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Lessons for and from Nigeria

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ICT and Secondary School Educational System in Nigeria: A Conceptual Review

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Chapter Summary

Information and communication technology has become the emissary of all innovations taking place in different spheres in the modern society. In the educational sector, many countries around the world are investing in ICTs to improve and update the quantity and quality of education they dispense to their people. In a rapidly changing world, basic education is essential for an individual to be able to access and apply information. The Economic Commission for Africa (ECA) has indicated that the ability to access and use information is no longer a luxury, but a necessity for development. Unfortunately, many developing countries like Nigeria are still low in the utilisation and application of ICTs. It is against this premise that this chapter focuses on how ICTs can be boosted for educational development in Nigeria, particularly with regard to the secondary educational system. The authors conclude that the adoption and use of ICTs in schools will have a positive impact on teaching, learning, and research

Introduction

Information is the live wire of all human activities. As such, man in his quest for excellence has always sought ways to collect, store, process and communicate information (Adedoyin, 2008). Many

countries around the world are investing in Information and Communication Technologies (ICTs) to improve and update the education they provide their younger generations (Hepp, Hinostroza, Laval & Rehbein, 2004). Information and communication technology (ICT), in simple terms, is the combination of computer and telecommunication systems. ICTs are electronic technologies used for information storage and retrieval. Products of communication technology include the use of computer, internet, telephone, cell phones, radio and television broadcasting. The rapid rate at which ICTs have evolved since the mid-20th century, the convergence and pervasiveness of ICTs, gives ICT a strong role in development and globalization (Nwagwu, 2006). Thus, ICTs have a significant impact on all areas of human activity (Brakel and Chisenga, 2003).

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research (Yusuf, 2005). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers as well as strengthen teaching and help schools change (Davis & Tearle, 1999; Lemke & Coughlin, 1998).

In a rapidly changing world, basic education is essential for an individual to be able to access and apply information. The Economic Commission for Africa (ECA) has indicated that the ability to access and use information is no longer a luxury, but a necessity for development. Unfortunately, many developing countries like Nigeria are still low in ICT application and use (Aduwa-Ogiegbian & Iyamu, 2005). It is against this premise that the paper, therefore, focuses on boosting ICT for educational development in Nigeria.

The Link between ICT and Education

ICT development is linked with and complements the development of education (Anie, 2011). Therefore, there is a strong interplay among computer literacy, ICT and education. In the modern dispensation, the term education is perceived as the machinery for empowerment towards being productive and creative in the technological age. On one hand, education is a weapon for capacity building in information and technology; while on the other hand,

the rapid advancement in technology especially in ICT continues to complicate the education industry as it strives to meet the challenges posed by innovations and advancement (Alebiosu & Ifamuyiwa, 2008).

According to Adedoyin (2008), in the context of education, ICT is often referred to as Educational Technologies such as Learning and E-Learning Technologies, Online Teaching and Learning Technologies, Digital Library Technologies and Digital Learning Objects. ICT within the framework of an education technology is described as a tool that can be used to assist students in the acquisition of knowledge and empower teachers and administrators to stimulate learning more effectively. ICT generally encompasses computers, software, video, communications, interactive video, satellite communications, television, video, robotics, CD-ROM and the internet. Thus, ICT includes the knowledge and skills necessary to use technology as a tool (Adedoyin, 2008).

Education encompasses teaching and learning specific skills, and also something less tangible but more profound. It is the imparting of knowledge, positive judgment and well-developed wisdom. Education has as one of its fundamental aspects the impartation of culture from generation to generation. It means to draw out, facilitating realisation of self-potential and latent talents of an individual. It is an application of pedagogy, a body of theoretical and applied research relating to teaching and learning and draws on many disciplines such as Psychology, Philosophy, Computer Science, Linguistics, Neuroscience, Sociology and Anthropology, among others (Akinnuwesi, Adedoyin & Adegoke, 2011).

