A New Instructional Competency Model: Towards an Effective E-learning System and Environment

Ahmed Al- Hunaiyyan
College of Business Studies, PAAET, Kuwait
hunaiyyan@hotmail.com

Salah Al-Sharhan
Gulf Univ. for Sc. & Technology, Kuwait
alsharhans@gust.edu.kw

Hanna Al-Sharrah
Ministry of Education, Kuwait

Abstract:

Today, e-learning systems and technologies become of a vital importance for the education advancement towards the 21st century learning and to have an effective teaching and learning environments. E-learning technologies aim at providing an interactive environment that is rich in applications based on computer technologies and internet. In such an environment students are enable to access the learning resources at any time and from anywhere. In addition, e-learning offers the latest learning methods using the most modern communication tools such as computers, networks and multimedia (audio, picture, graphics), search mechanisms and electronic libraries as well as Internet portals whether remotely or at classroom. Implementing e-learning system requires an efficient e-learning framework to have a successful implementation. In addition, this technology inflicts many challenges face the teacher and forcing him to keep pace with modern developments, whether educational, or technological or behavioral developments. In this work, we present a new instructional competency level that enables the instructors to be an efficient factor in the new environment.

Keywords-component; e-learning model, Instructional competencies, instructional design

1. INTRODUCTION

We are witnessing a numerous growth and rapid advancement in communication and computer hardware and software and educational technologies. To cope with these changes, several international initiatives have been launched e-learning projects toward the twenty-first century learning[1]. The main objective of these e-learning initiatives is to provide an interactive learning environment that utilizes a wide range of technologies and computer applications in addition to the Internet applications and collaboration tools. In addition, it utilizes multimedia applications and components, such as audio, video and graphics, search mechanisms and electronic libraries as well as Learning Management Systems (LMS) whether remotely or at classroom, and electronic libraries in a way that contributes and promotes the transition toward the twenty first century learning [2].

However, implementing a successful and efficient e-learning systems, an efficient framework and model must be designed and adopted to integrate all the different components of the e-learning and communication technologies, infrastructure, education, social networks, awareness and teacher/instructor
readiness [3]. Implementing a successful e-learning system requires an efficient methodology that incorporates all the essential components of a proper e-learning implementation. This is due to the fact that a complete e-learning environment incorporates several highly-dependent elements that form complex distributed systems. However, and due to the multiple-dimensions of e-learning systems, the process of finding a proper model and a framework forms a real challenge. In addition, the new technology based environment in schools inflicts many challenges face the teacher and forcing him to keep pace with modern developments, whether educational, or technological or behavioral developments.

In this paper, we present an integrated e-learning model that incorporates all the required components of an efficient e-learning system. Based on this model, an implementation framework is presented for such a complex system. Furthermore, a new instructional competency level is present to enable instructors to be effective in the e-learning environment.

II. AN INTEGRATED E-LEARNING MODEL

Realizing the fact that a successful e-learning system must orchestrate different technological, pedagogical, cultural and social components creates another challenge. Examples of these components are an efficient infrastructure, smart classroom technologies, providing and efficient Learning Management System (LMS), designing and developing on-line digital content, training and society awareness. In addition, any e-learning adoption must match learners’ expectations in order to keep them motivated and attracted to the system. Learners and instructors also must have efficient tools for knowledge presentations, searching for information, retaining information [4], [5].

Another dimension of the problem is to provide a flexible and integrated competency model to guarantee an efficient integration between the e-learning systems and learning and teaching environment. Hence, an integrated competency model must be presented in a dynamic way to ensure a successful and efficient integration between the e-learning systems and learning and teaching environment. The main objective of the proposed model is to ensure that teachers/instructors possess the required competencies to be an efficient facilitators in the rapidly changing e-learning environments in the schools and institutions.

