POWERING E-LEARNING THROUGH TECHNOLOGY: AN OVERVIEW OF RECENT TRENDS IN EDUCATIONAL TECHNOLOGIES

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ABSTRACT
In the present scenario where the technology is continually changing, there is an increased intensive competition in the e-Learning industry to make the knowledge transfer more accessible and comprehensible. Education has become much simpler with e-Learning system making it possible with a mobile device and an internet connection. Educational technology enables the learning process with the usage of the technological processes which could be categorized as computer-based technologies and mobile-based technologies. The purpose of this paper is to summarize the demands of e-Learning and also presents the various educational technologies that works in facilitating the design and application of the e-Learning systems.
Keywords: e-Learning, Educational technology, m-Learning

INTRODUCTION

As stated in the book, "e-Learning and the science of instruction" written by Ruth C. Clark and Richard E. Mayer, e-Learning can simply be stated as instruction delivered on a digital device that is intended to support learning. Educational technologies aim at simplifying the process of e-Learning by using the available resources and enhancing the experience of remote learning. As defined by the Association for Educational Communications and Technology, Educational technology may be defined as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources"
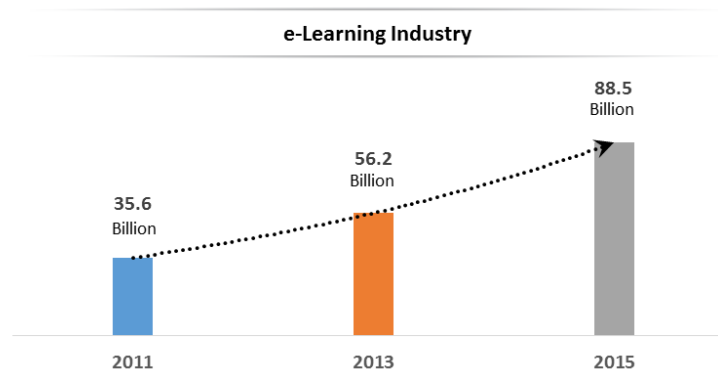

Figure 1: Growth of the e-Learning industry from 2011 to 2015

In the recent decade, e-Learning industry has seen a lot of developments in the market and the growth rate of those industries is shown in figure 1. In 2017, the number is expected to be doubled and lot of educational institutions have also adopted the e-Learning concept to improvise on the education quality. The technologies are also constantly aimed at bringing about a less expensive and effective e-Learning system.
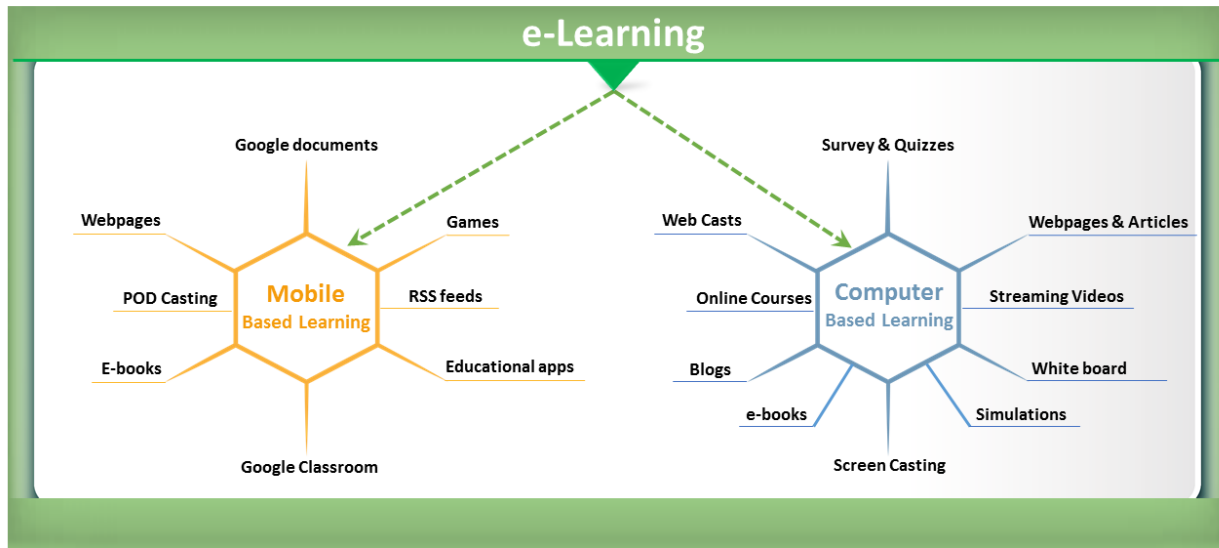
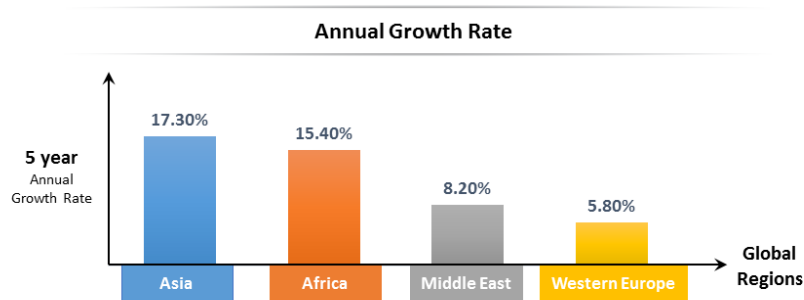Figure 2: Applications of Mobile-based learning and Computer based learning

