
**UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY
IN THE TEACHING OF SCIENCE FOR NATIONAL DEVELOPMENT**

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Abstract

Education is adopted as a tool for effective national development and growth so as to produce citizens that are dynamic both in thought and deed, self-sufficient, effective and show civil responsibility. Advancement in Information and Communication Technology (ICT) has brought tremendous relief to the human race. The use of ICT in education has provided complete opportunity through which information is transmitted and shared by people all over the world. Technology has made life easier and more meaningful. It has been a powerful force in the area of National development. Science teaching in the secondary school programme occupies a unique position and has many useful applications aimed at maintaining a healthier and more productive biosphere for the life of man and other living things. Science in various ways has reduced human labour and improved productivity geometrically. This paper discussed the use of information and communications technology in the teaching of science for national development. It also discussed the concepts of ICT, its relevant and effectiveness in science teaching. Based on the discussions, It was recommended that ICT facilities, such as internet and adequate provision of electricity should be provided in schools for effective utilization as this is hoped to broaden the knowledge of students most especially in science in order to compete with their colleagues in developed countries globally.

Keywords: Utilisation, Information, Communication, Technology, Science.

Introduction

The development of any nation can be measured in terms of advancement in science and technology. Information and Communication Technology (ICT) has permeated all activities that man engages in globally. ICT refers to a variety of tools and activities including computers, software, digital video and audio, communication technologies, email, internet, database and peripherals such as smart boards, cameras, scanners and musical instrument (Schrum & Schrum, 2009). In this modern age, the use of ICT to enhance effective teaching and learning of science has become imperative for students and teachers to be able to move with new developments and new ideas, to

interact with people in other parts of the world, and to be able to think globally.

The global adoption of ICT has often been premised on the potential of technological tool to revolutionise an out- modeled educational system and as such better prepare students and the average citizen for the information age, and or accelerate national development (Albirini, 2006). Peradventure this is why Bandele (2007) opined that ICT should hence be seen as a network technology comprising the use of information processing and sharing facilities or equipment relevant to meeting societal demands.

Government is interested in the use of ICT in education because of the enormous potentials it offers concerning the development of a nation. This is the reason why the government clearly stated in her national policy on ICT in education that, "government shall build and encourage the development and sustenance of the ICT manpower required to achieve an ICT-driven education" (Federal Ministry of Education, 2010).

Concept of Information and Communication Technology (ICT)

ICT is a combination of two concepts, that is; information technology and communication technology. Information technology is the technology of creating, processing, storing, retrieving and transmission of data and information. Information has to be accurate, relevant, complete, reliable, consistent, refine, adequate, timely and appropriately packaged in order to meet the individuals needs.

Communication involves the various ways of travelling and moving goods and people, sending information, connection by means of roads, railways, radio, television, air and sea. Adeosun (2002) defined communication as the process of information exchange between two or more individuals in an attempt by one or more of them to change behavior of the other(s). Technology is a systematic field of study which employs the application of scientific principles and skills in creating essential goods and services for mankind. Ede and Olaitan (2009) added that ICTs refer to the convergence of micro-electronics, computers and telecommunications which make it possible for data, (including text video and video) to be transmitted anywhere in the world where digital signals can be received. Liverpool (2002) discussed the concept of ICT and classified its functions into four. These are: ICT as a subject, ICT as an assisting or aiding tool, ICT as a medium of transmission and ICT as a

tool for organization and management of school. The use of ICT has become an integral part of education globally. This is because, ICT enhances the ability of each learner to be able to generate, access, adopt and apply knowledge and interaction,

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The challenge of school system throughout the world is that of providing an effective education for all children and young people which will prepare them for inclusive participation in the workplace, social environment, political sphere and sports arenas (UNESCO 2003).

Pulkkinen (2009) suggests a mere systemic or holistic vision for ICT integrations, and contends that problem of access, quality, efficiency, effectiveness and relevance at different levels of educational systems can be resolved by different and innovative uses of technology. The use of ICT in science teaching has become imperative to improve its efficiency and effectiveness at all levels and in both formal and non-formal setting.

According to Sani (2011), the three major roles played by ICT as stated in the Nigerian curriculum includes,

- ✓ Learning about ICT: This is when ICT becomes the subject or an area of study for the learners. In this case, the learners study the composition, structure and functions of ICT.
- ✓ Learning with ICT: This is concerned with the use of ICT as a medium of facilitating classroom instruction.
- ✓ Learning through ICT: This is concerned with the integration of ICT as an essential tool or component of the course of study that teaching and learning of that course without the use of ICT becomes relatively impossible.

