

THE CONTRIBUTIONS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TO THE ENHANCEMENT OF TECHNICAL EDUCATION IN NIGERIA

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Abstract

This paper took a critical look at the contributions of information and communication technology (ICT) to technical education in Nigeria. As the fourth industrial revolution, ICT has revolutionized the concept and progress made of pedagogy in technical education. This paper therefore attempts to analyze the concept in the light of modernity, enumerate some of the Impacts and importance of ICT to education generally and as an industry in its own right; its efficacy and technical education; examines the future prospects, the problems and the challenges. The ICT should be introduced at all levels of the educational systems.

In a forum organized for African Heads of state and presidents tagged “AfriNet ‘99” in Abuja, Nigeria by the Federal Government in 1999, they were urged to:

1. Show more commitment to the development of information and communication technology (ICT) by integrating it (ICT) into their socio-economic plans and budgets.
2. Be computer literate, alongside their ministers and get connected to the internet by the year 2000 in order to be part of the global village.
3. Introduce IT into the senior primary and secondary schools curricula by making its teaching mandatory.
4. Discourage the use of manual type-writers and enjoyed to use computers.

It was in line with these injunctions that the Federal Government in 1999 introduced the teaching of computer studies in unity schools. This is now studied in all levels of our education including the tertiary institutions.

According to Edikpa (2003), the launching of the National Policy on Computer in 1988 had the following as its cardinal objectives:

- a) Bring about computer literacy in Nigeria by the middle of 1990s.
- b) Enable the present generation of students at different levels of education to appreciate the potentials of the computer and be able to utilize them.

The national Policy on education (1981) defined technical education as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. Therefore, the contributions of ICT towards the achievement or realization of the mission of technical education is central theme of this presentation and what the future holds.

The Concept of ICT

Information and Communication Technology (ICT) is generally regarded now as the fourth industrial revolution in the world. Chukwuemeka and Agreen (2009) stated that ICT in education can be understood as the application of digital gadgets to all aspects of teaching and learning. And within this context, ICT is critical to the achievement of educational goals. The National Policy on Information Technology (2001) described ICT as any equipment that is used in the acquisition, storage, manipulation, management, control, display, switching and transmission of information. ICT is therefore conceptualized as communication in whatever form that is used to transmit, communicate, send and receive message or information.

Beebe (2004) defined this concept as shorthand for the computers, software, networks, satellite links and related systems that allow people to access, create, exchange and use data, information and knowledge in ways that until recently, were almost unimaginable. ICT has to do with creation, sharing and access to information by many people and includes the use of radio, televideo conferencing, computer hardware and software, multi-media. Akinsende (1998), defined technology as the way of doing things through the application of knowledge derived from systematic investigations of natural forces and materials. He also stated that technology leads to the development of process and devices that are indispensable to human progress.

Beebe (2004) sees technology as the practice of any or all of the applied science that have practical values or industrial uses technical methods in a particular field of industry or art, technical nomenclature, technical means and skills characteristic of a particular civilization, group or period.

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Nwajiobi (2009), states that the concept of ICT as an industry is an integration of the following elements.

1. People: This refers to information system specialists such as system analysts, programmers, computer operators, network administrators database administrators, and the of end users.
2. Procedures: This refers to documentations or manual which one must follow when installing a hardware or software
3. Data and information
4. Computer and telecommunication hardware such as cables
5. Software including communication software
6. Communication methods such as network and internet.

Wodi (2010), states the anticipated functions of an ICT professional if the concepts of this (ICT) is make meaningful impact. They include:

- a) Organization and management which included among others planning, establishing maintenance policies and procedures for operating a programme or agency relating to ICT.
- b) Personnel – management to hire, interact, supervise, motivate and terminate personnel.
- c) Research – to generate test theory related to ICT.
- d) Design – to translate theoretical knowledge into instructional specifications.
- e) Production – to create instructional products based on specifications.
- f) Evaluation/Selection – to examine and judge the quality and significance of instructional production and programme.
- g) Logistics - to acquire, store, retrieve, distribute and maintain information in all formats.
- h) Utilization – to bring learners into contract with instructional contact with information on educational technology.
- i) Utilization/dissemination – to bring learners into contract with instructional products and programmes.

