

A Proposed Mobile Learning Model for Egyptian Higher Educational Systems

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Abstract:

The quality of the mobile learning applications can only be delivered with an awareness of the special limitations and benefits of mobile devices. This is the reason for motivating the researcher to standardize the quality of mobile learning which was the principle in building the mobile learning proposed model for the Egyptian Higher Educational system. The present paper aims to investigate the standards and criteria for the mobile learning proposed model from three main aspects; the existing literature, the ISO/IEC 29140 standards and the mobile learning models. This is done by analyzing the existing mobile learning standards available in each aspect, then comparing the different standards to select the common standards for designing the mobile learning proposed model.

Keywords

Mobile learning, Mobile learning standards, Mobile learning proposed model, Mobile learning quality, Mobile learning models.

1. Introduction

Mobile learning is a type of learning which enables individuals to learn without limitation of area. It utilizes many devices such as PDAs, cell phones or tablet PCs at anyplace and at any time. These devices must help remote communicational innovations (GPRS, GSM, IEEE 802.11, Bluetooth) and have a possibility to show materials, and to understand an asynchronous / synchronous communication between learners and teachers. Mobile learning is more intuitive, includes more contact, correspondence and joint effort with individuals [1]. Mobile learning has attracted attention because of the expanding number of accessible mobile devices, which are reasonable and their expenses are progressively diminishing making them more available to individuals. In the meantime, these devices have various advantages and abilities [2]. Recently, mobile devices are accessible to learners whenever and wherever [3]. Mobile learning is a way to deal with electronic learning that uses mobile devices. So, the quality of mobile learning must be

conveyed with a consciousness of the exceptional constraints and advantages of mobile devices.

According to Wong [4], Internet connectivity is the main default that allows the user to take advantage of many capabilities [5]. Attewell [6] suggest that mobile learning aids the improvement of the higher educational institutions. So, according to Chou [7], with sound pedagogy and implementation, one-to-one learning has the potential to transform the classroom into a true learner-centered environment in which communication, collaboration, and creative problem-solving flourish to create student-driven learning. Instructors ought to adjust the outline of the courses to incorporate the mobile learning quality standards and criteria, this plan ought to be dynamic, effectively adaptable and ought to be connected consistently [8]. The quality of the mobile learning was previously determined according to the technical quality regarding the software, the hardware and the available network. All these elements are being replaced by the standards and criteria to be followed in building up the mobile learning application to meet the requirements of the learners.

In this paper, the standards mentioned in ten different existing literatures, the ISO/IEC 29140 and the existing mobile learning models was investigated. Actually, by establishing and maintaining standards and their criteria, institutions can effectively reengineer their learning programs to deliver high quality online education. The paper is organized as follows. Section 2 discusses the related work of the mobile learning and clarifies the purpose of the study. Section 3 clarify the status of the current teaching and learning of Egyptian Higher Education. Section 4 illustrates the mobile learning adopted standards to find out the standards and the criteria used in building the proposed model. Section 5 will present the proposed mobile learning model. And finally, the last section for the conclusions and future work.

2. Related Work

Previous research recommends that there are different factors that help the evolution of mobile learning. According to [9] who made an empirical study towards a quality model of technical aspects for mobile learning services, there was a proposed model that captures most abstract and generic technical quality aspects of mobile learning. An exact examination of quality issues is ordinarily announced after the advancement of portable

learning applications. This model assesses the possibility of the fruitful improvement of new mobile learning items, the adoption of a complete and well-defined set of technical quality aspects for mobile learning development and their adoption in the education environment. This work described a model that catches most theoretical and nonspecific specialized parts of mobile learning administration quality including accessibility, quick reaction times, adaptability, mobility, ease of use, usefulness, execution and security. The findings, point to an arrangement of logical specialized quality factors that impact the decision of portable learning application. The discoveries additionally show that there are causal connections between student fulfillment and the overall proposed model technical quality aspects.

An empirical study by Mohammed Amin Almaiah [10] for the Mobile learning system quality factors which is an investigation to explore factors that achieve high quality of mobile learning system based on students' perspectives. This study presents three frameworks for mobile learning system based on quality factors derived from the updated DeLone and McLean information system success model. This study used the questionnaire as a quantitative method to explore quality factors for mobile learning system based on perspectives of 392 students. It opens future work for using the identified quality factors as guidelines for researchers and designers to design and develop mobile learning applications.

