Information Communication Technologies in the Management of Education for Sustainable Development in Nigeria

Hamisu Muazu Ladan

Education may be the real ticket for the alleviation of poverty and sustainable development of any nation. This paper discusses the importance of the utilization of Information Communication Technologies in the management of education for sustainable development in Nigeria. It analyzed the variables ICTs in students' learning, ICTs in teaching and research, roles of information system in the management of college administration and the challenges of ICT application in Nigerian colleges of education. It offers useful suggestions and recommendations which will be employed to remedy the challenges and enhance effective utilization of the ICTs for better management of education sector for sustainable development in Nigeria.

Keywords: ICT, managing college education, sustainable development, Nigeria.

Introduction

Every society, no doubt, is endowed with necessary potentials to steer itself towards realizing its collective goals. For the optimum utilization of such potentials, the entire society requires comprehensive, efficient and effective education on all matters that relate to their very existence as a people. In this wise, access to functional education by the citizenry has been considered a fundamental human right (Ifinedo, 2007).

The dynamics of social change and the demands on education had always been the reason for the various editions of the National Policy on Nigerian education. The Policy (FRN, 2004) asserts that the fourth edition was necessitated by some policy innovations and changes, one of which was the introduction of Information and Communication Technologies (ICTs) into the school system. The Federal government was to provide basic infrastructure and training for the realization of this goal at the primary school level. FRN (2004) affirms that education is a potent instrument for solving most of the problems plaguing the nation in order to bring about national development. It therefore means that the lower - level, middle-level, and higher-level of education need to be properly managed for the enterprise to be result- oriented. Since education is accepted as a veritable instrument for national development, it seems that it is only when the three levels of education are effectively managed through the assistance of ICT initiatives for set-goals to be attained that a sustainable national/economic development can emerge.

Sustainable Development

A sustainable society is one that meets its needs without compromising the ability of future generations to meet theirs (Akpan, 2007). Actions are considered sustainable if there is a balance between resources used and resources generated; resources are as clean at end use as at beginning; the viability, integrity and diversity of natural systems and functions are restored and maintained; they lead to enhanced local and regional self-reliance; they help create and maintain community and a culture of peace; and each generation preserves the legacies for future generations. The three pillars upon which sustainable development stands are economic development, social development and environmental protection and it is only qualitative management of education that will provide the catalystic strength need to move the pillars towards achieving a rapid, efficient, equitable and sustainable development in a country (Imam, 2005).

The concept of Sustainable Human Development (SHD) which is said to be *propoor, pro-jobs, pro-women, and pro-environment* can only be actualized through careful and proper management of education. (Bolaniran and Ademola, 2007). For instance, when the objectives of education at the primary, secondary and tertiary levels are achieved, it is likely that poverty levels will be reduced in society since educated persons can go into paid employments or self-employments; can create jobs for themselves and employment openings for other people; women, especially housewives will be empowered educationally to aspire for paid employments, selfreliance or political appointments; and our environment shall be better off since sound environmental education should have been taught in the schools. Nwafor (2005) believes that environmental education is needed if the goal of sustainable development is to be a reality. He argues that this decision will lead to environmentally sound production, sound consumption and sound political policies. It therefore seems that if Nigerian higher education curricula planners embrace environmental education as a necessary instrument of change, this instrument then becomes a tool for producing new types of consumers, producers and policy-makers who are guided by the global interest to adopt environmentally sound strategies for development purposes.

Concept of Information and Communication Technology (ICT)

ICT is a network which offers a steadily expanding range of new services that have major economic consequences for the standardization of information in Nigerian tertiary institution. It is computer-based tools used by organization personnel in the processing of their information and communication needs. It encompasses the computer hardware and software, the network and several other

devices, e.g. audio, video, photography and camera that converts information and so on intocommon digital form (Yusuf, 2005a).

Njoku (2006) identified three categories of ICT somewhere to be processed information (computer systems), disseminated information (telecommunication systems), and represented information (multi-media systems). Information Technology (IT) systems available for college administration have been listed as email, Internet, intranet, teleconference, facsimile (Fax), mini- computer, microcomputer, main-frame computer, word processing computer, and basic website (Nwafor, 2005). ICT is an eclectic application of computing, communication, telecommunication and satellite technology. Lopez (2003) argues that they have provided innovative opportunities for teaching and learning and they have engendered advances in research about how people learn, thereby bringing about rethinking the structure of education. The prevalence and rapid development of information communication technologies (ICTs) has transformed human society from the information technology age to the knowledge age (Johnson, 2007).

