

THE NEED FOR SCIENCE TEACHERS TO BE COMPUTER LITERATE TO ENHANCE THE USE OF E-LEARNING IN TEACHING AND LEARNING SCIENCE SUBJECTS IN SECONDARY SCHOOLS IN ANAMBRA STATE

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Abstract

Science Education is very important in technological development of any nation, because of its numerous benefits, therefore the teaching of science subject in secondary school must shift from traditional or conventional method to technological teaching method. All nations of the world are in the era of information and communication technology (ICT) where teaching and learning could no longer be restricted to the classroom; rather it could be done anywhere including your bed room, rest room, play ground on the sea or in the air. That is why science teacher should be computer literate in order to enhance the use of E-learning in teaching and learning of science subject so that our nation will be among the technological nations. It was recommended that seminars and workshops should be organized regularly by Ministry of Education for pre-service and in-service teachers to make them upgrade their knowledge in ICT facilities and laptops should be made available to teachers.

Introduction

The quality of education in the world or a nation today could be determined by the extent of computer literacy possessed by her teachers. One of the most important factors in improving students' achievement in science subject is by empowering seasoned qualified science teachers who are computer literate and upgrading those teachers by sending them to computer workshop and seminar so that they will fit in the moving train of networking system. Ibrahim (2010) stressed that the extent of computer literacy among science teachers would go a long way to bring about pupils high academic achievement. The introduction of computer into teaching and learning has made both teachers and students overcome the re-occurring problem of conventional methods of teaching and learning science education (Ebeh, 2019). The growth of computer, internet and other electronic devices provide opportunities for the development of quality teaching and learning of science subjects. Science subjects taught in the secondary schools include physics, chemistry, biology, mathematics, agriculture, Home Economics, Basic Science etc. The teaching of these subjects is confined to the classrooms with ill-equipped laboratories using the teacher centered method. Teachers are the key factors in any educational innovation. They need training in the use of the e-learning devices like computer, internet and others to enhance teaching and learning of science subjects as the world is increasingly getting technologically driven.

Concept of Computer

A computer is a device that accepts information in the form of digitalized data and manipulates it for some result based on a program, software or sequence of instructions on how the data is to be processed. Also, computer can be described as a machine or a device that accept data under the control of a stored program in prescribed form, process data and supply the result as information in a specific form. It performs three major function such as it accepts data, it processes data and supply the result as information. Oxford Dictionary of Science (2003) defined computer as a programmable electronic device designed to accept data, perform, prescribed mathematics and logical operations at high speed and displays the result of these operations. Adedapo, Mitchel and Agunbiade (2016) see computers as a machine that

can solve problems by accepting data, performing certain operations and presenting the results of those operations under the direction of detailed steps-by-step instruction. The use of computer in teaching and learning science subjects contribute to quality teaching and learning of science subjects.

Limitations of Computer

Despite the importance of computer in teaching and learning of science subjects in secondary schools, there are many problem facing the use of computer in the schools. Eyibe (2014), mentioned that computer have many limitations like frequent breakdown, very short lifespan, frequent change of models or technology, difficult to use, power failures and outages . Solutions to the above problems should be possible if schools employed computer technical assistance. Computer assistance will provide the teachers with up-to-date equipment in the new world of technology. Also, they will help in maintain the computer to avoid frequent break down (Eyibe & Ogwata, 2016).

Concept of E-Learning

E-learning means electronic learning. E-learning is a unifying term used to describe the fields of online learning, web-based training and technology delivered instructions. Ebeh (2019) says that e-learning is a utilization of electronic technologies to access educational curriculum outside the traditional classroom. Adeosun in Eze (2016) refers to e-learning as comprising the combination, implementation and relationship of teaching and learning via different ICT media such as computer, internet multimedia, projector, video tapes, CD-Rom, flash drives, satellite, telephone, television among others. Stockley in Ebeh (2019), define e-learning as the delivery of learning, training or education programmes via electronic means using computer or other electronic devices to provide training, educational or learning materials. It can also be described as the use of information and communication technology, example, internet, computer, mobile phone, learning, management system (LMS), televisions, radio and others to enhance teaching and learning activities. E-learning refers to electronically supported learning and teaching using any form of digital communication, electronic devices or the internet. It involves such processes as computer-based learning and internet-based learning, but does not necessarily require either a computer or an internet connection, rather only the use of electronics such as CD Rom, watching an educational television program, or computer conferencing. It also includes delivery content via the internet, internet/extranet (LAN/WAN), audio and video tape, satellite broadcast, interactive TV, and CD-Rom. Therefore, e-learning is a structured purposeful use of electronic system or computer in support of the learning process to cover wide set of applications and processes, such as web-based learning, computer based learning, virtual classrooms and digital collaboration (Ebeh, 2019).

