CONTENTS

Chief Patron

Editorial Board

Title

"M-LEARNING" – A BUZZWORD IN COMPUTER TECHNOLOGY

Author(s)

Pooja Grover

Associate Professor & HOD-IT,

Om Institute of Technology & Management,

Hisar, India

Rekha Garhwal

Assistant Professor,

Om Institute of Technology & Management,

Hisar, India

Ajaydeep

Assistant Professor,

Om Institute of Technology & Management,

Hisar, India

Abstract:

With the exponential development in technology, there is always the danger that the equilibrium between technology and learning is disturbed. But Mobile Learning or short M-Learning creates completely new possibilities in learning. M-Learning creates completely new learning scenarios For example, a lecture about the unique architectural design of a building could take place at the building itself. This creates an entirely new learning experience This paper discusses the place of M-Learning as Part of E-Learning and D-Learning Relationships between D-, E-, and M-Learning It also critically investigates the potentials of M-Learning while examining the positive and negative effects of M-Learning for learners. Furthermore, it will investigate what kind of learners may and may not benefit from M-learning.

This paper also discusses how M-Learning can support classical learning and some M-learning practices that are in different sectors such as corporate, university and military have been mentioned This paper is a review of M-learning literature for understanding and discussion of current perspectives and theories in mobile learning

In the end the paper describes issues and special care needed when designing learning material with the mobile devices in mind.

I.   Introduction:

The term "Mobile Learning" can be defined in many different ways. From a technological point of view, M-Learning is related to E-Learning. "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" (O'Malley, et al., 2003). While M-Learning is essentially a type of E-Learning, the distinctions are important; M-Learning distinguishes itself from E-Learning in special technical conditions. Mobile technologies with small screens, limited bandwidth and limited storage space are especially developed for the mobile usage. On the other hand, mobile technologies enable the learner to learn anywhere and anytime in contrary to classical E-Learning application. Consequently, E-Learning applications can be extended or customized with mobile technologies,

such as adding access for cell phones or PDAs. By this, existing E-Learning applications can be used for M-Learning.

II.   M-Learning as Part of E-Learning and D-Learning

M-learning sets a new stage of the progress of distance learning (D-Learning) and E-learning. By nature the M-learning is a form of existing D-Learning and E-learning. Historically the distance education has more than one hundred years of experience and traditions. Its main characteristic is the distance and time separation between teacher and students. The E-learning offers new methods for distance education based on computer and NET technologies. Simultaneous to E-learning the other forms of D-Learning still exist (for example satellite based D-Learning).
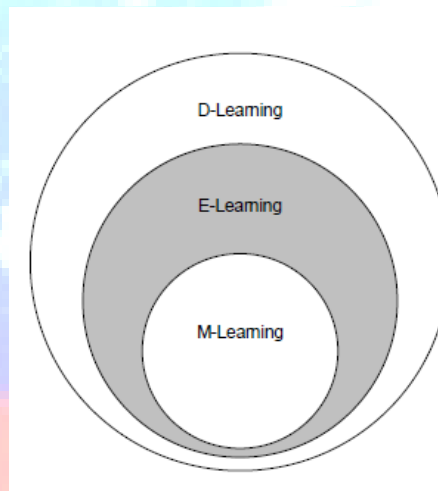
Figure 1. The Place of M-Learning as Part of E-Learning and D-Learning. Source: Tsvetozar Georgiev, Evgenia Georgieva, and Angel Smrikarov, "M-learning – a New Stage of E-Learning"

III.   Relationships between D-, E-, and M-Learning:

D-, E-, and M-Learning all provide communication between instructor and student. This characteristic often causes confusion and consequently leads to the methods being interchangeably used. To clarify, D-Learning is defined as learning at a distance. E and M-Learning, as subsets of D-Learning, also provide for learning at a distance. Thus, although they

have their own peculiarities based on learning object design and delivery medium, they represent a means to the same D-Learning end.

Further differentiating M- and E-Learning from D-Learning is the functionality of M- and D-Learning which affords the use of both electronically asynchronous (no simultaneous interaction) and synchronous (text messaging, virtual chat rooms, etc. that provide the opportunity for simultaneous communications) environments. This is in contrast to the one-way dialog typically associated with D-Learning (mail, television, fax, etc.).