ICTs in Students' Learning

Practising and trainee teachers need professional development programme to aid them integrate the computer and ICT related technologies into teaching and learning. World over, teaching and learning has been made more mechanical that requires the use of equipment and machine and the presence of a well package ICT policy to enhance the delivery of knowledge. ICT related tools can make institutions and economy more productive, enhance skills and learning, improves government at all levels. Researchers believe that students are able to forward completed assignments to lecturers through the e-mail; monitoring of students is made easy; managing large classes of 300 or more students is rendered more effective; time is saved and course management is made more flexible (Mutula, 2002, Delvecchio & Loughney, 2006;).

It is argued that the use of ICTs enhance students' learning through its constructivist approach which improves the performance of students; makes possible the application of multiple technologies (video, computer and telecommunication) thereby linking theory with practice; valuable computer skills needed in the job market are provided to students; flexible learning is available and accessible thereby catering for students of different learning styles; opportunities for students to collaborate and communicate on projects is increased; and a repertoire of resources to enhance students' learning are provided (Lopez, 2003; Yusuf, 2007).

ICTs in Teaching and Research

Available literature indicates that integrating ICTs in teaching and research is generally positive, leading to radical shift from the traditional teacher-directed/didactic approach to a more student – centered/constructivist approach (Lopez, 2003; Kirschner & Woperies, 2003). Yusuf (2005a) posit; that ICTs in teaching is less expensive, enables lessons to be introduced speedily, provides consistent message, makes possible working from any location anytime updating contents easily and quickly, increases learners' retention and management of large group of students. It is argued that ICTs increases the productivity of lecturers and secondary school teachers; helps teachers to be more effective and productive; increase teachers' interest in teaching; assists teachers in reorganizing and restructuring their course(s); increase teachers' emphasis on individualized instruction; provide teachers with the opportunity to experiment with emerging technologies thus providing multi-media presence in the classroom; and also provide teachers with increased opportunities to collaborate and network with colleagues (Yusuf, 2007; Tella, 2007).

The competencies that teachers of ICTs require for application in education are that: teachers should become competent to make personal use of ICTs; competent masters of a range of educational paradigms that make use of ICTs; sufficiently competent to make use of ICTs as a tool for teaching; competent in mastering a range of assessment paradigms which make use of ICTs; competency in understanding the policy dimension of the use of ICTs for teaching and learning (Kirschner & Davis, 2003). Yusuf (2007) argues that in using ICTs, lecturers should be competent in the use of a variety of software, particularly, software's that have specific application in various disciplines, e.g. lecturers in education should be able to use statistical packages like Statistical Package for the Social Sciences (SPSS) to enhance their output.

The value of ICTs is very important in designing research, implementing experimental and descriptive studies, statistical analysis, data production, storage, and dissemination of research information. Science used to be composed of two endeavours – theory and experiment - but today it has a third component (computer simulation) which links the other two (Colwell, 2000).

