

Developing an E-learning Quality Model for Higher Education

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Abstract

This research focuses on the need to design an e-learning system for initial teacher training in Egyptian higher education. Through examination of the literature, a model of design and evaluation is proposed based on four motivations for using technology in higher education: improving the quality of learning; improving access to education and training; reducing the costs of education; and improving the cost-effectiveness of education. The proposed model is based upon researchers' reports of implementation and evaluation of the quality of their e-learning systems for the higher education students and other stakeholders. Higher education institutions use e-learning systems because of the challenges they face such as: the rapid developments in information and communication technology (ICT); a shift in learners' expectations; changing demographics of learners; the rapid development of subject knowledge and decreasing financial support. These are represented by the growing agendas including: flexibility; interaction; personalisation, internationalisation and equality of opportunity.

1.0 Introduction

This research focuses on the need to design an e-learning system for initial teacher training in Egyptian higher education. Through examination of the literature, a model of design and evaluation is proposed. Bates [1] believes there are four reasons for using technology in higher education: improving the quality of learning; improving access to education and training; reducing the costs of education; and improving the cost-effectiveness of education. Thus, the proposed model is to investigate how researchers implement and evaluate the quality of their e-learning systems for the higher education students and other stakeholders.

Zhao [2] defined online higher education as “teaching and learning through electronic mail, the Internet, the World Wide Web (WWW), and multimedia in the higher education sector.” Higher education institutions use e-learning systems because of the challenges they face such as: the rapid developments in information and communication technology (ICT); a shift in learners’ expectations; changing demographics of learners; the rapid development of subject knowledge and decreasing financial support (Alexander) [3]. These are represented by the growing agendas including: flexibility; interaction; personalisation, internationalisation and equality of opportunity.

Implementation of a quality and sustainable e-learning system requires the designers to follow a well-defined procedure and a rigorous process of evaluation based upon critical success factors that have to be addressed in an e-learning strategy. This is presented.

The quality of e-learning results from the process of co-production between the learner and the learning-environment. In order to establish a model that can best support the design and evaluation of quality e-learning systems, there is an important question, “What are the criteria for evaluating the quality of e-learning systems for higher education?” These criteria, both technological and pedagogical have necessitated the consideration of the whole matrix of designing, implementing, and evaluating an e-learning system regarding all the elements that influence the quality of e-learning systems. The authors propose a model for designing and evaluating quality e-learning systems incorporating: stakeholders’ satisfaction; learning outcomes; environment facilities; and assessment facilities during the establishment of the VLE.

2.0 Developing an E-learning Quality Model for HE

This paper began as a plan to build an e-learning system for the Egyptian Higher Education but has turned into a model for constructing and, importantly, evaluating quality e-learning systems. It will discuss: learning outcomes; stakeholders' satisfaction; learning environment.

With regard to establishing the quality of e-learning criteria, one can identify three categories of researchers. The first are the researchers interested in the learning situation in e-learning systems such as Raab [4] who identified e-learning as “a learning situation where instructors and learners are separated by distance, time, or both”. The second are the researchers interested in the technological side in e-learning systems such as Sun et al [5] who identified e-learning as “the use of telecommunication technology to deliver information for education and training”. While a third group look at e-learning from the perspective of relating the above two parts such as: Rosenberg [6] who identified e-learning as “the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance”. One can notice this equality between technology and pedagogic when he said that e-learning is using the technology to create an array of solutions and these two parts had to work together in order to succeed.

The authors accept the three perspectives of e-learning. The developer has to be aware of the available technologies to create an e-learning system as well as considering the pedagogical devices used inside the e-learning system.

Bates [1] believes there are four reasons for using technology in higher education:

- Improving the quality of learning;
- Improving access to education and training;
- Reducing the costs of education; and
- Improving the cost-effectiveness of education.

Planning for the implementation of quality and sustainable e-learning systems requires a suitable model in order to identify critical success factors that have to be addressed in an e-learning strategy. E-learning models are attempts to develop frameworks to address the concerns of the learner and the challenges presented by the technology so that e-learning can take place effectively. Therefore, instructional technology researchers need to identify the available models for designing e-learning systems in order to fully benefit from the advantages of using such systems. Unfortunately, they are not readily available. “*There is no patent remedy and no universally applicable, standard perspective for developing or assuring quality*” Ehlers [7]

This e-learning quality model the authors are identifying is designed to address the needs of Higher Education students. Zhao [2] defined online higher education as “*teaching and learning through electronic mail, the Internet, the World Wide Web (WWW), and multimedia in the higher education sector*”. Because of the challenges that higher education institutions faced in recent years and the rapid changes in the learning environments Universities have found in e-learning systems a suitable method to deliver their teaching.

