	69

Table 7: Problems of ICT in Universities

Results from table 7 shows that 73.5% of respondents indicated that universities do not have enough fund, 76.5% indicated that universities lack adequate technical expertise and 69% indicated that not enough bandwidth in provided to implement ICT in universities.

Discussion

Results of this study showed that university teachers have a positive attitude to the use of computers for personal and research purposes. This is indicated by results in tables 2 and 4. However the study indicated that a large proportion (84%) of respondents is not disposed to the integration of ICT tools into teaching and learning. While academic may be favourably disposed to the use of computers for personal and research purposes for convenience in communication (e-mail) and access to research materials globally, they may be unwilling to embrace ICT in teaching and learning due to the low level of preparedness and lack of reward to initiatives. Integrating ICT into teaching is relatively new in Africa. According to Larose et al (1999) although this field of research is relatively young in that it deals with the implication of implementation of computer technologies in different working or educational environments, it reflects well establish traditions in the psychology of work. Such tradition may have to do with unwillingness to accept anything new or lack of incentives for innovation in the first instance and reduction in teacher - students' interaction. This agrees with the findings of Larose et al (1999) that the subjects who took part in their study appeared afraid that integrating computer technologies in higher education might eventually jeopardise the frequency of teacher leaner relations, rapports and contacts. However, there was indication of willingness to accept training to meet requirements for use of ICT tools in teaching and learning provided that enabling environmental conditions are made available. This tends to support Stein's argument (2005) that an ICT implementation strategy will lead to a higher willingness of employees to acquire ICT related competencies.

Results of the study also revealed that the uses of ICT tools among academics have increased tremendously. While about 72.5% of the sample indicated familiarity with the use of e-mail services, about 70% indicated that they were conversant with the use of other internet services. On a larger survey, 60% of staff of the six Universities sampled has personal access to internet services. This is a great improvement over the 2% of staff and students from 19 universities in a survey undertaken by the Nigeria Universities Commission (NUC) in 2000 (The Partnership for Higher Education in Africa, 2007b).

On the status of ICT implementation in universities there appear to be a promising future. While about 72.5% of respondents agreed that their universities have their own websites, about 40% indicated that their universities have installed their VSATs and developed their portal to handle students academic records and related activities. This is an improvement over the same ICT survey by NUC which indicated that although many individual staff members have e-mail accounts, only 44 universities (public and private) have registered domain names of which only 15 are active. The survey further stated that only 2 universities have VSAT (The Partnership for Higher Education in Africa, 2007b).

The change in situation could be attributable to the willingness of universities to bring in modern technologies into its administration and be part of today's global village. This growth notwithstanding a large proportion of teaching staff are yet to have access to ICT services in their personal offices as only a dismal 16% indicated that they have access in their personal offices. It was observed however, that these respondents were from one of the universities sampled for the study. In addition it was observed from the study that none of the universities have integrated ICT into teaching and learning processes. The benefit of ICT must be seen in all areas. We cannot be said to be ICT friendly when virtually all our teaching activities are still restricted to the old chalk and board paradigm. As observed by Garmer and Firestone (cited in Librero, 2001), due to the new Information and Communication Technology (ICT), 'the paradigm for learning is shifting away from the traditional notion that knowledge is transferred from teacher to the student within the confines of the classroom', Today, learners must now take control over their education, and the teachers should function as facilitators of learning.

Results of data analysis revealed that neither the staff nor the students are adequately prepared for the integration of ICT tools into teaching and learning process. Most respondents indicated that present level of computer literacy may not be adequate to handle the tools associated with integrating ICT into teaching and learning. Stein, Craig and Scollary (1997) described computer literacy as 'the ability to use ICT to identify and search effectively for specific information in order to build knowledge and develop critical and creative thinking'. The degree of computer literacy varies in individuals. This is largely dependent on the individual's previous access to a computer. The study revealed that computer facilities are in short supply in our universities, thus making it difficult for staff and students to acquire the relevant competencies.

The study revealed further that the implementation of ICT in Nigerian universities is constrained by a number of problems. These problems were: insufficient fund to implement ICT effectively, non-availability of

adequate technical experts to handle ICT activities both installation and technical support, procurement of sufficient bandwidth for VSATs and adequate software for teaching and learning. The institutions involved in this study are government owned institutions. Very often they are not adequately funded to implement projects that are capital intensive properly. ICT require a huge capital outlay to acquire, develop and sustain a functional state-of-the-act network. The problem of funding is however, not peculiar to Nigeria. It is prevalent in most African countries and some other countries of the world (Luboobi, 2007; Loing, 2005; Librero, 2001; The Partnership for Higher Education in Africa, 2007c).