Science students should be able to use technology because of the following benefits:

- It enables student to exchange and share idea among themselves for academic growth
- It allows them to use the online resources like email, chat, discussion forum to support collaborate writing and sharing of information which can greatly facilitate enquiry.
- It enables students to broadcast material on line facility or CD-ROM which can be used as source of information in different subjects.
- It allows students to demonstrate ability to apply online critical thinking skills
- It gives room for students to facilitate video conferencing or other form of tele conferencing which could involve wide range of students from distance geographical areas to share ideas.

Relevance of ICT in Science Teaching

Many countries now regard understanding of ICT and mastering the basic skills and concepts of ICT as part of the core of education. ICT therefore make available tools for acquiring and using information for thinking and expression; which is the basic of science.

According to Daniels (2002), ICT have become within a very short time, one of the basic building blocks of modern society. ICT have the potential to innovate, accelerate, enrich and deepen skills to motivate and engage students to help relate school experience to work practices, create economic viability for tomorrow workers, as well as strengthening teaching and helping schools change (Yusuf, 2005).

According to Lavonen (2008), some of the ways by which science teachers can make ICT relevant in the teaching of science include; ensuring that ICT use is appropriate and adds value to learning or new goals are activated for teaching and learning science, building ICT use on teachers own existing skills and practice and on

students prior knowledge and conceptions ,developing plan activities or tasks for offering students responsibility, choice and opportunities for active participation, prompting students to think about concepts and relationships, creating time for discussion, reasoning, analysis and reflection, developing students' skills for finding and critically analyzing information.

Utilisation of ICT in Science Teaching

The usefulness of ICT in science teaching has become so important to the extent that the government of many countries had invested highly on the production of educational software.

Government is interested in the use of ICT in education because of its enormous potential that often concerning the development of a nation. ICT on itself cannot bring about effective learning but the teacher who has the task of utilizing ICT in such a way as to make teaching and learning effective and efficient is very important. This is why the government stated in the National Policy on ICT in education that government shall build and encourage the development and sustenance of the ICT manpower required to achieve an ICT-driven education. Objectives of ICT in education according to FME(2010) are:

- To facilitate the teaching and learning process
- To promote problem-solving, critical thinking and innovative skills
- To promote life-long learning
- To enhance the various teaching/learning strategies required to meet the needs of the population.
- To foster research and development
- To enhance universal access to information
- To support effective and efficient education administration
- To widen access to education and the range of instructional options

and opportunities for anywhere, anytime, any pace and any path learning.

The use of ICT use in science education can improve the quality of teaching and learning of science. This aligns with the submission of Banjoko(2005) that Nigeria need to harness the interest power of the computer internet to enhance quality transmission and retention of knowledge for both teaching and learning processes.

Challenges of ICT in Science Teaching

1. **Paucity of fund:** Information and Communication Technology has been rather slow in taking its place in science teaching due to lack of fund to purchase the necessary equipment. Some schools cannot afford to install and maintain ICT centre. This has an effect on the acquisition of necessary equipment.
2. **Insufficient facilities:** ICT involves the use of devices and gadgets that can enhance the teaching and learning of science. It is sad that the internet service providers operating in the geographical zones are either not many or tend to be concentrated in urban areas at the neglect of the rural areas.
3. **Inadequate power supply:** The problem of inadequate power supply in Nigeria has rendered much ICT equipment unusable as well as damaging others. Despite the huge amount of money invested in the power sector, regular power supply is still more of an ideal than a reality. Vandalisation of power lines and equipment by fire and criminals have rendered the supply unsatisfactory to support ICT and to worsen the situation, most schools could not afford to purchase generator set to power the ICT gadgets
4. **Non-competence of ICT personnel:** Science teachers that are expected to use ICT gadgets are not competent enough in the handling of the gadgets. Majority of the

personnel who are graduates from universities and polytechnics have tended to be more theoretical than hands on. This has been a problem to effective teaching and learning of science.

5. **Inadequate proper training:** The training given to the teachers in form of workshop or seminar are not always detailed because only the trainer usually have access to the laptop ,thus making the trainees to be mere on- lookers.

Conclusion and Recommendations

It is believed that early involvement in the use of ICT will meaningfully enhance the teaching and learning of science. In view of this, it is imperative that science teachers should be willing to adopt the application of ICT in their approach to science teaching. Also it is important that science teacher should be trained in ICT to develop competence for handling ICT resources and ability to use them to impact knowledge . School heads must try as much as possible to ensure that ICT gadgets i.e the hardware and software on computers used in the schools reflect science research and are properly monitored to avoid unuseful information.

To prevent delay in the use of ICT gadgets in the schools, regular supply of electricity coupled with provision of internet service will go a long way to assist both students and teachers in making effective use of ICT gadgets. Laptops should be made available to trainees before the commencement of workshops or seminars.

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