To distinguish E- from M-Learning Upadhyay designed a model where the delivery methods were differentiated through a continuum consisting of functionality and mobility (see figure 2).
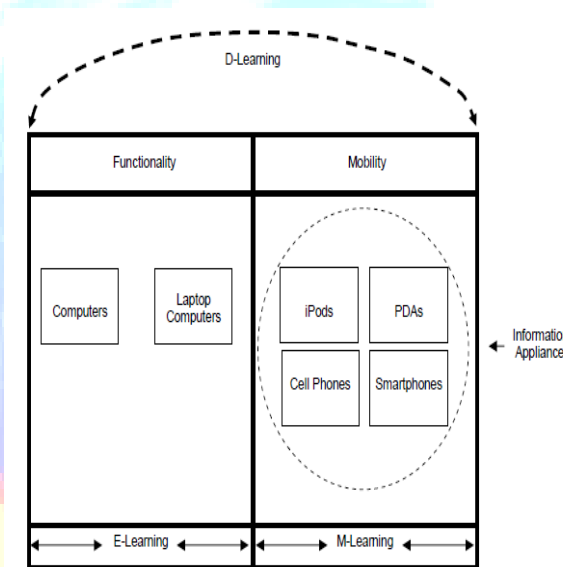
Figure 2. Relationships between D-, E-, and M-Learning. Source: Adapted from Upadhyay,"M-Learning – A New Paradigm in Education,"

In 2005, Keegan visually differentiated E- and M-Learning, with two models, 'Today' and 'Tomorrow', respectively (see figure 3).
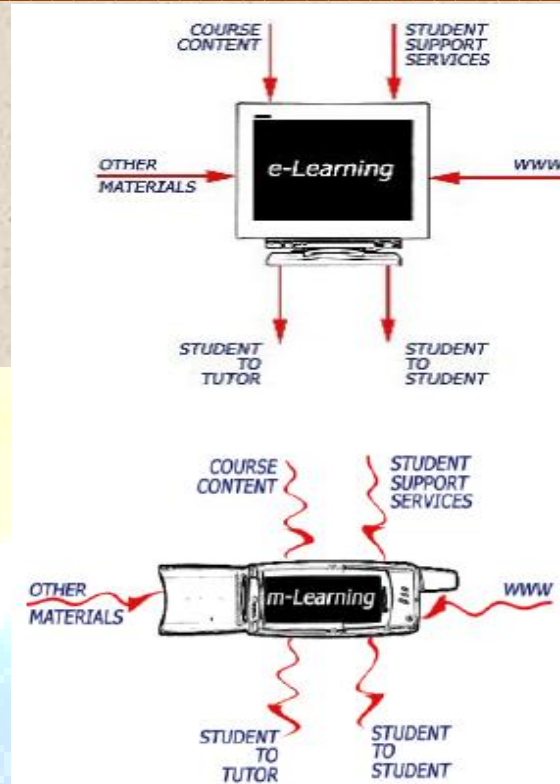
Figure 3. Above, The Wireless Virtual Learning Environment of 'Today' (2005). Source Desmond Keegan, "M-Learning – How far has it Come?"

Both models show similar functionality, i.e. course content, student support services, etc., but each demonstrates these features of the wireless learning environment being executed differently. In the case of E-Learning, a tethered approach is utilized. In the case of M-Learning, the same processes are performed in an exclusively wireless environment.

Keegan's 'Tomorrow' model delivers course content via the cell phone – an untethered, wireless small information appliance. In the two years that transpired from Upadhyay's model to Keegan's, M-Learning had become a reality; Upadhyay proclaimed that, ". . . M-Learning has now emerged as a new wave of development." A shift was made from that of an M-Learning vision, to an M-Learning reality.

Laouris and Etokleous further differentiate E-Learning and M-Learning by the use of terminology that came about as a result of the introduction of the latter (see table 1).

Table1 Terminology Comparisons between E-Learning and M-Learning

E-Learning	M-Learning
Computer	Mobile
Bandwidth	GPRS, G3, Bluetooth
Multimedia	Objects
Interactive	Spontaneous
Hyperlinked	Connected
Collaborative	Networked
Media-rich	Lightweight
Distance learning	Situated learning
More formal	Informal
Simulated situation	Realistic situation
Hyperlearning	Constructivism, Situationism, Collaborative

Source: Laouris and Etokleous, "We Need an Educationally Relevant Definition of Mobile Learning."

