M-Learning

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ABSTRACT

The term **M-Learning**, or "mobile learning", has different meanings for different communities. Although related to e-learning and distance education, it is distinct in its focus on learning across contexts and learning with mobile devices. One definition of mobile learning is: *Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.* In other words mobile learning decreases limitation of learning location with the mobility of general portable devices.

DEFINING MOBILE LEARNING

Mobile learning can perhaps be defined as 'any educational provision where the sole or dominant technologies are handheld or palmtop devices'. This definition may mean that mobile learning could include mobile 'phones, smart phones, personal digital assistants (PDAs) and their peripherals, perhaps tablet PCs and perhaps laptop PCs, but not desktops in carts and other similar solutions. Perhaps the definition should address also the growing number of experiments with dedicated mobile devices such as games consoles and iPODs, and it should encompass both mainstream industrial technologies and one-off experimental technologies.

The term covers: learning with portable technologies including but not limited to handheld computers, MP3 players, notebooks and mobile phones. M-learning focuses on the mobility of the learner, interacting with portable technologies, and learning that reflects a focus on how society and its institutions can accommodate and support an increasingly mobile population.

There is also a new direction in M Learning that adds mobility of the instructor and includes creation of learning materials "on-the-spot, "in the field" using predominately smart phone with special software such as AHG Cloud Note. Using mobile tools for creating learning aides and materials becomes an important part of informal learning.

M-learning is convenient in that it is accessible from virtually anywhere. M-Learning, like other forms of E-learning, is also collaborative; sharing is almost instantaneous among everyone using the same content, which leads to the reception of instant feedback and tips. M-Learning also brings strong portability by replacing books and notes with small RAMs, filled with tailored learning contents. In addition, it is simple to utilize mobile learning for a more effective and entertaining experience.

Technologies

Mobile devices and personal technologies that can support mobile learning, include:
- E-book
- OutStart,_Inc.
- Handheld audio and multimedia guides, in museums and galleries
- Handheld game console, modern gaming consoles such as Sony PSP or Nintendo DS
- Personal audio player, e.g. for listening to audio recordings of lectures (podcasting)
- Personal Digital Assistant, in the classroom and outdoors
- Tablet computer
- UMPC, mobile phone, camera phone and SmartPhone

Technical and delivery support for mobile learning:
- 3GP For compression and delivery method of audiovisual content associated with Mobile Learning
- GPRS mobile data service, provides high speed connection and data transfer rate

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- Wi-Fi gives access to instructors and resources via internet

Analysis (costs / benefits, forecast)

Value

The value of mobile learning --Tutors commented on the value of mobile learning as follows.

- It is important to bring new technology into the classroom.
- It will be more light weight device compare to books, PCs, etc.
- Mobile learning could be utilised as part of a learning approach which uses different types of activities (or a blended learning approach).
- Mobile learning supports the learning process rather than being integral to it.
- Mobile learning needs to be used appropriately, according to the groups of students involved.
- Mobile learning can be a useful add-on tool for students with special needs. However, for SMS and MMS this might be dependent on the students' specific disabilities or difficulties involved.
- Good IT support is needed.
- Mobile learning can be used as a 'hook' to re-engage disaffected youth.
- It is necessary to have enough devices for classroom use .

Challenges

Technical challenges include

- Connectivity and battery life
- Screen size and key size
- Ability for authors to visualize mobile phones for delivery
- Possibilities to meet required bandwidth for nonstop/fast streaming
- Number of file/assets' formats supported by a specific device
- Content security or copyright issue from authoring group

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- Multiple standards, multiple screen sizes, multiple operating systems
- Reworking existing e-Learning materials for mobile platforms

Social and educational challenges include

- Accessibility and cost barriers for end users: Digital divide.
- How to assess learning outside the classroom
- How to support learning across many contexts
- Content's security (or) pirating issues
- Frequent changes in device models/technologies/functionality etc.
- Developing an appropriate theory of learning for the mobile age
- Conceptual differences between e- and m-learning
- Design of technology to support a lifetime of learning
- Tracking of results and proper use of this information
- No restriction on learning timetable
- Personal and private information and content
- No demographic boundary
- Disruption of students' personal and academic lives
- Access to and use of the technology in developing countries

Growth

Over the past ten years mobile learning has grown from a minor research interest to a set of significant projects in schools, workplaces, museums, cities and rural areas around the world. The m Learning community is still fragmented, with different national perspectives, differences between academia and industry, and between the school, higher education and lifelong learning sectors.