This work presents a new integrated blended e-learning model and framework for an efficient implementation in both K12 and higher education. Based on the proposed model and engineering framework is developed to successfully incorporates all the different components of the e-learning systems at the different levels such technical and technological educational, social and media and awareness levels. Furthermore, the paper presents a new Educational Quality Assurance model that integrates with the blended e-learning model. The proposed model takes into consideration the factors related to the foundation of an education system, or what we call the internal factors, in addition to the environments factors, or the external factors, in addition to the e-learning factors and environment. Finally, the paper presents a new flexible and integrated competency for the teacher and instructor readiness in the e-learning environment.

III. E-LEARNING AND BLENDED LEARNING

E-learning can be generally defined as any form of learning that utilizes a computer/communication network for delivery, interaction, or facilitation. The network could be the Internet, a University Local Area...
Network or even a corporate Wide Area Network[6]. In this environment the learning can take place individually (guided or instructed by a learning management system) or as part of a class. E-learning is an efficient and highly effective method of enhancing traditional teaching methods and creating a creative and interactive learning-teaching environment. In the literature, there are several definitions for E-learning. Most these definition depend on the point of view and background that triggers the definition such as education, IT or psychology. A common E-learning is defined as the: “delivery of content via all electronic media, including the Internet, Intranet, Extranet, satellite, broadcast, video, interactive TV, and CD-ROM. It encompasses all learning that people undertake, whether formal or informal, through electronic delivery.” [7]

Modern types of E-learning can be found in different formats. However, there are three main modes that can be identified. The first type is a full-fledged on-line, or distance, learning where independent learning material is provided fully on-line. Collaboration and interaction between the students and the professors is also conducted virtually via the collaborative tools available in the learning environment. This scheme is sometimes called distance learning. The second type is based on integrating the technology within the learning experience. The e-learning is offered as additional learning materials or aids in parallel to classroom learning in order to enhance the education quality and effectiveness. The third type is based on the integration of the technology within the classroom. On-line learning materials are used while tutoring in a face-to-face classroom setting. This type is the most effective one in merging the technology with the conventional pedagogical aspects [8] and is called blended learning. In blended learning, on-line courses and learning objects can be accessed within classroom sessions as teaching aids inside computer laboratories or smart classrooms technologies. Students and faculty can access courses anytime, anywhere provided they use a computer connected to the Internet. Graham defined the blended learning as follows:

“A blended learning approach can combine face-to-face instruction with computer-mediated instruction. It also applies science or IT activities with the assistance of educational technologies using computer, cellular or iPhones, Satellite television channels, videoconferencing and other emerging electronic media. Learners and teachers work together to improve the quality of learning and teaching, the ultimate aim of blended learning being to provide realistic practical opportunities for learners and teachers to make learning independent, useful, sustainable and ever growing.” [9].

Al-Sharhan et. al, introduced a delivery model for the new E-learning environment as explained in [10]. The delivery environment describes the medium where the learning and teaching process are taking place. The elements of the environment are the learning management system, multimedia equipped classrooms (smart classrooms), and network or the Internet. The learning activities can be achieved in the delivery environment using the following framework that summarizes the blended learning process. This model was enhanced based on several cases studies of e-learning implementation. The new proposed model extends the previous delivery model and address all the factors related to both the internal and external environments of implementing an efficient e-learning. By the internal environment we mean the school environment whilst the external environment means the society environment. Figure 1 depicts the new model [11].
A. Implementation Framework

In the above model, the medium of delivery is the network and usually it is the Internet. Success factors related to the medium of delivery are mainly related to network efficiency. In other words, these factors are related to the bandwidth, strong wireless coverage, application architecture and network’s security. The delivery medium requires many-to-many communication (i.e., multi-casting). Hence, sufficient bandwidth plays a key role in ensuring smooth delivery. Another important factor is a good wireless coverage and up-to-date tools and protocols in the smart classrooms. In addition to the tools and technologies provided in a smart classroom, every student has his/her laptop and has an access to the content via the wireless network inside the class. Smooth and fast delivery via the network motivates the students and avoids frustrating waiting time to complete the content download. It is worth mentioning here that these issues are tackled in the delivery framework as high level factors and not from the perspective of technical and low-level design.