Role of Management Information System in College Administration

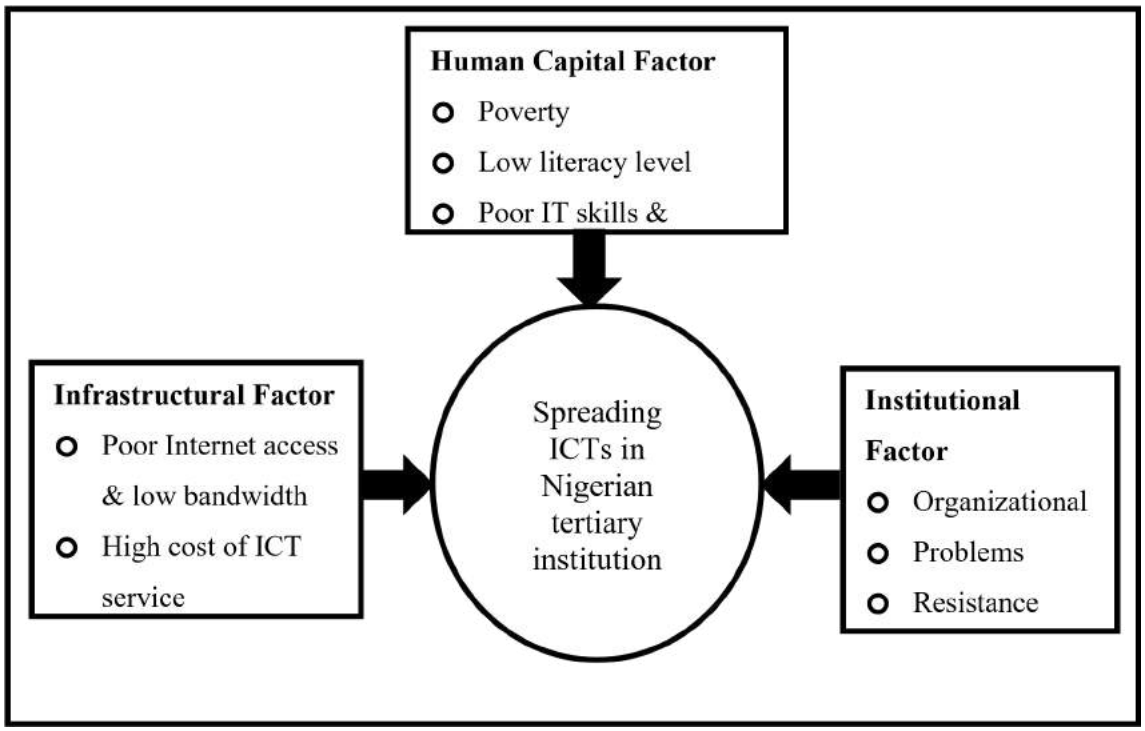
Management Information System (MIS) is a necessity in college administration, since it is required for need assessment, logistics and planning, resources utilization, operational control and management or evaluation of results. MIS

implies both the technique, the process, as well as the structure concerned with systemic, accurate and speedy organization and control of relevant signals, data or messages from the different parts and environment of an activity unit, through appropriate collection, editing, analysis, display, storage and retrieval of signals or messages in manners that would be useful for management decision-making (Emetarom, 2001). The MIS is therefore an integral part of the management process and its potential capacity in college administration will go a long way in ensuring institutional effectiveness. Computer-based MIS in the colleges is used for the process of mechanized analysis, updating, storage, display and retrieval of sets of information, particularly those connected with the management and operational sides of administrative decisions. ICT Tools have become increasingly important in colleges over the past decade as well as supporting specific IT teaching used data handling in science exploration and research using multimedia reference, networking system and increasing access to internet. Today, virtually, IT has provided e-everything. for example, it has eeducation, e-accounting, e-business, e-government, e-finance, e-learning etc. Infact a college without e.com has not arrived (Ladan, 2014).

Challenges of ICTs Application

There are many forces and factors that pose challenges and problems to inhibit effective diffusion of ICTs in Nigerian Tertiary Institution. Jagboro (2003) reported the reasons for low level of utilization of Internet by college students: low level of connectivity (Internet/computer outlet); the high cost of cyber café facilities; lack of substantial online learning resources; schools compensation for teaching online; inadequate funds; facilities; and schools' unwillingness to use ICTs for lack of skill on the part of staff and students identified difficulty in motivating faculty, inadequate equipment, and lack of ICT policy, poor attitude of staff, inadequate computers, and problem of connectivity to off-campus students. Some inhibitors identified for investigation at Uniport by Okorie, Agabi and Uche (2005) included lack of computer or ICT Centre, inadequate facilities/equipment at the ICT Centre, irregular power supply,absence of alternative source of power supply, lack of computer knowledge, expensive nature of ICT facilities, and lack of willpower by management to embrace ICT-revolution. Drawing from the developmental reports of notable bodies, like the G8 DOT Force (2001), United Nations ICT task force (2004), and UNPAN (2005), the authors have adapted a theoretical model (see figure 1) used somewhere to describe the problems faced by developing societies in spreading ICTbased initiatives in highlighting the challenges facing Nigerian tertiary institution in massive adoption of ICTs.

