J. Appl. Environ. Biol. Sci., 5(10S)100-105, 2015

ISSN: 2090-4274
Journal of Applied Environmental and Biological Sciences
www.textroad.com

Information and Communication Technology: Mobile Learning and its Role in the Learning Process

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Received: April 20, 2015
Accepted: June 15, 2015

ABSTRACT

This paper proposed a conceptual framework for mobile learning applications that provided systematic support for mobile lifelong learning experience design. It explored crucial factors and design requirements for the mobile learning environment. It also suggested how mobile learning applications can be designed with an understanding of these factors and requirements and further applied to lifelong learning.
The results of this study may furnish mobile learning can be particularly important supporting factor in the process of learning and teaching, including the elements of lifelong learning in the design of a mobile framework is essential. Mobile learning has one distinctive feature and that is the encouragement of collaborative activities. The collaboration activities can be between students, students and teachers, or students and other sources. It is hoped that by the end of the project, learners will have improved their current skills, learnt some new ones, sharpened their social skills and acquired teamwork skills.
KEY WORDS: information communication technology, mobile learning, learning, lifelong learning.

1. INTRODUCTION

Among the important ways to acquire knowledge in the present age is to undergo new technologies-based learning, from which electronic learning is the most recent. This viewpoint, thanks to its high potentials, can provide the users with a huge amount of information, communicational interchanges, and required knowledge together with their requirements and instruments. It can, in addition, obviate many inefficiencies of the previous educational system, reducing time- and location-related constraints to the least possible amount (Almekhlafi & Almeqdadi, 2010). If used appropriately, new technologies enable the users to learn in the least required time, allowing universities to focus on global learning atmospheres (Almekhlafi & Almeqdadi, 2010). In fact, diversified learning methods have been affirmed as an experience of learning for relationships and living in society—the process which is supposed to be necessary for a knowledge-based community and facilitating growth in the arena of learning therein. Presently, many universities are effectively making attempts to improve their professional experiences and personal skills in order to gain new technologies in learning activities and courses (Cavus & Kanbul, 2010). Many changes are directed through either economic pressures or demands of the graduates, who are able to present performance knowledge in the society.

The first such instruments were overhead projectors and PowerPoint presentations. As the technology moved ahead, interactive contents were developed for the users. There are multimedia technologies, powerful graphics, animations, simulations, virtual environments, etc., which are able to actively involve learners in the desired materials. Such contents were only of static, inactive states in the previous times offered in textbooks and lectures (Madeira et al., 2009).

The newest technology invented today is mobile and the requirements thereof. This is presently the most common tool for mobile learning presented within the framework of mobile sets. Mobile learning is a type of schooling whereby the learners and learners can get access to the learning systems through mobile tools and wireless networks. Mobile technology creates more accessible, customized, and immediate learning environments: a self-centered learning community (Kwon and Jeong, 2010). Mobile learning can also be defined as an acquirement of any type of knowledge and mastery anytime and anywhere (Liu, Li, and Carlsson, 2010). Although mobile learning is related to electronic and distance learning, it especially focuses on the learning which occurs through mobile devices (Cavus & Al-Momani, 2011).

Mobile learning is a starting line for a new mode of learning, whose demands are known to be a response to advancement and flexibility of learning methodologies and information technologies that have remodeled the communities. Present-day learning should be able to improve users' learning power, the power which permits them to create new skills in the areas of Information and Communications Technology (ICT) (Clay, 2011). The type of learning which is based less on content and text interactions and more on interaction of learners and leaning environment allows learners to get access to learning contents through wireless technologies at anytime

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anywhere, facilitating two-way interactions among learners and teachers (Kardan, 2006). This type of learning help organizations lessen their underlying expenses, facilitate their staffs' learning process, improve their outputs, and impact on cutback of time and location constraints (Donnelly, 2009; Grohmann and Martin, 2005). In academic environments, mobile learning offers profitable mechanisms for learners to acquire learning experiences. This technology facilitates cooperation and interaction among each couple of learners, crafting valuable social capital and student motivations (Sharma and Kitchens, 2004; Naismith et al., 2004). It, moreover, adds a new dimension to interactions and positive outlooks among learners and teachers in the learning atmosphere (Donnelly, 2009; Pei-Luen, Gao, and Li-Mei, 2006; Vogel et al., 2007).

