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Assessment of Information Communication Technology Integration in State Colleges of Education in North WesternNigeria

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Abstract: *This study assessed Information Communication Technology (ICT)integration in four state Colleges of Education in North Western, Nigeria. The study focuses on three criteria of technology adoption: availability, utilization and integration. This becomes imperative given that the prospective teachers the colleges produce will operate in school systems and with students that were influenced by global trends in information explosion. Also, like most educational innovations, the use of ICT in schools should satisfy the key demands of availability and accessibility to learners who demand its effective utilization, and, above all, integration into all facets of curricular and pedagogical practices. The study used the cross-sectional survey design since it aims at a description and evaluation of existing characteristics of a large population of respondents, by concurrently studying different samples drawn from the population. Data werecollated using questionnaires administered on lecturers and computer laboratory technicians of the selected Colleges. The data was analyzed using percentages and means. The major finding of the study is that ICT presence in these colleges was still peripheral due to lack of access to internet connectivity. It was therefore recommended that the schools should expand their ICT capability, the students be given proper orientation and training on the uses and benefits of ICT and that ICT integration must begin from the teacher training curriculum of the institutions.*

Keywords: *ICTAvailability, ICT Utilization, ICT Integration, Teacher Education*

I. Introduction

Information and Communication Technology (ICT) gadgets and their services have become inevitable parts of everyday lives in virtually all parts of the world. Whether viewed from the perspectives of simple communication, sharing of information, business transactions, or social networking, ICT gadgets and their services such as electronic mails, chat platforms, and social media have changed how people live their lives. The changes brought about by these tools and services have been so transformative that the socialization of present and future generations of learners would be incomplete if it did not equip them with the skills, knowledge, and attitudes they need to understand, cope with and benefit from the pervasive influence of ICT on all aspects of life. In addition, the pace at which ICT develops and changes makes the challenge for schools more daunting.

Nigeria's formal education demonstrates its awareness of these challenges since one of themotivations for the review of school curricula undertaken by the Nigeria Educational Research and Development Council (NERDC) is new developments brought about by ICT (Obioma, n.d.; Anthony, 2009; Carlecio& Lance, 2009, Rozojene, Olga & Zuzana, 2008).It is also well known that school curricula such as those being reviewed by NERDC

require major inputs from teachers if their provisions were to be implemented into concrete realities in line with the vision which informed their review (Yusuf, 2005; Ogunsola&Aboyade, 2005).

In Nigeria, Colleges of Education (COEs) bear a major responsibility of the production of teachers for a significant portion of Nigeria's school system (i.e. the basic education level covering the first nine years of formal schooling). In recent times too, COEs have borne a significant portion of the blame for the poor quality of teachers that operate in both primary and junior secondary schools which are the school levels that make up basic education in Nigeria. In view of this situation and the renewed attention that ICT has received, both as a content andas a delivery mechanism of a significant part of Nigeria's school curricula; this paper considers that a case for a review of the situation of ICT in COEs in terms of availability, utilization, and integration is a valid one to make. Therefore, the paper presents a review of the state of ICT in terms of the three parameters outlined above in COEs in Kebbi, Sokoto, and Zamfara states.

II. Background and Context

In its broadest sense, ICT encompasses traditional media such as interactive radio, multimedia including television (TV), computers and hand-held electronic devices (UNESCO, 2002). A major omission to this list is internet and its related services that form the backbone of recent developments in ICT. For without internet, many of the services that ICT makes possible will not have materialized. Over the last decade, the internet has replaced all other media as the biggest ever network channel and source of human information. According to UNESCO (2005), the internet has virtually swallowed other mass media such that it is possible to talk of internet-mediated mass media. For instance, a cellular telephone is now an integrated medium that gives you a telephone, a keyboard, a TV-screen, and an internet-connected computer device, all in one. That is why these devices are called *smartphones*. This means that ICT does not need to be defined as broadly as earlier rendered for it to encapsulate all the range of possibilities it offers. This study, therefore, relies on a conception of ICT as computer-related devices (both in their hardware and software formats) and internet facilities.

This delimitation in the scope of definitions of ICT is not meant to under rate the potential contribution of other forms of 'standalone' media such as Radio and TV as instructional resources. In many instances, in developing countries such as Nigeria, logistical constraints such as poor power supply and limited internet access may mean that a medium as simple as a Radio set may be the best option for a given set of learners (Daniel, 2002). This means that the infusion of technology into teacher education curriculum must consider the context and culture of any given location where this is attempted (UNESCO, 2002). The use of ICT in this context will mean not only considering limitations operating in that environment but also using it in ways that are culturally-appropriate and are respectful of multiple cultures and contexts.

