M-learning & Mobile Knowledge Management: Emerging New Stages of e-Learning & Knowledge Management

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Abstract—**Mobile technology devices have been used widely by people to effectively run their business as they provide powerful communication and mobility. It's time now to utilize powerful features of such devices in the process of learning. Prevailing trends in E-learning and Knowledge Management (KM) projects have been enhanced by their increasing relativity in technological arena. The paper analyses and compares different M-learning and Mobile Knowledge**

Index Terms—**KM, M-learning, MKM, D-learning, E-learning.**

I. INTRODUCTION

The traditional education is made in classrooms where the teacher presents the learning material to a group of students. The educational technology depends mainly of teacher and the students must physically participate in the learning process. Regardless of obvious advantages as a direct contact between a teacher and students and immediate feedback the traditional classroom education has many Management (MKM) introduction scenarios based on evidence found in various relevant resources. The similarities and differences as identified between MKM and M-learning during the entire course of study are mentioned in details.

The paper also focuses on the existing devices and technologies appropriate to realize M-learning as a new stage of progress in D-learning and E-learning.

disadvantages. For example if the student has no ability to take part in some lesson he or she will miss the training material. These disadvantages lead to search for new and more effective educational methods.

The rapid growth of information and communication technologies and rising computer knowledge of the students make possible appearance of these new educational forms. If 15 years ago the main accents have been on Computer Based Training which used primary CD and local area networks as information medium, 5 years ago the accent is moved to use of Internet and Learning Management Systems. The E-learning as new term is appeared. Nowadays extremely actual and perspective is mobile learning (M-learning).

Widespread availability of mobile devices and wireless networks offer enormous opportunities for knowledge acquisition both in terms of interaction with sources of

information and in terms of collaboration. Development in microelectronics and telecommunication technologies provide continuing increase of processing power, improved interfaces, extended functionality, fast and diverse wireless connectivity for mobile terminals. Combined with tendency to go down in price per unit and having advantage of being truly personal mobile devices have a potential to become a valuable learning and information acquisition tool for everyone.

Mobile learning (M-learning) and mobile knowledge management (MKM) are relatively new areas of research and practice. Since their appearance in the last decade interest on using mobile technologies in different knowledge acquisition scenarios and contexts has risen enormously. Some research indicates exponential growth of number of Internet publications in M- learning [8]. There have been attempts to explore relations between E-learning and M-learning [6, 7], KM and MKM [4], even between KM and M-learning [5] but nothing so far was found on comparison of approaches in M-learning and MKM. This paper tries to close the gap by finding similarities and differences between MKM and M-learning as well as by finding critical success factors for sustainable development in these areas.

This paper also discusses the existing devices and technologies to realize M-learning as 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).
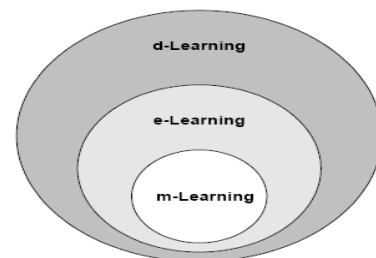

Fig 1. The place of M-learning as part of E-learning & D-learning

From the other side the M-learning is part of E-learning and therefore part of D-Learning (fig.1). In the literature

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there are different definitions for M-learning. Some of them consider it as only wireless or Internet based. We think that definition of M-learning must include the ability to learn everywhere at every time without permanent physical connection to cable networks. This can be achieved by the use of mobile and portable devices such as PDA, cell phones, portable computers and Tablet PC. They must have the ability to connect to other computer devices, to present educational information and to realize bilateral information exchange between the students and the teacher.

II. KNOWLEDGE MANAGEMENT, MOBILE LEARNING AND MOBILE KNOWLEDGE MANAGEMENT

Knowledge management is a discipline that promotes an integrated approach to identifying and sharing all of an organization's knowledge assets including unarticulated expertise and experience resident in individual workers. In other words, KM is taking advantage of what you know. It involves the identification and analysis of available and required knowledge, and subsequent planning and control of actions to develop knowledge assets so as to fulfill organizational objectives.

In relatively short history M-learning and MKM have proved their vitality and viability in knowledge sharing processes. Several research and implementation projects have been organized all over the world [7, 13]. The mobile approach allows delivering learning in place and time that was out of reach before. Though there are two different terms and two independent developments still M-learning an MKM are essentially about the same i.e. about learning and knowledge acquisition in a mobile situation. To compare M-learning and MKM let us first review existing definitions.

Many authors view M-learning as a further development of E-learning [7, 8, 10] or even more it is often considered as a sub-set of E-learning [3] or a sub-set of distance education [6]. Quite often definitions of M-learning are technology oriented like "learning that takes place with help of mobile devices". A number of sources define M-learning in intersection of E-learning and mobile computing [11].

For the purposes of this paper we will use definition given in MOBIlearn project [9] "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 mobiles technologies".