The basic principle of e-learning is connectivity; the process by which computers are networked to share information which can connect people. This is provided for by what is often called the e-learning landscape or architecture which is refers to hardware, software and connectivity component required to facilitate learning (Achufusi and Okapa, 2020). With e-learning, there is a shift from the traditional approach of teachers directed didactically to modern method, where computers technology plays a significant role; thereby improving the quality, efficiency and effectiveness of teaching and learning. E-learning as a sub-system with ICT is the electronic process which enhances the delivery and administration of learning opportunities and support via computer networked and web-based technology to help individual performance and development (Rosenberg in Achufusi and Okpala, 2020).

The National Policy on Education (FRN, 2014), places emphasis on the usage of variety of media and technologies to provide and improve access to good quality education for large

number of learners. The integration of ICT into the teaching and learning process has introduced a new system of learning called e-learning which is being accessed and delivered electronically with multimedia gadgets.

The Roles of E-Learning in Teaching and Learning of Science Subject in Secondary Schools

E-learning is an increasingly prevalent, viable and fully recognized method for teaching and learning science. E-learning accommodates different types of learning styles student learn at their own pace and through variety of activities. E-learning generates intrinsic motivation and initiation of organized active learning in science and technology.

It provides remote access via computers and networks to scientific instruments that allows students aid teachers to conduct scientific investigation that might otherwise be unavailable to them (NACOL in Ebeh, 2019). E-learning is learner centered. The greatest lesson learned from E-learning is that it is more focused on the learner and also more interesting to the learner as learners are allowed to select learning materials that meet their level of knowledge, interest and what they need to know to perform more effectively in an activity.

Generally, online learning accommodates everyone's needs by creating a whole new world where billions of houses of content on just about any topic you can think of, is available for anyone's consumption at any fine. All that is needed is an internet connection. Students can learn after work, on weekends without missing any programs. E-learning provide flexibility and that is what we need in today's busy world.

It also help to introduce innovation for the teachers and students. With the current changing and evolving technology, it is important for teaching material and method to be evolving and staying relevant. The teacher can quickly update and upload it live for students to continue studying.

E-learning is not only easily accessed, but the content is quicker to get through as well. In fact, statistics show that the actual time required for student to learn is reduced by up to 60% in comparison to traditional learning methods. Teaching and learning can be done at the comfort of their own homes. Thereby reducing travel expenses.

E-learning does not only benefit the teachers online course creators, but it benefits the students learning as well. (National Science Teachers Association www.nsta.org). The National Science Teachers Association (NSTA) supports and encourages the use of E-learning experiences for prek-16 science students, as well as for science educators engaging in professional learning in the traditional, informal or online learning environment. NSTA defines e-learning as the effective learning process created by combining digitally delivered content with learning support and services (Waller, 2001). E-learning can and should significantly enhance science teaching and learning experiences. NSTA further explains that e-learning is not limited solely to distance based online courses and instruction where the learner and instructor are separated by place and time, but e-learning include traditional classroom instruction that incorporates the planed and effective use of collaborative and or interactive digital tools and resources, blended learning experiences that incorporate various combinations of technology-mediated and traditional classroom instruction, and distance delivered courses or programs, as well as the rich collaboration and discourse enabled through online learning, networks and communities.

E-learning is an increasingly prevalent, viable and fully recognized method for teaching and learning science (Dede, Brown-LBahy, Ketelhut and Whitehouse (2004). NSTA supports e-learning as a promising way to more effectively provide access to images of science teaching that embrace three-dimensional learning in a wised range of classroom with diverse learner (NRC, 2012).

It also gives science educators opportunities to experience firsthand appropriate use of technology in teaching and learning and increase their confidence in using their tools in their own practice.

E-learning also meet the needs diverse student and teacher. Learners with varied preference for learning interacting across learning environments.

It reduce the isolation of science educators especially those in rural areas or teaching specialized science subjects-by providing and expanding access to colleagues and experts (NASEM, 2015).