Current areas of growth include:

- Testing, surveys, job aids and just-in-time (J.I.T.) learning

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- Location-based and contextual learning
- Social-networked mobile learning
- Mobile educational gaming
- Deliver M-Learning to cellular phones using two way SMS messaging and voice-based Cell Casting (pod casting to phones with interactive assessments)

According to a report by Ambient Insight in 2008, "the US market for Mobile Learning products and services is growing at a five-year compound annual growth rate (CAGR) of 21.7% and revenues reached $538 million in 2007. The data indicate that the demand is relatively immune from the recession."[10] The findings of the report indicate that the largest demand throughout the forecast period is for custom development services, content conversion, and media services and that the healthcare sector accounts for 20% of the total US market for mobile learning.

Future

Technologies currently being researched for mobile learning include
- Location aware learning
- Point-and-shoot learning with camera phones and 2D codes
- Near Field Communications (NFC) secure transactions
- Sensors and accelerometers in mobile devices in behavioral based learning
- Mobile content creation (including user generated content)
- Games and simulation for learning on mobile devices
- Context-aware ubiquitous learning
- Augmented reality on mobile devices

Approaches

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The use of mobile learning in the military is becoming increasingly common due to low cost and high portability.

In the classroom

- Students using <u>handheld computers</u>, <u>PDAs</u>, <u>smart phones</u> or handheld voting systems (such as <u>clickers</u>) in a classroom or lecture room (<u>Tremblay 2010</u>).
- Students using mobile devices(such as a Pocket PC) in the classroom to enhance group collaboration among students and instructors.

Blended learning

Mobile learning can provide support that enhances training in a corporate business or other classroom environment.

Class management

The mobile phone (through text <u>SMS</u> notices) can be used especially for distance education or with students whose course requires them to be highly mobile and in particular to communicate information regarding availability of assignment results, venue changes and cancellations, etc. It can also be of value to business people, e.g. <u>sales representatives</u> who do not wish to waste time away from their busy schedules to attend formal training events.

Pod casting

<u>Pod casting</u> consists of listening to audio recordings of lectures, and can be used to review live lectures and to provide opportunities for students to rehearse oral presentations. Pod casts may also provide supplemental information to enhance traditional lectures

Psychological research suggests that university students who download podcast lectures achieve substantially higher exam results than those who attend the lecture in person, but only in cases in which students take notes.

Pod casts may be delivered using syndication, although this method of delivery is not always easily adopted

Outdoor

- Learning in museums or galleries with handheld or wearable technologies
- Learning outdoors, for example on field trips.
- Continuous learning and portable tools for military personnel.

At work

- On the job training for someone who accesses training on a mobile device "just in time" to solve a problem or gain an update.

Lifelong learning and self-learning

The use of personal technology to support informal or lifelong learning, such as using handheld dictionaries and other devices for language learning.

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Mobile technologies and approaches, i.e. <u>Mobile Assisted Language Learning</u> (MALL), are also used to assist in <u>language learning</u>. For instance handheld computers, cell phones, but also <u>podcasting</u> have been used for helping people to acquire a language.

Other

- Improving levels of literacy, numeracy and participation in education amongst young adults.
- Using the communication features of a mobile phone as part of a larger learning activity (e.g.: sending media or texts into a central portfolio, or exporting audio files from a learning platform to your phone)

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Authoring:
- Learning Mobile Author, e.g. for authoring and publishing WAP, Java ME and Smartphone

Mobile learning could be used for:
1. **Activating knowledge** before a classroom (or virtual classroom or even an eLearning session);
2. **Summarizing** (after one of those sessions – delivered soon after the session);
3. **Recall** (or reactivating knowledge – probably a week or two after the session. This ensures key concepts are revisited and helps in transferring the new knowledge to long term memory – especially for learners who may not get a chance to apply new knowledge immediately after the sessions);
4. **Providing application opportunities** (through pop quizzes or learning games on mobile);
5. **Just-in-time search support** by letting employees search in company's knowledge databases (wikis, blogs, forums) using their mobiles.

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We believe mobile learning is becoming a key component of the blended learning mix. Take a look at a sample blended mix that we proposed to one of our clients in past.

