IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON TERTIARY INSTITUTIONS

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Abstract
The impact of Information and Communication Technology as a veritable tool for global competitiveness in a knowledge-based economy cannot be over-emphasized. This is why the Federal Republic of Nigeria (2014) places emphasis on the provision and utilization of Information and Communication Technology when it states that because of the prominent role of ICT in advancing knowledge and skills necessary for effective functioning in the modern world, there is urgent need to integrate Information and Communication Technology (ICT) into education in Nigeria. This paper discussed the various impacts of ICT on tertiary institutions as well as the major obstacles to the utilization and implementation of ICT in tertiary institutions. The paper suggested among others that adequate funds should be allocated and invested by the government if tertiary institutions are to meet the global best practices in Information and Communication Technology.

Keywords: Information, Communication, Technology, Tertiary Institutions.

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Introduction

Education all over the world is the basis for human development and civilization. Its major objective is to bring worthwhile positive change in the recipients. Specifically, it is a human skill production industry (Tabotndip, 2004). Society generally is dynamic due to its desires to achieve her hopes, aspirations and yearnings through educational activities, which might be formal, informal and non-formal.

Societies are high-powered and the method of operation which drives them economically, socially and politically are also subject to continuous change; these operational systems are the basis for developmental processes. Development in any society is however, tied to human resource development. By human resource development, it is implicit that humans whose knowledge, skills and manpower required to power economic growth must be properly advanced to meet the demands of the society at any given point in time. This can only be done through functional education. The place of education in development cannot be overemphasised, because education gives development the impetus required to harness human capital and material resources (World Bank, 2005). In this regard, education is congruous to national development. The transformative potentials of sustainable education increases national development. This strengthens the position that education is instrumental to the development process.

Information and Communication Technology (ICT) is a driving force for educational reforms and an integrative part of national education policies and plans in the 21st century. According to Desai (2010), ICT is a cluster of associated technologies defined by their functional usage in information access and communication of which on embodiment is the internet. It is an umbrella name for any communication device or application, encompassing radio, television, cellular phones, power-point, slides, computer networks, hardware, software and electronic mail, facsimile, satellite systems, as well as the various services and applications associated with them (Adomi & Kpangban, 2010).

The use of Information and Communication Technology (ICT) in education as a means of enhancing skills and building capacity for the promotion of economic development is critical to bringing about viable changes within the education system (Aduwa-Ogiegbaen & Iyamu, 2005). Information and Communication Technology in education encompasses the use of computers and their peripherals like printers, software, scanners, projectors for the purpose of teaching and learning.

Indeed, ICT represents a paradigm shift in the way mankind processes information using the computer and the internet. It has moved information exchange from a static to a dynamic mode. A typical example of information processing at the static stage is seen in an Africa village where drums and metal gongs were used to herald events. Information at this stage is not portable beyond the carrying capacity of the wind, sight and the state of readiness of participants (Dike, 2013). Similarly, Yakubu and Aboho (2015) asserts that information and communication technologies (ICT) is an umbrella term that includes any communication device or application, encompassing; radio, television, cellular phones, computer and network hardware and software, satellite systems, as well as the various services and applications associated with them; such as video conferencing and distance learning.

Tertiary education includes higher education and further education. It refers to the third tier of the educational system. The Federal Republic of Nigeria (2014) regards tertiary education as the education given after secondary education in universities,

colleges of education, polytechnics, monotechnics, including those institutions offering correspondence courses. Higher education institutions, according to Babalola (2011) are universities, polytechnics, monotechnics and colleges of education. Higher education includes all types of studies at the post secondary level such as:

i.   Universities
ii.   Colleges/Institutes of Education
iii. Colleges/Institutes of science and Technology which includes polytechnics and monotechnics.

These institutions have diversified curricula to meet the institution's demands and aspirations in order to cater for national interest and development. Higher institutions of learning occupy a crucial position in every society. They are expected to play critical role in promoting sustainable economics, social and cultural development. They are the major drivers of economic competitiveness in an increasingly knowledge-driven economy. The thrust of higher education therefore is to produce knowledge, this is why all universities the world over are referred to as citadels of learning.

The role of tertiary education in today's world is immense, complex and vital with a wide range of challenges and possibilities. Tertiary education institutions have a long history of engagement with the world outside as they are able to link to the local and global world in diversified ways which enables them influence change processes in various societies. There is a great demand for higher education and the reason for this among others is the awareness of its vital importance for economic and socio-cultural development of a nation. The adoption of ICT into the higher education provides opportunities for learners to access more advanced and wider areas of learning to develop analytical skills. Tertiary education institutions should be encouraged to lead in gaining the advantages and potentials of ICT. This is to ensuring quality and maintaining high standards for education practices as the rapid break through in the ICT will change the way knowledge is developed, acquired and delivered. However, ICT does not reduce the need for teachers (Dorgu, & Odigie 2013).