Figure 1: Challenges inhibiting diffusion (spread) of ICTs in Nigerian tertiary institution



Source: (UNPAN 2005).Modified From: UNPAN and G8 DOT Form

From the above figure, it can be seen that there three broad categories of factors are identified as being responsible for the low level of ICTs adoption and application in Nigerian higher education – infrastructural , institutional and human capital factors (Ifinedo, 2007).

Some of the infrastructural problems are poor internet access and low bandwidth, lack of investments in ICT, high cost of ICT services and poor power generation. The human capital factor includes ; poverty , low literacy levels , poor IT skills and technical, while the Institutional Factors are reflected in organizational problems such resistance and awareness among staff of the organization.

Infrastructural Factors - poor internet access & low bandwidth - high cost of ICT services - lack of investments,bandwidths greater than 10 million bps. Previously, countries in Africa, including Nigeria, had bandwidths between 64, 000 bps and 256,000 bps due to high international tariffs and lack of circuit capacity in the region (UN ICT Task force, 2004). Federal Government investments in the Information technology sector used to be very low in Nigeria, but recently there are some improvements in this direction. Internet access and computers are costly and hence outside the reach of the common man. The lingering problem of power

outage is one most worrisome factor inhibiting the smooth sailing of information technology system in all the sectors of Nigeria.

Human capital problems arise from poverty, low literacy levels and poor IT skills and technical ability. There is a general low literacy rate for the region and very low levels of IT skills and technical ability amongst college staff and students in Nigeria. The poor and non-chalant attitude adequate funding of education sector by the governments (Federal, States and Local Governments) makes it more difficult for higher educational institutions to train skilled IT professionals to match the current ICT needs.

Institutional problems consist of awareness problems, resistance and organizational factors. Many functionaries in developing countries lack the necessary expertise to manage innovations and changes, including effective implementation of ICTenabled education (NForg, 2004,;Ololube, 2006). A preliminary study suggests that administrators in Nigerian institutions are either unfamiliar with the use of ICT in education or are unwilling to change from the status quo (Bolaniran and Ademola, 2004). Also, complete lack of awareness regarding the use of ICT in higher education and resistance to change from the traditional teaching- learning methods to more innovative, technology-based methods by both students and faculty are powerful challenges.

Conclusion

The task of managing higher education, especially in colleges of education, in Nigeria in such an effective manner that will lead to sustainable development cannot be attained if the full use of Hi-Tech and ICT-related educational initiatives (e.g. elearning and distance education) are not explored. It is apparent that ICT is a necessary and indispensable tool that students, lecturers/researchers and administrators in the colleges need for good success in their daily engagements.

Recommendations

In line with the conclusion above, it is recommended that Nigerian colleges of education should see the need to:

a. Provide more funds to acquire and maintain internet facilities in the educational Institution of learning nationwide;
b. Plan and have a well-structured programme for confronting the various classes of barriers that can hinder effective plan implementation;
c. Develop general online strategies on use and application of ICTs;
d. Improve the capacity and level of adoption of ICT by colleges;

e. Fund ICTs educational initiatives adequately;
f. Train, develop and expose staff and students to various uses that ICTs are capable of;
g. Cultivate a positive attitude towards the introduction and use of ICT products in college teaching and research;
h. Integrate ICTs into all areas of college life – students' learning, Lecturers' teaching, research, and general administration. The need is urgent and demanding;
i. Parents, Teachers and Non-Governmental agencies should put measures to monitor internet accessibility to the community and society at large; and lastly
j. Government or the school administrators should provide standby generators to address the current power outage being experienced in the country.

References

Akpan, A. W. (2007). The sciences, education and sustainable development. In U. Etuk (Ed.) University Education and Sustainable Development. Lagos: Minder International, 143-155. Association of African Universities (2001). ICTs: Building capacity in African Universities. Programme of activities 2001 – 2004. mailto: 0/o20info aau.org .

Bolaniran, A. and Ademola, O. (2007). E-learning in Africa: Related issues and matters arising. Proceedings of the 9th World Conference on Continuing Engineering Education, Tokyo, Japan. CLI (Commonwealth of Learning International) (2001). Building capacity to deliver distance education in Nigeria's' federal university system. http://siteresources.worldbank.org/ NIGERIAEXTN/Resources/capacity/de.pdf.