Since the beginning of 20th century, Universities have been confronted with numerous changes in their environments. They are forced to respond to emerging challenges such as: broadening of the student body social profile, expanding and changing curriculum subject areas and the tensions between research and teaching endeavours. More recently, Alexander [3] notes the rapid developments in information and communication technology (ICT); a shift in learners’ expectations; changing demographics of learners; the rapid development of subject knowledge and decreasing financial support.

All of these challenges forced the Universities to look for a new method to deliver their curriculum named “e-learning” which Wagner [8] identified as “the expression broadly used to describe instructional content or learning experience delivered or enabled by electronic technologies”.

Universities do not use e-learning systems simply because of the challenges they face but also because the benefits they gain from using e-learning as a method of delivery including:

Providing learners with the flexibility of learning at the time, place, and pace they choose – Institute of Higher Education Policy [9].

Offering the opportunity to increase both the quantity and quality of interaction substantially. Many researchers agree that interactive instructional design is an essential factor for learning satisfaction and success, Hong [10] therefore, as noted by Inglis [11] offers the opportunity to improve the quality of the learning experience.

Scalability - it is the ability of a delivery mechanism to cope with large numbers, on-demand at little incremental cost - Epic Group plc [12]. It is the ability to host from 10 participants to 100 or even 100,000 participants with little extra effort or incremental cost (providing the infrastructure is in place). Rosenberg (2001: p. 31) [6].

Reducing the costs of education.

Reducing the technophobia of the students.

Encouraging students to learn more and faster.

Improving the equality of learning opportunities by reinforcing various learning styles and supplying a wide range of activities that suits all kinds of learners. For example those best working individually, cooperatively or collaboratively, and recognising preferred learning approaches including kinaesthetic, verbal or visual.

No user “ramp-up” time: With many people already on the web and comfortable with browser technology, learning to access e-learning is quickly becoming a non-issue. Rosenberg [6].

One of the most important benefits of e-learning system is its ability to flyover the boundaries of time, place, and nationalities. It can provide teaching with a true sense of *internationalisation*. E-learning system can be taught in two or more countries at the same time with the same quality. Moreover, the e-learning system could be used to accommodate or compensate for the differences between cultures and as a tool to fill the gap between countries around the world. E-learning is web-enabled and takes advantage of the universal Internet protocols and browsers, which means that everyone on the web can be enabled to receive virtually the same material in the same way.

Many reasons force the educational institutions to adapt e-learning systems as a tool to accomplish internationalisation such as:

- Increase student and faculty international knowledge capacity and production (22%)
- Strengthen research and knowledge capacity and production (21%)
- Create international profile and reputation (18%)
- Contribute to academic quality (14%)
- Broaden and diversify source of faculty and students
- Promote curriculum development and innovation (8%) IAU [13]

These institutions also are encouraged by the benefits earlier institutions gained from internationalisation such as:

- More internationally oriented students and staff
- Improved academic quality
- Increased revenue generation
- Opportunities for brain gain
- Greater international understanding and solidarity
- Innovations in curriculum, teaching and research
- Foster ‘national and international’ citizenship. [13]

Rosenberg [6] draws attention to the changing nature of learning and importantly, learning is 24/7; people can access e-learning anywhere and at anytime.

Educational institutions should be wary of adopting e-learning as a delivery method for their curriculum unless they are certain they could benefit from its advantages as well as overcoming its challenges. Many institutions adapted e-learning systems as their curriculum carrier but they were confronted with the common problems that online students suffer from such as:

- Technical problems;
- Lack of instructional intimacy associated with face-to-face conventional delivery systems in traditional classrooms;
- Lack of interactivity and limited interaction with the instructor;
- Delays in receiving feedback;
- Instructor's inability to monitor students cues (both verbal and non-verbal) in distance education, researchers are finding that students have lower expectations concerning nonverbal behaviour than in the traditional classroom (Arburgh) [14];
- Lack of compatibility of online instruction with individual learning styles (Fabianic, 2002: p. 173) [15];
- Taking one approach in terms of application of information technologies without sufficient regard for appropriate learning design.