Obtaining and retaining the technical expertise to implement and manage ICT facilities in Nigerian universities has been a great problem. This is largely due to the competitive nature of the economy. The universities are not able to attract and retain experts in ICT due to poor conditions of service and unattractive working environment. Luboobi (2007) observation that 'growing and retaining ICT human capital still remain a major challenge for the African continent in general and the African universities in particular' supports this finding. There is the need therefore to encourage a stronger partnership with the African Diaspora with a view to contributing to ICT in the continent.

The politics of bandwidth procurement and sustenance has been a bane to most ICT Installations in universities in Nigeria. 69% (about 136) of respondents indicated that their university cannot afford sufficient bandwidth required for their VSATs. The effect of this is the unnecessary reduction in the speed of accessing most websites and delay in the provision of needed information for decision making process. The integration of ICT into teaching and learning is likely to compound this issue as more computer access will now be involved in the network. Data analysis revealed that the major reason for for the inadequate provision of bandwidth is the prohibitive cost. This has support from the report of The Partnership for Higher Education in Africa (2007c), which stated that the universities at the workshop spent about $4,500 to $12,000 a month for bandwidth only depending on the amount purchased. The report further stated that generally, bandwidth rates are ten times higher in Africa than North America and Europe. Bandwidth is a major factor in ensuring effective performance of any server in an installation and therefore the problem should be vigorously addressed.

Nothing appears to have captured the imagination and interest of educators around the globe simultaneously as more than the World Wide Web (Owston, 2000). The web is now causing educators from the different levels of education to have a re-think of the very nature of teaching and learning. This is not without challenges. Some of the challenges identified in this study are discussed below.
One of the major challenges facing universities in Nigeria in the integration of ICT into teaching and learning centres around the issue of staff training, development and retention. The study revealed that majority of staff managing ICT facilities in the universities are ad-hoc staff from the private sector who are partnering with some of the universities. Universities do not have direct and effective control over such category of staff. Besides, their services are not continuous. They are usually available to carry out installation and provide support (logistics and technical) during the contract period. The uncertainty of continuity after the contract period presents a serious question due to lack of competent and staff in the most universities. This finding agrees with Luboobi (2007). For effective ICT implementation, universities cannot continue to depend on such ad-hoc staff. They must develop and retain their own staff and manage their installations.

The high cost of bandwidth, inadequate and unreliable telecommunication services and applications still remains a major challenge. Respondents in this study agreed that their university is unable to provide the required amount of bandwidth for effective internet services. Infact some universities have had to suspend/abandon their project due to inability to pay for bandwidth on a continuous basis. As observed earlier, most public universities in Nigeria are not sufficiently funded to enable them effectively attend to most of their financial needs. As at today, ICT projects in developing countries are expensive due largely to hardware acquisition and technical expertise. The Partnership for Higher Education in Africa (2007c) observed that universities in Africa buying bandwidth for their VSATs are using middlemen and know that they are paying too much. They therefore called for research on the economics and marketing of bandwidth as well as the regulatory environment.

Another major challenge revealed by the study was the literacy level of staff and students in the use of ICT for teaching. While it is true that over 70% of respondents are already familiar with the use of internet services, less than 15% indicated that they have used ICT tools for teaching and learning purposes. The respondents further agreed that their institutions has not integrated ICT into the teaching and learning process and so are

not familiar with the procedures involved. No conscious effort has been made by the universities to acquaint staff and students with such procedures as the facilities are not in place. The situation in some other African countries is not better (Luboodi, 2007). The universities cannot train its staff and students on the use of ICT in teaching as the suitable facilities are not in place. This issue need to be adequately addressed.

Conclusion

The study looked at ICT in universities and its status in developing countries, with particular reference to Nigeria. It reviewed some of the problems militating against integrating ICT into teaching and learning in universities. Five questions were raised to guide the study. The study came out with the following findings:

1. Teaching staff of public universities in Nigeria were favourably disposed to the use of the computer for their day-to-day activities. They however, show lack of enthusiasm towards integrating ICT into the teaching and learning process.

2. Quite a large number of university teachers are familiar with the use of e-mail and internet facilities for personal and research purposes.

3. Universities lack adequate facilities to implement the integration of ICT procedures into teaching and learning process.

4. Teaching staff and students of universities are not adequately prepared for the use of ICT tools in teaching and learning process.

