Pedagogical Impact of Educational Technology on Teaching and Learning in Open and Distance Education

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ABSTRACT
This study examined the pedagogical impact of educational technology on teaching and learning in Open and Distance Education. It is a position paper. Open and Distance Learning (ODL) was identified as a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, by a certified institution or agency. It identified pedagogy as a teaching method adopted by teachers or instructors to ensure that teaching and learning processes are carried out and it also identified pedagogical method to include e-learning, blended learning, information and communication technology (ICT), and electronic hearing via computer/internet. The study recognized educational technology as the application of knowledge, devices and systems derived from science to the solution of educational problems. It also highlighted the benefits of educational technology and its uses for National development. With the help of educational technology, new techniques have been introduced for teaching and learning. The study also recognized some advantages of technology to include cost effectiveness, independence of time and place and quality of education. It also observed the five levels of technology used in education to include: Presentation, Demonstration, Drill, Practice interaction and Collaboration. The study also examined the impact of pedagogical methods to the students as: Pedagogy helps the students to engage in the use of technology, it provides feedback between the teacher and the student, and it also improves knowledge retention, it encourages individual learning, collaboration and also provides useful life skills. It helps the teacher to improve on themselves. It was concluded that education is the primary right of human being for the development of a person both professionally and personally. It has also opened a new horizon for distance learning. Information and communication technologies are potentially powerful enabling tools for educational change and reform. Based on the conclusion, it was suggested that Government should at all levels encourage opening of Open and Distance education centers for those who missed the opportunity of going to school during their school going ages. Government should train teachers who can handle Open and Distance education using the proper methods or pedagogy so that the students can properly learn.

Keywords: Educational technology, Pedagogy, Open and Distance Education, Information and Communication Technology, Teaching and Learning

INTRODUCTION
Education is the basic need of every human being and today’s technology has big part in every sphere of life (Rachman, 2014). Education is the important investment by countries, societies, families and individuals for the future. Education has been previously described as teaching and learning that takes place within the fore-wall of a school and this involves the learners and their teacher. But with the introduction of technology, this notion has changed; education is no longer limited within the fore-wall of a school. In further explication of this, Scoppio and Covell (2016) noted that more recently, technology has facilitated the ability to learn from nearly anywhere in the world through internet
access, which has enabled masses of adult learners to engage in educational opportunities, regardless of location, context, or background. (Bakia, 2010). Along with technological advances, related learning technologies have also evolved from simple forms of material distribution to more complex tools for communication, knowledge sharing, or forums.

With the massive advances in technology and expansion of knowledge, it is today possible for students to receive learning or attend classes without the limitation of location or distance and can access learning when and where ever they wish without any inhibition. In trying to describe the concept of open learning, Daniel (1988) on the broad nature of this concept noted that “like the blind men touching and describing the elephant we each assume our version of open learning stands for the whole and generalize from it.

This pointed out, a technology based teaching and learning offers various interesting ways which includes educational videos, stimulation, storage of data, the usage of databases, mind-mapping, guided discovery, brainstorming, music, world wide web (www) that will make the learning process more fulfilling and meaningful (Finger and Trimidad, 2002).

The application of technologies in distance education provides an appropriate starting point for delineating the knowledge base required of expert teachers in today’s global society. Teaching the distance learners requires different skills to prepare relevant learning materials to facilitate the construction of knowledge and learning. Educational technology enhances the integration of information and communication technologies into the education system. This is a multifaceted process that involves not just technology, but also the pedagogy or methods to be adopted in the delivery of content to learners in their different locations. It has been demonstrated that the use of ICT can improve the quality of the student learning experiences and make education and training opportunities available to a broader spectrum of the population in developing countries (Habibur, 2014).

This seminar therefore, examined the pedagogical impact of educational technology on teaching and learning in open and distance education.

**Open and Distance Learning (ODL)**

Open and Distance Learning is defined by the Commonwealth of learning as “a way of providing learning opportunities that is characterized by the separation of teacher and learner in time, or place or both time and place, learning that is certified in some way by an institution or agency, the use of variety of media including print and electronic, two way communications that allow learners and tutors to interact, the possibility of occasional face to face meetings and a specialized division of labour in the production and delivery of course”.