Figure 3: Five year Annual growth rate of the e-Learning industry

This paper gives an insight towards the existing educational technologies for e-Learning and the importance of multimedia based learning. e-learning is much needed in the case of distance/remote education and also requires consideration towards the time and cost savings which will enable the knowledge transfer more accessible to any part of the world.

Advantages and disadvantages of e-Learning

After an extensive research conducted on e-Learning, the advantages and limitations are listed out in the Table 1.

Table 1: Summary of advantages and limitations of e-Learning

Advantages	Limitations
Low running cost	No social interaction
Flexibility in time	Sole responsibility lies on learner
Up to date content	High development cost
Learning pace is adjustable	No individual attention
Quick grasp using multimedia content	No face-face interaction
Customization of learning content	Technology-dependent
More control over the content	Too much exposure to screen could affect health
Delivery of content can be modified	Lack of control at the instructors end
Immediate feedback	
Flexibility in location	
Access to unlimited learning materials	
Better access to the instructors	

The advantages and disadvantages of e-Learning has been summarized by referring to various technological advancements in the field of education (Virginio et al (2004), Ruth and Richard (2016)). The limitations could be considered while designing an e-Learning system and the disadvantages currently present could be overcome.

EDUCATIONAL TECHNOLOGY

Educational technology refers to the field of technology that contributes towards the development and application of the methods that aid or promote education. In can also be looked at as the study and practice of simplifying the learning process by using, creating or managing the technological resources available. Claire et al (2017) has presented a 10- year study which has exposed the variations and changes in the teaching and learning process with the aid of technology. The recent technologies in the education is categorized as mobile-based and computer-based for simplification purpose. With computers being slowly replaced by mobile devices, m-learning is gaining its popularity in the field of education.

There are a variety of applications that are employed in both computers and mobile devices. The figure 4 shows these applications that are categorized under computer based and mobile based technologies.
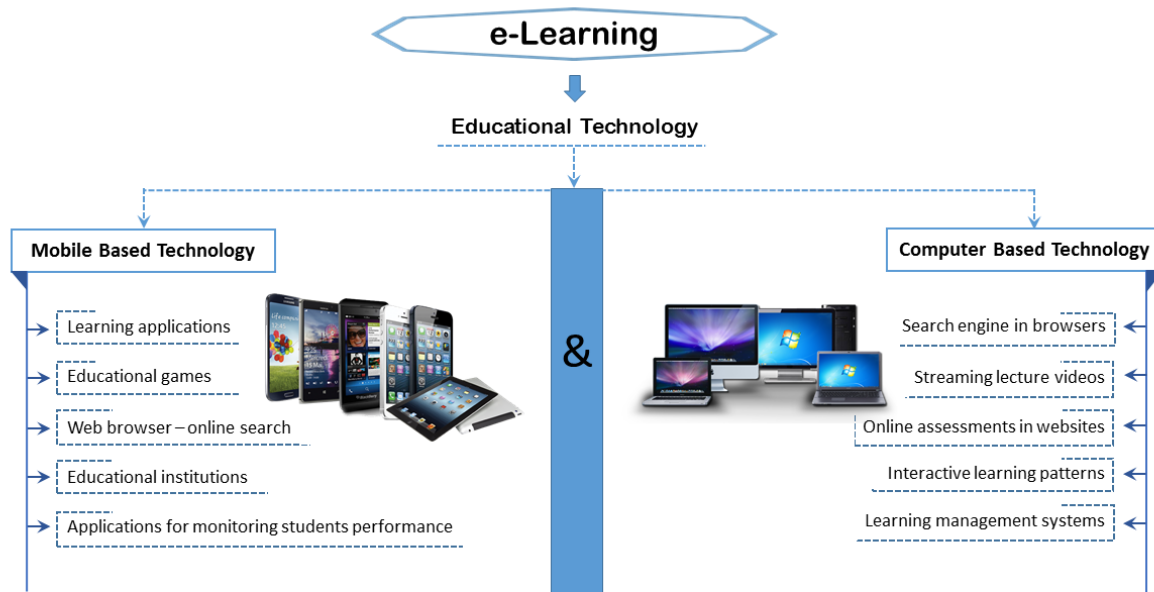
Figure 4: Categorization of Educational Technologies