Mobile learning allows users to experience accessibility, cooperation, and reusability of learning resources, progress, interaction, and flexibility at suitable times and locations. Additionally, it generalizes learning priorities for all social stratums (Murphy, 2006). Mobile learning provides a high level of categorization, personalization, cooperation, and long-haul learning. In other words, it makes possible the real state of learner-based instructions (Naismith, et al., 2004). It, in addition, procures the potential for increased interactions and coordination among people, providing geographically-dispersed people to share the same learning atmospheres (Keith Edwards, et al., 2002; Biström, 2005). Although this technology has yet not entered into the large-scale utilization phase, its applications can be effective in many educational respects, since they are uncomplicated and agreeable for kids, who need no special technological teachings (Idrus & Ismail, 2010).

This is believed that students carry their mobile phones all day long with no intermediary involved (Cavus and Uzunboylu, 2009). They, in fact, make use of their phones to complete their learning process and do their assignments (Virvou and Alepis, 2005).

Besides, SMS (Short Message Service) and WAP (Wireless Application Protocol) are two modes of wireless information communications, whose mobile-aided application is wholly trouble-free and globally popular (Motiwalla, 2007). Therefore, time is ripe to have a rethinking about our mobile phones as a new type of educational media, even more powerful than others available in other arenas (Kennedy & Levy, 2008).

2. Mobile Learning: Characteristics, Advantages, and Challenges

For those who take advantage of mobile technology for their learning purposes, it serves as a tutor who provides with his/her learner a bundle of systematic assignments, interactive animations, assessment tools, and chat rooms. Such facilities obviously offer some advantages to the users. For instance, they are familiarized with the web space in a brief and simple manner. Users can get access to all materials of learning courses. Learners are provided with such assessment tools that enable them to appraise their own leaning process and identify and modify the ways to improve it. Application of mobile tools makes possible outdoor learning at atmospheres where real learning experiences happens (Madeira, et al., 2009). Mobile tools are suitable media which can be taken advantage of in learning and rehearing English vocabulary and communication. Moreover, they enable their users to hold their practice sessions anytime and anywhere (Georgiev, Georgieva, and Angel, 2004).

Kwon and Eun Lee characterize mobile learning by four qualities: first, mobile learning atmospheres provide an incessant learning opportunity with learners, who can use them even when walking. Second, learners can get access to the learning system when a need arises. This gives to the learner a higher possibility of learning. Third, mobile learning provides a wide range of information with the learners, who are able to select the materials they consider as appropriate to their learning needs and levels. This contributes to the learners' power of personal selection and customized learning. Fourth, mobile technology allows learners to experience genuine learning atmospheres (Kwon and Jeong, 2010).

Another advantage of a wireless mobile technology is enabling people living in remote areas and having no access to schools, teachers, and libraries to make use of information and teachings without the need to leave their geographical locations. This is, consequently, a central factor for those who are unable to leave their workplace or living environment aimed at getting entrance into information and instructions (McKnight, Luz, and Doherty, 2010).

BenMoussa professes advantages of mobile connections in this way: first, mobile usages enable users to control and filter the information and communication trends by their devices and tools, which most of the time possess customization facilities. Second, mobile connections improve cooperation and interactions in an immediate manner, helping better decisions be made. And, finally, mobile connections enhance customization facilities and enable users to have improved access to information services. They, furthermore, introduce a sort of balance in peoples' professional life through reduced travel times (BenMoussa, 2003).

Academic environments are one of the best places for using mobile technologies. Seibu Mary and Biju describe academic applications as follows:

- Easy of access: instant, quick, updated, and free access to information and learning materials at anytime and anywhere;
- Self-study facilities: due to its flexibility, this type of learning makes possible inclusive teachings, whose level of intensity is determined by the learners himself/herself;

- Evaluation and feedback: mobile technology is able to provide the assessment tools aimed at controlling students' assignments and generating in-depth reports, which indicate which students have taken part in courses, how the courses have been arranged, and how the students have advanced;
- Access to online materials: a mobile learning system enables interaction between learner and teacher, the feature which gives power to learners to get access to course materials and online libraries as a profitable aspect in learning process (Seibu Mary and Biju, 2008).

Presently, mobile devices are regarded as a computer. Like many other technologies, this technology, however, comes with its own disadvantages and constraints for the users: it can disturb users' learning process. Many teachers consider computer and mobile phones as a source of distraction for the youth (Liu, Li, and Carlsson, 2010).