The Importance and Impact of ICT

The definitions so far advanced show that ICT performs the function of collecting, storing, processing and communicating information and involves technologies, equipment and methods to handle information. A modern information system follows the same pattern as the communication cycle or process which is an input-output cycle. This involves taking in raw data in the form of picture, sounds, information etc as the input and then analyzing them using computer to process them by storing, manipulate, re-arrange and analyze and then finally displaying the processed information to users on computer and television screens, printers or through loudspeakers.

According to Usoro (2010), ICT plays the key roles in administration such as students' data, personnel administration, purchasing and supplies; advertisement can be handled with ease using ICT.

The importance of ICT also gives rise to the concept of training and development, Armstrong (2005) affirms that training is the use of systematic and planned instruction activities to promote learning. It involves the use of formal processes to impart knowledge and help people to acquire the skill necessary for them to perform their job satisfactorily. On the other hand development is an unfolding process that enables people to progress from the present state of understanding and capability to a future state in which higher level skills, knowledge and competencies are required. Development can also be seen as learning experiences of any kind, whereby individuals and groups acquire enhanced knowledge, skills, values or behaviours and its outcomes unfold through time, rather than immediately, and they tend to be long lasting.

Robinson (1991) as quoted by Usoro (2010) stated that the importance and use of the new IT can serve three main functions, namely:

- a) Deliver all parts of the leaning content to learners
- b) Supplement and extend content provided in a different form, and
- c) Provide a two-way communication for feedback or for exchange between tutors and students with their peers for feedback or for learning problem-solving, advice, debate and support.

Nwajiobi (2009) enumerated some of the importance of ICT to include governmental and non-governmental offices and establishments such as banks, educational institutions, insurance, stock markets and the entire business community. This importance prompted the Federal Government to create the Ministry of Information Technology and that of communication. This importance has also led to the use of Automatic Teller Machine (ATM) cards by majority of the population.

The impact of the telecommunication revolution is not only felt on business but also in the ICT sector as it has eased the communication and information dissemination needs of the people by way of allowing increased access to the internet. More companies and government agencies and establishments are online.

The impact of ICT in technical education cannot be overemphasized. According to Iredia and Udi (2010), the emergence of ICT has brought about dynamic changes in the teachings as well as learning of technical education such as electronic classroom presentation through power point, graphic designs, and technical drawing using auto card. Emphasis has shifted from traditional printing to electronic method

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of information processing and publishing, journal bookstores, libraries, now operate electronically. Students' records are now carried out online as well as student's registration and result checking. Examination bodies such as NECO, WAEC, JAMB, etc now operate on electronic platform. Thanks to ICT which has brought great revolution to teaching and learning techniques. ICT has also given technical schools and colleges some competitive edge over others due to access to new ideas, technologies, and information. The exploitation of ICT facilitation has repositioned the school for the challenges of the 21st century and thereby keeping pace with global trends in learning standard and practices.

Application of ICT in Technical Education

There is hardly any aspect of human endeavour where ICT does not have a part to play. With the introduction of ICT into the school system in general and technical education in particular, some important changes have come to stay in education. Chukwuemeka and Agree (2009) enumerated some of the areas to include:

- **Mathematics** formulae, calculations, trigonometry, logarithmic solutions, square roots, etc become handy.
- **Language** Spellings and syntax corrections of sentences and voice recognition.
- **Multi-media** New teaching ideas, approaches and ideas, approaches and mythologies are being developed.
- **Distance Education** Traditional teacher-student scenario is eliminated.
- **Cross Curriculum Applications** ICT assist in several ways in the implementation of the school curriculum. This can be done by:
 - i. Accelerating students basic skills in school subjects like reading, science and mathematics.
 - ii. Challenging students to learn independently
 - iii. Updating students academic knowledge and instructional practices
 - iv. Providing teachers with efficient and detective tools to take care of student's individual differences.
 - v. Providing opportunities for cooperation with colleagues through network and internet services
 - vi. Challenging educators and learners to new methods of acquiring knowledge through sharing by connected to the global world.
 - vii. Not restricting the access teachers and students should have to relevant information. On their own part Iredia and Udi (2010) listed the following areas of application where ICT holds sway for technical education.

E-library This has given rise to sudden and decentralization of information and data. It has triggered an explosion of knowledge and information which the traditional libraries were unable to. The internet is now a source of current and up-to-date information in the teaching and learning of modern technical education.