Another investigation by Abide Coskun Setireka and Zuhail Tanrikulub [11] for recognizing the variables influencing the mobile learning sustainability which encourages and advance future empirical research. The investigation gives rules to help portable learning activities in supporting a powerful mobile learning for designing and improvement. The paper finds that some formative mobile learning sustainability factors are fundamentally essential. However, most of the m-learning initiatives disregard these factors.

The New Media Consortium in 2013 predicts that online learning, social media, and the bring-your-own device movement are emerging technology trends that will be adopted by community colleges. These trends are a direct result of mounting student demands for more personalized and mobile learning opportunities. Despite these reports, the literature provides minimal evidence that community colleges are adequately prepared to manage mobile learning on their campuses. A growing number of articles and books offer examples of mobile learning in higher education [12]. Osman and Cronje [13] placed additional emphasis on the mobility of the learner and the learning content. They claimed that the mobile learning experience is less about the use of a smartphone or tablet, and more about the ability to enhance a learner's sense of individuality and community as well as his or her motivation to learn through participation in collaborative learning. To that end, mobile learning is completely individual and different from the rigid structure of the traditional classroom, lecture, or laboratory experience.

Nevertheless, universities in the oil-rich Gulf Cooperation Council have shown particular interest in mobile learning which currently is treated as fashion but at the same time is considered by corporations and educational institutions to be very promising. There is expanded enthusiasm for mobile learning reception in educating and learning in the district, however, there is limited research conducted [14].

The purpose of this paper is to find out the standards and the criteria needed to build up a mobile learning proposed model in the higher education. The paper is useful for those who are interested in the field of constructing mobile learning applications.

3. The Status of the Current Teaching and Learning of Egyptian Higher Education

Today there is no obstacles to learn and to know. Technology has helped to increase the ability to read, write, and gain information about almost any subject. The Internet and the new emerging devices opened up the world to facilitate the learning process. This quick development enhances the new trend for using mobile devices in m-learning in the Egyptian higher education.

Since 1985, Egypt as a developing country has many investments in constructing its ICT infrastructure in the Egyptian Universities. In 2008, the Egyptian government establishments consider the requirements including: providing universities mutually high-speed net networks; finding establishing video conference to link all the universities. Progressively, broadband availability and high data transfer capacity are expected to support education in Egypt over the internet, especially for two-way synchronous communication, or utilizing the web applications and databases that have high limit necessities [15].

The Egyptian Higher Education has addressed the issues of infrastructure for many universal services. This is to reach out the unconnected parts of the country to manage development in ICT. [16]. There is consistently an admission period of time to improve the internet services level regarding the newly immersing communication technology in Egypt. The ICT in the Egyptian higher education comparatively changed the process of communication transfer especially in E-learning. As there is an immediate transfer of information over the network more rapidly if compared to the past, a great development was made about the electronic library in the Egyptian universities regarding the availability to offer the needed references. The World Bank is pushing for improving the quality of higher education. The World Bank considers Egyptian higher development to be 'severely compromised' now because of centralized governance. So, Egypt's government increases the IT teachers to help the progress process [17].

In the Egyptian higher education practically, educational institutions are moving towards online learning and teaching. Accordingly changing the style of

teaching, enables a movement thus from the lecture sessions and being uninterested to what they receive to a more observant learning environment. The trend nowadays is to be able to use mobile for learning purposes in higher education institutions to facilitates adherent engagement in the learning process. This is needed to enable student-to-student or student–instructor interactions—potentially prime to improve collaboration. Instructors and students can manage mobile learning inquiry to answers questions, review, imagine opinions, admit comparison with in-class discussions, hold students answer, collaboratively inspire information.