FTF (Face To Face) learning is the foundation of other learning models to include D-, E-, and M-Learning. As a several-thousand-year-old exemplar of learning delivery, FTF significantly predates the earliest documented D-Learning efforts Figure 5 shows the layering of D-, E-, and M-Learning models upon the FTF foundation.
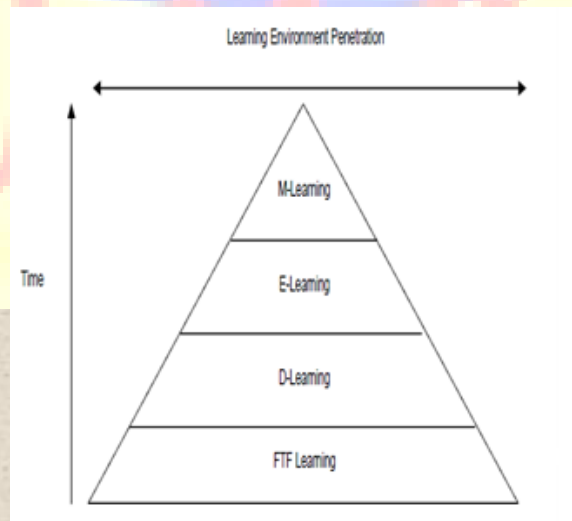
Fig 4 A Hierarchy of Learning Methodologies

Figure 4 depicts D-Learning as the foundation for E-Learning, and E-Learning as the foundation for M-Learning.

M-Learning technologies may continue to broaden the boundaries of the conventional classroom, making it possible for the learning strategy to become as prolific and, possibly, as effective as FTF learning. Many of the ambiguities surrounding D-Learning, E-Learning, and M-Learning were resolved by the research of Kulkulska- Hulme, et al., Upadhyay, and Keegan. Debate, however, continues to surround the placement of the fledgling M-Learning delivery medium along the 'Hype Cycle' continuum as compared to the more mature E-Learning strategy (see figure 5).
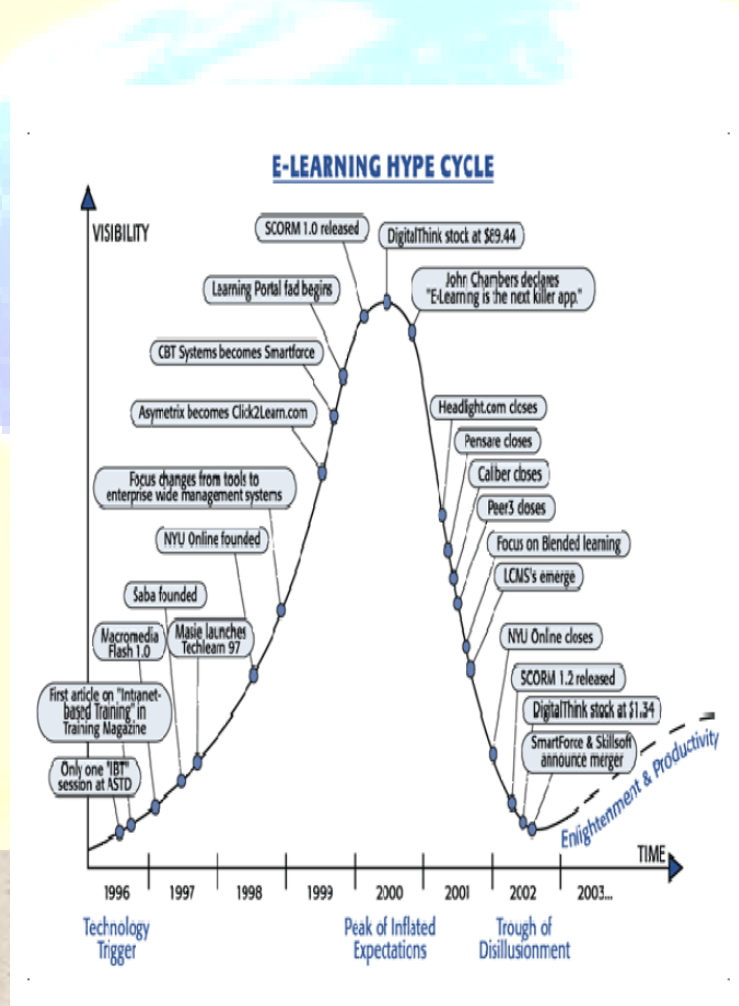
Figure 5 E-Learning Hype Cycle. Source: Kevin Kruse, "The State of e-Learning: Looking at History with the Technology Hype Cycle,"