The integration of ICT into the teacher education curriculum will involve significant changes even in the assumptions that underlie pedagogical practices, and significantly, changes in the behaviors of teachers themselves. For instance, Obanya (2004) considers that teaching has moved away from its old emphasis on teaching, inputs, formal schooling, centralized control, categorized learning, and rote learning to more flexible approaches. These flexible approaches place learning, focus on outcomes, lifelong learning, shared control, integrated learning, and applied learning as key to effective teaching and learning. In addition, these approaches make possible the utilization of ICT tools as aids to learning.

Therefore, simply providing computers or related aid to teachers and learners is not enough to ensure utilization or integration of ICT into teacher education curriculum. UNESCO (2002) has shown that very little will be achieved in ICT integration if teachers and their students have only rare and occasional access to ICT tools. Sustained and reasonable access to these tools is considered a prerequisite for the development of competence in hardware and software management. For instance, laptops have a better potential for sustained usage by teachers

especially since, unlike desktops, they can be carried around. For teachers, gaining awareness of ICT and its capabilities, and becoming ICT-friendly is a significant first step towards the eventual integration of ICT into teacher education curriculum.

There is a lot to gain from the integration of ICT into teacher education curriculum. For instance, James (1999) argues that if well utilized, ICT can improve the quality of and accessibility to educational opportunities. It can also overcome rigidity in curricular contents, learning styles, and pedagogy since it places learners in greater position of control over their learning.

III. The Problem

The value of ICT resources to teaching and learning situations has received much emphasis in education literature and widely mentioned as a policy position in all sectors of the Nigeria's education. In the field of teacher education especially, ICT resources are advanced as capable of addressing the learning needs of teacher trainees and equipping them with the relevant skills for teaching in contemporary classrooms. The response of the owners of teacher training institutions, particularly COEs to the potential benefits of integrating ICT resources into teacher education curriculum has been to put in place physical structures (mainly in the form of ICT laboratories/centres) in those colleges. However, given the well-stated position that ICT integration in teacher education curriculum goes beyond mere physical provisions, there is the need to investigate the extent of ICT integration in the curriculum of COEs in North Western, Nigeria. In particular, the study asks how ICT resources are integrated into the curriculum of COEs in North Western, Nigeria, and how they are accessed and utilized by their students and teachers?

IV. Objectives of the Study

The main objective of this research is to assess ICT integration into the curriculum of COEs in North Western, Nigeria. In particular, the study sought to find out:

1. The ICT resources for teaching and learning in COEs in North Western, Nigeria.
2. The extent of utilization of available ICT resources for instructional purposes in these colleges.
3. The steps taken by these COEs to ensure the integration of ICT into their curricula.

V. Research Questions

The following research questions were answered:

1. What range of ICT tools is available for teaching and learning purposes in Colleges of Education (COEs) in Kebbi, Sokoto, and Zamfara States?
2. How effectively are the available ICT tools utilized as instructional resources in these COEs in Kebbi, Sokoto, and Zamfara States?
3. What steps are taken by COEs in the three states to integrate ICT into their curricula?

VI. Methodology

The study adopted the cross-sectional survey design since it aims at a description and evaluation of existing characteristics of a large population of respondents in these colleges by concurrently studying different samples drawn from the population. The population of the study was all lecturers and ICT lab technicians in the four COEs in Kebbi, Sokoto, and Zamfara states. These colleges are: College of Education, Argungu, Kebbi State with a total of 150 lecturers, and three lab technicians; College of Education, Sokoto, Sokoto State (235 lecturers; four lab technicians); Federal College of Education (Technical), Gusau (185 lecturers; 5 lab technicians); and College of Education, Maru, Zamfara state (123 lecturers; 3 lab technicians). Whereas, all the population of lab technicians was used as sample in the study given its limited size; the stratified random sampling technique was used to obtain a total sample of 70 lecturers from the four COEs. The distribution of the sample per institution is Argungu (15); Sokoto (25); Gusau (18); and Maru (12).

