

An Approach for improving Mobile Learning supported for Knowledge Management

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Abstract

Knowledge Management is gaining acceptance in the field of education because it promises to lead to better decision making capabilities, improving academic services, and reducing costs. Knowledge Management can be described as a set of practices that help to improve the use and sharing of data and information in decision making. Similarly, several mobile devices have gained considerable popularity as instrument for learning. On the other hand, Mobile Learning is defining new relationships among the learners, teachers and resources. Mobile Learning should be an enabler to support the flows of knowledge in the learning/teaching processes, so some practices typical proper of Knowledge Management can be used for modelling, specifying, monitoring, etc. learning environments that are implemented using Mobile Learning. This paper it will be point out how Mobile Learning and Knowledge Management can match to enable for allowing the use of Knowledge Management in educational institutions.

Keywords: E-learning, mobile Learning, Knowledge Management

1. Introduction

There are pressures external and internal to educational institutions for measuring the improvement in the students outcomes. In this environment the institutions are seeking to understand how they can more effectively collect disseminate and share information and knowledge.

As organizations, educational institutions face similar challenges to many other profit and non-profit organizations as they seek to share information and knowledge among the people within organization (Petrides and Nodine 2003) Knowledge Management, initially raised in the business sector, promises to lead to better decision making capabilities, improve academic services, and reduce costs (Kidwell, Vander Linde et al. 2001). Thus educational environments can benefit from the experiences of the business sector in the field of the Knowledge Management.

There are not a universally accepted definition about Knowledge Management. However, broadly considered, Knowledge Management in education can be seem as an approach that enables people within an organization to develop a set of practices to collect information,

disseminate and what they know leading to action that improves services and outcomes. In other way, its central purpose is the action of transforming information and intellectual assets into enduring value. It connects people with the knowledge that they need to take action, when they need it.

In particular, in educational environments, the application of Knowledge Management can produce lead a lot of improvements in sharing knowledge in a variety of processes and services such as research processes, curriculum development processes, student and alumni services, and strategic planning. In this paper, we stress it the importance in the academic process and specifically in the teaching/learning process.

On the other hand, Mobile Learning, gives accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning and performance-based assessment. e-Learning is independent of location, time and space (Quinn 2000).

In this paper we propose support Mobile Learning with the use of Knowledge Management for improve learning and teaching processes. The content of this paper is organized as follows: In the next section, we described the importance of Knowledge

Management in education. In section 3 the Mobile Learning is outlined. In section 4 we present our proposal, how Mobile Learning can support the flows of knowledge in an academic field. Finally, concluding remarks and future works are presented in section 5.

2. Knowledge Management

Times feel uncertain. In an economy when the only certainty is uncertainty, with volatility and change in business environment, globalisation of markets and labour pools, the effective management of knowledge of organization is recognized as the most significant in determining organizational success, and has become an increasingly critical issue for technology implementation and management (Nonaka and Hirotaka 1995).

Knowledge Management (KM) can be defined as a set of processes to transfer intellectual capital into organizational value. These processes can be innovation, knowledge creation, knowledge acquisition, sharing and application. Knowledge Management is a strategic, systematic program to capitalize what an organization "knows". Moreover, KM envisions getting the right information, in the right context, to the right person, at the right time, for the right business purpose (Knapp 1998; Seiner 2000). Although not all KM initiatives involve an implementation of Information Technologies, (IT) (Davenport and Prusak 1998), many KM initiatives rely on them as an important enabler.