IV.   Factors Affecting M-Learning:

There are three factors which need to be taken into account when discussing the benefits and disadvantages which M-Learning brings to the learner:

1. The learner or the learning style

2. The mobile device and/or mobile application

3. The learning content

The following image shows the dependencies of these three factors on each other:
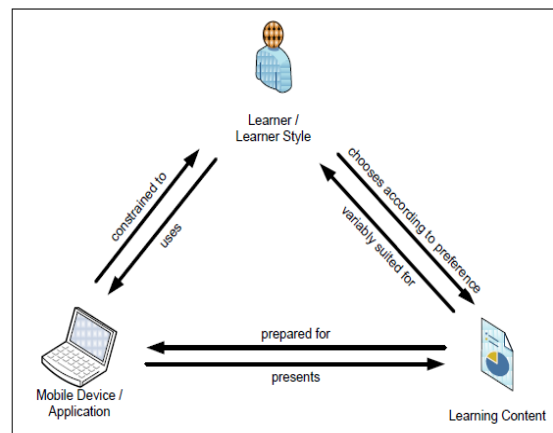
Figure 6 Three factors for M-Learning

As depicted above, each factor depends on or influences the others. The learner chooses the learning content according to the own learning style.

The learning content itself needs to be prepared for the mobile device it is meant to be used on. This could mean a different layout of a text to suit a cell phone display or the development of a learning application for a PDA.

There is also dependence between the learner and the mobile device or application. For example, depending on the learner's preference, a laptop could be better suited than a PDA. And of course, the learner needs the mobile device in order to "do" M-Learning.

V.   Advantages of M-Learning:

M-Learning has many advantages for learners, (e-teaching.org, 2007) presents a categorization into four key advantages:

1. Efficiency

2. Personal Sphere

3. Connection

4. Context sensitivity

1. Efficiency

"M-Learning enables (learners) to learn at places, which do not have a reference to the learning content, but could be used to learn due to time rational occasions (such as in the metro or train)." (e-teaching.org, 2007)

2. Personal Sphere

"Learning takes place in the personal sphere of the user. Due to the immediate access of information, problem-oriented learning is supported." (e-teaching.org, 2007)

3.Connection

"Because of the permanent internet connection, interaction and communication with the lecturer and other students is more intensive and group-work more flexible." (e-teaching.org, 2007)

4.Context sensitivity

"M-Learning allows the collection and evaluation of environmental information, like researches in a laboratory or museum." (e-teaching.org, 2007)

VI.   Disadvantages of M-Learning:

M-Learning also has some disadvantages. First of all, M-Learning does not replace classical learning situations such as lectures and can only support them under certain circumstances. For example learning facts, such as historic dates or vocabulary, or doing something practically, such as an experiment in a physics class.

The learners themselves or more specific their learning styles need to be suited to M-Learning. There are different learner styles, such as the already spoken of Active Learner, who prefers group work. This type of learner benefits from M-Learning, on the contrary a so called Reflective Learner, who likes to first think about a topic quietly does not benefit from M-Learning.

The last factor is the mobile devices and applications. For example, a cell phone has limited input possibilities and a small screen for the output, but can be carried easily with the learner. A laptop has a big screen and a full keyboard but could be too heavy and bulky in some situations. It needs to be analyzed when a specific device brings benefit to the learner or not.

VII. Learner Styles for M-Learning:

The learner's style of learning is one important factor which needs to be taken into account when judging the benefits or disadvantages of M-Learning. Learning is the handling, reception and processing of information. Therefore the term learner style means the student's preferred style of handling, receiving and processing, information.

A learning-style model classifies students according to where they fit on a number of scales pertaining to the ways they receive and process information. (Felder, et al., 1988).

