CHALLENGES FACING INFORMATION AND COMMUNICATION TECHNOLOGY IN NIGERIA EDUCATIONAL SYSTEM

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Abstract

Though it has been rightly said that what is wrong with education cannot be fixed with technology; there is no doubt that modern life is dominated by technology. There is universal recognition of the need to use Information and Communication Technology (ICT) in education as we enter the era of globalization where the free flow of information via satellite and the internet hold sway in global information dissemination of knowledge. In this paper an attempt was made to discuss the concept of Information Technology. It highlighted challenges in Information and Communication Technology. It identifies the high cost of computer hardware and software; weak infrastructure; lack of human skills and knowledge in ICT, and lack of relevant software appropriate and culturally suitable to Nigeria as the major stumbling block of the adoption of ICT in Nigeria. Also, recommendations on ways of overcoming the identified challenges were proffered.

The role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy (Rosen and Well, 1995; and Thierer, 2000). Most experts in the field of education agreed that, when properly used, information and communication technology hold great promise to improve teaching and learning in addition to shaping workforce opportunities. Poole (1996) has indicated that computer illiteracy is now regarded as the new illiteracy. This has actually gingered a new and strong desire to equip schools with computer facilities and qualified personal necessary to produce technologically proficient and efficient students in developed countries of the world. There is no doubt that computer can aid the

instructional process and facilitate students' learning. Many studies have found positive effect associated with technology aided instruction (Burnett, 1994, and Fitzgerald and Warner, 1996).

In the more advanced industrialized nations, there has been a staggering amount of research and publication related to ICT use for educational purposes during the past decade. Today, nearly everyone in the industrialized nations gained access to ICT and the purchase of computers for school use in such nations as the United States has been increasing in such a pace that is difficult to keep track of how many computer machines are now in American schools (Harper, 1987).

In Africa, concerted efforts have been made by many governments to initiate Internet connectivity and technology training programs. Such programs link schools around the world that in order to improve education, enhance cultural understanding and develop skills that youths need for securing jobs in the 21st century. In Uganda, an interconnectivity programme known as "Uganda School Net" is dedicated to extending educational technology throughout Uganda (Carlson & Firpo, 2001). In Senegal, teachers and students are using computers extensively as information tools. These programs in African countries mentioned are supported by their government through the ministries of Education.

In a rapidly changing world of global market competition, automation, and increasing democratization, basic education is necessary for an individual to have the capacity and capability to access and apply information. Such ability and capability must find bearing in information and communication technology in the global village. The Economic Commission for Africa has indicated that the ability to access and effectively utilize information is no longer a luxury but a necessity for development. Unfortunately, many developing countries, especially in Africa, are already on the wrong side of the digital divide in the educational use of ICT.

The Concept of Information and Communication Technology

Information and Communication Technology usually abbreviated as ICT, is often used as an extended synonym for Information Technology (IT), but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers, middleware as well as necessary software, storage- and audio-visual systems, which enable users to create, access, store, transmit, and manipulate information. In other words, ICT consists of IT as well as telecommunication, broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions.

The term ICT is now also used to refer to the merging (convergence) of audio-visual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the audio-visual, building management and telephone

network with the computer network system using a single unified system of cabling, signal distribution and management. This in turn has spurred the growth of organizations with the term ICT in their names to indicate their specialization in the process of merging the different network systems.

Anderson and Glen (2003) explain the origins of the educational application of the term Information *and Communication Technology* (ICT), as deriving from previous terms like *Information Technology (IT)* and *new technologies*. They comment that the addition of *communication* to *Information Technology (IT)* emphasizes the growing importance attributed to the communication aspects of *new technologies*. They define ICT as generally related to those technologies that are used for accessing, gathering, manipulating and presenting or communicating information. The technologies could include hardware (e.g. computers and other devices); software applications; and connectivity (e.g. access to the Internet, local networking infrastructure, video-conferencing).

Blurton (1999) contends that communication and information are at the very heart of the educational process and consequently ICT-use in education has a long history. Tinio (2002) concurs noting that that the groundswell of interest in the newer computer and internet technologies to improve educational efficiency and effectiveness, distracts attention from the longer and richer history of older technologies such as the radio, television and print to support instructional delivery.

