

BENEFITS AND CHALLENGES OF EDUCATIONAL TECHNOLOGY WITH REFERENCE TO PRINCIPLES AND PRACTICE FOR SUSTAINABLE DEVELOPMENT IN AFRICA

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Abstract

Educational technology has in recent times contributed its quota to the sustainable development of Africa. Its principles and practices gives in-depth knowledge on the level of advancement of educational technology as well as its influence on the masses as it transcends the primitive era of education to the modern age as expressed in this paper. The benefits and challenges have also been studied; it shows that educational technology can make life easier and increase productivity and development within the domain of education for both individuals and the masses at large thereby boosting the development of the Nation. The accompanying challenges show the side-effects of these benefits which can be detrimental if not checked. Recommendations were also given to improve on the already existing educational technology while curbing the challenges.

Keywords: Principles and practices, benefits and challenges, Educational Technology, sustainable development.

Modern age is the age of Education and technology. The world of today is very dynamic. The life of man in the primitive age is totally different from his life in this recent age.

There have been tremendous changes in the life style of human beings which may be attributed to the contribution of Education and technology together with its principles and practices. This has extended the frontiers of knowledge in various ways and directions.

Educational technology is an inclusive term for both the materials, tools, principles and the theoretical foundations for supporting learning and teaching. It is not restricted to high technology. Education technology is anything that enhances classroom learning in the utilization of blended or online learning. However, modern electronic educational technology and information and communication technology (ICT) among others foster the course of Education having deep knowledge of its principles and practices (Seiwyn, 2011)

Educational technology is defined by the Association for Educational Communications and Technology as "the study and clinical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Robinson et al., 2016). It encompasses several domains, including learning theory, computer-based training, online learning, and where mobile technologies are used, m-learning (Dekel, Gil, 2006).

Richey also defined educational technology as "the study and clinical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (Richey, 2008).

The following 4 M's are the major components of Educational Technology (Richey, 2008):-

(i) Methods, (ii) Materials, (iii) Media, (iv) Manpower.

(i) **Methods:** It is concerned with the devices such as Programmed Learning, Team Teaching, Micro Teaching and Personalized System of Instruction in Teaching Learning situations.

(ii) **Materials:** This is the use of Instructional materials such as Programmed Text book. The material of this type may be handwritten or printed.

(iii) **Media:** This involves using the media such as audio, or visual or audiovisual. A few examples are radio, tape recorder, charts, films, educational television etc.

(iv) **Man Power:** Man power controls educational technology in every way. Educational Technology without man is zero.

Principles of Educational Technology

I Behaviourism

Many psychologists and modern educators generally define behaviourism as one aspect of a holistic synthesis. It is linked to training, emphasizing the human learning experiments. Behaviourism consists of the view of teaching people how to do something with rewards and punishment. It is related to training people.

II Cognitivism

Cognitivism looks beyond behaviour. It explains a brain-based learning by considering how human memory works to promote learning.

III Constructivism

Constructivism has a primary focus on how learners construct their own meaning from new information, as they interact with reality and with other learners who bring different perspectives. Constructivism learning environments require students to use their prior knowledge and experiences to formulate new, related, and/or adaptive concepts in learning (Terres, 2012).

Practices of Educational Technology

i Hybrid learning or Blended learning

This refers to classroom aids and laptops, or may refer to approaches in which traditional classroom time is reduced but not eliminated and is replaced with some online learning. (Bake, 2014) (Stress and Valerie, 2012).

ii Distributed learning

This describes either the e-learning component of a hybrid approach, or fully online distance learning environments. (Hates and P. Mc, 2003)

iii Synchronous and asynchronous

E-learning may either be synchronous or asynchronous. Synchronous learning occurs in real-time, with all participants interacting at the same time while asynchronous learning is self-paced and allows participants to engage in the exchange of ideas or information without the dependency of other participants' involvement at the same time.

iv Flipped classroom

This is an instructional strategy in which computer-assisted teaching is integrated with classroom instruction. Students are given basic essential instruction before class. This frees up classroom time for teachers to more actively engage with learners. (Bates, 2003)

Characteristics of Educational Technology

- i. It is based on scientific and technological advancements.
- ii. It is more a practical discipline and less a theoretical one.
- iii. It is a fast growing modern discipline.
- iv. It makes use of the research findings of psychology, sociology, engineering, sciences and social psychology etc., and applies the same to the field of education.
- v. It brings pupils, teachers and technical means together in an effective way.
- vi. It is the science of techniques and methods. It locates the problems in the field of education, remedies them and ultimately aims at improving the education system.
- vii. It is bound to improve the teacher, the learner and the teaching learning process.