Education, given its important role in the economic, political and cultural development of any state, is potentially one of the key sectors where ICTs are applied. Two approaches can be taken towards overcoming low levels of literacy and education. ICT can help to overcome illiteracy and general education can be used to overcome ICT illiteracy (Odukoya, 2005). Hence, improved secondary and tertiary education is essential to the creation of effective human capital in any country (Evoh, 2007). The need for ICT in Nigerian secondary and tertiary schools cannot be overemphasised. In this technology-driven age, everyone requires

ICT competence to survive. Organisations are finding it very necessary to train and re-train their employees to establish or increase their knowledge of computers and other ICT facilities (Adomi & Kpangban, 2010; Tyler, 1998). This calls for early acquisition of ICT skills by students.

The ability to use computers effectively has become an essential part of everyone's education. Skills such as bookkeeping, clerical and administrative work, stocktaking, and so forth, now constitute a set of computerised practices that form the core IT skills package: spread sheets, word processors, and databases (Reffell & Whitworth, 2002). The demand for computer/ICT literacy is increasing in Nigeria, because employees realise that computers and other ICT facilities can enhance efficiency. On the other hand, employees have also realised that computers can be a threat to their jobs, and the only way to enhance job security is to become computer literate. With the high demand for computer literacy, the teaching and learning of these skills is a concern among professionals (Adomi & Kpangban, 2010).

For the student, ICT use allows for increased individualisation of learning. In schools where new technologies are used, students have access to tools that adjust to their attention span and provide valuable and immediate feedback for literacy enhancement, which is currently not fully implemented in the Nigerian school system (Adomi & Kpangban, 2010). ICTs can also be used to improve reading skills and promote adult education (Odukoya, 2005). Nigeria's educational system is now comparable to global best practices through the opportunities provided by globalisation and ICTs. Additionally, the educational system in Nigeria will be better positioned to compete in the global society when effort is made to further develop and run a paperless economy in its private and public functions and sectors (Imhonopi & Urim, *In Press*).

1. ICT as a Tool for Educational Development

Investment in the development of education at the grassroots level is a huge investment in the future of any country. The importance of ICT training cannot be over-emphasised. This is because the world is now a global village where human activities are computerised.

This implies that the applicability of the computer system to the affairs and administration of the educational sector in Nigeria would be of great benefits to its human resources development and productivity (Hepp, *et al.* 2004).

In the field of education, computers are increasingly playing significant roles to both teachers and students, thereby making computer literacy at all levels a must. Apart from the benefits derived from integrating computers with instructional procedures, computers aid research processes and other academic activities like presentations, calculations, data analysis, graphics, among others. The potentials of ICT transcend all spheres of life locally, nationally and globally. Its increasing use for wealth creation, poverty eradication, job creation, research facilitation, social empowerment, wide and fast communication networking, and rapid and unalloyed information dissemination all have significant implication for education (Alebiosu & Ifamuyiwa, 2008). That is why there is a more urgent need to improve the quality and equity of education to bridge the gap between developed and developing nations. ICTs are perceived as necessary tools for this purpose (Hepp *et al.* 2004). In developing countries, students often do not acquire sufficient mathematical skills, a basic understanding of scientific concepts or an adequate reading comprehension level during their school years. ICT provides tools and content to exercise these abilities, which will be needed to take advantage of the vast amount of content present in today's networks. Information processing skills to transform data (i.e. searching, selecting, synthesising and communicating information) into knowledge is rapidly becoming a basic requirement for the emergent information society.

If ICT policies are closely related to the curriculum, teachers will more likely use them for learning practices in classrooms. Therefore, curriculum designers should consider the inclusion of ICT as transversal themes, i.e. in all curricular sectors, and in the curriculum-specification guidelines that will be used by teachers. It is not advisable to have ICT as separate, isolated technical subjects or sectors in the curriculum (e.g. programming, software tools and hardware configurations), because in this atmosphere, teachers will tend to regard ICT as special subjects and may not integrate them

in their normal practice. Rather, ICT should be included as teaching and learning resources, along with examples of how to use them in classrooms, in all sectors, and in this way, turning them, explicitly, into a tool for all teachers in all grades and subject areas (Anie, 2011).