With the advancement in communication technology a variety of audio-visual media - radio, television broadcast, video cassettes, video compact disc, video text, CD, computer and other innovative techniques are used for effective transmission of knowledge to the learners at a distance and open learning system. Open and distance learning is the second chance for those who are not able to continue their studies due to certain reason. Distance education on demand has been a way of reaching students who are unable to attend a traditional classroom base course. Due to increasing pressure in higher education, distance education is a reality in the present world. By definition, distance education denotes an educational experience where the teacher and the learner are not face- to- face during the teaching and learning process. The word “distance” in itself denotes separation of isolation and hence the criteria of being isolated are a “given” in distance education.

“Distance Education is planned learning that normally occurs in a different place from teaching necessitating special techniques of course design. Instruction, special method of communication by electronic and other media and special organization and administrative arrangements” (Moore and Kearsley).

Moore’s(1989), definition of distance education as the separation between learner and teacher, such that the communication between the two is necessary in the educational transition is transmitted through print, broadcasting, telecommunications media correspondence institution through the mail, audio and video recording, computers and various combinations and variations of these.”

Distance Education the delivery of learning or training to those who are separated mostly by time and space from those who are teaching\(s\) training. The teaching is done with a variety of “mediating process” used to transmit content, to provide tuition and to conduct assessment or measure outcomes (Habibur, 2014, Christina, 2001 & Coble, 1996). As a result, distance education provides opportunity to those who were not privileged to attained formal education. Open Learning is in fact an elastic
concept, may be too flexible for its own good. What makes open learning open? Recent work by Lewis and Spencer (1986) can offer some help here. Open learning is when decision about learning are taken by the learners or learners themselves. These decisions may be over a number of different aspects of the learning process, including:

- whether or not to learn
- what to learn (selection of content/skills)
- how to learn (methods, media, routes)
- where to learn (the place of learning)
- when to learn (start and finish, pace)
- who to turn to for help or tutors/ trainers? friends? colleagues?)
- how to get learning assessed (and the nature of the feedback provided)
- what to do next (other courses? career direction?)

Both Distance and Open Learning are important, open because this directs attention to the acts of individual’s choice that are at the heart of learning, ‘learning’ because this reminds us as providers that what we are there for is to help the learner bring about desired change. To survive, let alone succeed, in the future all of us will need the active capacities. Open learning implies: the ability to diagnose our needs, plan programmes to meet them, evaluate the effectiveness of our constantly repeated acts of learning. Open learning can help the learner on how to learn, and to apply our learning in the real world.

Open Learning may be carried out at a distance and be called distance education. Distance education may open the possibility of study to people previously excluded and be called open learning (Daniel, 1988). We can also have either without the other. Distance education means simply form of instruction that rely heavily on ways of communicating other than meeting face-to-face (Abik, Ajhoun & Ensias 2012, Bakia, 2010).

**Pedagogy**

Pedagogy as an approach to teaching refers more broadly to the theory and practice of education, and how this influences the growth of learners. Pedagogy, taken as an academic discipline, is the study of how knowledge and skills are imparted in an educational context, and it considers the interactions that take place during learning (Crumpacker, 2001, Dearn, (2012, Educause, 2013).

Pedagogies vary greatly, as they reflect the different social, political, cultural contexts from which they emerge. Pedagogy is the act of teaching. Theories of pedagogy increasingly identify the student as an agent, and the teacher as a facilitator. Conventional western pedagogies, however, view the teacher as knowledge holder and student as the recipient of knowledge (described by Paulo Freireas “banking methods”.

The pedagogy adopted by teachers shape their actions, judgments, and other teaching strategies by taking into consideration theories of learning, understandings of students and their needs, and the backgrounds and interests of individual students. Instructive strategies are governed by the pupil’s background knowledge and experience, situation, and environment, as well as learning goals set by the students and teachers. One example would be the Socratic method. The teaching of adults, as a specific group is referred to as andragogy (Bernard, 2005).

One of the strengths of the Multi-Media Model of distance education is that it has concentrated efforts on improving the quality of the student’s individual interaction with learning materials.

As Bates (1991) has highlighted that Social interaction between learners and teachers needs to be balanced with the individual student’s interaction with teaching-learning resources including computer assisted learning program. In all these, pedagogies are indispensable in the field of open and distance education.

