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Mobile Learning Transforming Education & Training

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Abstract: With the great development in technology, there is always the danger that the equilibrium between technology and learning is disturbed. This paper aims to look at m-learning from an educational perspective. The context of this perspective is higher and lifelong education in a developing country. Mobile learning as a concept has come about through the availability of mobile technologies. A major benefit of using wireless mobile technology is to reach people who live in remote locations where there are no schools, teachers, or libraries. Mobile technology can be used to deliver instruction and information to these remote regions without having people leave their geographic areas. This will benefit communities in such places since students and workers will not have to leave their families and jobs to go to a different location to learn or to access information.

Keywords: component; formatting; style; styling; insert (Minimum 5 to 8 key words)

I. INTRODUCTION

Mobile learning as a concept has come about by virtue of the availability of mobile technologies such as mobile phones and handheld computers. New learning practices are emerging, such as bite size revision and just-in-time learning. Unlike more traditional forms of learning, mobile learning has not so far been studied as a phenomenon in the world; rather, it has been introduced as a new technology-led practice that will potentially lead to new learning phenomena. The aim of this paper is to fill the gap by studying the conduct of mobile learning in relation to everyday learning.[1]

Mobile learning through the use of wireless mobile technology allows anyone to access information and learning materials from anywhere and at anytime. As a result, learners have control of when they want to learn and from which location they want to learn. Also, all humans have the right to access learning materials and information to improve their quality of life regardless of where they live, their status, and their culture. Mobile learning, through the use of mobile technology, will allow citizens of the world to access learning materials and information from anywhere and at anytime. Learners will not have to wait for a certain time to learn or go to a certain place to learn. With mobile learning, learners will be empowered since they can learn whenever and wherever they want. Also, learners do not have to learn what is prescribed to them. They can use the wireless mobile technology for formal and informal learning where they can access additional and personalized learning materials from the Internet or from the host organization.

Peoples throughout the world will want to access learning materials on their existing mobile devices. As a result, educators and trainers must design learning materials for delivery on different types of mobile devices. The design of learning materials for mobile devices must follow good learning theories and proper instructional design for the learning to be effective.

II. M-LEARNING PLATFORM

A Technology Selection Roadmap, describing available and in-the-pipeline technologies and our assessment of their potential relevance and utility, was developed early in the project and was updated to take into account new technologies as they emerged and to reflect our experiences. The process of drawing up the roadmap assisted decision-making about which hardware and software to use. When internet browsers became available on some devices we decided that these should form a major stand of our technology platform strategy. We believed that the delivery of learning materials within a browser would give us a great deal of platform independence, enabling our materials to be easily ported between different existing and predicted devices.[2]

In practice, we found that, because of the immature nature of standards development and implementation in the mobile phone/PDA arena, browser delivery has resulted in much less platform independence than anticipated. As a result, additional development work had to be dedicated to ensuring that learning materials designed for one phone or PDA worked on others. Also, rather than developing one generic version of learning materials that can be used on all platforms, we developed some

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materials, or versions of materials, specifically to take advantage of the strengths of particular platform types.

In this project we focused primarily on two platform types:

a. Hybrid PDA/phone devices running the Pocket PC operating system
b. Hybrid phone/PDA devices running the Symbian operating system.

The Pocket PC/phone hybrids are typically a corporate rather than personal device and are increasingly being employed for business communication, data access and mobile training. They are also the kind of device that companies and institutions have started to purchase as a more convenient, though less powerful, alternative to a laptop computer. The Symbian phone/Pocket PC, although currently rather expensive for many mobile phone owners, are perceived as a phone rather than a PDA and therefore are more immediately attractive to the project's target age group. We know from a survey we carried out in phase 1 of our project that our target age group tend to consider PDAs to be business machines and not relevant to themselves (results from a survey conducted with 746 young people in seven UK cities and towns).

