

THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY TO THE TEACHING AND LEARNING OF PHYSICS IN NIGERIA SECONDARY SCHOOLS

A.K. Adelokun and T.T. Eyengho

Abstract

Taking cognizance that the Application of Information and Communication Technology (ICT) to the teaching and learning of Physics in our Secondary Schools is at low pace. This paper stresses the need why Information and communication Technology ICT should be applied in the teaching and learning of Physics in Secondary Schools. The paper proceeds to highlight the relevance of ICT to the teaching and Learning of Physics and ends with suggestions that will improve the application of the gadgets to enhance the performance of the students.

Introduction

Science is a field of study which probes into the nature of living and non-living things and uses the information to transform, synthesize, analysis, interpret and solve day to day problems in the society. Science has contributed in no small measure in making life worthwhile, interesting, conducive and suitable for mankind. Through the application of science, man ensures the longevity of his existence, science in general affects the society as a result of the interaction that exists between science and technology. (Akinkunmi, 2007).

Physics as one of the basic science subject still suffers set back in the teaching and learning process, study of physics is not gathering impressive momentum when compared with other subjects such as government, Economics, Mathematics and English (Akinkoye, 2007). The rate at which students in our Senior Secondary Schools withdraw from learning physics in favour of other subjects with the type of teachers handling the subjects is a matter that needs urgent attention. When questions are asked from the students on why they did not show interest in offering physics unlike other discipline, the general answer is that the subject is too difficult to comprehend even when some of the students have not attended physics lesson class once, the wrong notion has been inculcated into them by their seniors they believe without bothering to verify whether it is true or not.

Another factor is the fact that teachers handling the subject are not helping the situation, some of them are not friendly with the students, they are too difficult for the students to approach for help thereby worsening the situation by scaring them with figures and telling them that the subject is very difficult 'if you do not know mathematics you cannot offer physics'. These attitudes make students lose interest in offering physics. In addition most of the physics teacher employed to teach physics are not experts they do not know how to use appropriate instructional materials during physics lesson to reduce its complexity to the barest minimum.

Teaching and Learning Process

Peter (2005) Says 'teaching is as old as man himself, It can be informal or formal in the weaving, carving, arts and craft, blacksmithing and counting'.

It is explicit from the above, quotation that teaching often takes place in formal and informal situations, with teachers being born or made; due to the fact that is both a science and an art.

Dada (1999) defines teaching as a system of instructional activities which are intended to bring about or facilitate learning and which can be carried out in such way as to respect intellectual integrity and capacity for independent judgment. Teaching involves influencing someone to exhibit a

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behaviour one desires. Therefore a teacher can be human or non-human for instance a particular experience can influence your behaviour, a friend may influence your behaviour such an experience or person(s) is your teacher.

The nature of teaching varies with the maturity levels and ability of the students and with the area or subject of study. Besides, teaching is so alive, so dynamic and so person-involved that a fixed definition may not be possible, suffice it to say that teaching is an interactive process aimed at the achievement of learning (Oyetayo 2007).

The New Webster's Dictionary of the English Language (1995) defines learning as to acquire knowledge of or skill in by study, instruction, practice or experience (to commit to memory) to come to know or be aware of, or to acquire knowledge or skill. Falade (2005) alluding to Jegede (2003) says learning is 'importation and hence assimilation of knowledge that you get from reading and studying'. He went further that learning can be described as Universal Basic Education as Mass Literacy, as Education for all, as social mobilization etc.

In other words, by implication or application learning can be defined as acquired skill, knowledge, attitude and values that bring about relative permanent change in the life of an individual.

What is Information and Communication Technology (ICT)?

The word Information Communication Technology (ICT) and information technology (IT) are the same and can be use interchangeably.