Define the knowledge is a hard work; there are a lot of controversy from the ancient Greek philosophers till today. However, we will do a distinction between data, information and knowledge. Data are raw facts and numbers, information are data put into context and when the information is combined with experiences, judgments become in knowledge. Knowledge is difficult to codify because it is highly subjective and includes insights and human wisdom. The presumption of a hierarchy ranging between data, information and knowledge --with each varying along some dimension, such as context, usefulness, or interpretability--, rarely survives scrupulous evaluation. The key to effectively distinguish between information and knowledge is not found in the content, structure, accuracy, or utility of the supposed

information or knowledge. Rather, knowledge is information possessed in the mind of individuals: it is personalized information (which may or may not be new, unique, useful, or accurate) related to facts, procedures, concepts, interpretations, ideas, observations, and judgments. (Alavi and Leidner 2001).

There are several ways to see the knowledge: as a state of the mind, as a justified beliefs that increases an entity's capacity for effective actions (Nonaka and Hirotaka 1995), as an object, as a process, as a capacity with the potential to make future actions or as set of abilities to understand information and determine what information needs to decision making.

Knowledge can be shared through "best practices", manuals, chatting in cafeteria, and without words, as in the craftsmanship the apprentices learn look from the master.

There are two dimensions of knowledge, tacit and explicit (Polanyi 1975). The explicit knowledge is articulated and codified and, can be shared in form de manuals, scientific formulas, etc. The tacit knowledge is into peoples brains, it is difficult to articulate and codify. It has to do with beliefs, viewpoints and individual mental models; it is difficult to share with others. Many times the people are not aware of this knowledge, because it was obtained through experiences

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2.1 Knowledge Management in Education

Information and Communication Technologies (ICT) have been used by educators for many years to improve the efficiency of academic programs. Many educational institutions have invested in technology in order to generate data that can provide answers to those seeking improvements in performance. However, the implementation of ICT does not necessarily improves the outcomes. It does not consider how to effectively integrate those technologies into shared decision-making processes to improve academics' operating and planning.

Nowadays, Knowledge Management is gaining acceptance in the field of education. At the most basic level Knowledge Management can be described as a set of practices that help to improve the creation, use and sharing of information and knowledge (Petrides and Nodine 2003).

The educational institutions are adequate sites to explore the implementation of Knowledge Management principles because the connections between the academe and the production of knowledge. Today, there are pressures from the government and the private sector for an evidence of investment return from public money in education (Metcalf 2005). The advantage of educational institutions is that they understand very well the value of knowledge as their key asset and seek to apply that knowledge into actions to improve their mission.

One of main goals of educational institutions is passing knowledge to students, through exchanges of students with the teachers and books or other resources and interchanges among students themselves.

Knowledge Management builds upon a human-centred environment that view the organizations as a complex systems that spring from the unique context in which they are developed. The main feature of Knowledge Management in education is that it provides a framework that enables people within an organization to develop a set of practices to collect information and knowledge and share with others what they know.

3. Mobile Learning: educational paradigms and frameworks

The Computer-Based Instruction (CBI), also called Computer-Assisted instruction (CAI) environments, allowed transforming the classroom in a virtual space inside a computer. This way, PCs had software to give digital support to conductist repetitive exercises, or multimedia simulation activities.

In the last years, the use of Learning Management Systems (LMS) that enables Computer Supported Collaborative Learning (CSCL) (Koschmann & Erlbaum, 1996) for allowing constructivism as the base for the learning process had been spreading in a high number of educational institutions. As a consequence, LMS had allowed virtual classrooms where didactical material can be updated weekly, auto-assessment help students to know their lacks, collaboration is improved thanks to synchronous and asynchronous tools (like chats or forums), etc. Moreover, Blended Learning tries to empower the traditional learning classes with supplementary virtual classrooms provided by LMS. Also, standards like the one provided by IEEE LTSC, specifications given by IMS Global Learning Consortium and references models like the ones offered by ADL, allow reuse and interoperability principles.