Impact of Information and Communication Technology on Tertiary Education
Tertiary institutions are designed to create quality workforce by growing, training and attracting the finest talents; support current business and industry, improve learning and teaching from pre-school through graduate school; take strong and visible roles in regional initiatives, disseminate research and employ a diverse workforce (Myamoto, 2010). The use of Information and Communication Technology in educational settings will act as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes usually become immersed in the process of learning and use computers as information sources and cognitive tools (Reeves & Jonassen, 2006).

The trend towards a knowledge-based economy has emphasized the importance of higher institutions as repositories of valuable human capital to help secure shares in the global market. The accelerating shift to high technology and information technology economies require sustained human resources development and training. Driven by globalization and pressures to teach and train knowledgeable, skilled and competitive professionals, tertiary institutions face a huge challenge to increase access to higher education and improve the quality of higher education against the stark reality of decreasing resources (Amaechina; Chukwuemeka-Okolo & Ekoro, 2013).

In recent years, there has been a great interest on how computers and the internet can best be harnessed to improve the efficiency and effectiveness of education at all levels. However, ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools. For instance, radio and television have for over forty years been used for open and distance learning, although print remains the cheapest, most accessible and therefore most dominant delivery mechanism in both developed and developing countries. Potashnik and Capper (2008) notes that the use of computers and the internet is still in its infancy in developing countries due to limited infrastructure and the attendant high cost of accessibility.

We are in the world of technological development, functional and qualitative education, which are viewed as a necessary condition for national qualitative education, as a necessary condition for national development that cannot be achieved without sound knowledge of Information and Communication Technology (ICT). Gbadamosi (2006) identifies ICT as a factor that promote quality in higher education. Moreover, communication is a fundamental act of the education process. Therefore, to enhance quality, attention must be given to ICT. Indeed, the impact of Information and Communication Technology is becoming more and more pronounced world wide such that rarely is anything mentioned in any area of human endeavour without reference to this technology. Without doubt, the development of ICT is truly phenomena and Unique in history (Akubuilo, 2007). According to Akao (2002), some characteristics that differentiate this revolution from others that have taken place before include the following:

i.   It is happening at an extremely fast pace;
ii.   It is impacting all corners of the globe
iii.   The effects of the revolution are being experienced by all sectors of the society.
iv.   There appears to be no natural rules of laws binding or governing the pace and direction of the revolution.
v.   The demand for ICT products is insatiable.
vi.   The generation that has grown up with information technology has developed intuitive means of absorbing and exploiting the capabilities that technology offers, sometimes to the bewilderment of the older generation.

Information and Communication Technology is a force that has changed many aspects of the way people live. Information is a key resource for undergraduate teaching, learning, research, and publishing. This brings the need for effective methods of information processing and transmission (Nwosu & Ogbomo, 2012). This has paved way for change not only the way society assesses knowledge but also transform and restructure traditional models of tertiary education. Information technology is one skill area that is now essential for young people to gain a foot hold in the labour market in developed and increasingly in developing countries (Laura & Brown, 2005). Presently, higher institutions of learning have been focusing on e-learning environment and much less on traditional methods as a result of the newly acquired capacity for students and teachers to have access to the internet any point in time. ICT also help teachers and students become actively engaged together in online collaborative work to enhance traditional learning methods (Oliver, 2011).

According to Nwankwo (2013), Information and Communication Technology (ICT) has permitted people to participate in a world in which school, work and other activities have been increasingly enhanced by access to varied and developing

technologies. ICT tools have helped people find, explore, analyze, exchange, and present information most importantly, without discrimination. When efficiently use, ICT can provide quick access to ideas and experiences from a wide range of people, communities and cultures (Kwame, 2010). ICT involves the development of effective and integrated tools as well as training modules to enable ICT application through effective teaching and learning. These according to Nwankwo (2013) can be felt in the following aspects:

Promotion of better quality research is made possible through ICT. Application of ICT are particularly powerful and uncontroversial in higher education's research function. The steady increases in band with and competing power available have made it possible to conduct complex calculations on large data sets (Balasubramanian, 2009). Analyzing (process of huge amounts of data can now be done extremely fast, accurate and reliable, thus, reducing the burden of manually analyzing data which hitherto was very difficult and cumbersome.

Another important measurement of ICTs in research is the use of online full text data bases and online libraries/virtual libraries which are the direct outcome of the growth in telecommunications networks and technology. These databases and libraries provide researchers with online access to the contents of hundreds of thousands of books from major publishing houses, research reports and peer reviewed articles in electronic journals. Examples includes; the Questia online library which provide access 24/7 to the world's largest online collection of books and journals in the Humanities and Social Sciences. There is also the online Book page hosted by the University of Pennsylvania libraries which provides free online access to books which includes an index of thousands of online books, links to directories and archives of online texts.