The survey conducted by Corbeil and Valdes (2007) showed that many students are still unprepared for mobile learning. One of the most important problems in phone-based learning is writing mobile-compatible applications (Virvou and Alepis, 2005). Despite so many limitations, many users are familiar with advances of mobile technologies, the fact which obliges us to catch up with paces of technical development.

3. Requirements of Designing a Mobile Learning System

Upon designation of a multimedia system, such as a mobile learning one, the design manual should first of all be developed. Key points that should be taken into account are mentioned hereunder:

- Courses should be accessible from anywhere at any time as a requirement thereof;
- Materials should be presented in simple, straightforward, and attractive manner and language so as to fulfill the objectives thereof;
- Practical exercises accompanied by at least one image should be designated for theoretical concepts. Components such as games, competitive environments, and recreational activities must be included for enhanced motivation;
- Reference to historical background of some concepts, especially new ones, should be made for better understanding. A good number of pictures and multimedia animations can be used for improved description of the concepts which are highly abstract and difficult to understand;
- An automated evaluation method can be designed to enable self-assessments by learners;
- Users are allowed to repass a failed learning process in an unforced manner so as not to lose their enthusiasm;
- Mechanisms should be designed so as to enable teachers to familiarize their students with such methods and evaluate the time they allocate to their studies. System should be able to collect and preserve its users' demographical information and other data such as their registration date, number of access points, and the manner contents are presented, etc. (Catarino, Campos, and Madeira, 2006).

4. Mobile Learning and Critical Thinking

Dembo states that educational experts have recently expressed their criticism of excessive emphasis made by schools and educational centers on sole transfer of knowledge and learning materials to students and learners instead of cultivating their thinking abilities and instigating them to have critical and dynamic thoughts (Seif, 2005). Since critical thinking plays a crucial role in education, this should be taken into consideration in new technologies, too. Following are the opinions made by different experts regarding critical thinking:

Richard (1991) translates *critical thinking* as a way to reach at observations and knowledge. Norris (1985) defines the term as an exercise of students' knowledge on a certain topic and evaluation of it based on thinking skills and behavior change (Cavus and Uzunboylu, 2000).

According to Anis, critical thinking is a logical, reflective, responsible, and masterly process which focuses on what we believe and do (Ivie, 2001). Students would gain an in-depth and clear outlook, grow more interested in events, and become more beautiful with their logical approaches when they employ their critical thinking (Connerly, 2006). On the other hand, Rudd, Baker, and Hoover (2000) suggest that critical thinking is an introspective cause, ultimate, and approach to solve controversial and unlikely problems. Cited by Cavus and Uzunboylu (2009), Moore and Parker have recently proposed that critical thinking is a conscious deliberation by which one either accepts or rejects a claim or postpone the judgment. Also, Facione (2007) theorizes the term as being a purposeful thinking which can be a combined or noncompetitive effort. Kook Dimer (2003), cited by Cavus and Uzunboylu (2009), states that students' success would be witnessed in both academic arenas and social venues in case critical thinking grows to be a part of the present system of education. According to cognitive learning models and constructivism, a learner must, in a learning environment, have *action* and *feedback*, with the former of which being aimed at problem solving and the latter as a synopsis of derived solutions and accumulation of experienced knowledge. Theory of Dialogue indicates that successful learning calls for continued bilateral dialogues and interaction both between teacher and learner and among the learners themselves. According to this theory, mobile learning is of diverse potentials (Motiwalla, 2007).

To establish an appropriate teaching process, a number of stages should be taken to realize the instructions suitably. One of such methods is the cognitive-based Ganier teaching method. Ganier refers to his theory as teaching events, believing that the learning process shall be completed in a proportionate manner provided that these stages are taken properly. Theoretical framework of Ganier has its roots in the cognitive viewpoint and focuses mainly on influence of training plans. In his theory, Ganier associated nine training events to internal mental processes, formulizing them as good teaching elements which were able to improve the learning process (Facione, 2007). In this article, development of a mobile learning atmosphere is lodged in the Ganier's nine-item training events so as to consider them as a good training plan, since multimedia learning atmospheres can be suggested to be among successful training plans. In the mobile learning procedure, training process is molded as follows:

4.1. Event One: Drawing Attention

Learning is a process which calls for attention. Therefore, this is important to draw the students' concentration. Training materials should be able, as suggested by Ganier, to instigate learners to be inquisitive and motivated. Thus, pictures, textual information, voices, and colorful backgrounds can be taken advantage of in internet plans aimed at drawing the learners' attention. Animation, also, can be a constituent of training materials for better attention drawing.

