Supporting Distance Users of Mobile Learning Technology

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***Abstract*—With a rapid deployment of mobile devices, mobile learning gives rise to new possibilities for extending learning opportunities to all social-economic levels. Nevertheless, current research on mobile learning has mostly been aimed at enhancing learning of school or college students. In this light, the paper seeks to throw light on the potential of mobile learning for distance learner communities, including problem teenagers, social employees and ageing people. Rather than being employed as a complementation to the current conventional learning and teaching scenarios, mobile learning tends to make more sense when it serves as an effective conduit for a particular learner community to access training and education. Also, mobile learning is of increasing importance when used to support the learning activities of hard-to-reach groups to underpin social transformation and to deal with the challenges posed by demographic shifts.**

Keywords-mobile learning; aging learner; illterate; informal learning; lifelong learning; population aging

I. INTRODUCTION

Increasingly, information and communication technologies, or ICTs, have started to permeate nearly every aspect of our lives. It not only dramatically alters the way we communicate, work and run businesses, but also gradually changes the way people deliver and receive training. Advance in broadband wireless network technology enables mobile devices to transmit text, voice, video and animated images at anyplace and anytime. This in turn establishes a concrete technical basis for translating mobile learning from theory into actual practice.

The potential and impact of mobile learning are support through the worldwide proliferation of mobile phone. A report from Portio Research predicts that the global mobile penetration rate will surpass 50 percent in 2008, and a further 1.5 billion new mobile phone users are expected to bring the overall penetration rate to 75 percent by 2011, in which 65 percent of new consumers will come from the Asia Pacific Region [1]. In some parts of the world, such as Western Europe, the figure has already hit 100% since 2007 [2]. The wide penetration of mobile devices proposes that the number of potential users of mobile learning services has far exceeded the amount of students within the current education systems.

As mobile devices are becoming more and more sophisticated and affordable, they are increasingly deployed among ordinary consumers. As a result, it comes as no surprise that sooner or later people would begin to look for new ways to activate learners, in particular those with academic ambitions but reluctant to or can't enroll in the formal education systems. A Europe-wide mobile learning project—m-learning, for instance, has been launched for the purpose of educationally disadvantaged young adults, such as teen dropouts and unemployed. In addition to common students, it is clear that a number of new learner communities could benefit and be involved, and become an indispensable part of the future mobile learning landscape.

As most of the current research is carried out in the school or college settings, partly due to the easier availability of research resources, this paper aims to provide new insight on mobile learning potentials when applied to the distance learner communities. After studying the theoretical support of mobile learning for engaging learners in their daily lives, we discuss the benefits mobile learning offers in association with the unique learning requirements of different learner communities.

II. ENABLING MOBILE LEARNING IN SOCIAL CONTEXTS

Learning can take place as long as people hope to start and adapt their activities to enable educational behavior and outcomes. Vavoula in a study of everyday adult learning episodes discovered that, 51% of a total of 161 learning episodes took place at learners' home or workplace, while 21%, 6%, 5% and 2% of episodes happened respectively in a workplace outside the office, at places of leisure, outdoors and in a friend's house [3]. Other locations took 14%, including places of worship, the doctor's surgery, cafes, hobby stores, in cars. In addition to this, 48% of mobile episodes were found to be associated with work. Note that only 1% of the self-reported episodes occurred on public transport, indicating that there may be a chance to provide learning opportunities for people to utilize unproductive travelling time. The study indicated that there are lots of learning episodes in daily lives where mobile learning can probably be involved and lend a helping hand. Also, since learning practices are mobile in terms of location and time, technologies that support learning should also be mobile [4].

Among all the learning episodes, mobile learning will be favored if a learner is situated in the 'right' scenario. Mobile learning can be advantageous, particularly when a learner is on the move or at a 'non-place'. The term 'non-place' refers to the places such as airport terminals, waiting halls and hotels [5], where people are physically immobile but mobile in logic. Also, mobile learning facilitates learning activities where a

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learner is in a stable scenario, such as learning in class, or in a situation where a learner wants to avoid moving, e.g., a patient following a daily prescription and diagnosis at home when the doctor is working in the hospital. At home, a bed or a sofa is the most often mentioned place by mobile device owners [6], which shows a potentially ideal location for mobile learning. What is more, mobile learning is effective for just-in-time learning or the learning in urgent situations, such as first aid [7].