One can see that the above framework incorporates several areas in order to have an efficient blended E-learning implementation in K12. Specifically, the framework that form the blended e-learning program in K12 are as follows:

1) Infrastructure component at both the central and distributed levels. The Infrastructure projects aims to provide a high-performance data center in the head office and the required computing devices in the schools. It also provides all the network facilities in the schools and Head office to work in both centralized and decentralized manners.

2) Learning Management System. This component provides a single-sign-on portal that provides a complete learning management system and collaboration tools for learning process. It also provides a complete hierarchy of public websites for the different stakeholders in the E-learning initiative. The E-learning gateway represents the access point for the students, teachers, management and parents to experience the E-learning.
One component. It aims at proving each student and teacher with a laptop. The optimal goal is that library component. It provides and establishes a big digital library of scientific and international research line courses that are hosted on the Learning Gateway.

3) Interactive Multimedia based Content. The target of this component is to digitize the conventional curricula and transferring all the textbooks into interactive on-line courses that are hosted on the Learning Gateway and tracked by the LMS. Also, digitized courses can be utilized off-line by providing them on CDs, Laptops, or desktop computers.

4) Smart Classroom component. The Smart Classroom component aims at applying smart technologies in a physical and conventional classroom. The project bridges the gap between modern technology -based and traditional classroom activities in terms of the teacher’s and student’s experiences. More specifically, the components of the smart classroom enable the teacher to utilize modern technology to enhance the teaching experience. All the teaching activities can be recorded and hosted on the learning gateway for future consideration. In addition, the smart classrooms component will provide the teacher with efficient tool to manage the class and provide the students with an exceptional teaching and learning experience.

   The smart classroom technology turns a conventional classroom into a natural user interface for E-learning era. Teachers in the Smart Classroom can utilize different smart components inside the class or freely using conventional teaching methods to instruct students in a blended methodology.

5) One-to-One component. It aims at proving each student and teacher with a laptop. The optimal goal is that the laptop will be the only tools that student will need in the school where they can access the interactive digital content of the curricula from their laptop.

6) Smart Schools. With the E-learning era, schools must be smart in terms of providing full wireless accessibility, IP telephony and video conferencing. For example, students can access the gateway using their laptops via the wireless network while the principal, for example, can have a video conference with the Ministry management without leaving the school.

7) e-library component. It provides and establishes a big digital library of scientific and international research databases. In addition, it provides a huge library of eBooks and other online resources.

8) Teacher Readiness component. One of the most critical challenges that face a successfully E-learning adoption is the technical skills of the teachers. Naturally, when introducing a new technology in a traditional setting environment it is important to assess the knowledge and skills of the users before dealing with the new technologies. Evaluating the training needs and requirement of the teachers and management is a vital factor to have a successful implementation of the E-learning project.
9) Media and Awareness Campaign. It goes without saying that awareness is a crucial factor for any project to be a success. Awareness has a vital role in E-learning projects to the fact that these projects targets different levels in the society and deal with behavior change. E-learning works directly to introduce new educational models, skills, and attitudes at the level of the schools, managements, and society [12].

Figure 2 depicts the E-learning projects incorporated in full-fledge E-learning implementation in K12. It is worth mentioning here that all these projects are highly interconnected where the failure in one chain may cause serious problems in the whole implementation.

IV. A NEW INSTRUCTIONAL COMPETENCY MODEL

Implementing e-learning system imposes a new modern technological environment in schools. In addition, this technol- ogy brings many challenges confronting the instructor/teacher and forcing him/her to keep pace with modern developments, whether educational, or technological or behavioral developments. The modern educational environment based on applying and investing the technology in the educational process enhances the role of the teacher, where this role becomes the cornerstone to the success of the educational process and its transition towards the education of the twenty first century. In such an environment, the teacher becomes creative and reliable in managing the educational process, and capable to lead and direct it to form an interactive learning environment that motivates the learner is to be a researcher for the information and not only a recipient. In such an environment, the role of the teacher is indispensable, and his skills must be developed in a unique way that allows him to manage the learning process effectively. Moreover, the teacher’s character will be affected by the new technological environment from several important aspects. These aspects are summarized as follows:

1) Knowledge and Cultural Competencies.

