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# Investigation the role of online experience in learning (E-Learning) environment a review for researchers

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# عنوان البحث :دراسة دور التعليم الالكتروني وانواعه المختلفة في مجال التعليم : دراسة مرجعية للباحثيين في هذا المجال.

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**الخلاصة**

تطبيق التعليم الالكتروني هو من المجالات الحديثة في التعليم و في تطور مستمر بمرور الوقت والبحث المستمر. الباحثون في هذا المجال يتجادلون باعتباره في مرحلته الاولى. هذا يودي الى تبني عدد من الوسائل التكنولوجية في مدى علم التعليم الالكتروني. من بعض هذه الوسائل TV, CD ROMs, LMS, CMS, LCMS, Virtual World والعديد من الوسائل الاخرى.

هذا البحث يقدم تصور عام وواضح حول وسيلة التعليم، يصور بعض الطرق المتقدمة المستخدمة في العقد السابق وينظر في التغيير الكبير الذي احدثه تبني وسائل التعليم الالكتروني في التعليم الجامعي والى احدث الوسائل الموجودة والمستخدمة. وهذا يقودنا الى التعرف على بعض الامور المتداخلة والتي من خلالها اتضحت بعض المشاكل الواجب النظر الى حلها وهي:

١. محدودية استخدام التكنولوجية الالكترونية الحديثة
٢. الاستخدام غير الفعال لهذه التكنولوجية لخدمة التعليم

فكان الهدف الاساس من هذا البحث هو استعراض مفصل لكل وسائل التعليم الالكتروني الموجودة والتي ممكن اعتمادها في مجال التعليم . اي ليكون مرجع للباحثين في هذا المجال.

**Abstract**

E-Learning implementation is an area in progress that continues to evolve with time and further research. Researchers in this field argue that e-Learning is still in its infancy, resulting into numerous implementation technologies across a wide e-Learning spectrum. These technologies include TV, CD ROMs, LMS, CMS, LCMS and virtual world as well as collaborative technologies. This paper provides a general overview of the learning process, evaluates some current implementation trends pointing out a range of frameworks and strategies used in the past decade. It further looks at the changes created by the adoption of e-Learning within the higher education process. This is followed by an identification of emerging issues from which two problems are identified:
1) The limited uptake of technology as an instruction delivery method: and
2) The ineffective use of technology to support learning.
The aim of the paper is primarily a review to inform researches about current work in these different areas.

## 1. Introduction

E-Learning is a concept derived from the use of information and communication technologies (ICTs) to revise and transform traditional teaching and learning models and practices has evolved in the past decade onto new models involving the use of new technologies. This evolution has resulted from the emergence of the information society and has greatly impacted on the global economic and socio-cultural development. However, researchers in the field still argue that the development of e-Learning has not been tested by time and still in its infancy [1, 2]. This has resulted into continued research in the e-Learning field generating numerous implementation strategies a scope that requires identifying and understanding.

While e-Learning presents numerous opportunities to support learning, e.g. Garrison [3] noted that creating an e-Learning experience involves "serious commitment to understanding the different features of this medium and the ways it can be used most advantageously to impart learning".

## 2. Conceptualizing the learning process

It comes as no surprise that education is becoming increasingly vital in the knowledge society, resulting in new ideas within the area of learning and teaching [4]. Furthermore, general developments in higher education, resulting from social demands as well as an increased need for students to become autonomous, have increased the need for academics to understand the learning process [5].

Needless to say, many approaches to e-Learning have been suggested over the years, but most people tend to agree that learning is a process through which learners achieve their learning goals by carrying out a number of learning activities and participating in interactions to reflect their understanding [6]. Thus, learning seems to result from a change in student's perception of reality related to the problem area under study**.** Learning is then concerned with the way people acquire new knowledge and skills and the way in which existing knowledge and skills are modified to solve problems [7]. It does not involve some kind of obscure transfer of knowledge from one source to another, but rather consists of the active role played by the learner to process the information for use [8].

In this direction, Shuell and Lee [9] define three criteria of learning which are:

a) A change in an individual's behavior or ability to do something;

b) A stipulation that this change must result from some sort of practice or experience; and

c) A stipulation that the change is an enduring one.

The latter two exclude behavioral changes such as maturation and temporary change due to drugs, etc.