3.0 Implementation considerations

Therefore, the authors started to look in designing a quality approach which can make the best out of the e-learning benefits and try to avoid the common problems of using e-learning systems.

In order to reach such quality in an e-learning system the authors have used “VLE” which is a software system designed to support teaching and learning in an educational setting, the VLE system is integrated in itself so that student can admit themselves to the Virtual Learning Environment and register for courses. Once the student is enrolled in to one or more courses, these courses have to organise in a well planned sequence so that there is no repetition or over load at one point in time.

The VLE software authors have used is an open source software that enables the authors to design the VLE according to the aims and objectives without any shortage in the affordances that any VLE software could offer. This free software is called Moodle.

Gillespie et al. [16] identified VLE as “*an application that enables teachers and learners to do some or all of the following:*

- *Share files;*
- *Download information;*
- *Email;*
- *Use discussion boards;*
- *Undertake tests and surveys;*
- *Share information;*

- *Organise time and resources;*
- *Link teaching and learning applications and activities with management education systems.”*

Shrestha [17] identifies that VLEs have many affordances such as:

- Mapping of the curriculum into elements (or ‘chunks’) that can be assessed and recorded;
- Tracking of student activity and achievement against these elements;
- Support for online learning, including access to learning resources, assessment and guidance;
- Online tutor support;
- Peer group support;
- General communications, through a variety of media;
- Links to other systems, both in-house and externally.

These opportunities to engage with learners and for learners to engage with the curriculum offer the VLE approach to adapt to students with different learning styles; Adey (p2) [18] states ‘Style’ is understood as “*the way an individual sets about learning something*”.

The term “quality” has different dimensions. Ehlers (p3) [7] defines quality in three ways:

- Different meanings of quality;
- Different quality perspectives; and
- Different levels of the educational process to which quality can apply.

Within a lot of quality e-learning models, designers believe that educational outcomes, rather than mode of delivery, should be the criterion for evaluating the quality of education programs but we believe that the quality of any educational program can be obtained only by the satisfaction of all the elements evolved with that program including the satisfaction with educational outcomes. “*Providing the best possible forms of online learning is a critical component of the quality assurance process*” (Oliver) [19]

In order to reach the model that can help in design and evaluate quality in e-learning systems, researchers have to ask themselves an important question: What are the criteria for evaluating the quality of e-learning systems for higher education?

A study undertaken in Deakin University in Australia by Smissen [20], gave details about the most important criteria used by academics to evaluate the quality of online teaching and learning systems, these criteria were identified as follow:

- Easy to use (user friendly interface and navigation)
- Extent of platform and browser compatibility (the availability to the users to access the system from different platforms and use different browsers);
- Extent of ease of creation and maintenance of course materials;
- Extent of synchronous (such as chat, sharing files, audio video communications) and asynchronous (such as e-mail) communications;

- Extent of online help;
- The ability to conduct online assessment including self-assessment and surveys;
- The ability to maximize collaborative work by allowing uploading, downloading, sharing files, and creating groups;
- Extent to customization (allow to users to design their courses according to their own teaching styles);
- The flexibility of report generating;
- Ability to develop database (creating an interactive web pages).