In addition to the opportunities initiated by exterior factors, mobile learning lends itself well to motivate learners intrinsically by offering versatile learning experiences. Naismith et al. [8] summarized these new practices and compared them against existing learning theories, which are behaviorist, constructivist, situated, collaborated, informal and lifelong learning.

A. Behaviorist learning theory

Behaviorist learning emphasizes learning experiences gained as a change in observable actions with proper stimulus and response. With the advance of mobile technologies, mobile learning makes it possible to form a 'drill and feedback' mechanism complied with behaviorist learning theory. Specifically, mobile learning can give learners content specific questions, then gather their responses in a rapid manner and provide instant feedback eventually.

B. Constructivist learning theory

Constructivist theory emphasizes gaining learning experience through a program which learners actively build new ideas or concepts based on both their previous and current knowledge. With a mobile phone, a learner can construct his/her own knowledge and share it freely with peers regardless of time and place. Specifically, an easy way for mobile learning to enable a constructivist learning experience is to offer edutainment (e.g. handheld games).

C. Situated learning theory

Situated learning emphasizes learning activities that take place within authentic contexts where environment itself appears to be a part of education resources. For situated learning, the environments can be per-organized, such as studying in a museum [9], or naturally developed, such as watching birds open air [10]. Specifically, situated learning experience can be realized via three manners, namely problem-based learning, case-based learning, and context-aware learning.

D. Collaborated learning theory

Collaborated learning experiences are promoted as a learning process with proper social interaction. The increasing availability of wireless networks in personal devices not only makes it much easier to communicate and share data, files and messages with partners, but also makes learning collaboration easier to initiate and to respond to. Taking into consideration the recent popularity of the Really Simple Syndication (RSS) as well as open source software, learning collaboration on a large scale appears to be more socialized and self-initiated.

E. Informal and lifelong learning theories

Informal and lifelong learning emphasizes the learning activities that take place outside a dedicated learning environment, such as a predetermined curriculum. Informal learning can be intentional with intensive and deliberate learning efforts, or it can be accidental, such as through conversations, TV and newspapers [11]. To the extent that mobile devices facilitate instant information acquisition in a seamless and unobtrusive way, mobile learning is especially suitable for offering informal and lifelong learning experience.

In essence, these learning experiences tend to be integrated and combined instead of being separated. If leveraged appropriately, mobile learning makes it possible to form a learning space which is socialized, personal and digital, trusted, pleasant and emotional, creative and flexible, certified, open and reflexive, which will facilitate learning and knowledge management [12].

III. ENABLING MOBILE LEARNING FOR NEW LEARNERS

It is evident that a rapid proliferation of mobile devices expands the reach of education to all social-economic levels. As a result, mobile learning appears to be especially important for learner communities unreachable for conventional education approaches. As they are of great demographic importance, these new learners apparently can not be neglected.

A. Engaging problem teenagers and illiterate

In most parts of the world, it is undeniable that many teenagers are unsatisfied with classroom-based educational environments and they drop out without pursuing any further training or education. Teen dropouts are in general hard-to-reach by traditional educational approaches and are more likely to be the future illiterates, resulting in many serious social problems. For instance, in UK, nearly 10 millions adults lack confidence in using literacy skills [13], while in China, the people deemed illiterate jumps by 30 million to 116 million from 2000 to 2005, right after India [14]. Today, there are still about 785 million illiterate adults aged over 15 worldwide [15]. Early dropout of teenagers from schools would lead to serious problems for the society. According to a report of Pytel [16], early dropouts are more prone to be unemployed, in prison, living in poverty, receiving government assistance, poor health, divorced and single parents.

With this, mobile learning appears to be an ideal solution with a potential to accommodate the characteristics of today's young generations. Current young people, in particular the 'Millennial generation' that was born in or after 1982, shows a clear preference for technology applications [17,18]. With an information technology mindset and a highly developed skill for multitasking, the millennial generation is described as being focused on 'connectedness' and social interaction with a preference for group-based methods in study and social occasions [18].

To engage millennial learners, in particular teen dropouts, mobile learning has great advantages as it accommodates the unique nature of these new learners in comparison to traditional

education approaches. Also, in light of the fact that many learners might never be able to afford a personal computer or enroll into formal education again, a mobile phone, which is increasingly popular among young people, becomes a desirable conduit for delivering education. According to Attewell [19], there are several advantages to initiate mobile learning for problem teenagers as well as illiterates:

- Mobile learning helps learners to improve literacy and numeric skills and to recognize their existing abilities;
- Mobile learning can be used for promoting independent and collaborative learning experiences;
- Mobile learning helps learners to identify where they need assistance and support;
- Mobile learning helps to combat resistance to the use of ICT and can help overcome the divide between mobile phone literacy and ICT literacy;
- Mobile learning helps to remove some of the formality from the learning experience and engages reluctant learners;
- Mobile learning helps to concentrate a learner's attention for longer periods;
- Mobile learning helps to raise self-esteem;
- Mobile learning helps to raise self-confidence.

