

Delivering E-Learner Satisfaction: A Study of the Technical Dimensions

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Abstract

E-Learning has attained significance in today's cyber world due to the obvious advantages of anywhere anytime learning, to reach the unreachable and so on. It is a well known fact that explosion of E-learning technologies were due to the wide spread adoption of certain technical enablers. However no specific standards were followed for the development of existing systems making them more customized. In this paper, we discuss the important technical enablers that are considered vital in the successful implementation of e-learning. These are specific to the regional requirements of Middle-east and have been sought after due discussion and opting qualitative research techniques.

Keywords: *e-Learning, Technical enablers, IT infrastructure, Security, Navigation, Ease of access*

1. Introduction

The past few decades have seen dramatic changes in Higher Education in terms of increased access to education, lifelong learning, increased choice in areas of study and the personalization of learning (CIHE, 2002; DfES, 2001). To advance across all four domains seems to necessitate incompatible changes to the learning process, as instructors offer individualized learning to a larger, more diverse learner base. E-Learning is the result of such quest that allow instructors to be able to source and share materials, adapt and contextualize them to suit individual needs, and use them across a variety of educational models.

E-learning has subsequently evolved to computer-based training, web-based training, and more recently to "E-Learning 2.0." The term e-learning 2.0 was coined for the first time by Stephen Downes (2005). He defines e-learning 2.0 as the "use of Web 2.0 technologies in educational context". The interactive nature of Web 2.0 facilitates the unprecedented ease of authentic and meaningful learning activities (Oliver and Lake, 1997a, Oliver and Lake, 1997b, Herrington et al., 2003, Herrington et al., 2004) easier than ever before.

The use of high-end tools does not necessarily lead to improvements in the outcome of learning, just as technology for e-learning, in general, does not improved learning in terms of teaching (Moyer, 2002, Feuerstein, 1980). Several universities in Saudi Arabia and neighboring countries are using E-Learning systems as an important mode of learning. However there is no standard model in Arabian prospects. Technically focusing, there is no core standard on which all the systems can be based. Also there has been limited study on technical enablers for E-Learning in Saudi Arabia. Though King Saud University is leading in the implementation of E-Learning system in the region, but still it is far behind others in the western countries. In this paper, we have contributed certain standard key enablers of e-learning that have proved effective in changing learning and teaching process specific to the

requirements of middle-east region. These are supposed to be of utmost requirements for E-Learning.

2. Related Work

A lot of research has already been conducted on E-Learning resulting into the evolution of several numbers of different models suitable to the environment of learning organizations. However, there are no specific standards to be followed. E-learning standards have attracted a substantial and growing amount of attention from practitioners, institutions and governments over the past decade (Marshall 2004). Since every researcher has his/her own perception and requirements appropriate to his/her working environments, there are no specific standards that are followed in every part of the world. Most of the researchers have designed the systems suitable to their specific regional needs (Danesh, *et al.*, 2012). Since most of the E-Learning systems are open source, many researchers have concentrated on the security and privacy preservations and have proposed layered architecture of e-learning systems to enhance security level (Jianming Yong 2011). Some of the researchers look into methods and models that are useful when analyzing the risks and vulnerabilities of complex e-learning systems in an emergency management context (Vladimir I. Zuev, 2012). Since its inception, Internet has been the backbone of E-Learning and many researchers contributed to design the overall infrastructure regarding the E-Learning implementation (Silviu Rişco and Antoanela Naaji).

3. Technical Enablers for E-Learning

The last few decades have seen major changes, both in ideas about effective teaching methods, and in the availability and affordances of learning based on digital technologies. E-learning environments differ from one another with respect to some important dimensions: information modality, linearity, type of interaction (human-human, human-machine), number of participants, time (in) dependency, immediacy, place (in) dependency. (Dillemans, 1998, pg. 59).

Collies (1995) and Willis (1994) believed that it is not the information technology but the instructional implementation of the IT that determines the effectiveness of e-Learning. Webster and Hackley (1997) proposed three instructor characteristics that affect e-learning success: (1) IT Competency; (2) Teaching Style; and (3) attitude and mindset.