ICT application and use will prove beneficial in improving Nigeria's educational system and giving students a better education. A technologically-advanced workforce will lead to ICT growth in Nigeria, with the potential to improve military technology and telecommunications, media communications, and skilled ICT professionals who will be well-equipped to solve IT problems in Nigeria and other parts of the world (Goshit, 2006). This is because the holistic adoption of ICT into Nigerian secondary and tertiary institutions is pertinent in producing 21st century graduates who will rule world economies. ICT presents great opportunities for redirecting objectives of educational development from knowledge to economic empowerment (Osuagwu, 2013).

Furthermore, only a holistic incorporation of ICT into the Nigerian educational system can produce graduates, who are ICT-compliant, economically and digitally empowered to contribute to national development. Therefore, a major way of strengthening global competitiveness of Nigerian students, ensuring their continued relevance to themselves and their society, and the need to get Nigeria's educational institutions relevant on the global stage is through improved access to ICT (Osuagwu, 2013).

Furthermore, ICT has changed the way in which information is circulated and the way in which we educate and inform ourselves. ICT has also reduced inequalities of opportunity between rural areas and the urban centres with the introduction of internet services, which delivers educational programmes to remote locations. Educational institutions are becoming more dependent on telecommunications to access super computers and broadcast instructions. This has paved way for the introduction of distance learning, which can improve educational achievement in rural areas (Davidson, 1991). Significantly, ICT policy which has given birth to the National Open University, for instance, has led to population declines in cities and demographics shifts and pressure on rural libraries (Anie, 2011).

Relevance of ICT to Education

❖ *ICT in Support of Education Delivery and Access*

According to Adedoyin (2008), ICT can be used to improve the way instructional methods are delivered by making instruction more efficient, less expensive and more accessible to people. This is important particularly in rural areas where access to education is limited. For instance, the "Agbe Afokosoro" TV programmes aired on GateWay Television, sponsored by the Ogun State Agricultural Development Programme. Through this programme, thousands of farmers in Ogun and its neighbouring states are taught basic skills in agriculture.

❖ *ICT in Support of Knowledge Creation*

ICT can be used along with pedagogical, curricula, and assessment reforms, to support the process of knowledge creation in which students and teachers set their own goals, plan their learning activities, build on each other's ideas to create new knowledge, and monitor their current levels of understanding in preparation for lifelong learning and participation in the information society.

❖ *ICT as an Effective Tool in the Teaching-Learning Process*

ICT motivates students and energises classrooms and also empowers girls. It is argued that the development of computer labs in higher institutions, for instance, may take time and money but they work well in improving access and usage. Thus, sound technical support cannot be overlooked if ICT is to achieve the desired goals.

❖ *ICT as a Bridge between Users and Sources of Information*

Bowen (2000) observes that many walls created by distance, time zones and the need to work directly with physical objects have been breached, and there is much more to come as new technologies emerge and the cost of hardware, software and connectivity continues to fall. Hence, access to ICT such as computers, internet and emails bridges the physical distance between student and online information. It enhances interaction and has a potential to enhance higher education activity. ICT facility also improves library administration as manual controls are reduced, and distant learning is enhanced.

❖ *ICT as a Motivating Factor in Teaching and Learning Process*

The integration of the computer into the learning experience increases the student's ability to apply knowledge and skills to future problem-solving situations. Keats (2003) reveals that when used wisely, ICT such as Internet can help unite people and create powerful synergistic partnerships at local, regional and global scales. The use of the Internet has enabled the formation of various forms of virtual universities within and between countries across the globe. Internet enables new local and global education synergies on teaching and learning – for enhanced higher education to unlimited audiences, beyond time and distance boundaries, easily and conveniently.