Furthermore, it has become increasingly apparent that the amount of knowledge students possess has a substantial impact on their learning processes and learning styles. Students learn in differing ways and the manner in which information is presents to them affects their ability to learn. Consequently, the learning style must be differentiated. In this regard, Sun et al. [10] identify

three learning styles to support students in their learning process:

- *Visual learners* learn best through seeing things such as images, demonstrations, facial expressions, and body language of the instructor to fully understand the content of the lesson.
- *Auditory learners* learn best by hearing things through verbal lectures, discussions, talking things through and listening to what others have to say;
- *Tactile/Kinesthetic* learners learn best through experiencing, reflecting, interacting, and doing things. These learners prefer to actively explore the physical world around them and would benefit from manipulating real objects and/or acting on them in a simulated environment.

However, students need to utilize the different learning styles interchangeably during the learning process in order for them to have an effective learning experience.

## 3. E-Learning implementation trends

Significant work in e-Learning development have been presented in the literature ranging from comparison studied, pedagogical aspects, perception studied, and evaluation to monitoring studies. This has, not surprising, resulted in the development of various e-Learning implementation strategies and models

### 3.1 Defining e-Learning

Although the term "*e-Learning*" has been commonly used in the past decade, various definitions have been formulated to refer to the same educational experience. Examples of definitions include:

- Instructions delivered via all electronic media including the internet, intranet, extranet, satellite broadcasts, audio/video, interactive TV, and CD-RAM [11].
- Learning facilitated by internet and www technologies,

delivered via end-user computing that creates connectivity between people and information and creates opportunities for social learning approaches [12].

- Distance education using the internet and/or other information technologies [13].

We will take a general approach herein and define e-Learning as a learning method that uses ICTs to transform and support teaching and learning process ubiquitously. This takes into consideration a multitude of e-Learning technologies that we will discuss in the section that follows.

**3.2 e-Learning technologies**

There are several e-Learning technologies in use that dictate how actual learning will take place depending on the environment in which they are implemented. These technologies include TV, CD-ROMs, LMS, CMS, LCMS and Virtual worlds as well as Collaborative technologies.

*CD-ROM media* have been used to deliver learning material to students on distance programs [14] .This media was adopted mainly in the early 1990s and supports learning content in text or multi media formats. Use of CD-ROM media encourages independent learning where learners learn by executing special training programs on the computer irrespective of internet connectivity. This tool is commonly used for Computer Based Training, such as those usually offered as tutorial with new software and tutorials for learning foreign languages.

*Learning Management Systems (LMS)* are a whole range of information systems and processes that contribute directly or indirectly to learning and to the management of that learning [15]. They are primarily developed to provide online learning services for students, teachers, and administrators. Examples of LMS include KEWL [16] and Blackboard [17].

*Content Management Systems (CMS)* such as Moodle [18] are developed to facilitate the collaborative creation of content,

organization, control and to manage the publication of documents in a centralized environment. *Learning Content Management Systems (LCMS)* are mostly web-based systems that combine the management and administrative functionalities of LMS and CMS to author, approve, publish, and manage learning content. An example of such technologies is the Macromedia Course Builder [19].

*Multimedia Communities and Virtual Worlds* have transformed e-Learning environments from disseminating only text based to one that incorporates multimedia content. Omwenga and Rodrigues [20] affirm that "it is the online delivery of information, communication education and training providing a new set of technologies that can add to all the traditional learning modes-CD-ROM, and traditional computer based training". The CSILE/Knowledge Forum Scardamalia [21] is an example of such a tool which incorporates a multimedia community space that enables learners to make contributions and share reference material.

Virtual world, on the other hand, mimic the real world and have become popular and promising in facilitating student learning. They provide an enrichment of the educational experience that is compelling, informative, and fun Klaila [22]. In addition, they create new learning opportunities through which exercises and situations can be simulated and tested [23]. Graven and MacKinnon [24] point out the following examples:

- DVTS-Based remote laboratory across the pacific over the Gigabit network
- Web-based activities around a Digital Model Rail road Platform
- The Automatic Control Telelab: User friendly interface for Distance Learning
- Low-cost PC based on Virtual Oscilloscope

According to Cross *et al*. [25], multimedia communities and virtual world provide a learning environment that stimulates learner's high order thinking and knowledge development and creates social groups.

Learning objects as define by Wiley [26] are digital resources that can be reused to support learning. The definition includes anything that may be offered across a network such as digital images, text, etc. [27], on the other hand, defines a learning object as an entity, digital or non-digital that can be used, reused, or referenced during technology supported learning. Learning objects are created to provide useable content in various disciplines and context, as a result cutting down on production time and cost, enhancing productivity, and improving the quality of learning [28]. The learning object's potential of being reused, adapted, and scaled has led to their wide usage within e-Learning [29]. In this respect, they provide a comprehensive suite of e-Learning capabilities that enables interoperability, accessibility, and reusability of web-based learning content. Graven and MacKinnon [24] affirm that the current e-Learning trend should place emphasis on creating pedagogical technologies to support the authoring of learning objects.