4.2. Event Two: Notifying Inattentive Students

Learning objectives should be clarified for students at the beginning of each unit. First, learners should be informed of what they are going to achieve. Second, intended objectives produce responsibilities for learning process. This assists students to complete their learning tasks. Students would, as a result, be informed of educational purposes before training plans are determined. Internet plan includes a page where plan's objectives are pointed toward and unit's title is elucidated. Prior to introduction of the plan, a pretest can be instructive.

4.3. Event Three: Remembrance as a Prerequisite of Learning

Previous knowledge and understanding of the concepts which are learnt earlier are associated with all learning experiences. The ability to make connections between prior knowledge and newly-acquired information is a facilitator of the learning process. Students are expected to increase their basic knowledge about the web space, multimedia tools, and mobile technology to learn the topics and units in a sustained manner.

4.4. Event Four: Content Presentation

Due to diversity of learning techniques and behaviors, students will pick a selective approach from among the contents, which can be based on each individual's awareness and cognition. Content presentation can be used as a propelling force to receive students' responses. Consequently, simplicity and straightforwardness of presentations should be taken into vigilant account for improved clarifications. Figures, videos, voices, and animations can also be utilized for describing opinions and contents.

4.5. Event Five: Learning Manual

Further guidance is provided by examples, training instructions, concepts, similarities, graphical figures, and case studies in learning manuals. Students should be procured with examples coming with pictures, videos, voices, and animations in order to take advantage of the contents and get insight into the materials. Basic examples and clear-cut instructions are required to be presented to the students for enabling them to learn and research by themselves.

4.6. Event Six: Performance Inference

Final exams aimed at evaluating students' understanding can be carried out in internet-based platforms. Incessant examination of students' activities can illustrate their level of understanding.

4.7. Event Seven: Feedback Generation

An instructive feedback on the students' performance is a significant reinforcing process. In this learning environment, students are enabled to connect to their instructors via email or internet-based, private conversations. Internet furnishes an atmosphere for students to get help from their teachers through instant messages and receive each other's feedbacks.

4.8. Event Eight: Performance Evaluation

Evaluations are necessary to determine performance of learning process and assess learners' understanding and knowledge. A final exam is also suggested to be held to make out learners' comprehension from the taught materials.

4.9. Event Nine: Preservation and Transference Improvement

Learning is completed as knowledge is transferred to other new success. Different educational aids can facilitate the transference process and improve the preservation process. Students should be able to make practical use of what they have been taught in order to independently complete their learning process through mobile devices. Students should be able to display the principles learnt during the learning process (Soo, Teoh, and Neo, 2007).

5. DISCUSSION AND CONCLUSIONS

Mobile learning is a starting point for a new type of learning and training. Mobile-based learning can be regarded as a reaction to increased demands for advancement, flexibility of learning methodologies, and ICT, since present-day learning should be able to improve learners' power of learning, the power which permits them to build new skills in ICT areas. Following are the causes which necessitate application of this technology as a new medium:

1. One of the most important problems in the training process, whether in the present age or in the past, has been accessibility of required materials to individuals. Mobile technologies and services, however, could eliminate such problems to a large extent.
2. Mobile learning is time and place independent. In fact, there is no time or place constraint to get access to information resources and people are immediately able to reach at their needed materials when a need arises. This efficiency is observed in different aspects: economics, transportations, reduction of fatigue, etc.
3. Educational instruments are a sort of tiny computers with many capabilities of the larger ones. As a matter of fact, a good number of software which is installable on computers can also be installed on portable computers (laptops) and advanced mobile phones. As a result, many computer-based training programs are executable on such devices, too.
4. Learning processes whereby the learner plays an active role and learning atmospheres whose primary objective is not the sole transfer of information but nurturing critical, dynamic thinking are presently taken into meticulous consideration. Since critical thinking has a key role in education, this should be taken seriously in new technologies. Mobile technologies, with regard to their applications and characteristics, are able to establish such capabilities in their users.
5. Cognitive learning theories and constructivism are among those models which maintain that learning process can motivate active, dynamic, and critical thinking in its learners. Different models have been offered by related theorists. Among the advantages offered by mobile learning is its unproblematic compatibility with many models within internet atmospheres. This may be one of the reasons thereby to claim that this technology makes possible critical and creative thinking in its learners. Ganier's cognitive model can be mentioned as an illustrative instance that was elaborated hereinabove.

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