2. The Current Situation of ICT in Nigeria

The Federal Government of Nigeria, in the *National Policy on Education* (Federal Republic of Nigeria, 2004), recognises the prominent role of ICTs in the modern world, and has integrated ICTs into education in Nigeria. To actualise this goal, the document states that government will provide basic infrastructure and training at the primary school level. At the junior secondary school level, computer education has been made a pre-vocational elective, while it is a vocational elective at the senior secondary school level. It is also the intention of government to provide necessary infrastructure and training for the integration of ICTs in the secondary school system.

However, this was not the first attempt by the Nigerian government to introduce computer education in schools. In 1988, the Nigerian government enacted a policy on computer education. The plan was to establish pilot schools and diffuse computer education innovation first to all secondary schools, and then to primary schools. Unfortunately, the project did not really take off beyond the distribution and installation of personal computers. Apparently, computer is not part of classroom technology in more than 90 percent of Nigerian public schools. This implies that the chalkboard and textbook continue to dominate classroom activities in most Nigerian secondary schools (Okebukola, 1997). This assertion may be true for most public secondary schools due to gross

neglect and underfunding but for most private schools, the cost of providing classroom technology in the 21st century is built into the huge school fees charged by the proprietors of such elite schools.

The Federal Ministry of Education also launched an ICT-driven project known as School Net which was intended to equip all schools in Nigeria with computers and communications technologies. In June 2003, at the African Summit of the World Economic Forum held in Durban, South Africa, the New Partnership for African Development (NEPAD) launched the e-Schools Initiative, intended to equip all African high schools with ICT equipment including computers, radio and television sets, phones and fax machines, communication equipment, scanners, digital cameras, and copiers (Adomi & Kpangban, 2010). The primary goal of this initiative was to connect African students to the Internet. Although efforts have been made to ensure that ICTs are available and used in Nigerian secondary schools, the level of uptake is still low going by available statistic. Goshit (2006) observed that most schools, including private and government, do not offer ICT training programmes. NEPAD has scored the level of African continent students' experience with ICTs and their proficiency in using them very low. Fifty-five percent of students within the continent, including Nigeria, Algeria, Burkina Faso, Cameroon, Republic of Congo, Egypt, Gabon, Lesotho, Mali, Mauritius, Mozambique, Rwanda, Senegal, South Africa, and Uganda (who are participating in the first phase of the NEPAD e-Schools initiative), stated they had no experience at all in using computers. Other findings included that the typical African school environment provides neither opportunity nor training in using ICTs, and that 75 percent of responding teachers have very limited experience and expertise regarding ICT educational applications.

Okwudishu (2005) discovered that the unavailability of some ICT components in schools hampers teachers' use of ICTs. Lack of adequate research skills and access points in the schools were reported as factors inhibiting the use of the Internet by secondary school teachers (Kaku, 2005). The absence of ICT equipment in most Nigerian secondary schools and universities leads students to resort to cybercafés for Internet access. Most cybercafé clients in Nigeria are students (Adomi & Kpangban, 2010).

3. Obstacles to Access and Use of ICTs

Some of the challenges facing Nigeria's information technology education and technology capacity building include lack of sound policy framework and support strategies to drive ICT integration with education, poor link between academia and the industry, lack of ICT skills by most teachers (especially subject teachers), absence of integration and interaction across the Nigerian institutions (Bangudu, 2013), among others. The low rate of ICT adoption and application in Nigeria's educational system and schools is attributable to several factors such as:

❖ *Limited Information Infrastructure*

According to Adomi and Kpangban (2010), ICT development and application are not well established in Nigeria because of poor information infrastructure. More than 40 percent of the population of Africa is in areas not covered by telecom services. Schools located in such areas experience ICT connectivity problems. In Nigeria, the lack of basic infrastructure, which results in high costs for installing and running ICTs, has led to insufficient telecommunications infrastructure and internet connectivity as well as expensive internet access (Odukoya, 2005).

