Using mobile devices to entice the social component of learning

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Abstract—The article deals with the impact of the emergence of social software in conjunction with the raising popularity of mobile devices on education. Social software has become popular amongst the new generation of learners and inevitably starts influencing educational activities. It is our belief that mobile devices supplement the learning process by supporting social activities and extend the possibilities for collaboration. The article presents the MILE system which supports the integration of mobile devices into the everyday classroom environment, as well as informal learning, and presents various activities, such as note sharing, collaboration and virtual spaces, supported by the system.

Index Terms—mobile learning, e-learning 2.0, social software, collaboration, MILE system.

I. INTRODUCTION – TRENDS IN E-LEARNING

The term „Web 2.0" was introduced in 2005., denoting a shift in perception of the World Wide Web, which becomes regarded as a lot more than just a passive source of information - it becomes a platform, a user-oriented environment where people interact and actively participate in content creation [1]. One of the most important and well known components of the Web 2.0 concept is the so called "social software." [2]. Examples of social software can be found in tools and applications such as wikis, applications designed for collaborative work allowing a number of users to edit online content; blogs; online diaries; podcasting, a new type of online media transferring using syndication feeds; sites like del.icio.us and Flickr, which use a concept called "folksonomy," a style of a collaborative categorization of content using tags; content sharing tools such as YouTube, MySpace and RSS, allowing users to subscribe to a website's content and receive notification each time the page changes; e-portfolio applications etc.

All these applications and concepts focus on social interaction and collaboration [2] and it's not without a reason that Web 2.0 is often called the "social web." Some even refer to it as „a social revolution" which inevitably affects educational sector as well [3].

The impact of the Web 2.0 concepts on e-learning is summarized in the term e-learning 2.0 [3]. Tools like wikis, blogs, podcasting, e-portfolios etc. are used both in formal education and informal learning. The rise of importance of student-centred learning can be noticed: the learner is no longer a passive consumer of information but an active and engaged participant in the learning process who creates his or her own content and constantly interacts with other users. Control of the learning process has been placed „into the hands of the learner," communication and collaboration being the key components [3]. To summarize, the Web, once known as "The Read Web", is being transformed towards the "Read – Write Web" with its users displaying the new behaviour in the terms of interaction and engagement: "Passive has become active. Disinterested has become engaged." [3]

In the era of pervasive and ubiquitous computing, where learning is not restricted to one single place and has become integrated into our daily lives, the importance of mobile learning is rapidly rising due to the numerous possibilities mobile devices have to offer as means of supporting the learning process [8]. Due to their unique characteristics they provide new possibilities for interaction, collaboration amongst learners, informal learning and are, in the same time, user – centred and personal. Therefore, they naturally coexist and supplement the idea of e-learning 2.0.

II. LEARNING ON THE MOVE

Mobile learning is often described as learning on the move, independent of the location. This is only one definition of mobile learning and it doesn't completely convey its true nature. Mobile learning is spontaneous and personal [10], meaning it is accessible to learners on demand whatever their current location is. These features are naturally supported by the ubiquity of mobile devices and the pervasiveness of technology which, in this case, represents the force strong enough to advance the learning in general.

Mobile learning is often regarded as contextual and ambient [11]. Technological advancements of mobile devices minimize their size and embed them invisibly into our everyday lives. Software follows that philosophy a bit slower, but the importance of contextual use is rising every day. Software for mobile learners should adapt to their needs, sensing the learning environment and helping students to focus more on learning and less on technical issues.

The before mentioned issue led to the development of the context and location – awareness as means of adapting to the current context of use depending on the information gathered from the environment such as the current location information, sensory information etc. [12]

III. ALIGNING TECHNOLOGICAL TRENDS WITH PEDAGOGICAL CONSIDERATIONS

With the expansion of new technologies and concepts, one might say that now the challenge is to find a way to utilise the possibilities of emergent mobile and social technologies to support the new behaviour that students

exhibit in informal settings. In all this hype about new technologies and ways technology is being or can be used, one must not get blinded by the innovations and disregard a careful consideration of pedagogical design, keeping the position of learner in mind and embedding technology in a general pedagogic surrounding [14]. Technology is only a means to an end, a more productive, active, engaged and motivating learning experience for the learner.