VIII. Applications for M-Learning:

M-Learning needs some kind of application in order to present the learning material or guide the learner in some way. This application could be a web page, an office document such as a PowerPoint presentation, or a tutoring application.

The applications for M-Learning are divided into three categories: standalone applications, websites and all kind of document formats.

Stand alone applications are created in a programming language such as Java, C++ or Object C. There are many different programming languages available in the market; these three are taken as an example. Websites are divided into static sites, containing only HTML and basic CSS formatting, and interactive sites. Interactive websites could contain JavaScript functionality or

Flash elements for example. The document formats category contain PDFs, Office documents such as DOC, PPT or other document formats such as txt and so forth.

IX. Scenarios for M-Learning:

The scenarios for M-Learning can be divided into two parts: M-Learning as support for classical learning methods and M-Learning in new learning scenarios

1. M-Learning as support for classical learning methods

In support for classical learning methods, M-Learning can be used to repeat the already learned content. For example, it could be possible to learn the vocabulary of a language with a cell phone. The application on the cell phone questions in some sort of multiple choice quiz the correct translation of a word. In these learning scenarios the learning happens unexpectedly and could be interrupted, such as learning while waiting for a bus or while a train ride. Therefore the learning content should be prepared in small portions, in order to learn two minutes or two hours, without any disadvantages of interrupting and resuming it.

2. M-Learning in new learning scenarios

M-Learning enables the learners to not only learn at anytime and anywhere, it enables the learner to learn at any point of interest. This can be used for location-based learning. Additionally, M-Learning supports the interaction between learners in groups. This leads to the first two characteristics of learning content for these scenarios: Location-based learning content Learning content for group work where interaction is possible

After the presentation and description of the three factors which may benefit or hinder M-Learning, the following scenarios will provide practical examples for the application of M-Learning. They will show the benefit and the disadvantage M-Learning has for learners.

The presentation of the scenarios is divided into three parts. The first part contains examples in which M-Learning supports classical learning, such as the repetition scenario explained above. The second part shows scenarios in which M-Leaning is used to create new ways of learning. The final part presents the so-called bad example scenarios in which the usage of M-Learning disadvantages the learner.

Examples showing M-Learning as support for classical learning

a. Medical state examination preparation

In Germany, and other European countries, the study of medicine is completed with the medical state examination. This final examination tests the knowledge gained from the lectures taken.

These questions ask about the name or position of muscle, bones or nerves for example. Also disease patterns or treatment methods are topics of this examination.

There are already existing applications for PCs which can be used for the preparation for the examination. These applications are based on the real "medical state examination" multiple choice questions on medical knowledge.

It would be possible to create an application for cell phones to prepare for the examination. This scenario is very similar to the previous scenario. The questions and possible images are displayed and the learner selects the correct answer out of the options listed. In this special scenario, the learning content is excessive, and therefore, the medicine students learn as often as possible. In addition to the preparation at home with books, scripts and the PC application, they can use train rides, waiting time and so forth to keep learning while going about their day.

B. Drivers license preparation

This scenario is unique from the other academic learning scenarios, but it will show that M-Learning can be used in more ways than just in the academic field. In order to get a driver's license in Germany, people need to pass a theoretical examination and a practical examination.

The theoretical examination consists of a number of multiple choice questions about the car itself and the traffic laws in Germany. These questions are commonly known, and in the examination, a random selection of them is asked. In order to prepare for the examination, the learner uses study guides with the possible question to test himself and prepare. There are also applications available which include these questions and simulate the examination.

Therefore, and like in the previous scenarios already described, it would make sense to port this application on the cell phone. The questions are typically multiple choice questions with some text and a picture which shows the traffic sign in question or a traffic situation. Sometimes there are questions which need to be answered by the input of a number, such as the allowed speed

limit or the distance between cars and so forth. These inputs can easily be done with the cell phone. This example shows that M-Learning can not only be used in the academic field but can be used in many learning situations.

Examples showing New ways of learning

a. Architectural lecture in the building

The study of architecture includes lectures about special buildings and their astonishing structure, the Saint Bartholomeus's Cathedral of Frankfurt being an example. This cathedral is a Gothic building located in Frankfurt, Germany, it was constructed in the 14th and 15th century (Kalusche, et al., 1992).