Unwin (2004) laments the tendency to interpret ICT as being restricted to the newer technologies. He considers that our understandings for ICT use in professional development should be broadened to include the value of blended learning solutions which he defines as the 'combination of printed text materials, radio, video and face-to-face practical experiences alongside the use of computers and the internet (to enable) people to learn effectively in ways that are appropriate to their needs'.

Leach and Moon (2002) defend a differentiation in interpretation between older and newer technologies in terms of their potential impact for educational transformation. There have been they note 'past disappointments with technologies'. In line with several writers they believe that it is the reach of new cybernetic technologies that can provide new and potent opportunities to revolutionize both access to, and the quality of professional learning. The 'revolutionary' potency lies principally in new technology features such as web 2.0 where interactive written communication, multi-media text/image/sound/video combinations, hypertext creation, many-to-many communication in forms hitherto unthought-of, provide opportunities for learners to become producers of knowledge and not just consumers of information.

The rhetoric of revolutionary potency inherent in new tools is carried forward in Haddad's (UNESCO, online) description of ICT as a 'third revolution in the dissemination of knowledge and in the enhancement of instruction'. Drenoyianni (2006) questions the validity of the rhetoric pointing to international evidence which argues that

technology 'cannot revolutionize but can only strengthen, further and reinforce established educational goals, curriculum contents, teaching and learning methods'. Pulkkinen (2009) concurs pointing to evidence from more recent reports on technology for development (UNCTAD, 2007 cited in ibid.) which make clear that 'introducing a technology, no matter how innovative, does not necessarily change the reality at school level, if there is insufficient capacity and knowledge to develop new processes, to alter the institutional settings and to effectively utilize the given technology' (ibid.:Online).

Obstacles to the U**se of ICT in Nigeria Schools**

There are several impediments to the successful use of information and communication technology in Nigeria. These are: cost, weak infrastructure, lack of skills, lack of relevant software and limited access to the Internet.

Cost The price of computer hardware and software continues to drop in most developed countries, but in developing countries, such as Nigeria, the cost of computers is several times more expensive. While a personal computer may cost less than a month's wages in the United State, the average Nigeria worker may require more than two years' income to buy one.

Apart from the basic computers themselves, other costs associated with peripherals such as printers, monitors, paper, modem, extra disk drives are beyond the reach of most schools in Nigeria. The schools cannot also afford the exorbitant Internet connection fees.

Weak Infrastructure In Nigeria, a formidable obstacle to the use of information and communication technology is infrastructure deficiencies. Computer equipment was made to function with other infrastructure such as electricity under "controlled conditions". For the past fifteen years Nigeria has been having difficulty providing stable and reliable electricity supply to every nook and cranny of the country without success. Currently, there is no part of the country, which can boast of electricity supply for 24 hours a day except probably areas where government officials live. There have been cases whereby expensive household appliances such as refrigerators, deep freezers and cookers have been damaged by upsurge in electricity supply after a period of power outage.

Electronics equipment such as radio, television, video recorder and even computers has been damaged due to irregular power supply. When electricity supply is not stable and constant, it is difficult to keep high-tech equipment such as computers functioning, especially under extreme weather conditions as obtained in Nigeria. The high levels of dust during the dry season in Nigeria also make electronic equipment to have short live span.

In rural Nigeria most inhabitant do not have access to electricity, thereby denying rural secondary schools opportunity to benefit from the use of electronic equipment such as radio, television, video recorders and computers. The few Internet access available in Nigeria is found in urban centers. These environmental realities are difficult to manage because fans, sealed rooms and stable electricity are lacking in many urban homes and rural areas.

Inadequate Telecommunication Facilities: Though the International Telecommunication Union (ITU) has rated Nigerian's Telecommunication Sector as the fastest growing in Africa, majority of Nigerians have no access to telephone. The government officials and officers acquired more than half the lines connected. On the Global System of Mobile Communication (GSM), Nigeria is also ahead of most African countries with more than 8 million subscribers connected. The telecommunication sector in Nigeria has attracted more direct foreign investment hence the growth rate is faster than any other sector of the economy. As at the moment, more than 3 million landlines have been added to the existing telephone capacity.

Though Nigerian's telecommunication sector is growing faster than in most African countries, the over 3 million landlines and 2 million GSM subscribers are a far cry from the ideal when such figures are meant to serve Nigeria's nearly 124 million population. Again, most of the subscribers to the Global System of Mobile Communication (GSM) and landlines owners are found mostly in urban centers.