Benefits

- i. Through the use of educational technology, education is able to be individualized for each student allowing for better differentiation and allowing students to work for mastery at their own pace. (Bainholz, 2011)
- ii. Modern educational technology can improve access to education, including full degree programs (Ahmad, 2010)
- iii. It enables better integration for non-full-time students, particularly in continuing education, (Ahmad, Zameer 2010) and improved interactions between students and instructors. (Dalsgaard and Christian, 2013)

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- iv. Learning material can be used for long distance learning and are accessible to a wider audience.
- v. Students appreciate the convenience of e-learning and appreciate greater engagement in face-to-face learning environments. (Kemp et al, 2014)
- vi. Students usually learn more in less time when receiving computer-based instruction and they like classes more and develop more positive attitudes toward computers in computer-based classes. Students can independently solve problems (Lai, 2008). There are no intrinsic age-based restrictions on difficulty level, i.e. students can go at their own pace.
- vii. Students editing their written work on word processors improve the quality of their writing.
- viii. In addition, attitudes toward technology as a learning tool by parents, students and teachers are also improved.
- ix. The use of educational apps generally has positive effect on learning. Pre- and post-tests reveal that the use of apps on mobile devices reduces the achievement gap between struggling and average students (Classify, et al, 2004).
- x. Some educational apps improve group work by allowing students to receive feedback on answers and promoting collaboration in solving problems.
- xi. Recent e-learning studies modulated that the use of e-learning systems in university contexts increases productivity and allows learners to accomplish their tasks in more effective ways

Challenges

- i. New technologies are frequently accompanied by unrealistic hype and promises regarding their transformative power to change education for the better or in allowing better educational opportunities to reach the masses. Examples include silent film, broadcast radio, and television, none of which have maintained much of a foothold in the daily practices of mainstream, formal education.
- ii. Technology, in and of itself, does not necessarily result in fundamental improvements to educational practice (Lai, 2008) The focus needs to be on the learner's interaction with technology—not the technology itself.
- iii. According to Bruner et al., "technology does not guarantee effective learning" and inappropriate use of technology can even hinder it (Bruner, 2001). Adaptive instructional materials tailor questions to each student's ability and calculate their scores, but this encourages students to work individually rather than socially or collaboratively (Kruse, 2013). Social relationships are important but high-tech environments may compromise the balance of trust, care and respect between teacher and student.^[10]

- iv. With the Internet and social media, using educational apps makes the students highly susceptible to distraction and sidetracking. Even though proper use has shown to increase student performance, being distracted would be detrimental.
- v. Another disadvantage is increased potential for cheating. Smartphones can be very easy to hide and use inconspicuously, especially if their use is normalized in the classroom. These disadvantages can be managed with strict rules and regulations on mobile phone use.

This paper encompasses various areas ranging from the concept of educational technology as well as its principles and practices with their benefits and challenges. Educational technology, no doubt, has great capacity to influence the development of Africa if harnessed properly as highlighted in the benefits above. The challenges as stated in this paper should not be taken for granted and necessary action should be taken to reduce its effects. The recommendation should also be implemented to ensure the maximizing of educational technology to serve as a means of lasting sustainable development covering almost all areas of human capacity in Africa.

Recommendations

In view of the relevance of educational technology in enhancing the quality of education in African schools, the following recommendations are made:

- i. Teachers should see educational technology as a way of improving their teaching methods.
- ii. Junior Engineers and Technicians (JET) club should be made compulsory from primary to secondary school levels to enhance creativity in students.
- iii. Training and re-training of Science and Creative Arts teachers in educational technology programmes should be made compulsory.
- iv. Instructional Materials Committee (IMC) should be established to produce certain instructional materials and distribute to schools.
- v. Government should make teaching and learning of educational technology compulsory in all College of Education and Faculty of Education in the Universities.
- vi. Educational Technology Centres should be developed to Local, State and Federal levels.
- vii. School heads should be involve in management training programmes.
- viii. Teachers should be encouraged to produce instructional materials that are relevant to teaching-learning process.
- ix. Government should provide adequate fund for the procurement and production of instructional materials.
- x. Teachers should be well remunerated so that more time will be devoted to teaching and research.

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- xi. Enlightenment campaign on educational technology in solving educational problems should be well spread.
- xii. Building and equipping modern educational technology centre is highly necessary. This will give opportunities for local production and utilization of educational resources that can enhance effective teaching and learning process.

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