**The Pedagogical Methods used in Open and Distance Learning**

A broad range of learning approaches have being identified as pedagogies methods for teaching and learning in open and distance learning (ODL). These includes e-learning, blended learning (Maier,2007) and Information and Communication Technology (ICT). The use of ICT has a lot of benefits attached to it, for example, students in rural areas attend classes as distance learners and are also being motivated to learn like the “Group Learning Sets” (GLS) initiative offices. Based on this fact, the potential of e-learning seems very assuming but due to gaps between developed and developing countries, knowledge transfer is not only difficult but also costly.
E-learning denotes the use of ICT by teachers and learners. Schmidt,(2005) holds that, e-learning consists of conventional training such as courses, ad-hoc training, selected learning objects, formalization through document collections and community formation which can be achieved via social software.

The Concept of Educational Technology

Educational technology is a systematic and organized process of applying modern technology to improve the quality of education (efficiency, optimal, true, etc.). It is a systematic way of conceptualizing the execution and evaluation of the educational process, i.e. learning and teaching and help with the application of modern educational teaching techniques. It includes instructional materials, methods and organization of work and relationships.

For conceptualization of this, Collin (1987) defines technology as the application of “scientific knowledge to industrial process”. It becomes educational technology when the scientific knowledge is applied to educational processes. Hence, educational technology refers to the application of knowledge, devices and systems derived from science to the solution of educational problems.

According to UNESCO (1987) the original meaning of educational technology “concerns the use for educational purposes of media born of the communications revolution, such as audio-visual media, television, computers, and other items of hardware and software”.

The word technology is derived from the Greek word “techno” which means the willingness, skills, knowledge of the way, rule, skill, tools and “logos” which means science, word, learning, mental state. There is no single term for educational technology. Different countries use different terms and synonyms as educational technology, educational equipment, educational resources, the technology of teaching.

Terminological differences mostly occur on the grounds of the approach to the technical characteristics and the use of modern appliances, and not their actual application in teaching i.e. their actual pedagogical application. For this reason, there are different opinions among teachers in the field of social and technical sciences. Therefore, the application of educational technology requires knowledge from several areas. Pedagogy, psychology, didactics, computer sciences, informatics.

Educational technology has three domains of use:

- Technology as a tutor (computer gives instructions and guides the user),
- Technology as a teaching tool and Technology as a learning tool.

In the study of (Greenhow et al., 2009), we can find out that more students use modern technical equipment. Serious research on the influence of educational technology on cognitive processes was conducted by Kaufman, 2004; Lee et al., (2008). When using educational technology we should be primarily focused on the educational value of the tools and applications we use, how adequate they are in the acquisition of knowledge, whether there is an interaction between users and tools, and if we have positive effects in using them.

Based on the explanations above educational technology is very embracing. Onyejemezi (1988) opines that it is “as wide as education itself since it can be applied to the solution of problems affecting any aspect of education”. It is a problem-solving methodology which involves the use of scientific knowledge to design and develop solutions to educational problems. Its aim is to promote the efficiency and effectiveness of education.

Impact of Pedagogical Methods on Open and Distance Learning

Information and Communication Technologies (ICT) are potentially powerful tool for extending educational opportunities, formal and non-formal education. ICTs also facilitate access to experts, resource persons, researcher, professionals, mentors, business leader, and peers- all over the world. For developing countries ICT have the potential for increasing access to and improving the relevance and quality of education. ICTs stand for information and communication technologies. They are defined, for the purpose of this primer, as a “diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information.” These technologies include computers, the internet, broadcasting technologies (radio, television) and telephone (Victoria, 2002). This may include all types of learning technologies such as print, audio, video and the computer. The use of computers in open and distance education has provided new pedagogical strategies in distance learning as well as giving more autonomy to the distance learners.

Technology has become a part of our life on campus, at home, and in the office. The modern technologies used in open and distance learning are telephone tutoring, teleconferencing, audio
graphics, video conferencing, computer conferencing drill and practice, fiber optics, teletext, and videotext, multimedia and hypermedia CAI, e-books, the “Internet”, the World Wide Web (WWW), or the “Information Super Highway” on-line database, on line discussion, call-in course- on demand, satellite, talk-back TV etc. All of these technologies should have a place in the knowledge base of expert teachers. A potentially useful framework for organizing such a knowledge base is provided by the emergence of different generations of distance education (Taylor, 1995).