COMPUTER-BASED TECHNOLOGY

Computer based technology has been existent from the very start of the e-Learning industry. Teaching and learning methods that employed computer based technologies has benefits compared to the traditional approaches starting from the very use of search engines to employing computer based educational games. Bruce et al (2017) performed a study and found that the students performed better with the use of mathematical educational game. This proves that the use of computer based technology definitely provides greater learning opportunities to the students.

Search Engine

The very basic type of learning using the computer would be using the search engine for browsing and the application used for this are the web browsers. The number of lecture videos and the tutorials have increased in number over the decade. Lot of research work is carried on to achieve an energy efficient streaming for the educational videos online.

LMS

LMS (Learning management systems) is being actively used in the educational institutions for the management of the study materials. They help in administrating the tools that are used by the instructors and also aids in the distribution of the course materials, assignments and so on. In all the research being carried out in e-Learning, communication and collaboration among learners is considered important. Thus LMS provides a good solution by letting the students communicate with peers and tutors and also learn together online. Recent research conducted by Zanjani et al (2017) provides the LMS design factors that affects the user engagement by engaging the e-learning tools and as a result found that the factors affecting the user engagement were user-friendly structure, reducing the number of tools and links, privacy support, anonymous posting and customized student-centered tools. Considering the factors that affects the design, a better learning management systems could be created.

Computer based assessment

Computer based technology offers many innovative methods of assessments and an effective feedback system. A wide range of adoptions are available to make this computer assessment more interactive and effective. Scalise and Gifford (2006) in their paper have researched on the assessment techniques available in the computer based technology and have come up with 28 innovative types. This has provided a framework paving way for the discussion of assessment techniques which are innovative and effective in the computer based settings.

MOBILE-BASED TECHNOLOGY

With almost everyone owning a mobile device, the mobile learning could be considered as the next generation learning. Using the mobile technology for any type of learning model can be termed as m-learning. Mobile-based learning mainly includes the educational games, web-browsing, streaming audio-video, MMS and so on using the most recent of technologies. M-learning makes use of the multimedia components and communication and it also offers flexibility in time and location.

The educational use of the mobile phone was researched by Zahra and Amir (2012) and their research findings elaborate of the mobile based learning by the University students. The examination of the university students who used the mobile technology for education was conducted and found that the percentage of the students who used the mobile phones particularly for education was less. This has changed over time in a span of five years. The recent research conducted by J. Joo-Nagata et al (2017) have shown a high acceptance among students and resulted in a positive response. Mobile based educational technology was reviewed in Japan by Patricia & Chris (2005) where English lessons were sent through the mobile phones and a high effectiveness in the education was shown.

Mobile Games

Using mobile games as a mean of education creates an active and fun environment to the learning process. Educational games are being designed for the teaching specific tasks and mastering a particular field. There are few examples of such kind, one of which Ketamo (2002) has designed a game for kids at the age of 6 to teach geometry and also Goth et.al (2004) have developed a game for university students to learn the campus of the University and Zimerman, Barnes and Leventhal have explored the options of employing 3D graphics in the process of learning the art of Origami. J. Huizenga et al (2009) have discussed the effects of a mobile city game called Frequency 1550 and have performed an experimental study on the students of secondary education. The results of the study shows that the students who played the game had higher scores in the knowledge test compared to those students who did not play the game prior to the knowledge test.

Learning Applications

As mobile applications are increasing in number, there are a wide range of educational applications that have come in the recent past. Learning through mobile application makes the process of learning more personal and easier. In a research conducted by Fernando (2011) a framework was formed to evaluate different language learning applications and also the current research on potential learning applications was conducted.

CONCLUSION

Educational technology is about using the technological processes to enhance the learning experience making it easily accessible and comprehensible. This has been dealt according to the present day scenario by classifying it into computer-based technologies and Mobile-based technologies. This paper has thus dealt with the latest technologies available in the field of education that facilitates the design and application of the e-Learning systems.

FUTURE DIRECTIONS

In today's world the computers are slowly being replaced by the mobile phones, PDAs and tablets so it is sensible to design the learning materials which will suit both the devices thus inter-operability is expected

Collaborative learning is already existing but a few additions would add the benefits of traditional class room training to e-Learning

Using the present technologies, energy efficient streaming methods could be designed which will provide a cost effective streaming of lecture videos

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