The National E-learning Center in Egypt NELC joined the Supreme Council of Universities (SCU) in January 2009, after the end of the first phase of the Information Communication project (ICTP). It is now providing continues evaluation of electronic courses which produced in the Egyptian Universities. It is the planned goal established by the Information & Communication Technology at the Supreme Council of Universities in Egypt. Its main objective is to implement the electronic learning in the Egyptian universities. The actual intend is to enhance the higher education in Egypt, through using E-learning as a basic educational model within the Egyptian Universities to cope with international levels of education It is concerned with putting the polices and regulations of the E-learning centers. NELC detects the practicing and the power of E-learning in the Egyptian universities. The NELC main function is to develop the E-courses and establishing more centers to enable more participation for the faculty members and the development team. The National E-learning Center in Egypt (NELC) provides all the required devices as well as the IT professionals needed. The center (NELC) developed several software tools in order to improve and facilitate the process of production and publishing of E-courses. It offered about 577 E-courses for different scientific fields with more than 6000 learning objects.

4. Mobile Learning Adopted Standards

Designing for mobile learning is a critical challenge. The characteristics of mobile learning should be investigated. Consequently, a deeper insight into the standards and the criteria which is required to better understand the different methods to adopt mobile learning mobile learning models. This requires deciding the standards and the criteria of mobile learning. The standards can be characterized as the level to accomplish. Others characterize it as the level of quality. While the criteria can be characterized as the rule we need to use to judge something. Simply, a criterion is a defined specification to fulfil in order to reach a standard.

In spite of the fact that sometimes portable learning is viewed as essentially an augmentation of E-Learning and simply one more channel for conveying a similar substance, however, nature of mobile learning must be

conveyed with an attention to the uncommon limitations and advantages of cell phones. portable learning administrations can have increasingly ubiquitous presence and availability via mobile devices at any time which provides convenience. So, the researcher surveyed the first aspect which is the already existed literature on mobile learning standard and the ordinal scale used to determine the standards common in these lectures. Rate of 50% was a base of the measurement for ten references taken. There are only six standards higher than 50%. Regarding the second aspect which is the ISO/IEC 29140, there was a list of standards and criteria that should be considered when learners are endeavoring to be engaged in a learning process. And The third aspect is surveying of the already existed models on mobile learning standards which differs in percentages according to their existence in each model. The standards which is less than 20% is unacceptable and omitted. Finally, a comparison between the thee previously mentioned aspects to find out the main standards to be followed. The proposed model is based on these standards and criteria resulted from comparing the three different aspects investigated.

Those standards and their criteria are listed below and represented in figure 1:

1. User Interface:

- **Layout & Organization:** Simple and intuitive to use with attractive design.
- **Effectiveness:** Useful, appropriate and meaningful to increase the user productivity.
- **Accessibility:** Usable as possibly by as many people as possible.

2. Functionality:

- **Variety of functions:** Offering many features to deal with various situation.
- **Interactivity, Communication & Collaboration:** Offering various communication modes.

3. Reliability & Maintainability:

- **Error Free:** Should be correct and accurate with no errors.
- **Fault Tolerance & Recoverability:** Should always be available in any environment.
- **Easiness of Installation:** Easy and fast to install at any device.
- **Easiness of Maintenance:** Should need minimal effort and time to maintain its efficient operation.

4. Efficiency & Performance:

- **Responsiveness:** Response to a change should be fast and appropriate.
- **Communication Bandwidth:** Should utilize the BW efficiently and adjust its operation to the available BW.
- **Memory Storage:** Memory management techniques may be used to increase the performance.

- **Output:** The quality of the displayed images should be the best possible for the available screen size and resolution.

5. Connectivity:

- **Standards Conformance:** Compatible and easy to work together with other standard-based applications, data format, databases, devices, networks, platforms.

- **Variety of connectivity:** Support as many different data and systems as possible. For example, it would support various multimedia format.

- **Portability:** Easily import from and export to other systems data and services.

- **Transparency:** Should be transparent to the learner, should be harmonious and should concurrently operate with other applications without any interference.

6. Security:

- **Security Completeness:** Incorporate current, updated security technologies and should completely protect the access, storage and communication of the data.

- **Security Levels:** It should ensure that users are able to perform what they are allowed to do.

- **Privacy:** Support the user's confidentiality and trust.

- **Security Control:** Should have control over his data.

7- Usability:

- **Integration:** various functions in this system were well integrated

- **Simplicity:** Consistency and clearness within the various functions.

- **Easy to use and learn:** most people would learn to use this system very quickly.

8- Personalization:

- **Transparency:** Responses to any change should be transparent to the user.

- **Tailored:** Tailored to the individual user.

