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E-Learning; Its Implementation and Growth

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***Abstract*-This paper focuses on e-learning and its implementation and growth. In this work, e-learning was studied. E-learning can be described as the delivery of education, training or business content via all electronic media, which may include the internet, intranets, extranets, satellite, broadcast, audio/video tapes, interactive TV and many other technology based learning. Its advantages and disadvantages were reviewed. The operation models and implementation approaches where presented in this work. E-learning operates in two models: synchronous, and asynchronous. Its implementation approaches are: enhanced learning, blended learning and online learning approaches. From the results several world regions recorded significantly higher growth rates of e-learning adoption. The highest growth rate was recorded in Asia at 17.3%, followed by Eastern Europe, Africa, and Latin America at 16.9%, 15.2%, and 14.6%, respectively. It was also estimated that the e-learning growth rate in Asia was to be driven by growth rates in India, China and Australia. The growth rate in Eastern Europe was estimated to be driven by e-learning market rate in Russia.**

Keywords- E-Learning; Blended Learning; Online Learning; Enhanced Learning; Electronic Media; ICT

I. INTRODUCTION

Globally, the development towards improving education in the society through Information and Communication Technology (ICT) [1] has brought about E-learning. E-learning exploits interactive technologies and communication systems housed within the umbrella of ICT. It has the potential to transform teaching and learning methods across the globe. As a result, e-learning can raise standards and widen participation in life-long learning. E-learning, like many terms in cyberspace and ICT generally, does not have permanent definition which can be accepted by all but it keeps changing with the development and inclusion of new. The researchers can find many definitions of E-learning much more than what they expected because E-learning is becoming very interesting to many. Some terms which are frequently interchanged with E-learning include: Online learning/ education, Distance education/ learning, Technology-based training, Web-based learning/training, Computer-based training/learning from a CD-ROM. Jamil [2] defined E-Learning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration. Pollard and Hillage [3] defined it as the delivery and administration of learning opportunities and support via computer, networked and web-based technology to help individual performance and development.

According to Peter [4], e-learning has been the subject of many discussion papers in the human resources development and training. E-learning has numerous advantages which promotes its growth and development globally. It offers high flexibility, convenience and easy accessibility towards learning. It saves time and cost of teaching and learning in the academic institutions. However, e-learning has some limitations which have become impediments against its growth especially in the developing nations. E-learning cannot replace teachers and lecturers completely, but alongside existing methods in the traditional classrooms it can enhance the quality and reach of the teaching and also reduce the physical classroom meeting.

E-learning facilitated and supported learning through the use of ICT infrastructural technologies such as, desktop and laptop computers, software, interactive whiteboard, digital cameras, mobile and wireless tools or devices, electronic communication tools, and Virtual Learning Environments (VLEs) etc. It can cover a spectrum of activities and approaches of implementation in the academic institutions from supporting learning, to blended learning (the combination of traditional and e-learning or online practices), to learning that is delivered entirely online.

II. LITERATURE REVIEW

Urdan and Weggen [5] described e-learning as the delivery of content via all electronic media, including the internet, intranets, extranets, satellite, broadcast, audio/video tapes, interactive TV and Technology Based Learning. E-learning can be defined as the use of computer and Internet technologies to deliver a broad array of solutions to enable learning and improve performance [6]. David and Jane [7] opined that Electronic learning can take many forms, and consequently there has been some debate about what can legitimately be covered under such a term. A wider discussion on the use of the term e-learning can be found in Pollard and Hillage [3]. Electronic learning, or e-learning, is education based on modern methods of communication which are mostly electronic including the computer and its

networks, various audio-visual materials, search engines, electronic libraries, and websites, whether accomplished in the classroom or at a distance. Generally, this type of education is delivered through the medium of the World Wide Web where the educational institution makes its programs and materials available on a special website in such a manner that students are able to make use of them and interact with them with ease through closed or shared, networks, or the Internet, and through use of e-mail and online discussion groups. The definition of e-learning centers on its being a learning method and a technique for the presentation of academic curricula via the Internet or any other electronic media inclusive of multimedia, compact discs, satellites, or other new education technologies. The two parties participating in the educational process interact through these media to achieve specific educational objectives [8].

