

FACTORS IMPEDING ACCESS AND UTILIZATION OF INFORMATION TECHNOLOGY IN NIGERIAN HIGHER INSTITUTIONS

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Abstract

The use of Information and Communication Technology (ICT) in education lends itself to students-centred teaching pedagogy. This phenomenon and the need for globalization and collaboration are further entrenching the need for ICT in education. To this end, Teachers are expected to exhibit high usage of ICT in their teaching and research, but unfortunately this is not exactly the case in Nigeria just like it is in many other developing countries. The crux of this study therefore was to identify the factors that impede access and utilization of ICT in Nigerian Higher Education Institutions. Two hundred and sixty-nine (269) lecturers in twenty two (22) tertiary institutions across the six geopolitical zone of Nigeria participated in the study. Four research questions were formulated. Structured questionnaire was used to seek experts' opinions. The data collected were analyzed using percentages. Items that carried the highest percentage were considered the consensus of the respondents. The findings revealed factors impeding successful access and utilization of ICT in the higher education of Nigeria to include among others: social, economic, political, technical, human and electricity (power) factors. Based on the findings recommendations were made that: Higher Education Institutions should be connected to dedicated electricity power lines for guaranteed supply of electricity; the National Research and Education Network should be executed as dedicated Network and linked to Nigerian Universities Broadband Network for Internet access; adequately qualified staff should be engaged in the ICT units, they should be well remunerated and encouraged so that they would provide required technical support; ICT funding policies should be well concretized and enforced.

Keywords: Impeding factors, Globalization, Dedicated Network, Broadband Network.

1 INTRODUCTION

Information and Communication Technology (ICT) is an enabling technology, it is changing the way and how things are being done in all aspects of human endeavours. ICT presented an unprecedented opportunity to make new knowledge, services and opportunities available in underserved areas. [1]. Information and communications are at the very heart of the educational process, consequently ICT-use in education has a long narration. The sector is one of the greatest beneficiaries of ICT, others according to United Nations Commission on Science and Technology for Development (UNCSTD), [2] are health and Banking. ICT is the term for the diverse set of technological tools and resources used to create, store, manage, disseminate and communicates information, using computers, the Internet, telephony and broadcasting technologies. [3]. The government and the operators in education sector worldwide are quite cognizant of the benefits of the integration of IT in teaching, learning and research. To this end the Federal Republic of Nigeria's National Policy on Education (NPE, 2004) specifies the goals of tertiary education as to:

- (a) contribute to national development through high level relevant manpower training;
- (b) develop and inculcate proper values for the survival of the individual and society;
- (c) develop the intellectual capacity of individuals to understand and appreciate their local and external environments;
- (d) acquire both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society;
- (e) promote and encourage scholarship and community services;
- (f) forge and cement national unity; and
- (g) promote national and international understanding and interaction [4].

But, the overall goals of education, especially, the goals of higher education specified in (c), (e), and (g) above cannot be accomplished without adequate integration and utilization of ICT. In advanced countries, students use e-mail, web sites, streaming video and video conferencing technology to develop their learning skills. Through these media, the students learn, compete, interact with their global peers, and share their cultures with one another in new and compelling ways. In a meta-analysis of over 500 individual studies, James Kulik as quoted in [5] found the following results:

1. Students usually learn more in classes in which they receive computer-based Instruction;
2. Students learn their lessons in less time with computer-based instruction;
3. Students also like their classes more when they receive computer help in them;
4. Students develop more positive attitudes toward computers when they receive help from them in school.

1.1 The Nigerian National Developmental Plan

Consequently, as a demonstration of her recognition of ICT as a tool for national development, all Nigerian developmental policies and strategies feature ICT prominently as a tool for actualization of its goals. Some of these developmental plans are: the Millennium Development Goals, National Vision (Vision 20:20:20), Seven Point Agenda and National Economic Empowerment and Development Strategies (NEEDS), among others. This is because achieving the objectives of each of these might be a mirage without adequate well qualified ICT literate human resources. For instance the [6] which was published by the Nigerian National Planning Commission in 2004 focuses on four key strategies that include: reorienting values, reducing poverty, creating wealth and generating employment. NEEDS under the “Social Charter: Investing in the Nigerian People” recognizes Education as being critical to the accomplishment of its goals, hence, its sixth goal under this section was **to promote Information and Communication Technology capabilities at all levels of Nigerian Education Systems**.