We have also developed some learning materials for Java-enabled mobile phones (most phones launched in the last couple of years support Java) and some SMS (text messaging) materials that can be used on any mobile phone.

III. M-LEARNING SYSTEM

Learner access to m-learning project systems and materials was via a micro portal (mPortal), which consists of a series of mini web pages with navigation pointing to:

a. Learning materials
b. Mini web Page Builder tools
c. A collaborative activities tool (the media Board)
d. Peer-to-peer communication services (messages, chat, discussion and blogs)
e. The learning management system
f. Simple help guides for the system
g. Links to places on the Web that may be helpful or interesting for our target audience.

The mPortal also manages the 'behind the scenes' integration and security. The Page Builder tools within the mPortal allow learners to create and edit their own mini web pages for viewing on mobile devices (and also accessible from a desktop computer) in a password-protected environment. The pages learners create can contain a number of different elements including text, pictures, movies, animations, audio, blogs (a short version of the term 'web log', meaning a publicly accessible web-based journal), conversations and links to any web pages chosen by the learner. The learning management system– Intelligent Web Tutor (IWT) –includes a repository for online learning materials and learner tracking functionality. IWT includes access to an intelligent tutor system– Learner Intelligent Agent (LIA) – that selects modules for learners based on their preferences and progress to date, and a Knowledge Representation Tool (KRT), which allows tutors to create/import/export courses and modules [3].

IV. ADVANCES IN MOBILE LEARNING

The use of wireless, mobile, portable, and handheld devices are gradually increasing and diversifying across every sector of education, and across both the developed and developing worlds. It is gradually moving from small-scale, short-term trials to larger more sustained and blended deployment. Recent publications, projects, and trials are drawn upon to explore the possible future and nature of mobile education. This paper concludes with an examination of the relationship between the challenges of rigorous and appropriate evaluation of mobile education and the challenges of embedding and mainstreaming mobile education within formal institutional education. Mobile learning has growing visibility and significance in higher education, as evidenced by the following phenomena.[4]

The mobile learning currently exploits both handheld computers and mobile telephones and other devices that draw on the same set of functionalities. Mobile learning using handheld computers is obviously relatively immature in terms of both its technologies and its pedagogies, but is developing rapidly. It draws on the theory and practice of pedagogies used in technology enhanced learning and others used in the classroom and the community, and takes place as mobile devices are transforming notions of space. There are now a large number of case studies documenting trials and pilots in the public domain. In looking at these, we can see some categories of mobile learning emerging

a. Technology-driven mobile learning – Some specific technological innovation is deployed in an academic setting to demonstrate technical feasibility and pedagogic possibility
b. Miniature but portable e-learning – Mobile, wireless, and handheld technologies are used to re-enact approaches and solutions already used in conventional e-learning, perhaps porting some e-learning technology such as a Virtual Learning Environment (VLE) to these technologies or perhaps merely using mobile technologies as flexible replacements for static desktop technologies
c. Connected classroom learning – The same technologies are used in classroom settings to support collaborative learning, perhaps connected to other classroom technologies such as interactive whiteboards
d. Informal, personalized, situated mobile learning – The same technologies are enhanced with additional functionality, for example location awareness or video-capture, and deployed to deliver educational experiences that would otherwise be difficult or impossible
e. Mobile training/ performance support – The technologies are used to improve the productivity and efficiency of mobile workers by delivering Current State of information and support just-in-time and in context for their immediate priorities
f. Remote/rural/development mobile learning – The technologies are used to address environmental and infrastructural challenges to delivering and supporting education where conventional e-learning technologies would fail, often troubling accepted developmental or evolutionary paradigms Mobile distance learning could fall into any of these categories (with the exception of the

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connected classroom learning); how it develops will depend in part on the affordances of any given situation.