In the concept of new technology, distance learning provides multimedia- based education content to the student utilizing standard data networking, protocols and infrastructure. The main advantages of using technologies in distance education are cost effectiveness, independence of time and place, quality of education access resulting from the mass production of course materials, teaching a lot of students simultaneously, and finding a lot of educational resources.

Haddad and Draxler (2002) identify at least five levels of technology use in education; presentation, demonstration, drill and practice, interaction, and collaboration. Each of the different ICTs-print, audio/video cassettes, radio and TV broadcasts, computers or the Internet, may be used for presentation and demonstration, the most basic of the five levels. Except for video technologies, drill and practice may likewise be performed using the whole range of technologies.

On the other hand, networked computers and the Internet are the ICTs that enable interactive and collaborative learning best, their full potential as educational tools will remain unrealized if they are used merely for presentation or demonstration. The objectives of using technology must be very clear. Technology is nothing but an enabling tool and it is the deconstruction of the course into its core experiences and its communication to the student regardless of its delivery mechanism that is crucial (Coble, 1996). The technology which can be integrated into the distance education system, based on our experiences, the following factors should be considered:

- Accessibility
- Cost effectiveness
- Human acceptance
- Pedagogical suitability

Emerging technologies have thus far afforded the development of a new generation of distance education using voice mail, e-mail, teleconferencing and computer-based integrated telecommunications and multimedia technology. It is hoped that these new educational technologies will enrich the distance interaction between teacher and student and the production of highly interactive self-paced learning packages used in the distance learning environment. This will be greatly beneficial to the distance learners who carry out their learning anytime and anywhere. It can be deduce that ICT is an un-substituted pedagogy if there must be effective open and distance education.

**Benefits of Pedagogical Methods in Open and Distance Learning**

The main focus of educational Technology to teaching and learning in open and distance learning is to use systematic approach to determine the needs/problems and challenges of learning, teaching or an entire educational system and also to provide alternative methods to deal with these challenges. Since computers are still not widely used in many schools, the teaching process is dominated by traditional methods. It is dominated by the frontal form of work where the teacher had enough interaction with students. Failure to thrive at their own pace and insufficient activity of students was one of the drawbacks of this type of learning. In class, we have children who are not uniform in knowledge and never pay enough attention to those who have not sufficiently mastered the material and those who are above their average. This difference is often hampered by teacher assessment work and how to transfer knowledge to a group of children with different knowledge. The teacher chooses to keep average to good teaching where children with insufficient knowledge would not get the necessary knowledge. The children with insufficient knowledge can progress smoothly without unpleasant feeling of their ignorance, no frustration, and humiliation while for the most advanced children teaching will be boring.

With the development of information and communication technology, especially computers, a number of researchers (Mormson et al., 2010) were trying to see the benefits and the disadvantages between traditional and modern teaching where the prevailing educational technology, the period from 1967 to 1972 is considered to be a period of consolidation of educational technology, which has become the most commonly used term in the science of pedagogy and the educational process. With the application of educational technology, students can independently progress in mastering teaching
materials, to choose the pace of work, to repeat the material that is not sufficiently clear, that after tests performed immediately get results and track their progress. Interactive, multimedia content provides a great advantage of modern learning over traditional learning. With the application of educational technology we get feedback between the teacher and the student.

Among the first studies on the comparison of the traditional and modern ways with the help of educational technologies, researchers as Clark Richard (Clark, 1983), tried to compare research between lectures and computer guidance and instruction to determine which is the better way of learning. He came to the conclusion that they are both effective, depending on the ways they are used. The same conclusion came by other authors (Dynarski et al. 2007; Kulik, 2003), that, there are some major differences in the use of educational technology and traditional teaching. On the other hand, research at the Center for Educational Research in Pittsburgh within Individually Prescribed abilities of students, rather than teachers themselves. Educational technology must inevitably be integrated into classrooms and curricula (Clements and Sarama, 2003; Glaubke 2007; NAEYC and Fred Rogers Center, 2012). With the advent of educational technology in the classroom, teacher education is faced with the challenge that teachers integrate educational technology in their daily work. Numerous studies have shown that a small number of teachers are willing to integrate educational technology in their teaching activities (Becker, 2000; Hermans et al., 2008; Stosic and Stosic 2013; Wang et al., 2004). The reason is that there are two categories of teachers in the understanding of educational technology. Some of them have thorough understanding of modern technical appliances and their operation while others think it is necessary for them to gain additional technical knowledge of the appliance and methods, teaching methods, students-teacher relationship. These two groups represent a group of teachers between older and younger teachers. Older teachers during their study did not have the possibility of training with modern technical appliances, did not have the information technology, educational technology, while the younger generation of teachers possess the knowledge required for the use of educational technology. For a better understanding of educational technology required an experience of computer science, pedagogy, psychology, cybernetics and informatics.