5. Universities lack adequate fund to effectively finance ICT services.

6. Universities are not able to purchase sufficient bandwidth for their ICT installations due to prohibitive costs.

7. Few institutions have their VSATs while some others still depend on dialup access or wireless link to local ISPs.

8. Universities do not have enough digital centres to cater for the needs of staff and students.

9. Though large number of teaching staff uses internet services, they are yet to have internet access in their personal offices.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. ICT projects and are financially demanding. The universities therefore require increased and adequate funding from Government and their proprietors to enable them provide the needed facilities, logistics and technical support required by ICT projects. Such increased funding will also make available to university management the finances to train, develop and retain ICT experts in their institutions.

2. Deliberate and sustained approaches should be taken to address ICT staffing. This includes strategies for retention of ICT staff, and for knowing that those who leave must be replaced. Such strategies may include offering ICT training opportunities and pay package.

3. There should be adequate preparation of staff and students to improve their literacy level in ICT. This will help to create in them the willingness to embrace the challenges of integrating ICT into teaching and learning processes. As a step towards actualising this, the ICT units in universities should organise orientation programmes/workshops for staff to enhance their literacy level and the mandatory computer programme for students should be reappraised to make it more practically oriented.

4. The naughty problem of bandwidth need to be vigorously tackled. The universities need to undertake appropriate research to determine how much bandwidth they actually have need for to avoid wastage. Excess bandwidth capacity exists in satellites and fibre optic cables. Though expensive to deploy, universities should consider the use of such facilities in their installations. Besides, universities should explore the potential of creating consortia to purchase bandwidth at wholesale prices. This calls for collaboration between universities.

References

Aguele, L.I, Aluede, O.O, & Aluede, R.O.A. (1998). Attitude of undergraduates towards compulsory computer education. *Journal of Education Systems, Research and development*, 1(2), 75 – 85.

Brock, D.B, & Sulsky, L.M. (1994). Attitudes toward computers: Construct validation and relations to computer use. Journal of Organisational Behaviour, 15(1), 17 – 35.

Davies, G.K. (1995, June). *Higher education's big problems: Can technology help resolve them?.* Keynote address delivered at the semi annual meeting of the Education National Learning Initiative. Keystone, CO.

Larose, F., David, R., Diran, J., Karsenti, T., Grenon, V., Lafrance, S. & Cartin, J. (1999). Information and communication technology: Journey in a major Quebec university's reality. *Electronic Journal of Sociology.* Retrieved May 27, 2007, from http://www.icaap.org/iuicode?100.4.3.3

Librero,F. (2001, May 17 – 18). Constraints – cum – challenges in ICT education inthe Philippines. 4th National congress of the commission on higher education, Manila Midtown hotel, Manila. Retrieved June 16, 2007, from http://www.upou.org/books/fl_constraints.htm

Loing, B. (2005, April 6 – 8). ICT and higher education. 9th UNESCO/NGO collective consultation on higher education.

Luboobi, L.S. (2007). University roles in meeting aspirations for ICT and economic development, Retrieved June 16, 2007 from http://www,foudation-partnership.org/pubs/leaders/assets/papers/luboobisession4.pdf

McBride, S.H. & Nagle, L.M. (1995). Attitudes toward computers: A test of construct validity. *Computers and Nursing.* 14(3), 164 – 170.

Owston, R.D. (2005). The world wide web: A technology to enhance teaching and learning? Retrieved May 27, 2007 from http://www.edu.yorku.ca/-rowstron

Stein, B. & Tijdens, K.G. (2005). Workers and their unwillingness to learn: Will ICT –implementation strategies and HRM practices contribute to innovation? *Creativity and Innovation Management.* 14(2), 151 – 159. Retrieved May 17, 2007 from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=722248

Stein, A., Craig, A. & Scollary, A. (1997). Preparatory IT practices and skills of transition in business students. *Australian Journal of Educational Technology.* 13(1), 40–53.

The Partnership for Higher Education in Africa (2007a). ICT for teaching learning and research: ICT profiles. Retrieved May 23, 2007 from http://www.foundation-partnership.org/pubs/profiles/index.php?chap=chap2

The partnership for Higher Education in Africa (2007b). ICT and internet inmembership countries. Retrieved May 23, 2007 from http://www.foundation-partnership.org/pubs/bandwidth/index.php?chap=chap2&sub

The Partnership for Higher Education in Africa (2007c). ICT for teaching learning and research: ICT applications. Retrieved May 23, 2007 from http://www.foundation-partnership.org/pubs/ict/index.php?chap=chap2