## 4. E-Learning changing the higher education process

The structural changes in higher education institutions over the past decade have mainly been attributed to the introduction of technology initiatives [30]. E-Learning has created flexible approaches to learning for students who on the past lacked opportunities due to factors such as employment, families, lack of money, distance, and time. To this effect, technology in general has not only improved knowledge storing methods and learning techniques but has also acted as a catalyst to combat the barriers of inflexible organizational structures [31]. As a result, many higher education institutions have adopted e-Learning in their curricula.

E-Learning has transformed the transformed the traditional teaching and learning models and strategies [24, 32] inevitably, the competitiveness created by e-Learning within the higher education context implies that institutions that have not joined this education venture risk losing out. The current transformations of the higher education processes have been

mainly attributed to:

- The drive to join the knowledge society and knowledge based economy:
- The opportunities presented by the advances in ICTs to meet the increasing student needs at a reduced cost:
- The growing demand for knowledgeable and skilled personnel in the labor market:
- Escalating numbers of on-campus students, off-campus students , and life-long learners and the "on-the-move" personnel who seek to continue with education in the workplace:
- The growing demand for alternative learning methods and availability of electronic learning resources:
- Collaborative research opportunities.

However, while e-Learning provides a flexible learning environment, it requires more than just transforming learning material into web-based environment and learning online. Successful implementations of e-Learning environments require an understanding of the technology and pedagogy integration for learning to take place effectively [33, 11]

Additionally, the paradigm shift from teacher centeredness to student centeredness has greatly influenced the higher education learning process [34]. In this case, the teacher takes on a facilitator role while the students take ownership of their learning and personal development.

On the other hand, the adoption of e-Learning has reportedly created new educational issues for lecturers, such as the changing work patterns and in some cases the reluctant integration of technology [30] .This has been mainly attributed to the perceived increasing workload and the lack of skills to develop and manage an online course. Serwatka [35] points out that teaching techniques used by lecturers in traditional courses may also have to be reviewed and modified, as they do not always prove to be effective or necessarily transferable into e-Learning environments.

## 5. Discussion

### 5.1 Evolution of e-Learning

Within the e-Learning context, advancement in network technologies, e-Learning technologies, and content development has facilitated multiple content presentations, personalization and ubiquitous learning.

The evolution of network technologies has been evidenced from the development of client-server networks to wireless broadband access technologies. The architecture of client-server networks enable learners to access the learning materials from a centralized server. This architecture has been further developed to include web-based feature that have led to the emergence of Internet/Intranet/Extranet technologies that support learning through virtual/web-based environments. The progression of technology has further led to the development of wireless broadband access technologies that support through the use of portable devices. Figure 1 illustrates the evaluation of the networks technologies.

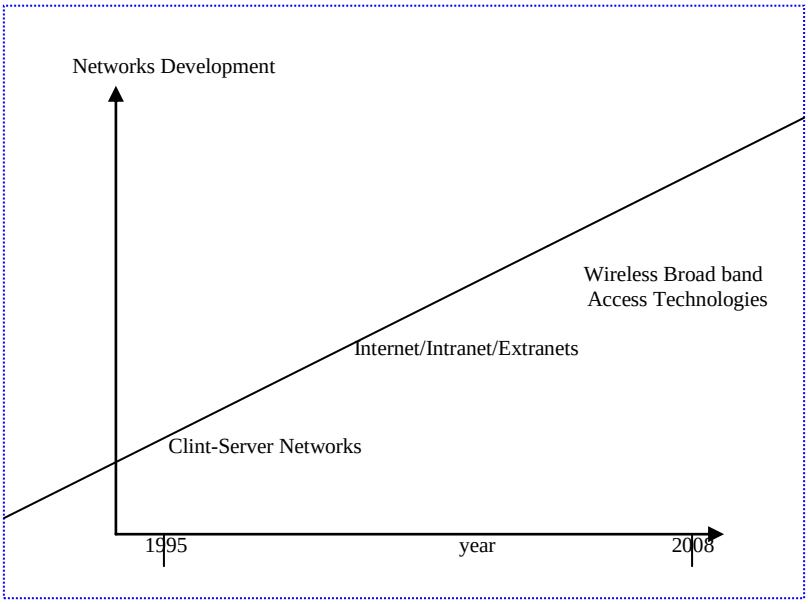



**Figure 1: Evolution of the network technologies.**

In the past decade, e-Learning tools have evolved tremendously from CD-ROM media to personalized technologies that cater for individual students needs as shown in figure 2. This evolution has been partially enabled by network technologies as underlying infrastructure. The basic CD-ROM media provides portable content that can be accessed by learners without being facilitated by network technologies. LMS/CMS/LCMS, multimedia and virtual communities,