9-Contextualization:

- **Orientation:** should offer many orientation facilities (e.g. sitemap, index, next, previous, home, exit, undo, redo, history trail, prediction, save, print).

- **Media:** Various media types with high quality.

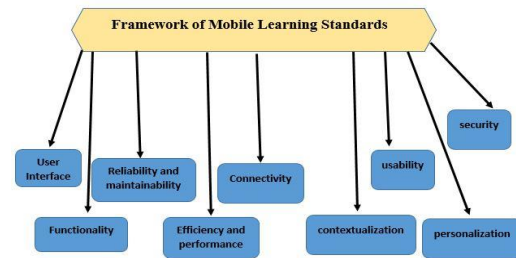


Figure 1. Frame work of Mobile Learning standards
The following figure represents the percentages of the previous standards:

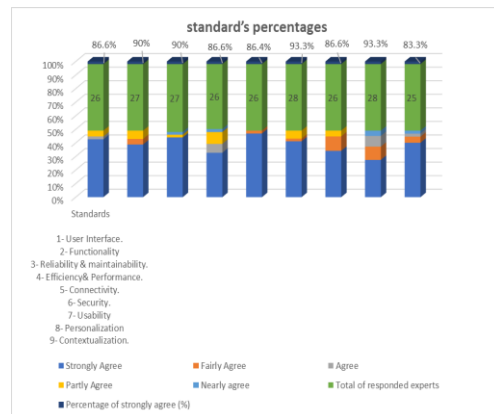


Figure 2. strongly agreed standard's percentages

Figure (2) represents all the standards that was taken when building the proposed mobile learning model. The researcher took the rate of 50% as a base of the measurement. The standard greater than 50% was accepted, therefore, the experts agreed on the nine standards previously mentioned as they exceed the determined percentage.

5. The Proposed Mobile Learning Model and Discussions

The development and popularization of mobile learning should be step by step, accompanying by the development and popularization of common mobile communication technology (such as 3G, 4G). The mobile learning *standards* in the proposed model includes the best practices that must address issues affecting the *creation, delivery, interoperability, and discovery* of mobile learning. In the investigation of these issues, standards and criteria issues should also be determined for the mobile learning content and model building. So, the previously mentioned standards mentioned in the previous section were used in building the following proposed mobile learning model. Figure 3 represent the mobile learning proposed model:

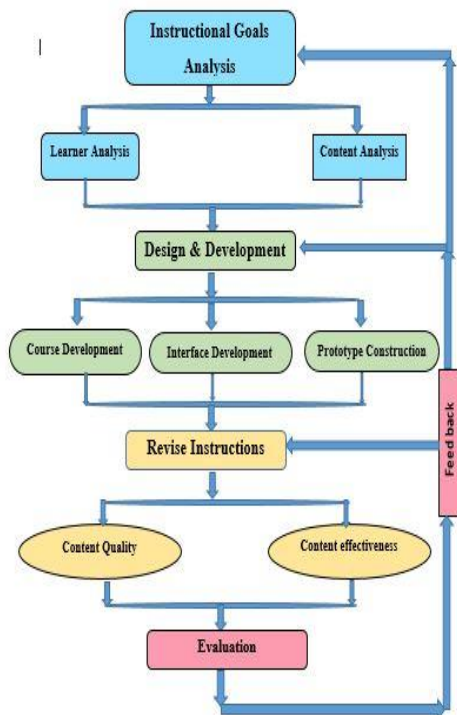


Figure 3. The Mobile Learning Proposed Model

The previously mentioned model gathers information about the end-user, scope, and the course syllabus. This stage follows the standards previously mentioned when determining the context and the media when adapting resources to mobile learning. This model includes:

1) Instructional goals analysis

This involves:

- Instructions to help learners reach learning goals.
- A description of the learning environment in which the instruction will be used.
- Describing the environment in which the context will be implemented.
- Determining what the learners should know or be able to do and the prerequisite skills and knowledge that learners will need in order to achieve those goals.
- Careful identification and description of a target audience is crucial to the success of instructional design efforts.