Instead of a lecture in the classroom, the M-Learning lecture takes place in the building itself. The students have the lecture on their cell phone, and the lecture itself is a guide through the cathedral. Beginning with the outside of the building, the students are prompted to see the special construction of the building. The guide on the cell phone shows or talks about the unique features in a text or audio output and the students can see the points of interest directly in front of them. This pattern is used in the entire guide, first a point of interested is presented by text or speech, and then the students can look at it directly. In addition images of the point of interest could be shown, to help the learners to identify it in the cathedral. This scenario shows one of the biggest benefits of M-Learning: learning at the point of interest, or location-based learning

b. Anatomy lecture at the corpse

The study of medicine includes anatomy lectures and practical training with a corpse. The students learn the structure of the human body by the dissection of a body. Of course, they need some guide in order to be directed to the current parts of interest.

This guide can be accomplished with M-Learning. A laptop can be placed near the dissection table and the guide run on it. The guide can be some sort of application with text, speech and also images or movies on how to do the dissection to get to the part of interest. In addition voice recognition would be beneficial since the student's hands are not free. The parts of interest, such as a specific vein or muscle, can be introduced by a description paired with some images and / or

a video to explain its function in the human body. This scenario shows how M-Learning can be used to modify existing lectures in order to make them more interesting and more informative

Bad examples

After the "good" examples on how M-Learning can help students to improve the learning experience, two "bad" examples show when the usage of M-Learning does not make sense or even hinders the learning effect.

a. Reading a book on a cell phone

Due to the potential of mobile devices and the availability of eBooks, it is possible to read entire books on these devices. In addition to reading books for fun in the free time, it is also possible to read recommended literature and scripts for classes on mobile devices. Most scientific papers are available in PDF form and notes for many classes are also available in some sort of digital format.

The reading of long texts on a mobile device can be exhausting for many persons. This disadvantage and the missing of the possibility to mark passages of interest or add own notes, depending on the used software, are the problems in this scenario. Especially while reading literature or scripts for classes, the student needs to work with the text. This means a student highlights special parts or adds own remarks and conclusions to the text. This is barely possibly with PDF viewer or other reading software on a mobile device. Therefore reading on a mobile device cannot substitute working with physical texts, like books or print outs.

b. Java lecture on a cell phone

The learning of a programming language includes theoretical training, like learning the instruction set and the grammar of the language. It also includes practical training like actively programming small programs to test the knowledge.

In this scenario, this training is done by a lecture on a cell phone. The theoretical part could be done by some sort of PDF file or a website instructing the learner what commands a programming language has, the grammar rules and so forth.

The practical part cannot be done on a cell phone. Except for some special modified smartphone's, such as Google's Android with a hacked Linux command shell on it, there are no

compilers available for cell phones. And without a compiler, there is no programming possible. Also, the programming with a standard cell phone keyboard is nearly impossible, due to the missing full-size keyboard and some special chars such as "*+", which are needed in most programming languages. Cell phones could be used as some sort of reference to look up commands, or grammar, but while programming, the student is already in front of a computer. Therefore, the reference can be used on this computer, too

X.   Mobile Learning Theories:

Some of the Current mobile learning theories are Behaviorism, Cognitivism, Constructivism, Situated Learning, Problem- Based Learning, Context Awareness Learning, All of these theories will be discussed in table