❖ *Inadequate ICT facilities in schools*

According to Okwudishu (2005), unavailability of some ICT components in the schools hampers teachers' use of ICTs. This problem may be due to underfunding.

❖ *Frequent Electricity Interruption*

Electricity failure has been a persistent problem militating against ICT application and use in Nigeria (Adomi & Kpangban, 2010). This makes the few schools with ICT facilities unable to use them regularly.

❖ *Inadequate ICT Manpower in the Schools.*

The main problem facing Nigeria and its ICT programme is workforce training (Goshit, 2006). Teaching as a profession in Nigeria is considered to be for poor people. Therefore, the few professionals

that are available prefer to work in companies where they can earn better salaries. With this deplorable policy (ICT) policy is an are not motivated to go the extra mile in assisting goals, principles acquire computer education (Adomi & Kpangban, 2010). development, as must

❖ *High Cost of ICT Facilities*

The cost of computers is too high for many to afford. Monthly internet rates are exorbitant and the charges for satellite television are unaffordable for most people in Nigeria (Brakel & Chisenga, 2003). This has made it difficult for Nigerian secondary schools to acquire and install ICT facilities for the use of teachers and students.

❖ *Poor Perception of ICTs among Teachers and Administrators*

There is widespread ignorance and misconception about ICTs among Nigerians (Adomi & Kpangban, 2010). One of the major inhibitors to fully embrace ICT in Nigeria is the average Nigerian's general lack of exposure to them. For most Nigerians, information technology is still something unfamiliar, distant, and mysterious. Rather than seen as a tool for personal and national development, information technology is seen as a hurdle (Adomi & Kpangban, 2010).

❖ *Poor ICT Policy Implementation Strategy*

The Nigerian Federal Government's 1988 policy introduced computer education to high schools (Okebukola, 1997). The only way this policy was implemented was the distribution of computers to federal government high schools, which were never used for computer education of the students. No effort was made to distribute computers to state governments or private schools. Although the government planned to integrate ICTs into the school system and provide schools with infrastructure, concerted efforts have not been made to provide facilities and trained personnel. Thus, most schools do not yet offer ICT training programmes (Goshit, 2006).

The NEPAD e-Schools Project is expected to take care of an estimated 600,000 African schools. This means that not all schools will benefit from this initiative. Most countries participating in the NEPAD e-Schools Project have an ICT development policy or are

creating one, but very few have clear implementation plans (Aginam, 2006).

Evoh (2007) observes that despite the recognised role of ICTs in improving education, ICTs remain a low financial priority in most educational systems in Africa. Most countries in Africa lack resources for a sustainable integration of ICTs in education, owing to the numerous competing development priorities. These range from budgetary constraints, management challenges, and shortage of teachers and other educational resources, to the dreadful impacts of HIV/AIDS on education. These are issues that vie for the attention of local policy makers.

4. **Overcoming Obstacles to Access and Use of ICTs**

In order to ensure that ICTs are widely adopted and used in Nigeria's educational system, the following efforts should be taken.

- ◆ Government should ensure that ICT policy statements are translated into reality. An ICT policy implementation commission should be created. This commission should be funded and given the power to provide ICT facilities in the schools and monitor their use.
- ◆ Educational institutions at all levels should be made beneficiaries of ICT projects.
- ◆ Government should provide necessary infrastructure and training for the integration of ICT in the school system.
- ◆ Curriculum developers must evolve appropriate curricular for ICT education and learning in schools.
- ◆ School administrators must ensure that like other school subjects ICT should be provided for on schools' timetables at the primary and secondary levels.
- ◆ Teachers should be encouraged through training workshops and seminars to develop skills and knowledge in ICT education.
- ◆ Teachers at all levels of education should be encouraged through grants and loans to purchase their personal computers as starting points towards ICT education and sustainable development.