The study designed two instruments that were used in collecting data from the respondents. These instruments were ICTInvent I that was administered on the sample of lecturers, and ICTInvent II which was administered on the sample of lab technicians. Each of the instruments had four sections (A-D) that consisted of personal data, accessibility to ICT facilities; utilization of ICT facilities; and integration of ICT into teacher education curriculum. Each of the instruments adopted a 3-point Likert-type scales on which respondents were expected to indicate their responses. Data used to answer the research questions were analyzed using percentages and means. For a 3-point scale, an item scoring a mean of 2.00 or above was considered significant, while items with means of less than 2.00 were considered insignificant.

VII. Results

Research question one

This research question sought to find out the variety of ICT resources that COEs in the three states studied have. Data presented on Table 1 shows that out of the eight ICT resources listed, only three (desktop computers, laptops, and printers) were commonly available in the institutions. Key ICT resources such as internet connectivity, computer laboratories, projectors, and virtual libraries were not sufficiently available.

Table 1: Views of Lecturers on Availability and Utilization of ICT Resources

S/N	Item	Accessibility		Utilization	
		Mean	SD	Mean	SD
1.	Desktop computers	2.57	1.06	2.05	1.12
2.	Laptops	2.58	0.85	2.13	0.96
3.	Internet	1.95	1.03	1.75	0.98
4.	Computer labs	1.66	1.13	1.22	0.93
5.	Scanners	1.31	0.97	1.05	0.86
6.	Printers	2.06	1.15	1.94	1.15
7.	Projectors	1.03	0.84	1.00	0.80
8.	Virtual library	1.06	0.79	0.95	0.72

Research question two

The focus of the second research question was to enquire into the extent of utilization of available ICT tools for teaching and learning purposes by both lecturers and students. Part of the data needed for answering this research question is presented on Table 1. From that table, computers (both laptops and desktops) were the commonly used ICT resources, the other resources were not being utilized since some of them were not available in the first place. But data presented on Table 2 went further to enquire from lecturers the possible uses some of the ICT resources were put to in the course of teaching and learning preparation or encounters. As you maysee from the table, the most pervasive use to which available ICT resources are put is in the preparation of content. This applies whether it is a computer being used, internet connectivity, computer labs/ICT centers, or virtual libraries.

Table 2: Various Ways Lecturers Utilize ICT Resources

S/N	Item	Preparing Content	Displaying Content	Sharing Content	Managing Records	Multiple Functions
1.	Computers	13(20.3%)	1(1.6%)	2(3.1%)	5(7.8%)	35(54.7%)
2.	Internet Connectivity	31(48.4%)	14(21.9%)	3(4.7%)	2(3.1%)	14(21.9%)
3.	Computer Laboratory/ ICT Centre	46(71.9%)	5(7.8%)	2(3.1%)	1(1.6%)	5(7.8%)
4.	Virtual Library	49(76.6%)	7(10.9%)	1(1.6%)	5(7.8%)	2(3.1%)

Still on utilization of ICT resources, computer lab technicians sampled provided data on various ways lecturers and their students use available resources. Data generated from these respondents are presented on Tables 3 and 4. Out of a list of six possible uses of ICT resources, the commonest use lecturers make of these resources is projectors to present lectures. Table 4, on the other hand, presents data on students' use of ICT resources. Data presented on the table show that the commonest use that students make of available ICT resources is browsing for answers to assignments and checking of mails.

Table 3: Lab Technicians' Views of Use of ICT Resources by Lecturers

S/N	Item	Mean	SD
1.	Use projectors to present lectures	2.40	0.74
2.	Referring students to web pages	1.87	0.83
3.	Uploading lectures	1.95	1.00
4.	Recording videos of lectures	1.27	0.85
5.	Posting messages for students	1.05	0.66
6.	Sharing contents with students via social media	1.53	0.83

Table 4: Lab Technicians' Views of Use of ICT Resources by Students

S/N	Item	Mean	SD
1.	Browsing answers to assignments	2.40	0.74
2.	Using social media	1.87	0.83
3.	Checking of mails	2.00	1.00
4.	Sharing of contents with other students	1.27	0.85
5.	Posting questions to teachers	1.05	0.66

Research question three

This research question sought to determine the extent to which ICT resources have become integrated into the curriculum of COEs in the three states studied. Data for answering this research question are presented on Table 5. From the table, the COEs appeared to have put in place some of the key variables for the effective integration of ICT into their teacher education programmes such as the possession of an ICT policy and Department, and the provision of training and incentives to lecturers. However, the key requirement of a functional website appears not to have been met by the institutions