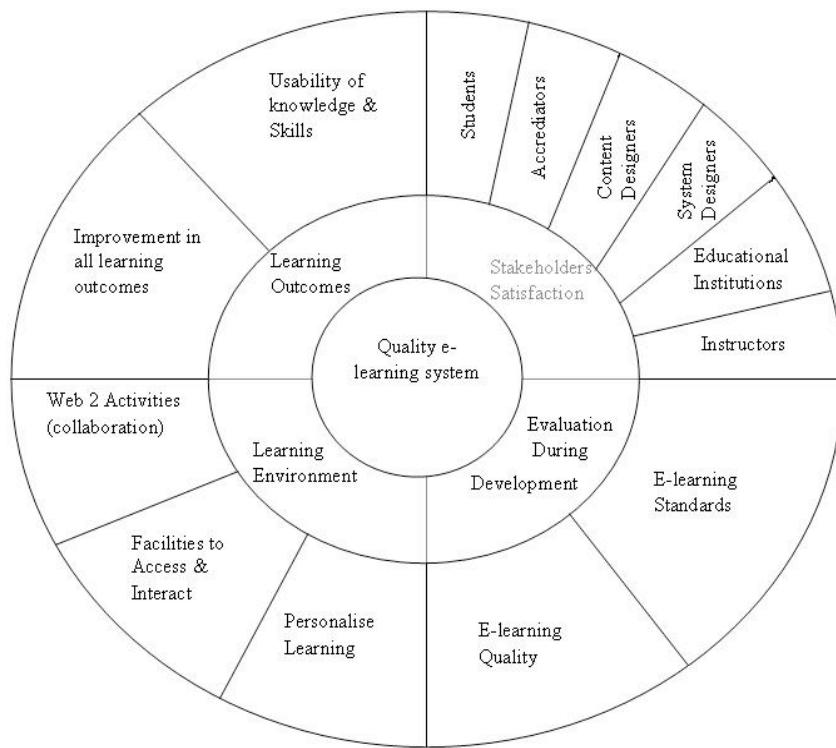
The above mentioned quality criteria have focused upon the technological part of e-learning systems disregarding very important parts in designing and evaluating the quality of an e-learning system such as those raised by Arbaugh [14] and Ehlers [7]:

- The pedagogical part in designing a quality e-learning system;
- The interaction between the instructor and his/her students and between the students themselves;
- The quality of the taught materials; and
- Course structure and design. (Arbaugh, 2001; Ehlers, 2004)

These criteria have implications for the whole matrix of designing, implementing, and evaluating an e-learning system regarding all the elements that influence the quality of e-learning systems.

In order to capture the multidimensional nature of an online professional quality system, designers and evaluators must follow the guidelines from numerous conceptual frameworks to design a plan that will collect vital information about whether or not system objectives were met and whether best practices were implemented. As a reflection to this challenge and as a responding to all the needs mentioned above, the authors propose a model for designing and evaluating quality in e-learning systems incorporating: (1) Stakeholders Satisfaction; (2) Learning outcome; (3) Environment Facilities; (4) Evaluation during Development.

4.0 A Stakeholders' Satisfaction Model



Students

Whether e-learning courses were blended e-learning or the entire courses were online, modern higher education students should be encouraged to use e-learning systems. Researchers, Allen [21], Wilkes [22] have showed that students' satisfaction plays a very important role in encouraging students to participate in e-learning courses. An important question is how student satisfaction in e-learning systems can be increased, and this becomes more urgent, from many aspects, as the world moves from the "early adapter" stage to the "wide spread usage" stage. There is a strong argument about the best strategy for e-learning is for it to be based on the learners, thus the needs of the learners have to be determined in a concrete manner before starting the e-learning system. Research by Wagner [8] has also linked higher levels of interactivity with increased student satisfaction in e-learning. Students' satisfaction concerns satisfaction with the quality of the course, the interaction with both their instructor and their colleagues, and with the support they find during learning with the e-learning system.

Instructors

Learners have preferences towards the communication and cooperation with the tutor of online course. Ehlers' study [7] showed that the tutor support is very important for learners in general, that 97.7% of learners value tutor support as "important" or "very important" aspect. Thus, it is important for the instructors to have the motivation and the satisfaction in the e-learning system s/he uses.

Instructors can be encouraged to use e-learning systems: by their institution's policy or provision; their professional or personal wish to reach as much students as possible; or their interest in the modern technology use in the field of education. Other research by Lee [23] and Wagner [8] has reflected that in recent times, the instructor's role has changed from student's source of the knowledge into a manager or a director for the knowledge sources. The important question still remains, how do instructors participate in ensuring an e-learning system is a quality and enjoyable useful e-learning system? In order to increase usefulness and enjoyment in an e-learning system instructors should "vary the types of content, create fun, provide immediate feedback, and encourage interaction".

Accreditation Bodies

The more e-learning applications expand, the more important for the accreditation bodies to ensure that they encompass e-learning in their own standards. In today's world it is important for e-learning courses to be taken seriously and in order to be so; a proper accreditation process for the courses should be established to give credence and added-value to the resource.