With the purpose of using the technology not only in virtual context but in a real context, where it is necessary to exchange information or promote social interaction, it is intended to adapt ICT for their use in a conventional classroom. Precedents can be found in the introduction of other systems in the classroom, as it is the case of the audiovisual media (projectors, video conferences, etc.). This becomes feasible thanks to the ubiquitous computing paradigm (Weiser, 1991). With this, the students and teachers are in scenarios where they are used to working, with their classmates, the blackboard, personal notes, a notice-board, etc. and behind all those, computers are "hidden" (in one of their ways: PCs, portable computers, TablePCs, PDAs, SmartPhones, etc.), and so do wireless networks (Wifi, Bluetooth, IRDA, etc.) that enable communication between them.

Ubiquitous computing in educational environments can be supported thanks to the use of Mobile Learning, allowing embedded ICT in traditional classrooms and merging them with virtual classrooms. So, Mobile Learning gives students the possibility to learn anywhere and at any time, this is, they learn

when and where they are ready to learn thanks to the use of ICT through Mobile Learning.

There are several definitions about Mobile Learning, but it is most generally defined as e-learning through mobile devices (Trifanova and Ronchetti 2003). Another definition "is the intersection of mobile computing and e-learning, that includes anytime, anywhere resources; strong search capabilities; rich interaction; powerful support for effective learning; and performance-based assessment" (Shepherd 2001). However, it should be viewed like an evolution from distance-electronic learning to Mobile Learning (Avenoglu 2005). Mobile Learning may be considered as an extreme form of flexible learning.

The main characteristics of Mobile Learning are:

- Mobility. From a classroom to another location with support for information networks for communicating. The mobile environment integrates studies that take place on campus, at home or outside the university facilities into one shared, flexible learning environment. There are three key elements of mobility: convenience, expediency, immediacy (Kynäslahti 2003).
- Opportunity. Enables learners to enter an information network at the precise moment when necessary by using a portable learning device and a wireless network.
- Dynamic. It actually consists of content with the support of on-line experts and best sources for emergencies are available. Learners get what they need, when they need it.

Mobile Learning takes its advantages from the use of mobile devices. There are a lot of experiences from the use of these devices in the education process, for example: communication among teacher and students (Lim and Lee 2003; Seppala and Alamaki 2003), use of mobile devices as PDA's and terminal phones for assessing the effectiveness and efficiency of them in a course (Giunta 2002; Roberts, Beke et al. 2003), reading and accessing course materials (Waycott, 2002, Meisenberger and Nischelwitzer, 2004), taking

quizzes and exams (Homan, 2003, Whattananarong, 2004), playing learning games (Ketamo, 2002), using them in outdoor activities (Rieger and Gay, 2004), using different activity programs in the classroom (Tatar et al., 2003), managing lessons, tracking students' records, online registration for courses. According to the results of these projects, using mobile devices increase attendance to courses, collaboration between students, communication between teachers and students, study time for students by increasing the flexibility of time and location.

4. Our proposal

Until here it has been suggested educational environment can benefit with the use of techniques proper from the business sector such as Knowledge Management. On the other hand, in the last section it has been introduced that Mobile Learning can help educational environment in the teaching/learning process. Now, in this section, Mobile Learning will be introduced as an enabler of the teaching/learning process employing Knowledge Management practices, this is, the use of Mobile Learning for implementing the Knowledge Management necessary in educational institutions. In this sense, in the field of higher education, Knowledge Management is being touted as a method that will increase institutional innovation (Lyman, 2000).

According to Alavi and Leidner (2001) we propose a framework to see an organization as a knowledge system. It has four set of enacted socially knowledge processes: create, store/retrieve, transfer and apply knowledge. Let's examine how the Mobile Learning can support each knowledge process.

Creation of knowledge

In Knowledge Management, our actions and interactions with the environment create and enlarge knowledge through the conversion process of tacit and explicit knowledge (Nonaka and Hirotaka 1995), knowledge creation starts with the socialization process in which new knowledge is converted through shared experiences into day to day interactions. Mobile Learning supports this process through CSCL (Computer-Supported Collaborative Learning) environments that support PBL

(Problem-Solving Based Learning). Another feature of Mobile Learning is that it allows connecting daily unstructured experiences with formal learning experiences and reflecting the individual perception of what is important in blended and ubiquitous environments.

