

INFORMATION AND COMMUNICATION TECHNOLOGY AND E-LEARNING AS A TOOL FOR ENHANCEMENT OF SCIENCE EDUCATION.

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Abstract

Information and communication technology (ICT) and e-learning are changing the society, so cannot be expected that education and training should be affected. Unlike the days when learning was confined to the four walls of classroom. Today learning has moved into virtual environments that culminate in E-teaching and E-learning. The prospect of deploying electronic teaching and learning methodologies in our contemporary society come with varied issues and challenge, hence the call for this work. The study was carried out in other to find out the extent to which information and communication technology and E-learning enhances science education. This was done by finding out the concept of ICT and E-learning, E-learning and the teaching of science, how E-learning enhances the teaching of science education, challenges in E-learning in science education, recommendations and conclusion. It was found that social interaction in E-learning is only online and the basic computer skills such as word processing, browsing, and software required by learners could be very expensive. Based on the findings; it is recommended that funds be made available by government and NGO to institutions of learning to purchase ICT equipment needed by the learners.

Introduction

As Nigeria and other parts of the worlds are experiencing rapid education al and technological growth, there is need for different application of teaching and leaning process. The question therefore is, through which educational practice will science education be enhanced? It is based on this that the application of information and communication technology (ICT) leading to the introduction of E-learning in our educational system came into play.

The phrase information and communication technology has been used since 1980s by the academic researchers but became more popular after 1979, after its appearance in the governmental report in United Kingdom (UK). E-learning system have their roots in the concept of computer assisted instruction (Mean, Toyom, Pakia and Jones, 2009), according to world learning (2015), computer assisted instruction refers to the use of computer to present drills, practice exercise and tutorials sequences to the students in a dialogue about the substance of the instruction.

E-learning system is widely used from academia to industry. The usage of E-learning system raises new research context. Multiple collaboration learned systems were implemented to improve people's interaction, communication and working, coordinating activities. Specializing and learning. E-learning system plays a significant role in the enhancement of science education (Linus, 2019).

Akinyili, (2009) opined that mastering learning of science is an integrated instructional

system, a logical step to step method of creating a learning process in which most students can achieve a higher level. According to the author, E-learning through the use of information and communication technology and learning of science in addition to shaping force opportunities. The use of E-learning has the potential to transform the nature of science education where and how learning takes place and the roles of students and teachers in learning process. E-learning library service and laboratories support facilities, make for better performance.

The study examines the level of enhancement in which information and communication technology and E-learning support the development of science education. Initially when E-learning was introduced people were frightened and criticized but today, it is generally gaining general acceptance not only in the academic field of endeavour but also help in the progress of the nation.

The concept of information and communication technologies (ICT):

Information and communication technology (ICT) is the technology that merges computing with high speed communication links carrying data, sound and video.

Information and communication technology is the use of multimedia technologies to communicate information, news or messages to the target audience. The multimedia technologies include the computers, satellites, fax machines, fibre optics, digital network and ultimately the internet and information super highway.

BET software(2023), defined ICT as a set of integrated technological resources that provide, through hardware, software and telecommunication functions, automation and communication of business processes, scientific research and teaching and learning. Information and communication technologies refer to the role of communication in modern information technology. It is understood that ICT consist of all the technical means used to process information and assist in communication, which include computer hardware, network and mobile phones.

According to K. M. P (2018) information and communication technology (ICT) first appears in the mid 1980s and was defined as "All kinds of electronic system used for broadcasting telecommunication and mediated communication". ICT is made of computer and communication technology. Computer technology is a tool for storing and processing information in digital form, while communication technology help us to transfer and disseminate digital information.

Additionally, ICT means a variety of technological application. The word ICT is a combination of two words information, communication and technology. Information means knowledge, and technology means computer and communication. The term ICT can therefore be defined as "the integration of computing, networking and information processing technologies and their applications". In other word, ICT means a combination of computer application and communication technology for gathering, processing, storing and disseminating information (Ashikuzzaman, 2023). This is evidence enough to say that ICT contribute in no small measure to the development of science education.

Concept of E-learning:

The concept of E-learning is taken from Anglo-saxon literature. The term E-learning according to Linus, (2019) refers to the different kinds of information and communication technologies

and electronic devices in education.