Similarly, the [7] which is Nigeria’s long term development goal designed to propel the country to the league of top 20 economies of the world by the year 2020. Its main goal is to improve the well-being of Nigerians. Hence, the Vision aims among others, to reduce “low quality human capital”. It therefore considered education as both a basic human right and a critical element in human development. The low quality and weak relevance of Nigerian graduates in national and global markets were lamented, hence, the vision “seeks to refocus the educational system in terms of access, equity, development, curriculum relevance, funding and planning.” More specifically, the vision plans to make the curriculum in Nigerian schools to be market-driven, skill development and **ICT-diffused**.

Several initiatives have been rolled out in Nigeria over the years towards making the product of Nigerian Education System IT ready, global player and full participant in the contemporary knowledge driven economy. The initiatives and instruments as contained in [7] which is also one of the initiatives include, formulation and approval of: Nigerian National Policy for Information Technology, Roadmap for the Education Sector, National Information Technology Education Framework.

The Vision of [9] was “to make Nigeria an IT capable country in Africa and a key player in the information society by the year 2005, using IT as the engine for sustainable development and global competitiveness. The Mission statement of Nigerian National Policy for Information Technology was to **use IT for Education**, Creation of wealth, Poverty eradication, Job creation and Global competitiveness. Some of the general objective of this policy was to ensure that IT resources were readily available to promote efficient national development and **to integrate IT into the mainstream of education and training**. Some of the implementation strategies were:

- Establishing a coordinated program for National, State and Local Information Infrastructure (NII, SII, LII)
- Provision of adequate connectivity to Global Information Infrastructure
- Restructuring of the educational system and the allocation of a special IT development fund to education at all levels
- Making the use of IT mandatory at all levels in educational institutions through adequate financial provision for tools and resources
- Development of relevant IT curriculum for the primary, secondary and tertiary institutions

- Establishing facilities for Electronic Distance Learning network and ensure effective Internet connectivity, which will provide opportunities for educationally disadvantaged areas to educationally leapfrog into the modern era.

1.2 ICT Programmes Initiation and Implementation

Nigeria has actually achieved a lot in Information Technology both in policies, strategies and implementations since 2001, when Federal Government declared Information Technology as a National priority [9]. Some of these initiatives according to [10] include, broadcasting of educational Radio and Television programmes as seen in Nigerian Broadcasting Corporation's "English by Radio" programme, and the Schools Educational Broadcast by the Nigerian Television Authority. Establishment of National Virtual Library during the tenure of a former minister for Education, Prof. Babalola Aborishade. Design of National Infrastructure Framework for open and distance learning, and the Computer in Schools project which was kick started in January 2002, with the intention of providing computer to staff at educational price under subsidized consumer arrangement. Donation of laptops to Institutions by the Nigerian Communications Commission (NCC) was part of its national effort to encourage the appreciation and use of Information and Communications Technology (ICT) in the country, under the Commission's Advanced Digital Access Programme for Tertiary Institutions (ADAPTI).

Others include, the Train the Trainers ICT capacity-building in line with international Computer Driven License (ICDL). This is being executed as Advanced Digital Appreciation Programme for Tertiary Institutions (adapt@dbieducation.org) by Digital Bridge Institute, the development of National Information Technology Education Framework (NITEF), the establishment of a National Information Technology Development Fund (NITDEF) under the aegis of the National Information Technology Development Agency (NITDA), the introduction of e-learning to facilitate teaching and learning, pronouncement of IT education as mandatory for all level of education and the development of the corresponding curriculum. [8]

Furthermore, there are several local and International ICT related interventions, for instance, Educational Trust Fund (ETF) projects are conspicuous in Nigerian higher institutions. There are also World Bank interventions. To demonstrate this, the World Bank's Country Director according to [11], remarked in 2009 that the IT status in Nigeria is unacceptable, he therefore revealed the commitment of World Bank to assist Nigeria. According to him "The world is really aware of the lapses... World Bank is ready to kick-start a \$2m (N300m) intervention to salvage the situation". Finally, the current administration has established a full fledged ministry with a cabinet minister for ICT.