V. RECENT RESEARCH IN MOBILE LEARNING

A. Studying online and off line:

In line with the above discussions on advance in learning and studying, most courses are not designed to function as online interactive e-learning programmers, although some parts of the courses may imply such interaction with multimedia materials, tests, and assignments. Most courses normally involve intensive study mainly of text-based materials that requires students to solve problems, write essays, submit assignments, and communicate with fellow students via email or during web-based conferences. This means that most of the time students will be off line when studying. From experience, we also know that students often download content for reading off line and print-out content for reading on paper.

B. Technical solution:

It should be emphasized that we assume that distance education students will have access to a desktop or laptop computer with an Internet connection. This means that the equipment and technologies students use when mobile are, in fact, "additions" to the equipment they normally use when studying at home or at work. It should also be noted that our developments were based on the absolute assumption that mobile learners would be studying with students who do not have access to mobile technology. Thus, the design of the learning environment had to cater efficiently to both learning contexts. We concluded that the learning environment for the first course should include the following aspects

C. Technology:

a. Pocket PC/ PDA
b. Mobile phone
c. Portable keyboard

D. Learning Content and Communication:

Learning content to be downloaded to the mobile device could be studied offline, if the student so desires. Downloaded content included all course materials, such as:

a. Contents page
b. Preface
c. Introduction
d. All study units
e. Resources (articles on the Web, references to other resource materials)
f. Online access to the discussion forum, with capacity that allows students quick access to readings in the forum, and writing and responding to contributions made in the forum
g. Email with capacity that allows students to communicate with tutors and fellow students, and for submitting assignments either as text based emails or as Word or Text attachments

E. Students' and tutor's use of technology when mobile:

When mobile – and using mobile technologies – we found that it was generally satisfactory for students (and tutors) to have the course content available to study on the Pocket PC. In addition, when mobile, students must be able to:

a. Access the course forum to read archived messages (if necessary).Messages on the forum were also emailed to participants
b. Access their course forum to submit their contributions to the course discussions
c. Send email to fellow students, their teacher, and to administration (i.e., study advisor)
d. Receive email from fellow students, their tutor, or from administration
e. Submit their assignments by email, including attachments
f. Receive assignments back from their tutor, corrected and commented on, as attachments

To access email and discussion forums, mobile phones with infrared connection to the Pocket PC were used.

VI. IMPLICATIONS FOR LEARNING

The examples presented here offer insight into new learning experiences or environments that can be developed for a broad range of both informal and formal learning contexts. They illustrate the potential for changes in the way that learning and education can be conceptualized and the way we might think about the structure of learning and instruction. The potential of flexibly combining technology with the physical world for learning is considerable. At a very basic general level digital augmentation can be used to attract attention at appropriate points in the learning task, or to things that might otherwise go unnoticed. In addition, theories of learning and cognition offer a compelling rationale for the value of digital augmentation for learning.

However, studies of these learning experiences show how highly motivating and engaging digitally augmented learning activities can be, and some begin to make reference to the nature of interaction and ways in which they might support particular kinds of learning activity, such as, collaboration or reflection. In particular a recurring theme is the concept of stepping in and stepping out of learning experiences that is engendered through an iterative cycle of embodied and abstracted interaction Some studies have begun to identify ways in which interaction might be mediated by the representation and tangible device, for example, ambiguity of representation promoting reflection through discussion and unexpected or unfamiliar representation events attracting attention and promoting reflection however, there are few, if any studies that focus in detail on learning itself and the cognitive impact of digital augmentation. Yet more work is required to verify initial findings and establish a better understanding of the particular value for learning, and the particular domains or learning contexts that are most effectively supported [5].

VII. RESEARCH FUTURE DIRECTIONS AND CHALLENGES

The potential for mobile and ubiquitous technologies to offer opportunities for new ways of learning have clearly been demonstrated, but currently there is little theoretical work

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looking specifically at the role of digital augmentation for learning. In particular, research needs to start to reach beyond concepts of fun and engagement, by looking more at specific learning benefits and at the effects of engaging in digitally augmented environments over time. We understand little about the underlying mechanisms of how digital augmentation actually works for learning. One critical area for research is gaining a better understanding of the impact of digital technologies on cognition, providing a clearer picture of where it works, how and why. For example, how do new ways of linking representation and context shape the way that learners think, or influence their interpretation of events or representation, the kinds of meanings that they construct and their understanding of the learning domain.