Store /Retrieve knowledge

At this point, standards, specifications and references models used in e-Learning environments play an important role. In this sense, there are a lot of standards that allow storing, retrieving and reusing information about learners, organization, courses, teaching methodologies, learning objects, etc. Moreover, they define the way in which all that information can be shared and interchanged.

Also, in the implementation of ubiquitous learning environments, the Mobile Learning is unobtrusive, because the learner can capture situations and retrieve knowledge without the technology obtruding on the situation. Here, the retrieval of learning material with some contextual information depends of the place or situation of the learner, and it would provide basic data to enable indexing and retrieval of the experiential learning objects. It will permit that the learning objects can be accessed and presented along any contextual dimension, for example as a timeline, or a spatial map where the learning event occurred (Sharples, Taylor et al. 2005).

Transfer of Knowledge

In CSCL environments, one of main elements of the learning process is the community, this is, people learn from one another in a synergic work. This stresses that it does not sufficient that the learner can access learning material for store/retrieve data from databases or other repositories. People need to exchange ideas with other individuals who have experience and skills related with the object of study.

In Mobile Learning supporting CSCL environments, the interaction between people leads in a naturally way to former communities. This concept can fit with the "community of practice" concept in Knowledge Management. A community of practice can be defined as "a group of people informally bound together by shared expertise and passion for a joint enterprise" (Wenger and Snyder 2000) or as "a collection of individuals bound by informal relationships that share similar work roles and a common context" (Gongla and Rizzuto 2001).

Mobile Learning that implements CSCL environments can support expert localization when the learners need it, and it connects colleges and professional peers. Another feature of Mobile Learning is to promote to social interchange for sharing tacit knowledge among community members, it gives to the learners freedom, unstructured time, and encourage to learn in this way (Leung and Chan 2003).

Apply of knowledge

In blended and ubiquitous learning, there are several applications of Mobile Learning. However, Mobile Learning activity management is stressed because it can track the location of a learner and evaluate their needs in its particular situation and then arrange information or knowledge delivery accordingly for improving the learning purposes, for example in a visit to a museum.

Also it permits to help learners without another person, because in Mobile Learning environment supported by Intelligent Tutoring Systems (ITS), the learner's experiences in the real application can guide the user through a series of actions that help her/him complete the learning tasks.

5. Concluding remarks and future work

Mobile communications tools will lead to anytime, anywhere learning. The use of these devices into the classroom gives the chance to record data and this is often needed in CSCL projects. Outside the classroom it allows supporting decisions and storing/retrieving information for a specific context, for example data collection or performing a task.

Knowledge Management involves interdependent process of creation, store/retrieve, transfer and application of knowledge. In this paper we presented specific examples of how the Mobile Learning can support these processes. The way in which Mobile Learning and Knowledge Management can match has been established, allowing using the technical, methods and tools that enable Knowledge Management to improve Mobile Learning, and so educational institutions can be benefited from those practises proper of the business sector.

To conclude, we present a set of advantages and disadvantages for the use of mobile devices

in education process. Advantages: For reasons of space they only show the relevant information, do not use empty rows, allow easy access to specific information, consider the possible variation in context, minimize the need for user inputs, etc. Disadvantages: One of the problems of the mobile devices is usability; because it has small screens, small keypads and technology for speech recognition is insufficient for educational purposes. Another problem is using PC applications without redesign.

As future work we consider that Mobile Learning requires new pedagogical and technological views to be innovative. For a successful implementation of Knowledge Management in education a complex work is needed because there are a number of knowledge types and attributes. Mobile Learning should be an enabler in combination with other approaches.

6. Acknowledgements

Project PBI-05-006 of the Junta de Comunidades de Castilla-La Mancha, in Spain.

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