1.3 World ICT Indicators for Africa and Nigeria

However, despite all of these, Africa and indeed Nigeria is still placed at lower end of the ladder in all global indicators. The International Telecommunication Union (ITU), ICT facts and figures 2010 boldly revealed that "Two billion people on the Internet... but too few in Africa". Other ICT access and usability indicators are:

- The 100 inhabitants Internet user report 2010: Africa has 9.6% while Europe has 65% and America has 55%, [12].
- Household with Computers: Developing countries: 22.5%, Developed countries: 71%, [12].
- Household with Internet Access: Developing countries: 15.8%, Developed countries: 65.6%, [12].
- Networked Readiness index 2010-2011: Nigeria is ranked 104 out of 138 countries rated worldwide, [13].
- Public Expenditure on education in Nigeria is placed at 128th in the world, [14]
- The first Nigerian University in "Ranking web of world university" – webometrics is occupying 104 position in the world out of 138 universities considered.[15]

All these and many more are pointers to the fact that the situation of ICT in Africa, Nigeria and most especially in its higher institute of learning, in terms of access and utilization is grossly inadequate. The crux of this study is therefore to investigate the factors hindering access and utilization of ICT in Nigerian Higher Institutions and to make adequate recommendations to improve the situation. The following research questions were raised for the study:

- Is ICT policy formulation and implementation an issue in ICT access and utilization in Nigerian tertiary institutions?

- ii. Are there adequate ICT facilities in Nigerian tertiary institutions?
- iii. Is inaccessibility and incompetency an impediment to proper ICT usage in Nigerian tertiary institutions?
- iv. Is adequate funding available for ICT project in Nigerian tertiary institutions?

Consequently, the study will significantly be a guide to the government, educational planner and administrators, foreign body, NGO and other stakeholders in education to have real picture of the factors that have been a cog in the wheel of progress to the full implementation of ICT in education for the purpose of proffering solution. In the same vein the study would contribute to the body of knowledge towards enhancing teaching and learning in Nigeria.

2 METHODOLOGY

This study adopted the descriptive survey design approach. The teaching staff of Nigerian tertiary institutions forms the population for the study. Stratified random sampled 269 lecturers from twenty-two (22) institutions across the six geographical zones of Nigeria were used as sample (see Table1). Structured questionnaire containing a mixture of open and close ended questions was drafted for the study. The questionnaire was specifically structured to elicit answers for the research questions raised. Experts' input and corrections were fully effected; thereafter, reliability test was conducted and the coefficient obtained was .72. The data collected were analyzed, using frequency count and percentage. Document materials, articles and reports were also used in this study; their validity and value were subjected to four overlapping validity criteria: authenticity, credibility, representativeness and meaning Scott (1990, as cited in [16]).

Table 1: Sampled Tertiary Institutions

S/N	Institutions	Samples
1	University of Benin, Benin City, Nigeria	10
2	Ebonyi State University, Abakaliki	12
3	Federal Polytechnic, Oko, Anambra State	12
4	Federal Polytechnic, Nekede, Imo State	12
5	Ladoke Akintola University, Ogbomoso	20
6	Osun State Polytechnic, Iree, Osun State	13
7	Rufus Giwa Polytechnic, Owo, Ondo State	10
8	Federal College of Education (Technical), Oyo	12
9	The Polytechnic, Ibadan, Oyo State	15
10	University of Ilorin, Ilorin, Kwara State	20
11	Kwara State Polytechnic, Ilorin, Kwara State	20
12	Kwara State University, Malete, Kwara State	20
13	Kaduna Polytechnic, Kaduna	7
14	Kaduna State University, Kaduna	5
15	Ahmadu Bello University, Zaria	6
16	Kogi State Polytechnic, Lokoja, Kogi State	10
17	Ado Bayero University, Kano	5
18	Federal University of Technology, Minna	9
19	Al-Hikmah University, Ilorin, Kwara State	20
20	Niger State College of Education, Minna	10
21	Federal College of Education, Kano	6
22	Kwara State College of Education, Oro	15
Total		269