Conen and Nyez (2000), defined E-learning as using technology to meet societal needs for learning. To him information science framework help us to understand that teaching in to meat societ necas higher education involve a cast of roles that might best be performed by different specialist

Nyez (2006), defined e-learning as a current technological solution to problems of finding the best match between needs of a given set of learners to learn using a given set of learning tools Koohang and Harman (2005), defined E-learning as the delivery of educational activities relevant to instructing teaching and learning through electronic media. The electronic media could be internet, internet satellites, TV, radio audio tapes or CD. According to national science teachers association, learning system based on formalised teaching with the help of electronic resources is known as E-learning while teaching can be based in or out of the classroom, the use of computers and the internet forms the major component of E-learning. E-learning can also be termed as a network that enables transfer of skill and knowledge, and delivery of education is made to a large number of recipients at a small or different time. Earlier, it was not accepted wholeheartedly as it was assumed that this system lacked the human element required in learning. Today it is the key to teaching and learning of science education

However, with the rapid progress in technology and the advancement in learning system, it is now embraced by the masses. The introduction of computers was the bases of this revolution and with the passage of time, as we get hooked to the smart phones, tablets etc. These devices now have an important place in the classroom for learning. Books are gradually being replaced by electronic educational materials like optical disc or pen drives

E-learning and the teaching of science

The use of E-learning in the teaching of science makes it exciting, energetic and emotional. The use E-learning in the teaching of science will go a long way to promote the development of science skills such as observation, identification, classification and independent study as well as inquiry into the unknown. Over the years the child learning experience largely depended the teaching among other factors. The teacher was seen as the posting of on knowledge and the learner as a mere recipient of knowledge. This made for poor performance in science. The result of the second international science study indicated that out of the forty different countries that participated in the study, Nigeria became second in the ranking of secondary schools science study (Rossier cited in 1999) in report by Shelter Rights initiative a nongovernmental organization (NGO), in Kalu, (2006) candidates from Nigeria who attempted WASCE between 1999 and 2002 with regards to overall achievement were behind those of Ghana, Serial Leone in physics and other science subjects. To make up the number of candidates for science courses some institutions in Nigeria now admit students on remedial studies in science. It will appear that the poor teaching quality of science contributes to students' poor in science. There is also a worrisome decline in enrolment in secondary school physics. Momolle (1997). The problem of poor achievement and low enrolment has put pressure on researchers and science educators to show concern by empirically addressing the problems. This explain why Agulana cited by Ukozor (2004) called for the use of methods for improving teaching and learning which will ensure quality education enabling our students compete favourably and meet with scientific

and technological challenges of the 21st century,

E-learning using information and communication technology (ICT) have come to save the teacher the stress of preparing instructional materials manually leading to the effectiveness and mastery based on the fact that information communication technology arouses interest of the learner. Okebukola (1997) maintained that Nigeria for example enacted a policy in computer education in attempt to keep pace with technological development

The use of E-learning gives opportunity to students to identify problems and find solution. E-learning is activity based oriented which is paramount in science education. Cohen and Nyer (2006) in the study "learning objectives and their roles in E-learning", maintained that understanding the various roles involved in teaching and possibility of task specialization lead to a fuller understanding of the impact of learning objective of higher education.

Bernard (2001) observed that use of E-learning laboratory system for biology teaching and learning will stimulate scientific curiosity in young minds and encourages more young people to pursue a life in science to fulfill the growing shortage of research talent.

E-learning, information and communication technology and challenges in science education.

A lot of challenges have occurred in our educational system, in particular with regard to information bearing technologies, and those changes are faced with a lot of challenges. Ajudeoma (2007), maintained that such challenges include, that social interaction in E-learning is online only, learners require basic computer skills with words processing intimate browse and e-mail soft ware's which could be expensive.

The implication is that adequate finance limit the level of operation of information and communication technology (ICT) used for E-learning studies.