In most cases in literature there are descriptions of MKM system implementations rather than generic MKM definitions. Attempt to define MKM in a broader sense is made in [4, 13]. In [4] authors take a multidisciplinary view and MKM is defined in a merge of two research areas - *mobile computing* and *knowledge management*. Authors classify MKM as a subset of KM emphasizing extra value added by mobile and wireless technologies to classical KM tools and approaches. According to [4] MKM has its focus on "the seamless integration of mobile work into the corporate knowledge management loop, especially where knowledge is associated while performing tasks, tasks necessitate out-of-office work and tasks necessitate communication".

From the literature survey and definitions above one can make conclusion that M- learning could be treated as mobile extension of E-learning technologies and approaches whereas MKM builds strongly on knowledge management technologies and approaches. Both of them relay heavily on mobile computing tools and technologies. Research outlines also similar nature of E-learning and knowledge management [14]. There is no widely accepted and strict borderline of what fits into MKM and M-learning research and application areas. Same practices and applications exist both in M-learning and MKM. Finally we may say that these research and application fields are diverse, complex and overlapping that could be represented graphically (see Figure 2).
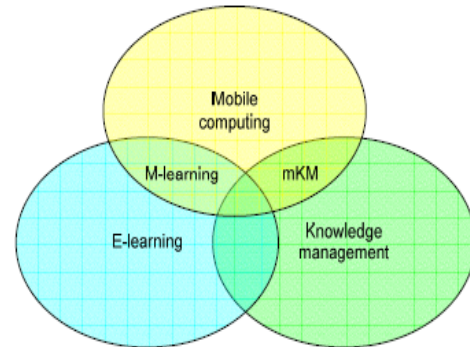

Figure 2 Interrelations of concepts

III. THE M-LEARNING ADVANTAGES COMPARING TO E-LEARNING

The M-learning advantages comparing to E-learning are:
1) It can be used everywhere at every time;
2) most of mobile devices have lower prices than desktop PCs;
3) smaller size and light weight than desktop PCs;
4) Ensures bigger students' engage as M-learning is based on modern technologies, which students use in everyday life;
5) Using GPS technology the M-learning can provide location dependent education.

IV. SIMILIARITES BETWEEN MOBILE LEARNING AND MOBILE KNOWLEDGE MANAGEMENT

Although M-learning and MKM often are applied in different scenarios they have a lot in common:
1) Both carry the attributes of any time and any place accessibility to knowledge as well as personalization, context awareness for content creation and delivery, and option for permanent connectivity.
2) Both make use of out of office learning situations or knowledge acquisition "without any pre-planed infrastructure" thus bringing information to where the people need it instead of forcing them to be in the place where information resides - classroom, library, etc.
3) Both gain from advances in fields' of microelectronics, wireless communications and human computer interfaces.
4) Both use the same or similar technology tools and

therefore have inherently the same range of technology limitation such as performance, limited memory, and software compatibility problems.

5) In both adaptation of content is necessary when delivering either course content in M-learning from E-learning system or delivering a knowledge chunk in MKM from KM system. This involves creating a "cut down" versions of original material and also adding of new features provided by mobility.

6) Both tend to support rich interactive multimedia communication and knowledge capture.

V. DIFFERENCES BETWEEN MOBILES LEARNING AND MOBILE KNOWLEDGE MANGEMENT

One of the differences observed is much less research has been done and small number of internet publications available on MKM. Quick search on the Goggle reveals three orders of magnitude difference in number of publications when compared to M-learning. I am not successful to find any book devoted exclusively to topic of MKM. There are two titles however available from amazon.com on topic of M-learning [6].

If we look at the major differences between KM and E-learning we see that traditionally KM is being associated with corporate sector, whereas E-learning traditionally is being applied more widely including academic and vocational training sectors. This is still true to some degree to MKM and M-learning where a greater overlap between areas observed.

MKM is often mentioned in context of organizations more often than not encompassing it as entire system instead of providing separate courses as this is the case in M-leaning. MKM tends to create a long term evolving system rather than simply training module and puts an accent on collaborative activities in particular.

VI. CRITICAL SUCCESS FACTORS FOR SUSTAINABILITY

Despite the fact that M-learning and MKM as a new research and application areas are becoming popular and many trials are being organized all over the world they still are not part of the mainstream yet. Several reasons could be identified.

1) Although there is an enthusiasm to adopt new technologies for knowledge acquisition some institutional opposition to change exists [2]. New technology often comes with a requirement to change old ways of thinking and working. Extra motivation and building of new skills should be provided.

2) Devices and platforms available for the areas are diverse so are the knowledge acquisition scenarios for each type of situation. It is resource and time consuming to produce customized materials.

3) Technical capabilities are an important factor in developing sustainable M-learning and MKM projects. Larger color display and some increased computing capability of mobile terminal are welcome.

4) Cost of introduction is still high [2].

5) Mobile operators and manufacturers of mobile handsets pay a little interest to knowledge sharing applications, as there is no real revenue stream [6].