Afolabi, Adedapo and Adeyanju (2005) opine that Information can be seen as "*Idea conceived in the human mind*", while communication is the transfer of that information from the original source to the destination where it is needed with the intention of producing a change in behaviour of the receiver' (NCET, 1995, Ekinshwo, 1998 and Adekomi, (1997). When information and communication assume drifts away from the orthodox verbal and print media, towards the more recent electronic media then the concept is known as ICT. This is why Afolabi, *et.al* (2005) citing Badru (2002) stress that ICT is the science and activity of processing, storing and sending information by using computer. They further define Communication Technology 'as the use of hardware and software to enhance communication'. In other words, there is an overlap between the function of Information Technology and Communication Technology. Hence Afolabi *et.al* (2005), agree with Badru (2002) that due to the great similarity in the function of IT and CT that the two became fused into ICT. Therefore Information Communication Technology (ICT) is the means of accessing or receiving, storing, transferring, processing and sending ideas, perception or information through computer and other communication facilities (NCET, 1995)

Obueh and Iyehowa (2005) also opine that Information and Communication Technology (ICT) refers to 'the handling and processing of information as in instructions, graphs, texts, and images for use by means of electronics and communication devices such as computer and telephone'. This points to the fact that Information communication Technology (ICT) is a *sina - qua-non* for individual and group development.

Information technology is an aspect of technology that has a great impact in all human endeavour in a very profound manner. There is hardly any undertaking that has not been affected for better by the recent development in Information and Communication Technology. The ICT offers opportunities for students and teachers to have a place where the things they want to know about are gathered together in a form they understand (Iyekowa and Obueh, 2005).

The Use of Information and Communication Technology ICT in the Teaching Learning Process

The traditional method of teaching is no longer adequate for the demand of education, hence there is need to improve the academic training for Physics and Science related subjects in Nigeria; ICT has been identify worldwide as a way out for this. For example full access to internet is just equivalent to having access to a good library (Edeson, 1997).

The traditional methods of teaching still being adopted by science teachers in Nigeria are based on the objectivist epistemology which has been faulted. Constructivist epistemology which guides current thinking on the process of learning demands a shift from the traditional methods which seek to transmit fixed, well structured knowledge with a firm external control of content, sequence and pace of learning to a teaching method that requires the teachers and students to work in different ways include not only use of various teaching and learning resources in the pursuit of learning, but also requires the students to construct their own knowledge and learn more independently This has led to the emergent transformation of teaching and learning which now include the use of computers, compact discs, digital video discs (DVDs), Satellite communication, Internet, electronic mail E-mail, world wide web (w.w.w), search engines, News group remote login and file transfer. All these are ICT, that could assist in classroom instructions; in order to have effective and efficient teaching and learning students needs to be knowledgeable and have access to the use of different equipment.

Classroom Technology Equipment

The media centre on each campus provides equipment for use in classroom instruction. Some equipment are permanently available in classroom while others equipment are requested for and picked up at the media centre. Akintujoye (2007) identifies the under listed as classroom technology equipment. They are: over-head projectors, TVs and VCRs (video cassette recorder), multimedia charts, laptops, video projectors, video projector remotes, wireless presenters, console keys (sac and cyp) digital cameras, recorders and tripods. Slide projectors and portable screens.

Advantages of ICT to Teachers

Iyekowa and Obueh (2005) identify the following as the advantages of Information Communication Technology (ICT) to teachers as follows:

- (a) The teachers are provided with ready materials for teaching subjects in a given area;
- (b) It provides easy production, storage retrieval and modification of course material;
- (c) It increases interaction time among teachers to exchange idea;
- (d) The teaching of a large class is less stressful and more efficient;.
- (e) The teacher has access to many libraries in the world.

Sequel to the brief advantages of ICT to teachers, the new communication technology has eroded borders and times to the extent that the remotest villages and towns in Nigeria has the advantages and possibility of trapping a global store of knowledge. This development in technology greatly facilitates the opportunity to enhance their educational systems, improve their policy formation and widen the range of opportunities to everyone to receive fast amount of information from anywhere in the word in seconds. ICT are also applied in teaching when dealing with a large number of students inside and outside Nigeria (Iyekowa and Obueh, (2005).

Advantages of ICT to Learners

Iyekowa and Obueh (2005) state the following as the advantages of ICT to learners. They are:

- (a) It provides a rich source of a significant of reading materials through the internet;
- (b) The learning process assist in self-motivation;

- (c) There is added fun to the learning process that helps to remove boredom;
- (d) It help students to be more creative;
- (e) It builds confidence in the learner;
- (f) It exposes the learner to useful contributory ideals.

In a nutshell, Information communication Technology (ICT) has helped to provide a way for accommodating individual differences among students by creating some opportunities for learners to have equal understanding of different concepts in science, by way of repeating the instructions several times (Ezehiora, (1997).