2) Technical and Technological Competencies.

3) Practical Competencies.

4) Behavioral and Social Competencies.

5) Supervision and planning Competencies.

6) Teaching methods and Instructional Design Competencies. The competency level is presented in figure 3.

A. Knowledge and Cultural Competencies
The instructor’s/teacher’s personality in the e-learning environment is affected by the knowledge and cultural aspects. These aspects are not limited to teaching, but surpass it to include a massive influx of knowledge through computer networks, Internet, and other learning sources and e-libraries. The teacher’s role in the e-learning environment; based on technology and modern communications; is to facilitate, lead and supervise the educational process [2]. Moreover, in such an environment, the instructor/teacher is involved in the instructional design process where he prepares the educational and scientific material and the appropriate teaching methods. In addition, knowledge broaden requires the effective interaction between instructors/teachers and interactive learners, where each of them finds the different learning sources of knowledge according to their ability. Hence, the instructor faces a new reality based on the large amount of information brought by learners from different Internet and knowledge sources, and therefore the teacher confront cultural challenges[5].

B. Technical and Technological Competencies

The integrated e-learning environment imposes that the instructors/teachers to interact with computers, computer networks, Internet, and learning management systems, in addition to different display devices and interactive white boards. Therefore, it is important for instructor to be competent with how to use those techniques and tools within the classroom environment, as well as how to adapt those tools to serve the curriculum and help the students to use those techniques. The teacher’s role in such environment is to interpret and explains the curriculum using all technological tools, and therefore it is essential for him to be familiar with the use of such tools in addition to his ability explain the curriculum using the technological and modern tools and being able to deal with it efficiently, and help the students to use it [10]. The new role of the teacher requires him to have full knowledge of the Internet and how to use its components. The teacher should also be able to identify the information sources available on the Internet and access it via search tools and mechanisms for their effective use in the educational process. In addition, the teacher should have the ability to assess the information available on the Internet. Moreover, the teacher should also be familiar with computer networks, learning management system and educational applications provided by the network such as search engines, emails, chat, file upload. Also, he must have the ability to verify the adequacy of learners’ technological and technical skills and assure their knowledge to use the learning management system and classroom management system.

C. Practical and Hands-on Competencies

This competency focuses on the new reality imposed by e-learning and the 21st century education model which provides many modern and technological tools that enrich the learning process. In the e-learning environments, the latest technological tools are used to create an interactive environment for both teachers and students where they can use these tools to interact with the teacher and/or other students, access the e-curriculum and enrich the learning experience. The practical and hands-on aspects in the educational field have multiple forms and require many skills and abilities. It is essential for the teacher to have the required skills and abilities to use and benefit from those tools and use them to interact with the students and the curriculum in the classroom. One of those tools, for example, the video, whether on the Internet or prepared by the teacher himself is considered one of the most important tools and requires high skills and abilities. In addition, the teacher can benefit from the “Video Conference” tool to host a guest to explain a specific topic to the students; which
requires the teacher to be familiar with these tools and their uses. Moreover, other e-learning modern methods include e-book, interactive e-curriculum which is designed according to multimedia tools such as interactive whiteboard which requires the teacher to be aware of them and their uses. This environment provides the teacher with the tools required to enhance and develop the learners’ scientific thinking skills and encourage them to interact with this environment. Figure () below shows some of those necessary and required skills.