3 RESULTS AND ANALYSIS

This section presents the analysis of the findings based on the responses collected through the questionnaire on the factors impeding the successful access and utilization of ICT in higher education in Nigeria. Percentage was the major statistical tool used in this study. It was used to analyze the respondents' responses in different degree of choices. The percentages for each category of the responses were calculated. Tables were constructed to show the analyses.

Research Question 1: Is ICT policy formulation and implementation an issue in ICT access and utilization in Nigerian tertiary institutions?

Table 2: Information and Communication Technology Policy

	Yes (%)		No (%)
Availability of functional ICT policy	37.1		62.9
Sources of the Policy (where available)	Institution	Gov't.	
	66.0	34.0	
Existence of political and administrative willpower to ICT policy implementation.	10.0		90.0

From Table 2 above, 37.1% of the institutions have ICT policy while 62.9% have no ICT policy or at least the existence of such policy is not known by our samples. Where ICT policy exists, 66% of such ICT policy emanated from institutions while 34% of it emanated from the government. Only 10% of the administrations demonstrated the determination, self-control and self-disciplines required to successfully implement the policy

If 62.9% of the study samples (staff) who are strong stakeholders are not aware of the existence of an ICT policy in their institutions, then it means they were neither carried along at the stage of formulation nor at the implementation stage. As such, successful integration of ICT in educational system might not be realizable.

Similarly, where ICT policy document is available, they are majorly (66.0%) institutional based. When individual institutions formulate and implement an uncoordinated ICT policy, it leads to diverse prioritization and focus; and it makes accomplishment of overall goal difficult.

Furthermore, if only 10% of the administration were adjudged to have the political willpower to implement ICT policies, then such administration may neither commit enough funds to ICT projects nor accept ICT initiatives or ICT solution promptly. In all, the findings show that ICT policy formulation and implementation are an issue in ICT access and utilization in Nigerian tertiary institutions.

Question 2: Are there adequate ICT facilities in Nigerian tertiary institutions?

Table3: Availability of Information and Communication Technology Facilities

S/N	Facilities	Available	Not Available
i.	On-line admission and registration facilities	18.0	82.0
ii.	On-line student registration of courses facilities	62.0	38.0
iii.	Virtual class (e-learning) facilities	18.0	82.0
iv.	Virtual library (e-library) facilities	10.0	90.0
v.	Computer-based test facilities	40.0	60.0
vi.	Facilities for Cooperate e-mail services for staff	28.0	72.0
vii.	Video conferencing facilities	0.0	100.0
viii.	Facilities for collaboration with others for service delivery	20.0	80.0
ix.	Facilities for collaboration with others for research	20.0	80.0
x.	Campus-wide Internet service facilities	48.0	52.0

Table 3 above unveiled the ICT facilities that were mostly made available as: on-line student registration of course facility with 62% availability rate, while those that were fairly made available were computer-based test facilities with 40% and campus-wide Internet service facilities with 48% availability rate. The following ICT facilities were poorly made available in the institutions: on-line admission and registration with 18%, e-learning facilities 18%, e-library 10%, e-mail services 28%, video conferencing 0%, e-collaboration service 20% and e-research collaboration 20%. These ICT facilities with low scores are quite essential for effective modern higher education. Accordingly, Nigerian higher education is far below the standard of universities in the developed world and even below several universities in other developing economies.

Research Question 3: Is inaccessibility and incompetency an impediment to proper ICT usage in Nigerian tertiary institutions?