Lack of Skills Nigeria does not only lack information infrastructure, it also lacked the human skills and knowledge to fully integrate ICT into education. To use information and communication technology (ICT) in schools in Nigeria, the need for locally trained workers to install, maintain and support these systems cannot be over emphasized. There is acute shortage of trained personnel in application software, operating systems, network administration and local technicians to service and repair computer facilities. Those who are designated to use computers in Nigeria do not receive adequate training, at worst, do not receive any training at all (Okebukola, 1997).

In Nigeria also, most school teachers lack the skills to fully utilize technology in curriculum implementation hence the traditional chalk and duster approach still dominates in school pedagogy. School teachers in Nigeria need to be trained on educational technologies and the integration of computers into classroom teaching. According to Carlson and firpo (2001), "teachers need effective tools, techniques, and assistance that can help them develop computer based projects and activities especially designed to raise the level of teaching in required subjects and improve student learning.

Lack of Relevant Software There is no doubt that the ultimate power of technology is the content and the communication. Though, software developers and publishers in the developed countries have been trying for long to develop software and multimedia that have universal application, due to the differences in education standards and requirements, these products do not integrate into curriculum across countries. Software that is appropriate and culturally suitable to the Nigerian education system is in short supply. There is a great discrepancy between relevant software supply and demand in developing countries like Nigeria. According to Salomon (1989), there are clear indications from many countries that the supply of relevant and appropriate software is a major bottleneck obstructing wider application of the computer. Even if Nigeria tries to approach this software famine by producing software that would suit its educational

philosophies, there are two major problems to be encountered. First, the cost of producing relevant software for the country's educational system is enormous. Second, there is dearth of instructional design.

Limited Access to the Internet In Nigeria there are few Internet providers that provide Internet gateway services to Nigerians. Such Internet providers are made up of Nigerians who are in partnership with foreign information and communication companies. Many of these companies provide poor services to customers who are often exploited and defrauded. The few reputable companies, which render reliable services, charged high fees thus limiting access to the use of the Internet. The greatest technological challenge in Nigeria is how to establish reliable cost effective Internet connectivity. In a country where only about 0.6% of the populace has home personal computers, the few reliable Internet providers who have invested huge sum of money in the business have a very small clientele. They have to charge high fees in order to recoup their investment in reasonable time.

Schools in Nigeria are not given adequate funds to provide furniture, requisite books, laboratories and adequate classrooms let alone being given adequate funds for high-tech equipment (computers) and Internet connectivity.

Again, due to the lack of adequate electricity supply, especially in rural areas in Nigeria, schools located in those areas have no access to the Internet and are perpetually isolated and estranged from the world's information superhighway. Nigeria in lagging behind other African countries such as Uganda, Senegal and South Africa who are already helping school students in those countries to become better information users. All Internet service providers in Nigeria are based in the urban areas.

For many years, the Nigerian government had a monopolistic control of telecom service, which does not allow for the competitive environments that reduce telephony rates. Paltridge (1996) asserted that the penetration of Internet hosts is five times greater than in monopoly markets and that Internet access in countries with telecommunication competition enjoyed a growth rate five times higher than the monopoly environments. All that may change for Nigeria now as the government had invited private participation in the telecom industry and many investors are already in the Nigeria markets but it will take many years to know their full impact on Nigeria education system.

Conclusion

The increasing dependency of education on ICT is inevitable as it helps meet the needs of the learner. ICT is a powerful tool for enhancing quality in education. This paper has therefore discussed the concept of ICT and challenges of ICT. Some recommendation was also made. Nigeria educators must accept the challenges of ICT and settle for a change, the reorientation and embrace the concepts for personal and professional growth.

Recommendations

Based on the above discussions the following recommendations are made:

1. To contend with the present challenges of ICT, there is need for appreciable fund to be generated apart from government allocation; other sources of funding should be explored. Government should also increase the allocation for education.
2. There is need to procure enough ICT facilities/Infrastructure to aids ICT in schools. Government can appeal to international agencies like common wealth of learning, the world bank, the UNDP/UNESCO to come to our aid in this direct
3. Teachers should be trained and retrained in the teaching of ICT through in-service training. UNDP/UNESCO funded a project for training Teachers for introduction technology in Jalingo, Taraba state in 1988. Such help should be extended to training of all teachers in Nigeria.
4. Parents should be sensitized on the need to procure computers for the children so as to enable the children to be ICT compliant.
5. There is need to overhaul our curriculum to include ICT components.