As most Web 2.0 concepts are located around communities of practice [9], the situated approach to learning, which regards the learning process as fundamentally social rather than psychological [6], gets a whole new perspective. The majority of the Web 2.0 applications motivate active user participation and content creation by supporting interaction between users. [5] According to the situated approach, learning is situated in contexts of communities of practice and requires social interaction and collaboration [6]. The role of motivation must not be omitted as learning in cooperation provides a higher motivation for learning than learning individually [6].

IV.   THE MILE PROJECT

As far as the use of technology in education is concerned, it has mainly been focused on enhancing learning in formal settings [19]. Nowadays, in the world of Web 2.0., when with mobile devices the paradigm "anywhere, anytime" becomes a reality, the importance of learning that takes place in informal settings can not be neglected.

MILE (Mobile and Learning Environment), developed at the Faculty of electrical engineering and computing, University of Zagreb, is a system designed to demonstrate and utilize capabilities of mobile devices when education is concerned and demonstrates some of the e-learning 2.0 possibilities. A broader approach to the design of the system was undertaken, keeping in mind both informal and formal learning scenarios.

In a classical learning scenario with this system, students are equipped with mobile devices and connected to a campus or a faculty wireless network. They benefit from the central server – side component (MILE Server) which manages distributed events in a learning environment, coordinates collaborative activities and communicates with client – side application installed on students' mobile devices (Fig. 1).
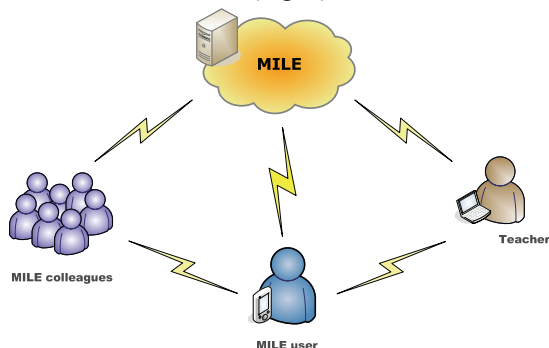

Figure 1.   MILE system overview

Client – side applications installed on students' mobile devices represents a base onto which various applicative

modules can be installed in order to utilize server - side components and distributed events.

Four client – side modules with highly emphasised social features will be presented in the following chapters: MNotebook, MCollaboration, MWhiteBoard and MVirtualBoard.

A.   Information sharing and tagging

Listening to a lecture, following a displayed presentation, making notes and exchanging them with colleagues all at the same time is challenging even for the most skilful students. Managing these activities during the lecture degrades the learning process and sets focus on activities of a secondary or administrative nature.

MILE system tackles this problem with the MNotebook module which automatically displays presentations opened by a teacher in a classroom. As the teacher passes on to the next slide, slides are automatically changed on students' mobile devices as well. In addition to that, students are given the opportunity to tag the bullets with their own notes. By using a stylus, students tap a bullet and enter note text in the note area (Fig. 2).
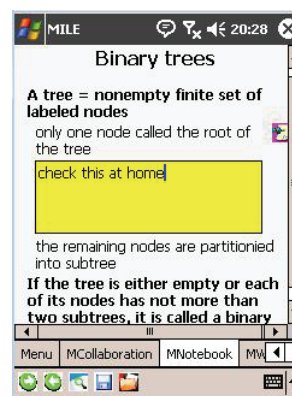

Figure 2.   A MNotebook slide displayed to a mobile user

Notes are then uploaded to a community web site and become available to other students enriching the learning resource (the presentation in this case) with information of significance at a student community level, providing students the possibility to benefit from other students' notes thus facilitating the creation of social networks and clearly demonstrating socializing powers of mobility.

The module presents a process some authors refer to as the digitalization of didactic action since it transforms elements of classical education and inevitably leads to a shift of competences when some standard student activities are concerned [13]. In addition to that, such an approach aids recall and reflection similarly to other form of social software such as blogs or discussion groups [11].