Table 1. Mobile Learning Theories

Theories	Definitions	Focus	Examples with mobile technologies
Behaviorist Learning	Learning has occured when learners evidence the appropriate reinforcement of an association between a particular response and stimulus (Smith and Ragan, 2005)	**Information and content delivery in mobile learning** Language learning: Test, practices, quiz, listening-practice speaking Drill and feed back: Mobile Reponse System Content delivery by text messages.	English learning applications *SMS, MMS, Voice recorder softwares* Mobile Response System: *Qwizdom, Turning Point Response System* *Tell me tech. (searching)*
Cognitivist learning	Learning is the acquisition or reorganization of the cognitive structures through which humans process and store information (Good and Brophy, 1990)	**Information and content delivery in mobile learning** Using Multimedia learning (Dual code, Cognitive Load Theory): Images, audio, video, text, animations	Multimedia (text, video, audio, animation, images) *SMS, MMS, e-Mail* *Podcasting* *Mobile TV*
Constructive learning	Learning is an activity process in which learners construct new idea or concepts based on their current and past knowledge (Bruner, 1966)	**Context and content-dependent mobile learning** Questions for Exploration Cases and examples Problem solved and Decision making applications Multiple representations Authentic contexts based information database **Collaboration and interaction in mobile learning** Collaboration and interaction between students Comunication via mobile phones	Handheld games Simulation Virtual reality Interactive Podcasting and SMS Interactive mobile TV and SMS
Situated learning	Learning is not merely the acquisition of knowledge by individuals, but instead a process of social participation (Brown et all, 1989).	**Social Context and Social participant dependent mobile learning** Authentic domain activity Collaborative social interaction Cooperative activities Expert modeling Situated mentoring Workplace learning	Natural science learning Medical education Multimedia museum Virtual experts by artificial intelligence tech. Mobile performance support system
Problem-based learning	Learning aims to develop students' critical thinking skills by giving them an ill-defined problem that is reflective of what they would encounter as a practicing professional (Koschmann et all, 1996)	**Problem based context and solved based content-dependent mobile learning** Problems – Solutions Case centred activities Collaborative social interaction	Medical education Business administration Nursing *Simulations* *SMS* *MMS* *Voice responde systems*
Context awareness learning	Context awareness means gathering information from the environment to provide a measure of what is currently going on around user an the device (Naismith et all, 2004)	**Context aware in mobile learning** Context-dependent content management Contextual event notification Context-aware communication Navigation and retrieval of learning materials User interface adapted according to time and location contexts	Multimedia museum and gallery Pre-class podcasts *Films* *e-books* *Podcasting*

XI.   Current Mobile Learning Practices:

This section justifies how these theories can help us in current mobile learning applications developed by METIL LAB (Mixed Emerging Technology Integration Lab) in the Institute for Simulation & Training in University of Central Florida which is a world-leading center for the development, demonstration, and utilization of interactive and virtual systems for simulating operational environments and for training personnel who will utilize specific equipment and systems in those environments. METIL produces mobile learning application and provides mobile learning research and development expertise for the public, private, and social sectors.

• **Microsoft Mobile Course and IVR Sales Materials**

As smart phones become more common and mobile web browsing improves, the need for mobile access to learning and training materials is more in demand and has greater impact for business professionals. METIL took Microsoft's existing web courses and created a SCORM-compliant mobile web template. This allows the content from Microsoft's web courses to be easily repurposed (requiring only some modifications to media assets) for mobile access with full progress tracking and scoring.

Sales professionals in particular have a strong need for on-demand, mobile access to refresher materials on their product line. Driving, however, provides challenges to many methods of delivering mobile content, such as apps or mobile web access, due to limiting ability to look at the device's screen; this is especially true now due to stricter hands-free laws in many states. In order to allow simple, hands-free access to sales data, we developed a voice recognition IVR (Interactive Voice Response) system that allows sales professionals to navigate Microsoft's product information library and select audio for listening

Figure 7- Microsoft Mobile Course and IVR Sales Materials Project

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories
Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A.
International Journal of Management, IT and Engineering
http://www.ijmra.us

337

- **My Sports Pulse**

The My Sports Pulse project combines mobile and web technologies, STEM education, and a sports theme to create an innovative approach to bolstering understanding and interest in science and mathematics fields.

Students can register with the My Sports Pulse program to receive questions, presented within the context of sports scenarios, about subjects such as physics, nutrition, algebra or geometry. Questions are delivered through text messages or email, and can also be accessed and answered directly through the My Sports Pulse website. As students answer questions, they earn points in various knowledge areas and build up their own avatar to compete with other students and schools. The My Sports Pulse program has been piloted with several schools inside and outside of the US, with promising results.

Figure 8.- My Sports Pulse Project

XII. Special care for the mobile device:

This section elaborates on important considerations when designing a web page so it will adapt itself to the mobile phone as well as being accessible for the widest audience possible

Size

Screen size

The size of the mobile screen is one of the main obstacles for its use as a fully acceptable web browser.