B. Supporting the informal and lifelong learning of employees

As human societies are becoming more and more hectic and knowledge-based, employees have to adopt more learning activities to renew and update their knowledge and skills to remain competitive in the workplace, and to accommodate to an increasingly technological environment. The growing learning requirements went with problems, as today's workforce is increasingly mobile around the world [20]. Approximately 40–50% of the American workforce, for instance, is mobile, according to the Runzheimer International study on workforce mobility [21]. In 2009, the global mobile workforce is expected to reach 850 Million [22]. Consequently, the time available for employees to stay in a stationary place to learn is becoming limited. In 2003, the average time available for training was less than three days [23]. Also, there is little evidence to show that time and resources available for formal training will be increased.

In this regard, mobile learning appears to be a desirable way to provide transmitting training and education to an increasingly mobile workforce. Great benefits can be achieved though the use of mobile learning. As Koschembahr state, mobile learning can assist enterprises in saving cost, enhancing customer services and offering better selling opportunities [24]. On the other hand, mobile learning reflects a potential to improve job satisfaction and to reduce job stress as well as employee turnover [24]. Also, it enables employees to utilize previously unproductive time as part of people's increasingly hectic lifestyle [25]. With regard to ICT literacy, as Punie pointed out, mobile learning promotes ICT skills, digital competence and other new skills, and helps to fight ICT resistance [12]. Ufi/learndirect and Kineo indicate that mobile learning can help address some challenges faced by businesses as follows [26]:

- Mobile learning enables business entities to provide learning to mobile staff and to distribute learning quickly.
- Mobile learning enables the delivery of key data at the point of need— particularly relevant for workers who need access to updated product specifications, pricing details or other time-sensitive information.
- Mobile learning enables companies to utilize staff downtime, those short periods of time waiting or travelling.

C. Facilitating the retraining of aging people

Population aging is a pervasive phenomenon. In the Asia-Pacific area for instance, people aged 50 and above are expected to take up approximately 31% of the total population by 2025 [27], while in Japan, population ageing seems to be more significant and one in three will be elderly in 2025 [28]. In addition to this, it is predicted almost one third of the working age population will aged 50 or over by 2050 in developed countries [29]. In this light, population aging impresses people with an ongoing trend—aging people will inevitably become an incremental part of the future workforce. Due to lack of enough qualified employees, ageing people nowadays have already been encouraged to join the workforce in some parts of world. In Europe, a marked rise has been found in the employment rate of people aged 55-64 from 36.6% in 2000 to 43.6% in 2006 [30].

The requirement for the retraining of aging learners is intensified, but research targeted at aging learners is in short supply, also within the context of mobile learning. Unlike young and prime adults, aging learners have unique learning requirements and traits. For instance, ageing individual needs a learning approach that facilitates the review of learning materials, as they incur a biologically-based decline in fluid intelligence, which impairs rapid processing of new information [31]. In addition, older learners may have a lack of confidence and thereby resist trying something new. In this concern, mobile learning gains advantages as it tends to address these problems through bringing training into local areas and offering courses in less formal settings [32]. Also, there is little extra economical and physical effort required for aging people to learn via mobile devices in comparison to the computer-based or classroom-based learning approaches.

IV. CONCLUSION

The potentials of mobile learning are profound and far-reaching. With a worldwide diffusion and increasingly educational use of mobile devices, mobile learning extends learning opportunities to all social-economic levels and the people who can benefit from mobile learning is increasing. For learners as well as society as a whole, mobile learning is particularly cost-effective in terms of its capability to be centrally processed and updated with a fast and economical allocation of educational resource in a 24X7 manner for all

mobile phone owners regardless of location. As such, in addition to common students, more attention is needed to play to learners who are previously hard-to-reached or incompatible with traditional educational approaches so as to realize the full potential of mobile learning. As little effort in literature has been made regarding mobile learning implications for distance learner communities, this paper attempts to make a contribution in this regard and provide theoretical support and topics leading to an in-depth understanding of mobile learning potentials.

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