Peter [4] suggested that e-learning has been developed to describe the convergence of a whole range of learning tools which uses technology as their basis for delivery. During the 1980s, the compact disc (CD) began to be used in education, but the fact that it lacked the quality of interaction between the student, the material and the teacher was an important flaw in the opinion of a number of educators. This problem was only resolved with the appearance of the Internet which justified the adoption of e-learning because it fulfilled the condition of immediacy or simultaneity. E-learning assists in the transformation of the educational process from the stage of learning by rote to the stage characterized by creativity, interaction and the development of skills. The student, in e-learning, is able to access educational materials at any time and from any place, thereby transforming the concepts of the educational process and learning to go beyond the limits imposed by traditional classrooms into a rich environment in which there are numerous sources of learning. Sources of programs of e-learning include experts in the field, ministries, corporations and other organizations concerned with the dissemination of technical applications in education. Programs are offered by way of closed or shared networks, as well as over the Internet, and e-mail and discussion groups are among the techniques and mechanisms employed in e-learning [8].

E-leaning continues to grow in it approaches and usage with the continuous growth and development of mobile telecommunication devices such as smart phones, palm tops, tablets etc. Rachel et al [9] carried out a review on mobile learning (m-learning), a product or aspect of e-learning which is making successful transition in the universities and in tertiary education generally. The flexibility of e-learning gives room for the mix of online learning practices with the traditional methods of teaching and learning and in this case it can be termed blended learning. This brings about the process of enhanced learning for better performance of the students and teacher/lecturers. Rhona et al [10] carried out a survey on the undergraduate experience of blended e-learning and practice in UK. From their institutional visits and the review of course evaluations, they observed that there were three ways in which the term 'blended learning' was being used. Currently the most common type of blended learning is the provision of supplementary resources for courses that are conducted predominantly along traditional lines through an institutionally supported virtual learning environment. Second, they found some, but far fewer, impressive examples of transformative course level practices underpinned by radical course designs. These often make use of technology to facilitate interaction and communication and replace other modes of teaching and learning.

Advantages and Disadvantages

E-learning like other techniques in information and communication technology has advantages and disadvantages. These are as follows:

Advantages

Flexibility, Convenience and Accessibility: E-learning offers easy and quick accessibility of various resources any time anywhere and also options to select learning materials from increased quantity of courses offered online which the learner need and have interest in. It gives easier distribution of the course materials way via internet, immediate feedback when using online homework, quiz, and testing and quick reviewing, updating, and editing Learning materials needs. It offers self-pacing and satisfaction, by allowing students with varied learning abilities (slow or fast) to study at his or her pace and speeds so it increases satisfaction and reduces stress.

E-Learning presents different styles and facilitates learning through a variety of activities. Easy to join bulletin board discussions any time, or visiting classmates and instructors remotely in chat rooms. It can provide stronger understanding and increase retention on the subject, due to using many elements which exist under e-learning, e.g. multimedia, quizzes, interaction…etc and the ability to retry / replay training parts over and over in order to understand it.

It can be easily managed for large groups of students and it makes student-tracking systems easy, because students complete their learning while they are connected to the network.

Time: E-Learning saves the time because it reduces travel time, so the learner can schedule his classes and learning activities around his family and his work. It moves faster - because the students can skip activities or materials they already understand and jump to new issues.

Low Cost: E-learning is cheap since the users can operate from anywhere thereby reducing the cost of traveling, lodging and meals. It offers cheap production and distribution of the course materials, guides…etc and provides cheap way of teaching and testing the students.

Easy Communication and Interactivity: E-learning provides easy communication and interactivity between students and supervisors in online courses. The students

can study in any place where they have access to a computer and Internet connection and the teachers/lecturers can teach or test the students from anywhere.
The interaction among instructors and students is better in e-learning than in courses in large lecture. Interactivity engages students by pushing them rather than pulling them through training.

Disadvantages
There are some disadvantages limiting e-learning especially in most developing nations where the government has no proper policies and significant contribution towards the implementation of ICT and other infrastructures that can help in the full adoption of the technology.
E-learning requires technology infrastructure which may be not be available in some countries or parts of a country such as some rural areas in most developing nations.
Bandwidth limitation, or slow Internet connections, which can affect the ease of the learning process, because, it causes weak performance for multimedia: video, sound and graphics, as well as long waits for download. Increased costs for initial development, because the greater portion of the costs associated are start-up costs. Some students might feel lonely and isolated from their instructor and classmates and might get lost or confused about learning activities
Normally, not all courses can be delivered online, while some other courses require a more personal touch so it is not delivered well by the computer. Sometimes the instructor may not be available when the students need his help (in real time mode), so lack of human contact or face-to-face (f2f) interaction with the instructor and other classmates may affect the students' performance. It requires computer skills and sometimes files and software management of online learning, which could be complex for beginner students and some work labs are difficult to simulate in a virtual classroom. Some students may fail due to bad study habits or low motivation.