Understanding of how to employ these characteristics is still evolving and instructors are in the position of learners as they explore effective ways of using them. Thus, as Beetham (2002) emphasizes, in characterizing effective e-learning practices, it is indeed appropriate to consider the technical enablers that impact on the effectiveness of e-learning.

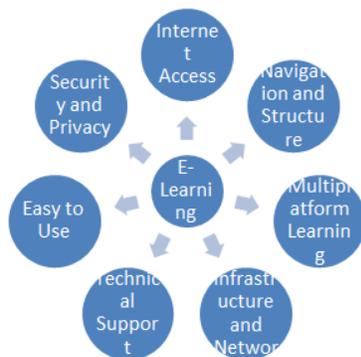


Figure 1. Key enablers for effective e-learning

In the following sections, we will go through these key enablers for effective e-learning shown in Figure 1. The enablers mentioned in our research are not exhaustive; but they do include all the basic requirements for a healthy e-learning.

3.1. Internet Access

This is the utmost basic requirement without which we cannot imagine about e-learning. For the successful e-learning implementation in the learning environment, a dedicated and easy on-campus access to the Internet is a must. Raul (2012) has mentioned the importance of Internet and Web 2.0 in higher education and its educational use in the university environment. All the learners' systems should be connected to Internet uninterruptedly to have anytime, anywhere access to the learning contents. The instructors as well as students should be connected in such a way that the delivery of course contents and assignments can be performed well in time without technical hassles.

3.2. Navigation and Structure

Context and resources are important dimensions for e-learning programs. The entire educational endeavor greatly depends on the way in which content is presented, a condition for efficient perceptive-visual learning. Therefore the navigation and structure of support materials for e-learning is an important element when calibrating the formative value of the educational message. David Casuto (2008) has enlightened the importance of information architecture in e-learning. To assimilate and interpret the navigation and structure of the content, learners in technology-based environments develop a series of psychological processes such as visual perception, attention, understanding, motivation, memory, thinking and conscience. In order to provide a significant learning situation, effective design must rely on several basic principles aiming to support the learners' confidence and comfort, but mostly their learning performance.

3.3. Multiplatform learning

Multiplatform e-learning systems are emerging technologies that provide integrated learning content to various accessing devices. Tim and Alba (2010) describe a multi-platform extension of learning networks. In addition to Web- and desktop based access, the authors propose to provide mobile, contextualized learning content delivery, and creation. This is an embryonic trend that addresses technical challenges, design frameworks, and development experiences of the future that integrate multiple mobile devices and PCs into a single multiplatform e-learning system. Here we wish to elaborate two different things. First is that the system should be able to work in the same way on various hardware platforms; be it a tablet, a Laptop computer, a smart phone or a Desktop PC. Second issue is related to the hardware. In today's tightly networked world, several software platforms such as Windows, Android, Macintosh, IO6 etc. are being utilized. The system should be designed and developed in such a way to be able to work on all these platforms with uniform ease.

3.4. IT infrastructure and Network

The term "infrastructure" is highly contextual in its meaning. In e-learning contexts "e-learning infrastructure", "technical infrastructure", and "ICT infrastructure" all convey a range of meanings. For the technically inclined, "infrastructure" often describes a bottom "layer" of an architectural description or diagram, indicating network hardware components, communications processes, services and protocols. However, for others, it can also serve as a

label that includes the “applications layers” or even more broadly, the entire platform required to deliver services.

The resources involved in the development of a system like e-learning require both hardware and software infrastructure as well. The transition from a "classical" network used in a university to an e-learning oriented network needs some basic transformation. The first step in this regard is to develop the hardware support to offer an Internet connection between all the University locations and the second is to choose a software platform

Efficient IT infrastructure & Network is required for an efficient e-learning system. Siavash and Maslin (2011) have presented a review on the challenges and infrastructure of e-learning in developing countries. The system should be brought up in a way that the learners should not apparently experience problems while browsing. The browsing speed (Upload and Download) should be satisfactory. There should be no connectivity issues. The main objective is to provide a robust network infrastructure that can deliver all e-services to all targeted learners, academic staff and employees.