Colwell, R. (2000). Information technology: Afriadne's threads through the research and education labyrinth. EDUCAUSE, 15-18. Available: http://www.educause.edu/pub/er/ ermoo/article003. colwell. pdf .

Delvecchio, K. and Loughney, M. (2006). Advantages and disadvantagesof elearning. Available: http://www.bloom.edu/spring_2006e-book files/ chapter4 .html #h#414

Emetarom, U. (2001). Computer-based MIS and the 21st centuryuniversity administration in Nigeria. In M. A. Ogunu, & Mon Nwadiani (Eds.) *Current Issues in Educational Management in Nigeria*. Benin City: NAEAP Publications, 345358.

Federal Republic of Nigeria (2004), *National Policy on Education*, Lagos: Heinemann Educational Books Ltd.

Ifinedo, P. (2007). E-learning in the Nigerian higher education sector: Opportunities and challenges. The African Symposium, 7(2), 48-54. *An Online Educational Research Journal: A Publication of the African Educational Research Network*.

Imam, H. (2005). A comparative study of teacher-pupil ratio in public andPrivate primary schools in Nigeria. *Nigeria Journal of Educational Administration and Planning*, 5(2), 124 – 128.

Jagboro, K. O. (2003). A Study of Internet usage in Nigerian universities. A case study of Obafemi Awolowo University, Ile-Ife Nigeria.

Johnson, S. O. (2007). Enhancing quality in higher education throughInformation and communication technology in Nigeria. In J. B. Babalola, G. O. Akpa, A. O. Kirschner, P., & Davis, N. E. (2003). Pedagogic benchmarks for ICT in teacher education (Electronic version). Technology Pedagogy and Education, 12(1). Ladan, H.M. (2014), An analysis of some factors affecting Students'Academic performance in computer practical courses in Colleges of education (a case study of Federal College of Education, Zaria).Being a practical project work submitted to the Computer Department, Federal College of Education, Zaria. Lopez, V. (2003). An exploration of the use of information technologies in the college classroom. College Quarterly , 6(1), 8-88. http://www.collegequarterly.ca/ 2003 -volo6-num01-fall/lopes. Html.Retrieved on 4/5/2016.

Mutula, S. M. (2002). E-learning initiative at the University of Botswana: Challenges and opportunities. Campus-wide Information Systems, 19(3), 99109.

Njoku, S. (2006). ICT and Nigerian teachers. Paper delivered at Teachers' Registration Council of Nigeria (TRCN) National Workshop. Abuja: TRCN.African Research Review Vol. 3 (3),Pp. 414-428

Nwafor, S. O. (2005). Information Technology: A modern tool for the administration of Universities in Rivers State. *Nigerian Journal of Educational Administration and Planning,* 5(2), pg184-188.

NForg (Nigeria Firstorg) (2004). Obasanjo outlines vision for Nigerian universities . http://www.nigeriafirst.org/article 3231.shtml .

Okorie, N. C., Agabi, O. G., & Uche, C. M. (2005). Application of ICTs in the management of public and private universities. *Nigerian Journal of Educational Administration and Planning*, 5(2), 29-36.

Tella, A. (2007). Impact of web-based e-learning at the University of Botswana. The African Symposium:*An on-line Journal of African Educational Research Network*, 7(2), 87-97.

UN ICT TASK Force (2004). United Nations ICT

TASKForce.http://www.unictaskforce. org/index.html UNCED (1992). Report of the

United Nations Conference on Environment and Development. Rio de Janeiro: UNCED.

UPAN (2005) UN global e-government readiness reports, http://www.unpan.org/egovernment4.asp.Retrieved on 14/7/2016. Yusuf, M. O. (2005a). Integrating information and communication technologies in Nigerian tertiary education. The African Symposium, 5(2),: *An On-line Educational Research Journal: A Publication of the African Education Research Network*. http://www2. ncsu.edu/ncsu/a ern/INDEX .HTML .Retrieved on 24/8/2016.

Yusuf, M. O. (2005b). Information and communication technology for education: Analyzing the Nigeria policy for information technology. *International Education Journal*, 6(3), 316-321.

Hamisu Muazu LADAN, Is an Assistant Chief Instructor in the Department of Computer Science, Federal College of Education, Zaria, Kaduna State, Nigeria.