The knowledge teachers possess is sufficient for a basic use of educational technology. However, educational technology is one big system. First of all, teachers have a basic knowledge of the use of educational technology; it takes far more professional training through a variety of conferences, course, professional literature, seminars, in order to get a better knowledge in the use of educational technology. The fact is that under use of educational technology, primarily due to poor school equipment, necessary resources, insufficient information and knowledge of teachers and the lack of interest and lack of motivation of teachers to use them. Teachers have to be motivated to use the same because the use of educational technology in teaching provides better interaction with students, better reception of information because the students receive knowledge visual, auditory and kinaesthetic way. Among other things, an educational technology motivates students to work independently where the student is more motivated to return to learning and working because modern technical equipment is widely available at any given moment.

Other benefits attached to educational technology in education are as follows:

1. **Benefit to students**
   Students generally are interested and have engaged in various ways to the use of technology. This has provided an avenue of various ways to schools and teachers to benefit from the use of technology in the classroom and also to make teaching and learning more effective. Educational technology provides different opportunities to teaching/learning and also makes it interesting. For example, the teaching that is done through gratification and taking students on virtual field trips and other online learning resources. Technology also encourages a more active participation in the learning process which ordinary would have been difficult to achieve through the normal traditional lecture environment.

2. **Educational technology improves knowledge retention**
   With the help of technology, students who are engaged and interested in things they are studying, have better knowledge retention. Technology encourages active participation in the classroom which is also a very important factor for increased knowledge retention.

3. **Educational technology encourages individual learning**
   Technology provides great opportunities for making learning more effective for everyone with different needs. With the help of educational technology, students can learn at their own speed,
review difficult concepts or skip ahead if they need to. With the help of technology, disabled students and hard-working students have greater opportunity.

4. **Educational technology encourages collaboration**

Through technology, students can practice collaboration skills, this can be achieved by getting involved in different online activities. Example: Working on different projects by collaborating with others on forums or by sharing documents on their virtual learning environments.

5. **Educational technology encourages useful skills**

With the use of Educational technology, students can learn useful life skills. With the use of technology in the classroom, both teachers and students can develop skills essential for the 21\(^{st}\) century. Technology helps students to gain skills that can help them in the future. Modern learning is about collaborating with others, solving complex problems, critical learning, developing different forms of communication and leadership skills, and improving motivation and productivity. With the help of technology, practical skills are being developed. These include: creating presentations, learning to differentiate reliable from unreliable sources on the internet.

6. **Benefits of educational technology to the teachers**

With the help of technology, teachers can improve on themselves with the use of resources from on-line. Teachers can use different apps or trusted on-line resources to enhance the traditional ways of teaching to keep students more engaged. Teachers with the aid of virtual lesson plans, grading software and online assessments can save a lot of time.

**CONCLUSION**

Education is the elementary right of human being for the development of a person both professionally and personally. With the emergence of technology especially in the field of open and distance education, have open a new horizon for distance learners. Application of technology in education is not the ultimate goal; instead, we should use it to pursue quality. Information and communication technologies (ICT) are potentially powerful enabling tools for educational change and reform. With educational technology, teeming number of uneducated Nigerian especially in Rivers state can have access to education no matter their location and age, education can be provided to them without having face to face contact with the teachers and coming into the fore-wall of a school.

Based on the conclusion, it was suggested that the government should at all levels encourage opening of distance and open education centers for those who missed the opportunity of going to school during their school going age. Secondly, government should train teachers (educators) who can handle open and distance education using the proper methods or pedagogy so that the students can properly learn.

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