It engages a greater number of teachers in ongoing high-quality peer-to-peer and teacher focused professional learning experiences (Csss, 2015).

It provides remote access-via computers and smart and mobile devices to networks, data and scientific instruments that allows teachers and the students they serve to conduct scientific investigations that might otherwise be unavailable to them (NACOL, 2008).

Needs for Science Teachers to be Computer Literate

- Science teachers should be computer literate so that they will be able to make use of online tools to promote sharing of information, discourse, critical analysis, and collaboration between students and teachers at various location throughout the world.
- They should be able to access up-to-date information relating to science content and pedagogy.
- Being computer literate will give science teachers opportunity to share and engage with like-minded colleagues through discourse as they learn content and new innovations for teaching science subjects.
- With the knowledge of computer, science teachers should have experience on how to employ three dimensional teaching and learning strategies and make their use explicit.
- Being computer literate, will widen science teachers experience in using e-learning technologies in teaching their students.
- During pandemic, science teaching and learning will be on-going at the comfort of their homes if teachers are computer literate.

Effects of E-Learning in the School System

1. **Increased Access to Education:** E-learning breaks down geographical barriers, allowing students to access educational materials and courses from anywhere with an internet connection. This is particularly beneficial for students in remote areas or those unable to attend traditional schools due to various reasons like illness or disability.
2. **Flexibility and Convenience:** E-learning offers flexibility in learning schedules, enabling students to learn at their own pace and according to their own schedules. This flexibility is advantageous for students balancing school with other commitments such as work or extra curricular activities.
3. **Personalized Learning Experience:** With e-learning platforms, educators can tailor learning materials and experiences to meet the individuals need and learning styles of students. Adaptive learning technologies can assess students' strengths and weakness and provide targeted instruction, leading to more personalized learning outcomes.
4. **Enhanced Digital Literacy Skills:** E-learning requires students to engage with digital technologies and online platforms, fostering the development of digital literacy skills. These skills are increasingly essential in today's digitally driven society and are transferable to various aspects of life and work.

5. **Cost-effectiveness:** E-learning can be more cost effective than traditional classroom based education, as it eliminates expenses associated with physical infrastructure, transportation, and printed materials. This cost-effectiveness can make quality education more accessible to a wider range of students.
6. **Environment Impact:** By reducing the need for printed materials and commuting, e-learning can have a positive environmental impact by lowering carbon emissions and reducing paper waste.
7. **Global collaboration and diversity:** E-learning facilitates collaboration and communication among students and educators from diverse geographic locations and cultural backgrounds. This exposure to different perspectives fosters global citizenship and cross-cultural understanding.
8. **Continuous Learning Opportunities:** E-learning provides opportunities for lifelong learning, allowing individuals to acquire new skills and knowledge beyond formal education settings. This continuous learning is essential in a rapidly changing job market where up-skillful and reskilling are increasingly necessary.

Conclusion

There is no gain saying the fact that teachers are the key factors in e-learning programs which requires competence in managing the required e-learning devices.

Teaching and learning science subjects in secondary schools require instructional materials such as ICT facilities. ICT facilities are set of tools that help one work with information and perform tasks related to information processing. There are various forms of ICT facilities in the society ranging from computer, laptops, internet, digital calculators, etc. Some science teachers in secondary schools cannot effectively use ICT facilities in teaching due to lack of competence in basic ICT.

The emergence of e-learning applications in educational delivery services in the secondary schools pose a lot of problems to the teachers. Some teachers lack the adequate knowledge and skills for e-learning instructional delivery.

Recommendations

Based on the problem of lack of adequate knowledge of ICT instructional facilities like computer laptops, internet, digital calculators etc. The author suggest the following:

1. Government should make the study of computer as a course compulsory at teacher training institutions.
2. Seminars and workshops should be organized regularly by Ministry of Education for pre-service and in-service teachers to make them up-grade their knowledge in ICT facilities.
3. Laptops should be made available to teachers.
4. Adequate e-learning facilities should be provided by the government to improve teaching and learning of e-learning.
5. School to cooperate with teachers by providing sufficient time for them to implement new technologies in the classroom.
6. Teachers should be open-minded towards new approaches to teaching. Where support is lacking, they need to find ways to be able to solve problems involving their use of ICT in schools.
7. Finally, teachers should acquire skills of self-organization which will help them a great deal in conducting their classes when using ICT.

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