M Learning Advantages

Cutting edge information and communication technology (ICT) can most often be found employed within gaming, movies or other sectors of the entertainment industry. It generally takes 12-18 months for its adoption to cross over into mainstream industry learning applications (E. Masie, 2004. pers comm, 28 July). This mainstream industry adoption has been emerging over the last few years with some positive results. This article proposes four major advantages that can be gained from mLearning to a greater degree, or more easily than any other learning methods. The advantages are: access, context, collaboration, and appeal.

Access

The most obvious advantage of an mLearning environment is the ability to access information where it would not be possible without a mobile device. The salesman on the way to meet a client, the worker sitting on public transport, the emergency services Personnel on the street and the list of examples goes on. But how much would modern society actually use this facility if it were available. The increased requirement to undertake personal learning to maintain a competitive advantage in the global economy has resulted in the average adult spending 15 hours per week conducting deliberate personal learning. Considering those 15 hours per week are not conducted at regular times or in regular places the potential use is considerable. That potential is likely to increase as the information age accelerates. People will need to be able access information faster and more effectively if they are to increase their employability, business success, personal fulfilment and social development.

mLearning provides people with the opportunity to access information where it would previously have been impossible. This access advantage is not limited to time and location. The devices

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required to access mobile networks are relatively inexpensive compared to desktop or laptop computers. This reduced expense can make access to this learning available to people who otherwise could not afford it. Extensible Markup Language (XML) in the future could (if not XML then another similar markup language) allow those people, who only have mobile devices, to access a considerable proportion of the content and learning materials on the Internet. XML is a vendor, application and platform independent language that defines data and can be easily exchanged between systems and hardware. XML also has significant advantages with regard to data reuse and re-purpose. By applying the appropriate style sheet the same data can be displayed in any number of systems or hardware types

Context

There has been considerable research into the advantages provided by placing the learning situation into the work or application situation The research revolves around the ideals that meaningful learning will not occur unless it is anchored in an authentic task where the learner can experiment, make mistakes and learn.

The main types of mobile devices used in the education process are:

• **NoteBook computers**. From one hand they have such abilities as desktop personal computer; from the other hand they have small sizes and support wireless communications. Their prices are still high.

• **Tablet PC**. These are one of the newest mobile devices. They also have full range of abilities as personal computers. Some of them haven't keyboard but have software to recognise handwritten text. It is relatively expensive.

• **Personal Digital Assistant (PDA)**. They have small sizes and significant processor power. New models support more than 65000 colors, recognise handwritten text and can play different types of multimedia files. The main

operating systems used are Palm and Microsoft Pocket PC.

• **Cellular phones**. The low class devices mainly can be used for voice communication and sending and receiving of text messages (SMS). Some of their disadvantages are low memory capacity and low data transfer rate. The cellular phones from the higher class can be used to Internet access via WAP or GPRS technologies. They also can be used to send and receive the multimedia messages (MMS). Their prices continuously decrease.

• **Smart Phones**. They are hybrid devices which combine the abilities of cellular phones and PDA. They have smaller sizes than PDA and bigger than cellular phones. Typically they haven't full sized keyboard and can recognizes handwritten text. They use Symbian, Windows Mobile or other operating system. As they have Internet browsers they have potentiality to be successfully used in the mobile multimedia education.

CONCLUSION

This paper attempts to summarize the factors that will influence our understanding of mobile learning in the coming years. This understanding will itself influence the progress and direction of mobile learning and its perception and acceptance by the wider educational community. The definition and depiction of mobile learning as 'merely' portable e-learning is a gradualist position which will ease its diffusion but weaken its contribution whereas the definition and depiction of mobile learning as something wholly new and distinct is a radical position that will make diffusion and acceptance more problematic but maintain its identity and coherence. What we have not considered here is the extent to which mobile learning could draw on discourses outside e-learning.

As we progress through the 21st Century, and the already hectic pace of our lives increases, society will need to find faster and more inventive ways to utilise previously unproductive time. Lifelong learning will be essential for maintaining a competitive

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advantage in the global economy, for personal growth, and for simply functioning efficiently in an increasingly technological environment. With an increasing requirement to conduct learning activities independently, the ability to read and comprehend, and to metacognitively analyse and understand our learning processes, will be key factors in our successful development and our ability to function in the 21st century. These requirements and skills can be improved through the use of mLearning. It provides access to learning during previously unproductive times, it allows more flexible and immediate collaborative options, it allows controlled learning in contextual situations, and provides greater options for teachers to observe and assist in independent learning.

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