References

Anderson, J. & Glen, A. (2003). *Building Capacity of Teachers/ Facilitators in Technology-Pedagogy Integration for Improved Teaching and Learning* [Online]. Available from UNESCO Bangkok at: http: //www. unescobkk. org/ fileadmin /user_upload/ict/e-books/ICTBuidling_Capacity/BuildingCapacity.pdf [Accessed 9 April 2011]

Blurton, C. (1999). *New Directions of ICT-Use in Education* [Online].Available online http:// www. unesco.org/education/educprog/lwf/dl/edict.pdf [Accessed 10 April 2011]

Burnett, G. (1994). Technology as a tool for urban classrooms. *ERIC/CUE Digest, 95,* New York: Eric Clearing house on Urban Education, retrieved December 21, 2004, from http: //www .ericdigests. org/ 1994/tool.htm.

Carlson, S. & Firpo, J. (2001). Integrating computers into teaching: Findings from a 3-year program in 20 developing countries. In L. R Vandervert, L. V. Shavinina & R. A. Cornell (Eds.), *Cyber education: The future of Distance Learning.* Larchmont, NY: Mary Ann Liebert, Inc, 85-114.

Drenoyianni, H. (2006). Reconsidering change and ICT: Perspectives of a human and democratic education. *Education and Information Technologies* [Online]. 11(3), 401-413. Available from: Springlink http: //www. library. dcu.ie /Eresources /databases-az.htm [Accessed 14 April 2011]

Fitzgerald, G., & Werner, J. (1996). The use of the computer to support cognitive behavioral interventions for students with behavioral disorders. *Journal of Computing in Childhood Education, 7*, 127-48.

Hooker M. (2009). *The Use of ICT in Teacher Professional Development GeSCI.* Dublin, Ireland. April

Harper, D. O. (1987). The creation and development of Educational computer technology. In R. M. Thomas & V. N. Kobayashi (Eds.), *Educational technology: its creation, development and cross-cultural transfer,* Oxford: Pergamon Press, 35-63.

Leach, J. & Moon, B. 2002. Globalisation, digital societies and school refore: realising the potential of new technologies to enhance the knowledge, understanding and dignity of teachers. *IN: 2nd European Conference on Information Technologies in Education and Citizenship: A Critical Insight,* Bareclona, 26 june 2002 [Online]. Available at: www._open._ac.uk/_deep/_why/_Pan_Commonwealth.doc *[Accessed 20 April 2011]*

Paltridge, S. (1996). How competition helps the Internet. *OECD Observer, 201, August/September,* 26.

Poole, G. A. (1996). A new gulf in American education, the digital divide. *New York Times, January 29.*

Pulkkinen, J. 2009. Preliminary Conclusions and the Way Froward. *IN: UN Global Alliance for ICT and Development Expert Group Web-Forum.* 11 March 2009 [Online]. Available from GAID at: http://un-gaid. ning. com/ forum/ topics/ preliminary-conclusions-and-1 [Accessed 17 April 2011]

Rosen, L., & Michelle, W. (1995). Computer availability, computer experience and technophobia among public school teachers. Computer in Human Behaviour, 11, 9-31.

Salomon, G. (1989). Computers in Curriculum. In M. Eraut (Ed.), *The International Encyclopedia of Educational Technology,* Oxford: Pergamon Press, 167-170.

Thierer, A. (2000). *Divided over the digital divide,* Washington, DC: Heritage Foundation.

Tinio, V. L. 2002. *ICT in Education.* New York: UNDP

UNESCO 2002. Statistical Document: Education for All 2000 Assessment [Online].Available from UNESCO at: http:// unesdoc. unesco. org/ images/ 0012/ 001204/120472e.pdf [Accessed 26 March 2011]

Unwin, T. (2004) Towards a framework for the use of ICT in teacher training in Africa. *Open Learning: The Journal of Open and Distance Education* [Online]. 20, pp 113-129. Available from: http://www.gg.rhul.ac.uk/ict4d/ict%20tt%20africa.pdf [Accessed 15 December 2010]