D. Behavior and Social Competencies

The instructor/teacher can play different roles in the e-learning environment as he facilitate and direct the learning process and interacts with his students. In addition, the teacher has to achieve his goals and objectives by understanding the learners’ needs, behavior and abilities. Also, he should be able to interact with the learners as well as instill the positive behaviors by urging and guiding them to observe the ethics and taking into consideration our religion while interacting with the e-learning environment. Those behaviors can be summarized as follows:

- Ensure the proper handling of devices and educational software.
- Spread the ethical social networking tools.
- Encourage the interaction with other colleagues and teachers in a scientific competition atmosphere.
- Instill the values of respecting others rights among learners through mentioning the information resources and quotations in order to preserve the intellectual property rights.
- Raise the awareness about the safe use of the Internet.

In addition, the teacher has to understand the learners’ abilities and needs and have to provide with the learning opportunities that supports their mental and social development. This should be achieved according to the modern technology and provide a variety of teaching strategies to help the learners to develop their critical thinking, problem solving and performance skills [8].

E. Supervision and Planning Competencies

In the era of e-learning, the role of an efficient teacher is to plan, supervise and facilitate the learning process in the classroom. The teacher must have the ability to plan for the learning process and design the required tools and mechanisms that improve the capabilities and abilities of the students to use the communication skills. The following are the capabilities to be met by the teacher [8]:

- **Planning Capabilities which assures the following:**
  - Determine the overall objectives of the e-curriculum.
  - Identify the requirements of curriculum.
  - Identify the target age group characteristics and their previous experiences.
  - Identify the requirements of the e-curriculum.

- **Design and Development Capabilities which assures the following:**
– Determine the educational objectives of the e-curriculum.
– Identify the teaching methods and strategies needed to achieve the goals of e-curriculum.
– Identify the learning activities and extra curricula that encourage the interaction among learners.
– Identify various tools used in the e-curriculum.
– Identify the various ways of interaction between the e-learners, teachers, and the curriculum.
– Identify the various methods of feedback.

- Supervision and Guidance Capabilities which assures the following:
  – Supervise and direct the learning process.
  – Create a learning environment that encourages positive social interaction and in active learning and motivates the self-stream.
  – Promote the positive research and survey, the active cooperation and interaction between students inside and outside the classroom environment.
  – Encourage students to generate knowledge, creativity and use of technical and technological tools.
  – Develop the potential intelligence of the learner including: scientific intelligence, linguistic intelligence, mental intelligence, mathematical, and social intelligence.

F. Teaching Methods and Instructional Design

The transition of education towards the 21st Century Education through the implementation process of e-learning system imposes a new reality on the instructional design process, which highlights the role of the teacher. The role of the teacher is not anymore limited to the conventional instruction methodologies. Rather, in the integrated e-learning environment he plays an effective role as he contributes to the instructional design process, and identifies the learning objectives and the learning reality for learners, as well as identifies the best teaching methods and tools. For example, Roberts Model proposed one the latest instructional design models where he shows us the importance of the teacher’s role in the instructional design process in the E-learning environment.

V. CONCLUSION AND FUTURE WORK

This work presented an efficient Integrated e-learning model and framework for K12 schools and Higher Education. The presented Integrated model is a crucial factor of a successful implantation of e-learning systems. This is due to the fact that contemporary learning environments are complex, incorporates several factors, and requires certain expertises and competencies in order to provide a high-quality education. However, several future directions are required to extend the research work toward a fruitful and efficient E-learning system. These directions can be categorized into three main areas; E-learning impact on behavior change and the evaluation of the E-learning experience.

Change behavior is another direction that can be explored. Changing learners’ behavior is one of the main challenges in implementing a successful E-learning and it spans multi-levels such as the students’
behavior, teachers’ behavior and the society behavior. Research that concentrates on studying the behavior change concentrate on measuring the learners and society behavior change as an outcome of the learning process in the new environment, either in a class on in a self-study format. The second direction to extend this work is the evaluation of the E-learning system and experience. The evaluation and performance measure is important to guide the E-learning adopters on their directions and future impacts.

References