E-learning This is learning made possible through personal computers, CD-ROMS and the internet. It enables interaction between many people across the world and also helps the accessing of critical and up-to-date information and poses a challenge to technical teachers and learners in Nigeria.

+ **Internet in the Class** This can be used by a technical teacher as a source of information to enhance teaching and learning. Where there is internet connectivity, the teacher can incorporate what is found on the net into a lesson in various ways to real life application and engineering designs as well as complex technical drawing.

ICT have an important play in technical education. According to Chomcinne (1990) this role falls into four principal categories. These are:

1. Technical assistance for teaching
2. Teaching tool
3. A work tool for students
4. System control tool or workshop or laboratory tools. ICT's role are relevant in all the service areas of technology education such as agric education, business and office education, nursing education, technical education, industrial education and distributive education. According to Usoro (2010), ICT are needed in vocational-technical education with respect to:
 - a) Teaching
 - b) Inventory of tools and equipment
 - c) Maintenance and servicing equipment
 - d) Process students' performance scores in all examination or projects.
 - e) Supporting educational system in such areas as administration of vocational-technical education, communication and curriculum development.

Challenges of ICT in Nigeria

Information and communication technology is a very useful tool in vocational and technical education and education in general, but it has at the same time given rise to some challenges. Mac-Ikemenjima (2003) summed these challenges up by asking the following questions.

1. Can ICT be effectively used with strong teacher training programmes to facilitate its operations? In applying ICT, the question remain:
 - a) How easy is in to use the equipment?
 - b) Is it motivating and interesting to use?

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- c) Will the use lead to improved learning result?
- d) What are the advantages of using ICT compared to other teaching methods? Other problems and challenges confronting the smooth implementation of ICT in Nigeria according to Nwajiobi (2009) are:
 - i) High level of poverty in the country
 - ii) Lack or inadequate supply of some basic ICT driven infrastructure such as electricity, fibre optics and broadband.
 - iii) Problem of foreign dominance in the industry
 - iv) Government policy
 - v) Low level of local/indigenous content
 - vi) Expensive hardware and software
 - vii) Not very relevant to some people
 - viii) Time wasted in the learning of ICT
 - ix) Cannot checkmate the activities of non-professionals.

Chukwuemeka and Agreeen (2009) listed their challenges to include:

- a) Low ICT awareness by Nigerians
- b) Limited access to ICT hardware and software by the populace
- c) Unconducive environment
- d) Poor maintenance culture
- e) Lack or inadequately trained teachers in ICT
- f) Low internet connectivity
- g) Poor power supply
- h) Low technical expertise

Nigeria, like most of the developing nations, is still an infant in the ICT sector. The prospect seems bright because of some these reasons:-

- ICT market is open for locals to explore
- The launching of Nigeria satellites, efforts by the Nigerian Communication Commission (NCC) and deployment of the broadband etc point to a brighter future for the industry
- Jobs opportunities are being created for ICT Practitioners/professionals.
- The internet and other gadgets has discouraged outside training and saved cost.
- Enhancement of no-the-job training for people who did not specialize in ICT related areas.
- ICT education is being made a part of the National Curriculum by the Federal Government
- Its impact on business and the economy is still very dynamic.

Conclusion

The contributions of Information and Communication Technology to our national economy, especially in education is fast growing although its full potential has not yet been fully deployed and internalized. This may not be unconnected with some problems and challenges its implementation is going through. To help the ICT industry to contribute effectively to the realization of the objectives of technical education in particular and education in general there is need for constant/steady power supply, curricula review, provision of infrastructure, reduction in the cost of ICT software and hardware, among others.

Recommendations

1. Since information and communication technology has become a part of modern life, especially in education, governments at national, states and local should introduce ICT centers to bring learning closer to the classrooms.
2. For technical education to achieve its desired objectives and met the challenges, it must be domesticated and our ICT examples should be localized particularly at the early stage of introduction.
3. There should be planned and guided ICT curriculum to produce indigenous skills in different areas of specializations.
4. Technical Education curricula should be redesigned to equip the technical education graduates with adequate and modern trends in the world of ICT.
5. The stakeholders in ICT should have an agreed guidelines and minimum standards that will guide the implementation of ICT programmes in our schools and colleges.

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