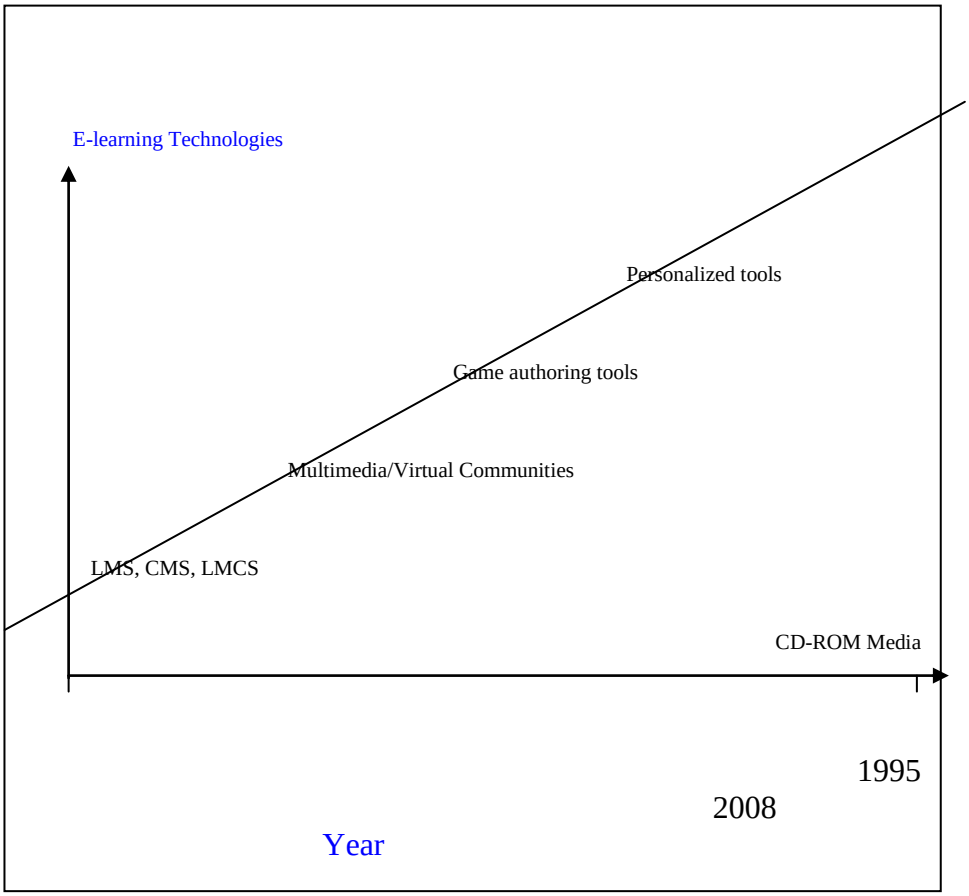
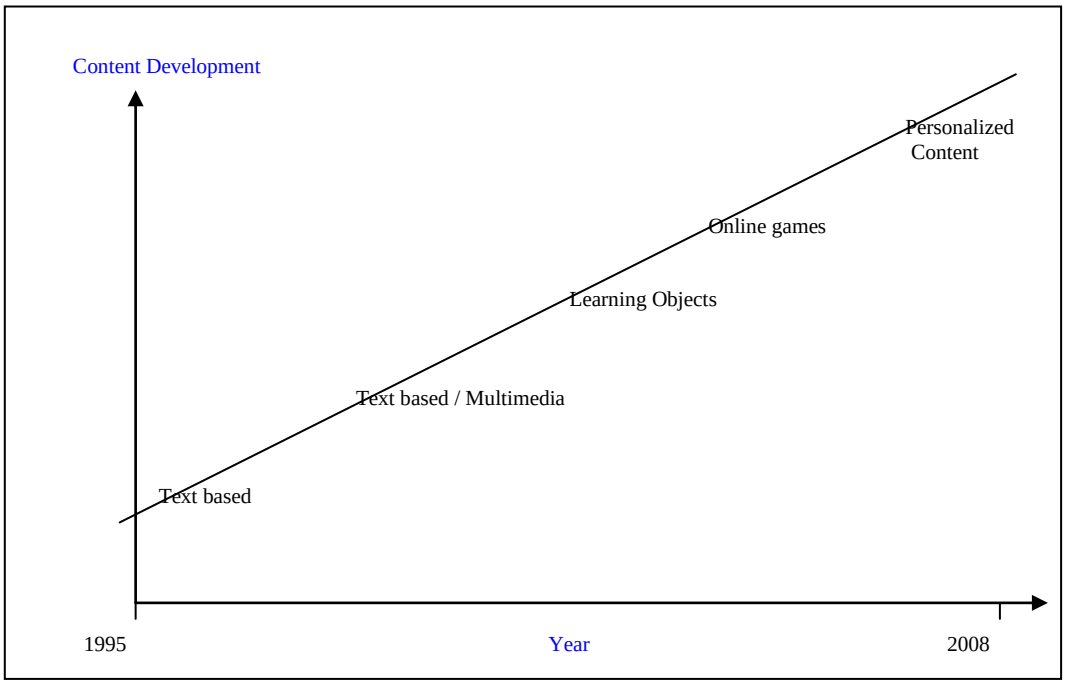