B.   Collaboration as an educational tool

Social software supports creation of ad hoc groups, often called swarming [10] while socializing powers of mobility are said to facilitate collaborative learning and encourage interaction [15]. Learning is inherently social and mediated through interaction with others, and involves a process of engagement in a community of practice. Thus, a great deal of attention in the design of the MILE system was given to the social component of learning. The MCollaboration module strongly supports
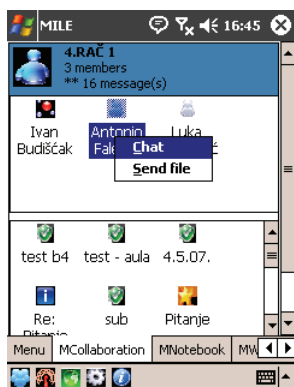
Figure 3.   Users in a group together with the messages in MCollaboration module

Figure 4.   Location capabilities of the MCollaboration module

the concept of communities of practice, with members sharing common interests, learning together and interacting with each other [6].   Using MILE, communities of practice can be formed spontaneously and can be very informal, or they can be formed „artificially" (e.g. by a teacher). Either way the important role of social interaction and collective learning is strongly emphasized.

The module supports collaborative activities such as chat (Fig. 3), file sharing and instant messaging by utilizing wireless network and MILE's central sever – side component. Students are notified of the presence of their colleague in the learning environment and are able, depending on the security and privacy settings, to explore colleagues' whereabouts through a digital map of a learning environment (Fig. 4).

Another module, named MWhiteBoard, is used to support group work in a controlled classroom environment. Students collaborate by sketching ideas on their mobile devices and sharing them on a common canvas (e.g. on a projector) (Fig. 5). In this way knowledge can easily be shared offering the possibility for cooperation skills improvement [16].

The described modules create a common space amongst learners and facilitate knowledge sharing. This is very important since formal learning environments, such as faculties or campuses originally, amongst other reasons, exist to promote chance encounters and awareness of other people's activities [17].

C.   Virtual learning environments
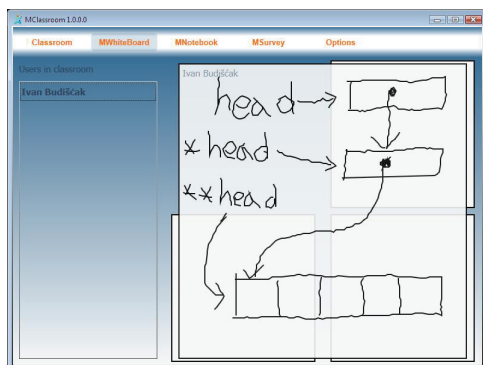
Virtual communities are nowadays becoming more and

more popular and tend to resemble to the Spohrer's vision of virtual world, or information in spaces [18], in which every object in the world should have its virtual representation and should be available for interaction. MILE's MVirtualBoard module provides students with the infrastructure to tag objects within the learning environment. Student can create messages, post and relate them with various faculty or learning objects (e.g. with a classroom). Each message is contextually, depending on the time and location, delivered to the intended recipients (Fig. 6). This is a way of demonstrating the ambient character of mobile learning across the virtual and material boundaries.

CONCLUSION AND FUTURE PLANS

The article has presented a system called MILE which supplements classical campus or faculty environments by utilising unique educational characteristics of mobile devices whilst providing a way to support new patterns of behaviour that modern students display. Current trends in social software are joined with the capabilities of mobile devices in order to support discursive elements of a learning environment. Collaboration, message exchanging, context – awareness and learning content annotations presented in this paper are just some of the many MILE system components.

Future research plans include the evaluation of the system in the actual learning surroundings as one component of a blended approach to teaching. Mobile devices, together with their socially enhanced modules will be used as a tool to stimulate collaborative activities

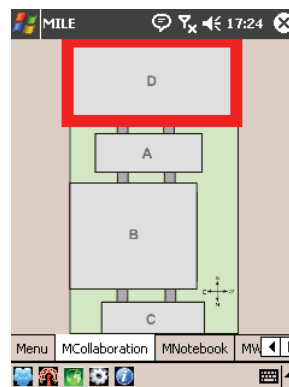Figure 5.   Drawing session on with students using MNotebook module diplayed on a teachers MClassroom application
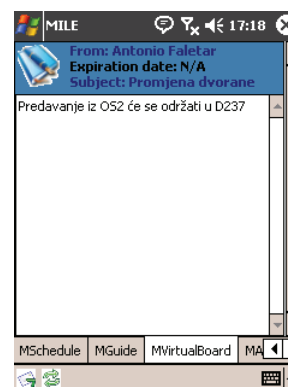

Figure 6.   An MVirtualboard item

and a more situative approach to learning.

It is out belief that an approach to teaching and learning based on paradigms of socials software combined with the use of mobile devices can significantly enhance collaborative activities, increase interaction and support the active approach to learning.

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