5. ~~X~~ ICT Policies in Nigeria

An Information and Communication Technology (ICT) policy is an official statement which spells out the objectives, goals, principles and strategies intended to guide and regulate the development, operation and application of ICT, among others. ICT policies must take into account other policies such as education policies, trade and investment policies, foreign policy, monetary policy and transport policy.

It is a well-established fact that telecommunications infrastructure and services, in the age of information and transnational communication, are linchpins of a healthy, growing economy. ICT is the backbone of business activity, productivity, trade and social development. For a developing country like Nigeria and other West African countries, effective implementation of ICT policies is a precondition to the emergence of a strong market economy. The growth of industries and enhancement of social activities is dependent not only on adequate skilled labour but also effective implementation of ICT policies (Anie, 2011).

Therefore, ICT policy is key on the ICT agenda. Most developing countries have come to realise the need for policies on ICTs to guide the development of their national information infrastructure. Nigeria is one of the developing countries that have already established an IT policy. The Federal Executive Council approved a national IT policy in March 2001 and the implementation started in April with the establishment of the National Information Technology Development Agency (NITDA) charged with the implementation responsibility.

Clearly, the role of ICT policies in socioeconomic development cannot be over-emphasised as ICT is a prerequisite for developing countries' economic success. The ability of developing countries to thrive in the global economy depends on the nations' objectives of ICT policies and their ability for proper implementation of such policies. However, previous studies have shown that most developing countries, including Nigeria, are yet to fully embrace the application of ICT in socioeconomic and political life of the people (Anie, 2011). The major clog in the wheel of progress with regards to the adopting and implementation of ICT policies in Nigeria is the government's indifference towards adequate investment on Information and

Communication Technologies. Anie (2011) asserted that the biggest hindrance to telecom service development has been the attitude of the government and the desire to control the population. Many only see the huge expense and fail to see the benefits that establishing an adequate telecommunications infrastructure would have on a developing country like Nigeria.

Consequently, West African nations are far behind the level of industrialisation and technological development in this information age due to lack of a well-defined ICT policy to guide development plans. It sounds ironical to realise the situation in developing countries where these nations use the same or even similar policies that have been used in the developed economies but are unable to experience improvement and development in their economies (Anie, 2011).

The latest economic strategy in these nations especially in Nigeria is "regulation and privatisation policies". Such policies will yield no fruit in the development of the nation's economy if the implementation of ICT policies is still dismissed with a wave of the hand by the government and industrialists. It is true and worthy of commendation that developing nations have emerged from the grip of colonial masters, only to discover that they are more seriously placed under the yoke of egocentric and egoistic political leaders, the World Bank, International Monetary Fund (IMF) and others. However, the awareness for self-reliance and self-sufficiency is gaining momentum in developing countries, therefore, the promotion of ICT as an essential catalyst for social and economic development is on the high gear in some West African countries (Anie, 2011).

6. Conclusion

The adoption and use of ICTs in schools have a positive impact on teaching, learning, and research. Hence, the use of ICT as a force to drive all subjects and courses in Nigerian schools is a major undertaking, but it is an investment in the future productivity of the Nigerian workforce and the future prosperity of the country. Despite the roles ICTs play in education, secondary schools especially have yet to extensively adopt them for teaching and learning. Efforts

geared towards integration of ICTs into the educational system and schools, have not had much impact. Thus policies, norms and guidelines will have to be established to promote the use of ICT in schools.

In this chapter, the authors have proposed a review of ICT and the educational system in Nigeria illustrating the need for comprehensive ICT policies that if adopted and properly implemented could help the country benefit from the proceeds for many years to come. The success of the implementation will, therefore, require a major commitment of resources and supports from many stakeholders in the public and private sectors. It also requires the total and sincere support of all agencies in the educational system. Moreover, sufficient funds are needed to establish and maintain ICTs in schools. Also, continuing professional development for teachers, school heads and other educational personnel must be instituted. This is needed to overcome the problem of poor policy and project implementation and limited information infrastructure that militate against ICT and educational development in Nigeria.

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