2) Design and Development

It is concerned in organizing the content. It also defines the graphical and mobile learning characteristics. This phase requires Course development, interface development and prototype construction to end up with the mobile learning application. This includes the following:

- Instructional interface by using the discussion topics and embedded questions to stimulate an attitude of application's interaction.
- Whole course development which enable the interface development by designing features that must

capture learners' attentions by using the appropriate media and links.

- Prototype construction to simulate the application for the learners as a demo enabling them to understand the structure before using it.

3) Evaluation

It provides information to the task or process of learning that fills a gap between what is understood and what is aimed to be understood.

- Uses the feedback and the evaluation as an information with which a learner can confirm, add to, overwrite or restructure new information to enhance the collaboration process between the learners.
- Continuous evaluation for the student's performance, media components and instructor performance.

This model is a circular model as the items listed above are interdependent. The model insists on having the instructions for the entire system. There must be a relationship between the content to be taught and the performance required. This was done by distinguishing the learning activities that can be associated with the practice of mobile learning, which allows one to design and develop materials that help the mobile learner getting benefit from the leaning process, in a way that the materials can actually be used by the intended learners in their learning environment. It also defines the graphical user interface for the mobile learning application. A richer interface is used to energize further engagement with course content than the traditional course arrangement as it is a key for empowering the mobile learning in the educational process. Engagement is a focal idea for portable adapting course plan. This model offers the end user appropriate instructions to access and use the application towards the maximum usability within the hosting environment. The effectiveness of the model, was determined by evaluating the student's performance, media and instructor performance which occurs to end up with the needed feedback. Evaluations and feedback benefit the proposed model at every stage of implementation. Evaluation occurs during and after design development and informs the designer and the learner if the desired learning has taken place or not. The main advantage of this model is that it can be applied in complete courses or programs, modules, individual or parts of teaching sessions as it focuses on the design process and the using of technology in order to make the learner more engaged and collaborated with others. It helps in managing collaborative relationships to support students in assuming increasing responsibility for their learning Actually, new technologies have become major resources for teaching and learning in higher education.

6. Conclusions and Future Work

Mobile learning is revolutionizing the information technology (IT) industry by enabling learners to have flexible method of learning. Mobile learning has many benefits to students including ability to access new software services and applications. Mobile learning technologies offer teachers-and students more flexible approach to learning. It supports the idea which offers the functionality of wireless Internet browsing and office applications.

From this standpoint, this paper includes surveying the already existed literature on mobile learning standards, ISO standards and the different existing models. The proposed model enables the mobile learning to facilitate the learning process and the service quality in mobile learning is used to denote the general perception of how good the mobile application in terms of the previously mentioned standards and their criteria. Mobile learning application quality criteria are used to acknowledge that application quality comprises many different standards, for example User Interface, Functionality, Reliability & maintainability, Efficiency& Performance, Connectivity, Security, Usability, Personalization and Contextualization. The suggestion drawn from these discoveries is that, achievement of portable adapting generally relies upon the presence of a well-created media transmission system to help the utilization of cell phones (Venkatesh and Zhang, 2010). There are clear signs that the utilization of mobile technologies will keep on increasing globally, and it is the challenge for teachers to guarantee that mobile learning will be a part of their utilization (Laxman, 2012).

Finally, the proposed model provides fast improvement of mobile learning which has a great effect among students' and instructors' portability, bringing expanded utilization of portable devices, for example, PDAs, Smartphones, cell phones and tablet PCs with computationally improved learning condition. The proposed model takes into consideration effective learning. It has to be as close as possible to the real environment where the knowledge will be applied. Also, the content must be meaningful and engaging to satisfy the dynamically changing needs of learners. One of the elements utilized to integrate such an approach in mobile learning can be animated, or use real actors, or be written, offering examples of real-world situations, which demonstrate topic relevance to the learners. In this way, the abstract knowledge and data makes more sense for the learner. It can also motivate learners to explore the topics deeper, raise discussion, and exchange knowledge.

Further studies can investigate the advantages and disadvantages of mobile learning tools and its educational uses. Investigative comparisons about m-Learning perceptions among IT managers, academic administrators, or even presidents might be an important area of inquiry. Future research also, may include multiple institutions and examine differences based on region and available

resources. Most investigations concentrate on the students' observations and utilization of m-learning without exploration directed in the teachers' perspectives (Mirza and Al-Abdul Kareem, 2011).

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