Table 5: Views of Lecturers on the Integration of ICT into Teacher Education Programmes

S/N	Item	Mean	SD
1.	Institutions have ICT policy	2.33	1.04
2.	Institutions have ICT Department/unit	2.70	0.79
3.	Institutions provide incentives for using ICT	2.16	0.98
4.	Lecturers have received ICT training	2.52	0.89
5.	Institutions use ICT in managing records	2.39	1.02
6.	Institutions have functional websites	1.89	0.96

VIII. Discussion

This study undertook three major tasks. First, it sought to determine the types of ICT resources most commonly found in COEs in Kebbi, Sokoto and Zamfara states. Second, it investigated the extent to which available ICT resources were being utilized by lecturers and students of these institutions. Third, the study enquired into how ICT resources have become integrated into the programmes of these colleges. Findings in relation to the first task suggest that what UNESCO (2005) refer to as 'the hardware component of ICT' are the most common ICT

resources in these colleges. These are laptops, desktop computers, and printers. It is a common practice, particularly in countries with low level of ICT adoption, for the procurement and supply of computers to overshadow the other requirements of an enduring ICT culture in their education system. When one visits schools in Nigeria where ICT is said to be part of the school programmes, it is not uncommon to find severalstandalone computers proudly displayed in classrooms or computer laboratories. Never mind that these computers may not have any steady source of power supply. Whereas computers are necessary part of the ICT infrastructure, these machines do not provide solutions to every problem that teachers and students encounter in class (Chandler, 2014; Lewin, Diane & Derek, 2007). Building an ICT culture requires the supporting infrastructure of an integrated policy, software components, personnel, logistics and maintenance.

UNESCO (2002) cautions that teachers move through stages as they adopt ICTs. Among the characteristics of early adopters of ICT is the tendency to simply use technology as a substitute to current practice. For instance, teachers may replace the traditional chalkboard with a computer projector, or increasingly use computers for word processing tasks such as preparing lecture notes or using spreadsheet to compute students' results. If, as UNESCO asserts, these are the characteristics of early adopters of ICT, then the findings of this study regarding the use of ICT resources by both lecturers and students of COEs suggest that ICT adoption is still in its infancy in these institutions. The results of this study show that the most pervasive use lecturers make of ICT resources is in the preparation of lecture content using computers.

This finding suggests that although respondents of this study perceive that their institutions have taken concrete steps towards the integration of ICT into their programmes, ICT presence in these institutions is still peripheral. A major constraint to the full integration of ICT beyond its infancy stage is lack of access to internet connectivity that will enable lecturers and students make the maximum use of the wealth of information available worldwide through the web and virtual information channels.

IX. Conclusion

The challenges facing teacher education in Nigeria are enormous. Challenges such as poor infrastructure, inadequate funding, limited access, and poor quality of its products are so enormous that one would wonder whether teacher education programmes in Nigeria can afford the luxury of devoting attention to things like ICT. However, ICT has become such a big influence on the lives of the average Nigerian, that any programme of education that neglects it is likely to fall into obsolescence sooner rather than later. Teacher education programmes cannot afford to continue to train teachers that are not relevant to the demands of fast changing workplaces. But the reality of ICT adoption in COEs is such that these institutions have a long way to go for their lecturers and students to benefit from the richness and excitement that ICT offers.

X. Recommendations

The study makes the following recommendations based on its findings:

1. COEs need to expand their ICT capacities by diversifying the range of resources andinfrastructure they have. This means they need to acquire more than just computers and printers. Spending on sustainable internet connectivity, educational software, subscriptions to virtual libraries, e-journals, and e-books, as well as intensifying capacity building of their staff will greatly improve their chances of fully integrating ICT into their programmes.
2. Students that enroll into COEs need to be given proper orientation and training on the useand benefits of ICT resources in their learning endeavor. Since students are key to the sustainability of the ICT culture in Nigeria's school's system, COEs need to expand their access to wireless internet access that will make it possible for them to engage with all aspects of this technology. Already, as youths, students are likely to be more interested than their lecturers in the opportunities that ICT provides.

3. Attempts to integrate ICT into teacher education programmes must begin from the curriculum itself. Much as COEs want to embrace ICT, if the curriculum provision is not flexible enough, such attempts may only cosmetic. It is therefore recommended that COEs should use the opportunity provided by the periodic review of their curricula to restructure teacher education curriculum and make it ICT-friendly.

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