A precondition for successful M-learning

Implementation is that technology should be widely available for massive usage to begin [6]. According to the statistics mobile device adoption is widespread and will continue to grow significantly.

According to numerous user trials [12] M-learning works best when it is a part "of a blend" i.e. a part of other learning activities. Therefore M-learning should be viewed as an accompanying element and not as substitution to either classroom or distance education. Integration of M-learning into E-learning and traditional teaching reported to be successful [15]. For wider implementation of M-learning it is important to achieve that universities incorporate M-learning approaches into curricula and grant some acceptance from educational establishments in forms of degrees, diplomas and certificates. There is no general agreement on how successfullyM-learning integrates into existing earning processes. In some cases "M-learning" is finished as soon as project ends [6] still there are number of organizations that continue M-learning after the first trials are over [12].

Important is role of social networks in adopting of new approaches for knowledge acquisition [2]. There must be a discussion and sharing of best practices about the benefits of M-learning and MKM for increased their acceptance. Other critical success factors include interactivity, coordination, communication, and proper organization [1].

For MKM to be successful it should be integrated in the knowledge management cycle of an organization and effectively support knowledge creation, codification, sharing, and application.

VII. CONCLUSION

Regardless of existing till now disadvantages the M-learning will became more and more popular with the progress of information and communication technologies. Its common use with the traditional education will correspond to the needs of educational quality improve. The educational process will became more flexible and will fulfill to the needs of life long learning. M-learning also can assure good educational opportunities for disabled people.

M-learning and MKM are new approaches that contribute to transition to the knowledge society. Currently well developed E-learning and KM approaches do not take explicitly into account possibilities offered by user context e.g. location. This has provided a basis for new research and application area development with potentially large target audiences. Anyone with a need to access/create some sharable "information chunk" in a mobile situation is a potential user of MKM or M-learning.

Traditionally KM put an accent on organizational performance and goals providing work related information, whereas E-learning emphasized individual studies and development. For majority of people it becomes difficult to separate work from studies, and that is inherent property of

knowledge age.

We conclude that although there are two different research and application areas M-learning and MKM they are similar in nature, they are merging at even faster pace as E-leaning and KM does. There are more differences between KM and E-learning than there are between MKM and M-learning. Much of the research done in one area may be easily related to the other, technology and tools used are often the same. Overall there are many more similarities than differences.

It should be noted that M-learning and MKM are still at the begging to become a widely accepted way of knowledge acquisition. These fields are dynamically changing and developing along with supporting technologies and methodologies. Despite the fact both fields have a great promises for flexible knowledge acquisition it is clear that many situations will demand a combination of delivery and communication channels. My future efforts are to implement an effective mobile learning system and to see how M-learning can be better utilized to increase knowledge.

REFERANCES

[1] A. Barker, G. Krull, and B. Mallinson, "A Proposed Theoretical Model for M-learning Adoption in Developing Countries," in MLearn 2005 - 4th World conference on M-learning Cape Town, South Africa, 2005

[2] E. Fife and F. Pereira, "Adoption of Mobile Data Services: Towards a Framework for Sector Analysis," in Mobile and Wireless Systems Beyond 3G: Managing New Business Opportunities M. Pagani, Ed.: Idea Group, 2005, p. 66.

[3] T. Georgiev, E. Georgieva, and A. Smrikarov, "M-learning - a New Stage of E-Learning," in International Conference on Computer Systems and Technologies - CompSysTech'2004 Rousse, Bulgaria, 2004, pp. IV.28, 1-5.

[4] M. Grimm, M. Tazari, and D. Balfanz, "A Reference Model for Mobile Knowledge Management," in 5th International Conference on Knowledge Management (I-Know '05), Graz, Austria., 2005

[5] J. Hayes, "Knowledge Management within M-learning Environments (research paper)," in Mlearn 2003 Learning with Mobile Devices, London, 2003.

[6] D. Keegan, "The Incorporation of Mobile Learning into Mainstream Education and Training," in MLearn 2005 - 4th World conference on M-learning Cape Town, South Africa, 2005

[7] D. Keegan, "Mobile Learning: The Next Generation of Learning," Distance Education International, 2005. http://learning.ericsson.net/M-learning2/files/workpackage5/book.doc

[8] Y. Laouris and N. Eteokleous, "We need an Educationally Relevant Definition of Mobile Learning," in mLearn 2005 - 4th World conference on mLearning Cape Town, South Africa, 2005

[9] C. O'Malley, G. Vavoula, J. P. Glew, J. Taylor, M. Sharples, and P. Lefrere, "WP4 –Guidelines for learning / teaching / tutoring in a mobile environment.," Deliverable D4.1. project IST MOBIlearn, 2003.

[10] N. Pinkwart, H. U. Hoppe, M. Milrad, and J. Perez, "Educational scenarios for cooperative use of Personal Digital Assistants," Journal of Computer Assisted Learning, vol. 19, pp. 383- 391, 2003.