3.5. Technical Support

A 24/7 round the year technological support is a must criterion for an effective e-learning system. Since e-learning facilitates anytime, anywhere learning, it is a mandatory requirements that the systems are available constantly. Normally, there are dedicated support teams to look after the servers and other important fragments of the e-learning systems. Nawaz and Khan (2012) have discussed the issues of technical support for e-learning systems in higher education institutions.

3.6. Easy to use

Moon and Kim pointed out that Information Technologies that are easier to use will be less threatening to the individual, implying that perceived ease of use will have a positive effect on users' perceived credibility as interacting with e-learning. Perceived ease of use was found to be an important antecedent of perceived usefulness and perceived credibility. User-friendliness is also important for the success of e-learning and will increase eLearners' perceptions of perceived usefulness and perceived credibility.

Ease of searching the relevant resources is another important enabler in the e-learning effectiveness, as suggested by studies showing that the current generation of students often choose to source digital resources in preference to print based materials (Armstrong, *et al.*, 2001), and their habitual use of 'Google' as a primary resource search engine (Griffiths & Brophy, 2005). Among the reasons given for these preferences are that the computer terminal provides a 'one stop shop' for resources, and that while Google may not provide the best quality information or most efficient search, it is familiar and has a track record of producing results that are adequate. Similar criteria of unified access, familiarity and adequacy seem likely to apply to instructors' strategies in sourcing resources.

3.7. Security and Privacy

Neal, (2004) emphasizes that using new systems leads to new security and privacy issues. In the e-learning environment, there are three major issues to be tackled with; namely, security, privacy and plagiarism.

In our context, security means that in a secure teaching environment, users need not be concerned with threats specific to e-learning platforms or to electronic communication in general. A secure learning platform should incorporate all aspects of security and make most technical details transparent to instructors and learners. For many higher educational

institutions, e-learning systems become assets critical to production. It is thus imperative to evaluate all of the generic requirements (confidentiality, integrity, and availability) during a process of risk assessment (Weippl, 2005c). The first step in such a process is to understand security as including all factors enabling technology. Only when systems work reliably will users trust them and use them (Weippl, 2001).

Chadwick, *et al.*, (2003) present views on privacy and define related terms, such as pseudonyms, aliases, nicknames, anonymity, privacy, and confidentiality. The importance of privacy considerations is reflected by recent laws, such as the Patriot Act in the US and the Rip Act in the UK. The privacy considerations are important in e-learning as online time, participation rates, and reaction times of students are recorded by e-learning systems.

Plagiarism is a constantly arising issue in the educational systems. Currently, a variety of anti-plagiarism software exists on the market with the aim of determining whether authors used other sources and included verbatim copies of intellectual property. This topic gains even greater relevance with the hype of Web 2.0, in particular, and the possibility of linking, sharing, and embedding sources from other websites (Maurer, *et al.*, 2006). While anti-plagiarism software may certainly help to find sources on the Web in digital libraries, it cannot determine whether a student actually plagiarized. Manual checking is required to determine if texts highlighted for plagiarism are cited correctly. Deep linking¹ other people's Web content in one's own work may violate their usage policies or copyright and can constitute plagiarism if not properly acknowledged.

4. Methodology and Results

As discussed earlier, there was a need to standardize the core of E-Learning systems. Nowadays, many universities in Saudi Arabia and middle-east region have adopted the E-Learning systems and are increasingly using them. But a lack of standards in core components was felt. It was noticed that the systems could have worked better had there been uniformity in them. We perceived this requirement and worked on it. The standard enablers presented here for the core development were selected after thorough study and research. A qualitative research methodology was adopted where we contacted several persons from different universities in the middle-east who expertise in this field. A mix blend of open and close ended questionnaire was utilized to seek their requirements for the implementation of a successful E-Learning system suitable to the requirements of middle-east region.

5. Conclusion

The use of e-learning applications is increasing rapidly and new applications are available almost daily. Needless to say, from an educational point of view, the possibilities of computer-supported education may seem unlimited. Novel technology empowers instructors and learners to be creative in new ways. However, there remains a need for customized systems supporting the regional requirements. These systems should incorporate some standard technical enablers to enhance the effectiveness of new technologies in e-learning. Our contribution has been to provide to the higher learning institutions in Saudi Arabia with proper technical enablers to achieve e-learning satisfaction. These are designed to extend the requirements of the middle-east region.

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