III. E-LEARNING TECHNOLOGIES, MODELS AND APPROACHES

E-learning is learning facilitated and supported through the use of information and communications technology. The following are some of the technologies can be involved in e-learning:

- desktop and laptop computers
- software, including assistive software
- interactive whiteboards
- digital cameras
- mobile and wireless tools, including mobile phones
- electronic communication tools, including email, discussion boards, chat facilities and video conferencing
- Virtual Learning Environments (VLEs)
- learning activity management systems

E-Learning can cover a spectrum of activities in the academic institutions from supporting learning, to blended learning (the combination of traditional and e-learning or online practices), to learning that is delivered entirely online. Whatever the technology, however, learning is the vital element in the e-learning. E-Learning is no longer simply associated with distance or remote learning, but forms part of a conscious choice of the best and most appropriate ways of promoting effective learning [11].

E-Learning Models
There are two implementation models of eLearning; synchronously and asynchronously [2]:
Synchronous eLearning: Synchronous events take place in real time. Synchronous communication between two people requires them to both be present at a given time. Examples of synchronous activities are chat conversations and audio/video conferencing. This means that all students and instructor are logged on at the same time and communicate directly and virtually with each other, "where all the students must be in the classroom at a certain time for the class to start. Synchronous eLearning events include live web-casts, chat rooms, application sharing, and whiteboard sessions.

Asynchronous eLearning: Asynchronous events are time-independent. A self-paced course is an example of asynchronous e-learning because online learning takes place at any time. E-mail or discussion forums are examples of asynchronous communication tools. In this model, the communication between participants does not occur simultaneously. Where "the learning content or courseware is served from a Web server and delivered on demand to the learner's workstation, Learners can thus take courses at own pace. Courseware is normally available to learners 24 hours per day, 7 days per week". Examples of this model includes; taking a self-paced course, posting messages to a discussion group. Sometimes it called "distributed learning" and it receives more attention because of its lower cost of development, reusable components, and convenience to the learner.

Table 1, shows e-learning tools classified under synchronous and asynchronous e-learning models.

Table 1: Synchronous and asynchronous e-learning tools [6]

Synchronous e-learning	Asynchronous e-learning
Chats: Real-time text-based communication in a virtual environment. Chat can be used in e-learning for student questions, instructor feedback, or even group discussion. Instant Messaging (IM): Software that lists users'	Email: Messages sent from one computer user to another

selected "buddies" (friends, family, co-workers, and so forth) who are online and enables users to send short text messages back and forth to them. Some instant messenger programs also include voice chat, file transfer, and other applications.	
Video and audio conferencing: Using video and audio signals to link participants at different and remote locations.	Discussion forums: Forums on the Internet or an intranet where users can post messages for others to read.
Live webcasting: A live broadcast of video signals that is digitized and streamed on the World Wide Web, and which may also be made available for download	Wiki: A collection of web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified markup language. Wikis are often used to create collaborative Web sites and to power community Web sites
Application sharing: Live sharing of computer applications from one computer to another elsewhere	Blog: An extension of the personal Web site consisting of regular journal-like entries posted on a Webpage for public viewing. Blogs usually contain links to other Web sites along with the thoughts, comments, and personality of the blog's creator.
Whiteboard: An electronic version of a dry-erase board that enables learners in a virtual classroom to view what an instructor, presenter, or fellow learner writes or draws. Also called a smartboard or electronic whiteboard.	Web casting: A broadcast of video signals that's digitized and streamed on the World Wide Web, and which may also be made available for download; (verb) To digitize and stream a broadcast on the World Wide Web.

E-Learning Approaches

E-learning has been identified to be implemented in the academic institutions mostly with different methods or approaches depending on the facilities involved. The various approaches of implantation of e-learning resulted in the varied definitions given to it in different areas and places of learning. There are three types [2] of e-learning implementation approaches:

Enhanced approach: This method is also known as enhanced learning, the eLearning solutions used to support, facilitate and enhance the f2f learning by using web-based technology, e.g. Course management systems. This method can reduce some academic seat time, but the reduction must not be up to half of the class work.