Content designer

Content designers should be motivated to use e-learning systems in delivering their courses; this motivation could be rewarded by the increased learning results or the copyright/licensing arising from selling their products to multiple customers.

The content provider's responsibility is to prepare the course in a format that allows the content to be supported by different e-learning technologies. It is very important for the content designer to have the reasonable computer literacy to enable him to judge the possibility to transform the content into an e-learning content.

System Designer

E-learning system designers are also motivated to provide users with an effective e-learning system but their contribution is evaluated so s/he needs to develop his/her system continually in order to obtain the satisfaction of all other

stakeholders with his/her e-learning system. It is a very important issue that system designer should be an educational instructor as well, in order to understand the different learning styles and to have the ability to cope with each type in his/her design. Thus, it is very difficult to be a successful e-learning designer because you have to provide a system that accommodates consideration personalisation of the learning process and to cope with the differing characteristics of the students.

Educational Institutions

Higher Education institutions are highly motivated to adopt e-learning system for the advantages they offer to the learning process. Converting into e-learning method of delivery has a lot of benefits in higher education institutions such as the ability to reach to a lot of students in different places around the world and at different times breaking the shackles of time and place and the overheads of accommodation and services. The institutions must be satisfied with the designed e-learning system from both the technological and pedagogical aspects in order to accomplish their aims.

5.0 Learning Outcomes

Although all the benefits of the e-learning systems to the stakeholders have been identified, there is an important question still to be asked, how is the effectiveness of e-learning assessed? From an economic perspective, educational institutions will look for a return of their investment in e-learning systems, but on other hand, it is important to consider effectiveness in terms of learning outcomes.

Usability of knowledge and skills:

The situation today is not only characterised by the importance of knowledge and information, but the acquisition and application of knowledge described as capability. The importance of learning (in general) is determined by how much knowledge is gained and can be used. In other words, the usability of what is learned determines the quality of learning; the usability and increased capability is also a measure of e-learning.

Improvement in learning outcome:

UCE Birmingham [24] identifies earning outcomes as: “*the specific intentions of a programme or module, written in specific terms. They describe what a student should know, understand, or be able to do at the end of that programme or module.*” Thus, it is very important to know the exact outcomes required of the e-learning system before the design process begins. In order for an e-learning system to be a quality system it must show that, through its use, a measurable and

noticeable enhancement in one or all of the learning outcomes (knowledge, skills, and attitudes) are accomplished.

6.0 Learning Environment

The collaboration sequences in the online course focus on the social interaction through online discussion, group activities, web logs, wiki and computer mediated communication in general.

Personalised learning

One of the current issues in the e-learning field is how to communicate with each student as if he is the only student learning within the e-learning system. This can be equated with coping with the learning style of each student. Thus, one of the ways to evaluate the quality of an e-learning system is to evaluate its tools of coping with different learning styles.

E-learning facilities to access and interact

An aspect of evaluation of the quality of e-learning systems relates to accessibility by students and the opportunities the system offers for the users to interact with each other and to interact with the instructors. These considerations have a technological aspect regarding the accessibility and a pedagogical aspect relating to the kinds of interaction available for the users of the system.

7.0 Conclusions

Higher education is confronted with a number of challenging yet opportunistic changes in teaching and learning. Institutions are forced to respond to emerging challenges such as: broadening of the student body social profile, expanding and changing curriculum subject areas, the tensions between research and teaching endeavours, the rapid developments in ICT, the shift in learners' expectations and the impact of financial pressures. The development of e-learning opportunities is an important aspect of that response to the challenges.

The proposed model of e-learning implementation acknowledges the motivations arising from the challenges: improving the quality of learning, improving access to teaching and reducing the costs for providers. It incorporates: stakeholders' satisfaction; learning outcomes; learning environment functions; and assessment facilities. Consequently the model facilitates:

- flexibility of learning at the time, place, and pace learners choose;
- increased quantity and quality of interaction of learners and tutor;
- scalability of deployment and reducing the costs of education;
- increasing accessibility and
- reducing aspects of technophobia;

An important criterion for designing and evaluating quality e-learning is the continuing evaluation of the system during the stages following implementation.

This evaluation will be developed over a group of benchmarks for implementation and evaluation of quality e-learning; and

accommodating various learning styles and increasing personalisation.

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