Table 4a: ICT Access

Access	Regularly (%)	Rarely (%)
Internet access	45.5	54.5
Electricity (power) supply	25.3	74.7
Computer system access (by ownership or by proximity)	47.0	53.0
Access to qualified ICT technical personnel	10.0	90.0

Table 4b: ICT Competency

Competency	Adequate (%)	Inadequate (%)
Proficient computer literacy	27.0	73.0
Readiness /confidence to explore and adopt ICT solution	13.7	86.3

Table 4c: ICT Usage

Usage	Regularly (%)	Rarely (%)
For teaching	40.0	60.0
For research	62.0	38.0
For collaboration	36.0	64.0
For information dissemination (Publication)	30.0	70.0

Table 4a (ICT Access) above, shows regularities or otherwise of some important resources required for adequate ICT usage in Nigerian higher institutions. The Internet access shows 45.5:54.5 ratio for regularly and rarely respectively. This figure is not acceptable for any serious academic activity because Internet access must be regular in this era of cloud computing. The percentage ratio 25.3:74.7 for power supply is grossly unacceptable, because there can never be a meaningful development without stable electricity. Inadequate access to computer system (47.0:53.0) is another issue revealed by the data. If staff has no regular access to computer system, this will hinder their competency and confidence, hence, they would resist usage instead of being embarrassed in the class. Every technology requires maintenance and technical support; the research, however, shows that, access to qualified ICT technical personnel is very low (10%).

Table 4b (ICT Competency) above indicates the human factor in the access and usability of ICT in Nigerian tertiary institutions. The proficiency computer literacy rate of the operators is very low (10%). The level of readiness and the confidence to explore and adopt are also unacceptable. Hence, inaccessibility and incompetency is a great impediment to proper ICT usage in Nigerian tertiary institutions.

Table 4c (usage) above, shows the percentage of how regular or how rarely ICT (projector, computer, campus intranet, Internet, campus radio and television, etc) are being used for academic activities. It shows that 60% of the faculty rarely uses ICT for teaching; hence they stick to the traditional teaching pedagogy. It is only in the area of research that the staff demonstrates relatively fair percentage of usage; this is not unconnected to the fact that most GSM providers (MTN, GLO, Etisalat etc) now provide Internet services. Hence, it is possible to browse the Internet via the GSM MODEM or directly on mobile phones. The current percentage for collaboration with colleagues locally and internationally is very low (36%). And the percentage for uploading or publishing of academic research papers, course materials and presentations is very low (30 %).

Research Question 4: Is adequate funding available for ICT project in Nigerian tertiary institutions?

Table 5: Sources of Funding and Sustaining ICT Facilities

Sources	Available (%)	Not available (%)
Government grants (support)	80.0	20.0
Students ICT fees	80.0	20.0
Staff ICT charges	12.0	88.0
ICT fund from local and International NGO	59.0	41.0

Government funds are available for ICT projects in most Institutions (80%) in Nigeria, the government funds are available through her agencies like the Education Trust Funds (ETF), the National Information Technology Development Agency (NITDA) etc. Similarly, most Institutions (80%) charge students for ICT fees, such money accrued as an Internal Generated Revenue (IGR) which can be used by the management to initiate and maintain ICT projects. Higher institutions get funds from local and International Non Governmental Organizations (NGO), like the World Bank and UNESCO etc. Furthermore, some of the Institutions demand the staff to pay some ICT fee, mostly for Internet subscription. Availability of funds through all these means neither implies adequacy nor proper utilization of the funds. None of the institutions had enough funds for ICT projects and services as revealed in the following highlights of other deducted factors that impede access and implementation of ICT in higher education in Nigeria:

- ❖ Lack of incentives or financial assistance to staff on ICT equipment acquisition.
- ❖ Some states and private-owned institutions have weak financial base, hence, they are not coping with the high cost of ICT projects.
- ❖ Because the language of the Internet is predominantly English, the language is a barrier to those without western education.
- ❖ There is no enough enlightenment on the applications of ICT to teaching, learning and administration.
- ❖ Some old senior lecturers with few more years in service felt bothering their heads with ICT and its jargons is not necessary any more.