Blended approach: In this learning method there exist mixed traditional f2f and online learning method, thus, substantial portion of content is delivered online. The blended method of e-learning can reduce more than half of the class work f2f meetings.

Online approach: The learning method here is basically through online (that is, the internet). It uses the virtual learning (VL), which can be realized without any need for physical face-to-face class meeting. However, this approach could have some class meeting, such as during examinations and test, but majority of the course content is delivered online.

IV. E-LEARNING GROWTH

The results in this section show the estimated current and expected growth of e-learning in the world generally and in Africa especially. There seems to be universal agreement that the worldwide E-Learning market will show fast and significant growth over the next three years. The worldwide market for Self-Paced E-Learning reached $35.6 billion in 2011. The five-year compound annual growth rate is estimated at around 7.6% so revenues should reach some $51.5 billion by 2016.

While the aggregate growth rate is 7.6%, several world regions appear to have significantly higher growth rates. According to recent regional studies as shown in figure 1, the highest growth rate is in Asia at 17.3%, followed by Eastern Europe, Africa, and Latin America at 16.9%, 15.2%, and 14.6%, respectively. The growth rate in Asia was estimated to be driven by the e-learning growth rates in India, China and Australia. E-learning growth rate in Eastern Europe was estimated to be driven by the market rate in Russia.

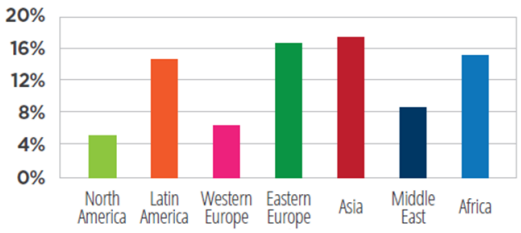

Figure 1: Growth rate of E-Learning by region [11]

The E-Learning market is clearly expanding year-on-year, even though it's difficult to compare market data coming from different sources. For example, if you include the Gaming and Gamification tools within the E-Learning market, then the growth numbers are even more impressive.

The "classic" understanding of E-Learning reveals at least three dominant sub-sectors namely: Content, Authoring tools, and Learning Platforms. The recent innovations within the technology infrastructure divide the Learning Platform into two business (and technological) models: Hosted and Installed platforms. According to a recent analysis from Ambient Insight, these sub-sectors are expected to grow at different rates as illustrated in the result shown in figure 2.

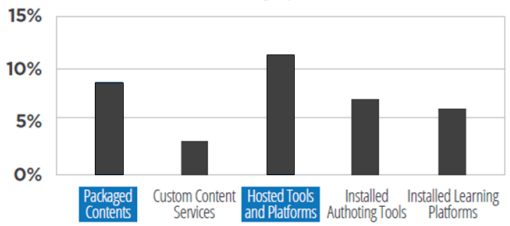

Figure 2: Growth rate by product [11]

From the results hosted tools and platforms recorded the highest value more than 10% while packaged content recorded second. Costumer content recorded lowest value in the result.

V. CONCLUSION

In this work, e-learning was studied including its development and growth. E-learning was described as the delivery of content via all electronic media, including the internet, intranets, extranets, satellite, broadcast, audio/video tapes, interactive TV and Technology Based Learning. It is also the use of computer and Internet technologies to deliver a broad array of solutions to enable learning and improve performance. E-learning operates in two models: synchronous, which involves the activities of teacher/lecturers and students in real time, and asynchronous, which involves the delivering of course content independent of time. It can be applied with different approaches namely: enhanced learning, blended learning and online learning approaches.

From the results several world regions appear to have significantly higher growth rates of e-learning adoption. It was observed that the highest growth rate is in Asia at 17.3%, followed by Eastern Europe, Africa, and Latin America at 16.9%, 15.2%, and 14.6%, respectively. The growth rate in Asia was estimated to be driven by the e-learning growth rates in India, China and Australia. E-learning growth rate in Eastern Europe was estimated to be driven by the market rate in Russia. Hosted tools and platforms recorded the highest value more than 10% while packaged content recorded second, while costumer content recorded lowest value in the result

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