Owing to the complex nature of ICT gadgets and accessories which have led to advancement of knowledge the world over, there is the need to be abreast with manipulative skills to advance and enhance the use of these gadgets in scientific information retrieval and application of knowledge and ability, pose a paramount challenge to science teachers in Nigeria. A high percentage of our science teachers are not adequately trained in area of Information and Communication Technology (ICT) (Iyekowa and Obueh 2005).

Barriers to the Use of ICT by Teachers

Notwithstanding the advantages of Information and Communication Technology (ICT) there are still some challenges that are facing its uses. This informs the reason why Iyekowa and Obueh(2005) citing Adelokun (2002) mention some challenges facing the use of ICT as follows:

- (a) Low level of computer literacy;
- (b) Lack of inner drive;
- (c) Lack of interest and;
- (d) Incessant power failures.

The inability of teacher to gain access to Information communication Technology (ICT) resources may be as a result of a number of factors and not always because the hard ware/software are not available alone. Becta (2004) identifies up to five reasons why teachers have no access to ICT. The reasons are:

- (a) Lack of hard ware
- (b) Poor organization of resources
- (c) Poor quality of hard ware
- (d) Appropriate software
- (e) Lack of personal access for teacher

To alleviate some of these problems/challenges Abimbade (1999) summarized the solutions to existing problems when he said that “there is need to popularize the already available computer education in schools. Thus, there is need to use the already available computer syllabus in schools provide computer system units, train teachers in computer education, providing infrastructural facilities in a conducive environments security for the systems and funds for maintenance and running of Computer programmes and software.

Implication of ICT for Teaching and Learning of Physics

The implication of Information and Communication Technology to the teaching and learning of Physics can not be over stressed due to the affinity between ICT and Physics teaching and learning in this jet age.

Information and Communication Technology aids the teaching and learning of physics. This is because it helps to speed up the rate of teaching and learning thereby enabling students to learn more in a less time. Not only has it taken over teachers’ routine job of information transmission and

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heavy burden of administrative tasks such as marking, and recording. Thus, the teacher will have more time for creative work with students for research and other gainful activities.

Also, Information Communication Technology (ICT) makes instruction more powerful and more, meaningful new forms of communication system gives man added capacity. Distant and routine events (in compressed, expanded or normal form) can be brought to the classroom via the use of motion picture. For example, by means of appropriate motion pictures the teacher can sensitize his students to events and happenings in other parts of the world. It makes learning to become more concrete, real, immediate and permanent. The gap between the world outside and the world inside the schools can be bridged. Reality can be studied almost directly and the learners' route to knowledge and understanding can be more meaningful (Adewoyin, (2002.)

In addition, Information communication Technology (ICT) provides the teachers the means of arousing and sustaining the interest of learners as well as changing students' attitude. Introductory film, slide, filmstrip, T.V. programme and demonstration help the teacher in stimulating learners' interest, (i.e, encourages them to work) It opens possibilities for further exploration, present meaningful information and open up avenues for the activity' learners reading is thereby developed as the teacher is provided with opportunity to vary his pedagogy of instruction. Now that the whole world is a global village, people from different parts of the world can talk and exchange ideas Computer performs a host of functions in teaching and learning. This is the reason why I agree with (Adewoyin 2002) when he stated the importance of Computer as follows:

- (a) Perform complex and repetitive calculations rapidly and accurately.
- (b) Store large amounts of data and information for subsequent manipulations
- (c) Provide information to the user
- (d) Draw and print graphs
- (e) Converse with users through terminals.

Recommendations

However, based on the issue raised in this paper as regards the relationship between Information and communication Technology and the teaching learning of Physics in Nigeria Senior Secondary Schools, the following recommendations are proffered. They are as follows:

- (a) Physicals teachers should undergo in-service training in computer, in order to be acquainted with Information communication Technology (ICT) and all it entails,
- (b) Nigeria Junior and Senior Secondary Schools need to be on Web-site, in order to afford teachers and students opportunity to be abreast of latest information world-wide.
- (c) The government and school proprietors should endeavour to procure, install and makes Information communication Technology available to teachers and students.
- (d) The different tiers of government should provide and make enough funds available for the procurement of ICT gadgets and accessories.

Conclusion

In conclusion if all the Information Communication Technology (ICT) devices or gadgets and accessories are made available for the use of physics students and versatile, knowledgeable and well grounded teachers are put in place to direct and guides physics students, this will enhance and facilitate the rate of teaching and learning of physics in Nigeria Senior Secondary Schools.

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