1. The learner requires technological literacy and computer literacy. Sherry (1994) maintained that without relevant knowledge of the use of relevant tool, E-learning will degenerate into the old correspondence course model
2. The computers that are used for E-learning, radio, television, software and other hardware requires the use of electricity which is not readily available. In most countries electricity are provided only for those living in the urban areas thus making it difficult for the use E-learning in teaching and learning.
3. The cost of computers and other information and communication technology (ICT) and devices that are used for E-learning are expensive and pose much financial to the government and the students since all the studies are online, this makes it inevitable that both students and teachers must purchase their individual laboratory tops which is not readily affordable; this reduce the number of interested learners thus not making education accessible to all.
4. Lots of self-discipline and motivations are needed for the learners. Gana (2007) maintained that there are no structure meeting time and no regular instructor contact, learning means the learner must be independent and self motivated to complete the programme.

E-learning and enhancement of science education

The role of ICT in E-learning cannot be overemphasized. The learning process achieved by using digitally delivered content or interaction is E-learning. E-learning focuses mainly on the use of computers whether in distance or in a classroom content to student. The extent to which E-learning exist or replace other teaching and learning approaches is variable; ranging on a continuum from non to online learning. A variety of descriptive terms have been used employed to categorize extent to which technology is used. Example, 'hybrid learning or blended learning may refer to the classroom in which traditional classroom time is reduced but not eliminated and is replaced with some online learning. "Distributed learning may describe either the E-learning component of a hybrid approach, or fully distance learning. Other sources describe the level technology support as "well enhanced" web supplement and web dependent. (Linus 2019) listed the following as the possible ways in which E-learning can enhance the development of science education:

- ❖ You are able to link the various resources in several varying formats
- ❖ It is a very efficient way of delivering courses online
- ❖ Due to it convenience and flexibility, the resources are available from anywhere and at any time.
- ❖ Any one who is a part time student or is working fulltime can take advantage of web-based learning
- ❖ Web-based learning promotes active and independent learning As you have access to the net, you can train yourself anytime and from anywhere
- ❖ It is very convenience and flexible option; above all, you don't have to depend anyone for anything on
- ❖ Not only can you train yourself on day to day bases, but also on weekends or anywhere you have the free time to. There is no hard and fast rule.
- ❖ Through discursion boards and charts, you are to interact with anyone online and also clear your doubts if any.
- ❖ The video instructions that are provided for audio learning can be rewind, seen and beard again and again if you do not happened to understand the topic first time around.
- ❖ Through discursion boards and charts, you are to interact with anyone online and also clear your doubts if any.
- ❖ The video instructions that are provided for audio and video learning can be rewind and seen and hared again if you did not happened to understand the topic first time around.

Recommendations

Manpower development is the process of acquiring and increasing the number of persons who have the education, skills and experience which are critical for the development of science education. To make a sustainable progress in education using information and communication technology and E-learning in the teaching and learning of science, the following recommendations are made:

1. Since the fundamental information and communication technology (ICT) for E-learning are computers and telephones, most of which are not available, some that are available are not functioning and the level computer education literacy is still very low. Farel (2001) observed that many rural people do not have computing and literacy skill to access E-leaning. It is

- therefore necessary for the government of every nation extend information and communication technology communication to rural areas.
2. More effort should be made by government and other interest groups to make power supply very regular in both cities and rural communities.
 3. There should be in-service or on the job training of science teachers to the use of internet
 4. The school curriculum should emphasis computer education or makes it compulsory for students from secondary schools to enable people meet up with the new innovation and equip them for higher education.
 5. Funds should be made available to institutions of learning to purchase information communication technology (ICT) equipment as to provide the students with adequate skills in information communication technology (ICT) to enable them succeed when using E-learning in science education

Conclusion

Use of information and communication technology and E-learning in science education is a necessity for a sustainable economy of any nation. Science is inquiring and search for how curiosity can be satisfied. It therefore means that any method that is to be used in the teaching and learning of science must be such that make the learner develop to the best of his aptitude. This can be achieved by ICT and E-learning which involve step by step teaching and learning. Accommodating slow and fast learner, not considering time and space. Products of information and communication technology and E-learning in science are therefore employable and productive and efficient making for better future. E-learning has come to stay due to its contributing roles and impacts bridging educational gaps, improving, enriching, and updating people in science and other professions for better performance and higher performance.

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