4 CONCLUSIONS AND RECOMMENDATIONS

The Identified factors hindering successful integration of ICT in Nigerian higher education system can summarily be said to be social, economical, political, technical, human and infrastructural factors. The social factors include the unwillingness of the teaching staff to adopt ICT based pedagogy in their academic activities. The economic factor is due to inadequacy of funds in the system to support ICT projects and services. The political factor includes lack of harmonized ICT policy and weak political willpower for effective implementation of ICT policy and projects. The technical factor was the problems of qualified technical personnel to install and maintain ICT equipment and to provide other relevant ICT services. The human factor is the weak ICT literacy level among stakeholders and lack of confidence to explore ICT solutions. The Infrastructural factor (electricity, broadband Internet access and computer system), the current 5000MW of electricity currently being generated for a population of over 145 million is grossly inadequate, hence electricity supply is erratic and it is greatly affecting the use of ICT in the higher education institutions in Nigeria. The cost of Internet access is currently on the high side, hence most institutions cannot subscribe for the required bandwidth for their institution.

This result is corroborated by various researches in the same subject matter. The work of Okotuma (1992, as cited in [17]) classified the problems of introducing ICT in developing countries into three generic categories: contextual, strategic and operational. The contextual problems are due to poor match of developed countries models design and applications to the developing countries environment. The strategic problems relate to local, national and regional policy initiatives and the operational problems are the technical, economic constraints and lack of skilled personnel (Kunda & Brooks, 2009, as cited in [17]). Similarly, according to UNESCO (1998), Igwe (2005) and Nwagwu and Ahanihe (2006), as cited in [17]), efforts to improve ICT access in Africa have been hampered by a number of factors; these are summarized as follows:

- prospective ICT users that have the expertise, competence and equipment to benefit from access to electronic information networks are minute in number;
- the shortage and high cost of equipment, software and information compared to situations in industrialized nations;
- the lack of reliable and accessible physical telecommunications infrastructure; telecommunications monopoly, associated with overly restrictive regulations and high costs, and
- lack of interregional networking and cooperation amongst national universities and international institutions

On the basis of the foregoing, it is essential to use a multifaceted approach to ameliorate or totally eliminate the problems militating adequate access and utilization of ICT in Nigerian Higher Institutions.

On the human factor, in order to create ICT-enabled teaching and learning environments, it is necessary to provide ICT training for teachers. As noted by [18], "The changes being asked of faculty members in restructuring their work lives will be extraordinary and will require them to function in ways they never conceived of and for which they were not trained." It must be a requirement to have training in ICT-use to earn a teaching credential. Beyond preparative training, as educational applications of ICT continue to evolve, refresher training for experienced teachers becomes necessary. Additionally, ICT training must be extended to educational administrators. Successful technology training can only be accomplished through effective administrative leadership. These leaders must be knowledgeable in the use of technology and must show support by providing access to the equipment and materials necessary for successful integration.

Furthermore, there is need for ICT supportive policy, such as provision of a tax rebate on ICT equipment to bring down the prices. Adequate and well conceived, centrally coordinated ICT access policy should be made available to all institutions, strategies to ensure compliance should be initiated. It is essential to execute the National Research and Education Network (NREN) as proposed by [19] as a dedicated Network connecting all universities and research institutes across the country. The NREN should be linked to Nigerian Universities Broadband Network (NUBNet) for Internet access. It is necessary for the government to give definitive directives to all Internet Service Providers (ISPs) to release free bandwidth at non-peak periods to the NREN as part of their social responsibility.

Generally, the issue of acute problem in the power sector in Nigeria must be solved promptly. However, higher institutions and research institutes need to be connected to dedicated lines for improved and stable power supply for academic purpose. The staff, students and all stakeholders should get value for the money paid for ICT services. A sincere and well implemented ICT funding strategy should be agreed upon and implemented accordingly. A deliberate and purposeful training programme for massive training of ICT technical personnel should be mounted; such personnel should be well remunerated to retaining them in academic institutions. If all the suggestions are well implemented, it is the hope of the researchers that the Nigerian higher education system will be better with an improved access and utilization of IT for academic activities.

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