**Figure 2: Evolution of e-Learning technologies**

**Figure 3: Evolution of content development.**




game authoring tools and personalized tools on the other hand are facilitated by network technologies in providing various capabilities that support student learning as pointed out in the section that discussed e-Learning technologies.

The development of e-Learning content has been highly facilitated by advances in e-Learning technologies. Content development has been transformed from text based to include multimedia supported content that caters for personalized learning, as illustrated in figure 3.

Implementation of e-Learning has been attributed to the evolution of technologies as described in figure1 and figure 3. However, the implementation of e-Learning needs to be applied within a context, such as environment, resources, digital divide, in order to successfully realize the full potential of e-Learning.

### 5.2 Emerging issues within the higher education context

Despite the advancement of e-Learning tools, several emerging issues that have impact on successful e-Learning implementation in higher education have been cited. These include:

*Identifying pedagogies underlying online courses*

Successful implementation of e-Learning necessitates a two-tier training approach. The "learning" which refers to pedagogical aspects, through which individuals learn, acquires and retains skill and information to facilitate knowledge development. The 'e' refers to technologies which communicates information to be learnt. This implies that the use of technology in itself does not cause or improve the quality of learning. To this effect, Garrison [3] asserts that "to realize that potential of e-Learning as an open but cohesive system to support learning, it is essential that we rethink our pedagogy".

*Improving ICT skills*

The level of ICT skills for both teachers and students affects the effective use of technology to support online instruction. For instance, Muilenburg and Berge [36] point out that confidence and comfort in using ICT reduces barriers to social interaction, administration, learner motivation, and time. Therefore, the lack of relevant skills interferes with the learning process and often causes problems for both teachers and students.

*Technology use*

Miller et al. [37] assert that " the argument against online often focus on what is viewed as negative impacts from not having face-to-face contacts and anxiety caused by the nature and quantity of information transmitted through technology". In this regard, reluctance of teachers in adopting e-Learning relates to their being too traditional in their teaching style, unwillingness to adopt change, or perceived increased teacher work load [38].

*Management support*

Furthermore, e-Learning initiatives require full commitment

and support from management for their operationalization and sustainability. Successful transitions to more flexible modes of delivery require significant buy-in from senior management and a long-term commitment to support, foster, and monitor strategic change. Marshall and Mitchell [39] further point out the need to improve organizational processes associated with e-Learning. O'Hearn [40] contents that university structures are rigid and unproven, regarding the incorporation of technological advancements.

## 6. Conclusion and future works

There is a strong need for identifying suitable strategies for effective e-Learning implementation and we have here provided a general overview of various theories for learning processes and methods. We have analyzed some quite recent e-Learning implementation trends and discussed e-Learning implementation aspects.

More specifically, we have discussed e-Learning state of art, eliciting different implementation strategies indicating the continual evolution of e-Learning. We have also taken a look at e-Learning within a higher education context and emerging issues that have impact on its implementation. We, as many others, have noted that e-Learning implementation are serious commitments in a variety of ways, involving encompassing change processes which consider strategic, didactic, organizational, economic, and cultural dimensions for all.

From the emerging issues of e-Learning within the higher education context, two problems emanate: 1) the limited uptake of technology as an instruction delivery methods; and 2) the ineffective use of technology to support learning. In respect to this, future research should therefore seek to further investigate these aspects and to explore suitable approaches for effective implementation of e-Learning to support learning. Note the least in higher education contexts.

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