Navigation

Navigation on a small device is not similar to navigating on a computer screen. This is very clear to most people, with a technical competence or not. The problem is that most web pages are not tailored to the small screen. Consequently, different ways to ―fit‖ a traditional web page to a small screen are most normally used

Bandwidth

The Internet bandwidth is increasing at a tremendous rate. The increasing bandwidth available to most people have made designers create more appealing and ―heavy‖ web pages that looks great to the eye, but have a ―heavy weight‖ when it comes to bandwidth demands. This is not much of a problem for the traditional devices, but the mobile devices do not have this seemingly unlimited bandwidth. Most phones today have the possibility of GPRS up to 114 kbit/s (Wikipedia contributors 2008d) or EDGE with up to 473.6 kbit/s (Wikipedia contributors 2008c) and most new phones comes with 3G data rates.

Text input field

Input of text has always been a problem for small devices with small keyboards, so entering texts on a mobile phone can be difficult. The mobile phone supports active and passive validation, which means that if the text can be validated as each letter is typed, an active validation is possible – and a good way to stop the user from submitting something that will fail on the passive validation anyways.

Guidelines

1. Provide equivalent alternatives to auditory and visual content.

2. Don't rely on color alone.

3. Use markup and style sheets and do so properly.

4. Clarify natural language usage

5. Create tables that transform gracefully.

6. Ensure that pages featuring new technologies transform gracefully.

7. Ensure user control of time-sensitive content changes.

8. Ensure direct accessibility of embedded user interfaces.

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories
Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A.
International Journal of Management, IT and Engineering
http://www.ijmra.us

339

9. Design for device-independence.

10. Use interim solutions.

11. Use W3C technologies and guidelines.

12. Provide context and orientation information.

13. Provide clear navigation mechanisms.

14. Ensure that documents are clear and simple

XIII. CONCULSION:

Computers can improve human senses, or substitute one for another. They can do even more, and operate different devices such as home appliances. Even for persons with the most severe challenges, the computer is a helpful tool with which to communicate and control the environment . Mobile

technologies offer significant opportunities both for learners and educators in the process of knowledge society. Mobile technologies have the structure of independency of time and place, so mobile technologies have found themselves an important use in e-learning supported by mobile technologies (m-learning) information can be accessible, free from time and place, via mobile technologies which have an opportunity such as wireless communication. By means of their technical features, mobile technologies can be used not only for educational purposes Accessing but also for increasing social interaction. Based on their portability and wireless communication features, handheld computers, admitting of verbal and written communication, allow for deaf and hard of hearing students reach communication and learning experience.

In the end we can say that M-Learning has a long way to go before becoming a substitute for classical learning. It is an extension or an addition to the classical learning that can enhance the learning process. Depending on the scenario, it provides additional informative benefits or an enjoyable and interactive alternative to the learner. Such an alternative can be a good motivation for learners and is more engaging than classical classroom teaching. Therefore, the proper use of M-Learning provides promise of enhancing the learning process.

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories
Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A.
International Journal of Management, IT and Engineering
http://www.ijmra.us

340

XIV. <u>References:</u>

- Tsvetozar Georgiev, Evgenia Georgieva, and Angel Smrikarov, "M-learning – a New Stage of E-Learning" (paper presented at the International Conference on Computer Systems and Technologies – CompSysTech, Rousse, Bulgaria, June 17-18, 2004): IV.28-1, fig. http://ldt.stanford.edu/~educ39106/articles/m-learning.pdf (accessed August 1, 2007).

- http://learning.ericsson.net/mlearning2/files/conference/dkeegan.pdf (accessed September 21, 2007);below, The Wireless Virtual Learning Environment of 'Tomorrow'. Source: Keegan, "M-Learning".

- http://www.itdl.org/Journal/Feb_06/article04.htm (accessed September 21, 2007).

- e-learningGURU.com, under "The Triggers," http://www.elearningguru. com/articles/hype1_1.htm (accessed September 17, 2007).

- **e-teaching.org** e-teaching.org [Online] // Mobiles Lernen. - September 27, 2007. - March 03, 2010. - http://www.e-teaching.org/didaktik/gestaltung/mobilitaet/.

- **Felder Richard M.** Learning Styles and Strategies [Online] // Learning Styles and Strategies. - 15. March 2010. - 15. March 2010.http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/styles.htm.

- O'Malley C. and Vavoula G. Guidelines for learning in a mobile environment [Journal] // MOBIlearn. - 2003.