A further important area for research is to understand better the kinds of learning tasks, domains or activities it most benefits. So far studies suggest that digital augmentation can promote reflection and collaboration, but research needs to look in more detail at the kind of reflective and collaborative activity promoted, and where this is most beneficial for learning in the learning domain and task. Furthermore, we need to understand whether and how digital augmentation and/or the technology influence learners' interaction with activities and learning context.

Is there a difference in this level of focus depending on the kind of technology? For example, digitally embedded physical objects are not so obviously 'technology', so does this make a difference? We also need to understand whether these issues are related to novelty, and whether interaction and effect change over time. Research more broadly into the impact on education and structure of teaching and learning is wanting. For example, the potential for integrating formal and informal learning, bridging the gap between school contexts and outside, and understanding the impact of technology in facilitating the concept of distributed teaching and learning i.e., through paradigms such as embedded phenomena, which offer a more radical model for teaching and learning.[6].

VIII. RESEARCH CHALLENGES

A number of research challenges arise from such questions, many of which stem from the rapid advances in technology and continual change and development in computer technology, including improved networking and more robust applications. Research into interaction, learning and cognition suffer from issues of novelty. The majority of studies demonstrate the highly engaging and motivating nature of the learning experiences. This is not surprising given the novelty of these experiences for learners, especially within traditional school settings and culture. Early days in this research field mean that novelty value cannot easily be factored out of such findings, and more extensive longitudinal studies are required to establish the sustainability of digitally augmented environments on motivation and engagement [7].

However, longitudinal studies themselves are challenging, being difficult to realize. One reason is again because of the rapidly changing technology environment, making it impractical for educational environments to invest heavily in new technologies. Extensive deployment and implementation is, therefore, scarce if even in existence. In addition, integrating new technologies, particularly if it means new teaching practice, is an extensive research area in itself. This means there is no reliable test bed for researching either extensively or longitudinally. Consequently large numbers of disparate case studies emerge, making coherence of findings problematic. What is needed is a more systematic breakdown of the unique features of mobile technologies with studies focusing on particular aspects enabling integration of findings. Another approach might be to identify key themes where ubiquitous computing appears to have an impact on learning (e.g. Rogers and Price, 2006). From the literature we identified four key themes: integrating knowledge, constructing knowledge, collaborative learning, and interaction and control, and outline different design challenges, which can be used as a basis for investigating specific learning benefits in more detail.

IX. CONCLUSION

The use of mobile technology in education is a recent initiative due to the availability and rapid advancement of mobile devices such as smart phones, PDAs, and handheld computers. Recently, there have been many research studies and applications of mobile learning in both formal and informal learning. In this paper present some of these recent studies and projects on mobile learning in education and training. The research studies presented in this paper have shown benefits of using mobile technology in learning but, at the same time, suggested challenges organizations face when designing and implementing mobile learning. There are some areas that were identified in the paper for further research. Since mobile learning is new in education, best practices and standards for mobile learning must be identified. Considerable research is needed on how to design learning materials for delivery on mobile devices and what is the right mix of technology for distance delivery. In this paper we also described projects that use mobile technology to deliver formal and informal materials to students. As reported in this paper, because of the mobility of the mobile devices, they are suited for delivering instruction at anytime and to anywhere. This is important for students, workers, and citizens who are mobile and need to access information and learning materials from wherever they are located. This paper also illustrated how digital augmentation can be combined with mobile technologies to be integrated into various kinds of learning experiences in different contexts. Research to date clearly demonstrates how this technology 'works' in learning contexts and provides new opportunities both for learner interaction and activity, and for structuring teaching and learning.

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