E-registration of courses and details of examination and other services are being offered online, thereby, reducing pressure during course registration. With the use of ICT, students pay school fees online and check their results after every examination. Moreover, the use of the internet could reduce administrative cost because the same information can be sent to all Departments through the internet without having to do it individually. Therefore, communication both within and outside the department is a lot easier with the use of the internet.

In addition, open and distance learning are defined by the common wealth of learning opportunities that are characterized by the separation of teacher and learner in time or place, or both time and place; learning that is certified in some way by an institution or agency, the use of a variety of media, including print and electronic, two way communication that allows learners and tutors to interact, the possibility of occasional face to face meetings and specialized division of labour in the production and delivery of courses. The National Open University (NOUN) was established to provide for the educational needs of people aspiring for university education. The instrument offers opportunities for these students who are unable to reside on campus because of their job or other engagements as the case may be through different devices of information and Communication Technology.

Obstacles of Information and Communication Technology in Tertiary Education
Information and Communication Technology (ICT) is faced with myriad of challenges. Some of these challenges include: a large urban-rural imbalance in infrastructure, instructional materials and the required human resources for the use of ICT. High costs of hardware, software and other infrastructural facilities. Obsolescence of hardware and

the need for replacement after just a few years of use. Inadequate and poor utilization of existing resources, includeing Radio and TV in the instructional processes.

According to Nwankwo (2013), the obstacles for ICT implementation include; insufficient number of computers, teachers' lack of ICT knowledge/skills, difficulty to integrate ICT to instruction, scheduling computer time, insufficient peripherals, inadequate copies of software, insufficient teacher time, not enough simultaneous access, not enough supervision staff and lack of technical assistance. Other common problems associated with the effective implementation of ICT are lack of qualified ICT personnel, cost of equipment, management attitudes, inconsistent electric power supply, inadequate telephone lines, particularly in the rural areas and non inclusion of ICT programmes in teachers' training curricula and at the basic levels of education. Nwankwo (2013), summarizes these challenges as limited equipment, inadequate skills, minimal support, time constraints and teacher's own lack of interest or knowledge about computer.

According to Gbadamosi (2006), the major challenge against the use of ICT in higher education is funding. Eduation is grossly under funded in Nigeria and this has affected many areas in education. For example, the funding of ICT project, training and retraining of teachers, provision of technological infrastructure, development of software packages and maintenance of electricity reducing station. The ever increasing complexity in the modern society and rapid modification of technologies call for a continuous expansion of the volume and variation of required knowledge, skills and abilities to thrive the technological environment. The quest for new information technologies and continuous improvement remains a challenge in ICT (Johnson, 2007).

Conclusion
Education systems around the world are re-designed to rely more on electronic delivery methods. No conventional tertiary institution can successfully cope with the ever-growing demand for admission into further learning. Information and Communication Technology is a powerful instrument for enhancing quality in tertiary education. The quest for quality education by all stakeholders has led to the radical change in school practices and a unique way of managing the challenges of the technological environment. The removal of wastages and management of tasks cannot be effectively achieved without the application of Information and Communication Technology in all areas of tertiary institution's operations. The development of ICT in Nigeria tertiary institutions must therefore be improved by the acknowledged principle that unless the ICT initiative is packaged, networked and marketed on the global stage, the objective of bridging the digital divide and effectively providing answers to the global competitiveness may not be fully achieved.

Recommendations
Based on the foregoing review the following recommendations are made:
1. Tertiary institutions should be equipped with modern and advanced technological infrastructure to enable the effective use of appropriate technologies required for teaching and learning programmes.
2. Government at all levels should make available adequate funds and resources particularly for the funding and sustenance of tertiary education.

3. Information and Communication Technology foundation classes should be taught compulsory at both primary and secondary levels in order to integrate ICT into the curriculum of schools. This will make ICT to become part of students.

4. Free and compulsory Information and Communication Technology services should form part of students' general studies programmes in tertiary institutions to provide students with functional and practical knowledge of the computer, internet and other associated areas of ICT.

5. Schools should be provided with appropriate and adequate infrastructural and instructional ICT facilities to promote effective and efficient ICT training.

6. In view of the uniqueness of ICT, staff of tertiary institutions should measure up to the demands of new technology for knowledge creation. The benefits of ICT should be effectively harnessed in teaching and learning, for personal use in research, publication of articles, communication within and outside the institutions as well as social interaction.

7. Students in tertiary institutions should be encouraged on the use of internet to solve their academic problems.

8. Government should ensure the constant supply of power to tertiary institutions to aid the use of ICT associated facilities.

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