

# ***Designing for mobile participation in blended higher educational settings***

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## **Abstract**

As society is increasingly dependent on mobile technological solutions, higher education needs to be prepared for changing behaviours in terms of increasingly emerging mobile communication patterns of students and teachers. Therefore, projects that explore models of mobile participation in blended higher education settings are needed. This paper concerns the design for participation in mobile learning and in particular how participation could be designed into educational settings. Focus in the paper is the design of a university project aimed at exploring models of participation in blended learning through the use of mobile learning. The project "Mid Sweden University and Mobile Learning (MUML)" is used in the paper as an example of such design. This is argued to be of strategic value for institutions of higher education, the need to be up-to-date with the development within the mobile society. A wide range of learning about mobile learning in higher education settings were built into the project, including conducting research reviews and diverse experiences from teachers. The project included trials that were conducted in four different first-cycle programs, which then informed the planning and conducting of further trials in courses. These trials included approaches to mobile applications and devices that embraced the deployment of university-owned equipment as well as bring-your-own-device scenarios. Cumulative features were included in the design of the project with the purpose of informing the performance of features in later stages of the project. Iterations were included to create loops of different features that could help participants recycle and share their experiences. In this way the project had the intentions to explore different forms of participation.

## **Keywords**

Blended learning, educational design, higher education, mobile learning

## **Research Context**

Designing for the use of technologies in educational settings is not a new thing, it can be traced throughout history (Mitcham, 1994). But in a sense, educational technologies are becoming more and more invisible as aspects of educational practice. As Dillenbourg (2008) point out, most educational practices today involve some kind of technology. But technology per se can not be seen as solution for providing high-quality higher education (Laurillard, 2008). It is always put into practice for a reason. When technology is integrated in the students' learning activities, it can almost be described as it is being orchestrated by the teachers (see also, Sorensen & Ó Murchú, 2006). In many cases technology is evident, and the design can be easily understood. But in designing for mobile devices for educational settings, the technology in itself is becoming more and more transparent. What can be done on a smartphone today is in one way more than a computer could manage some years ago, and the use people today make of the mobile devices they have is increasingly communicative. In short, little can be taken for granted regarding mobile learning. In designing educational technology, Mor and Winters (2007) claimed that technologies designed for education have epistemological assumptions, and therefore support a particular organisational structure. For instance, educational designs may differ in natural sciences or the behavioural sciences. The growing diffusion of mobile technologies in society affords the possibility to apply such devices in participation in higher education. There is reason to see increasing use of mobile devices in higher education and subsequently a significant impact in the organisation of higher education. To meet the demands of the increasing diffusion of mobile technologies, institutions of higher education are developing projects that explore how mobile learning could be designed. Therefore this short paper concerns the design of mobile learning in blended higher education settings involving teachers from different subjects as co-designers of participation.

The technological shift from desktop-based solutions to more mobile solutions has consequences. A growing number of mobile devices and applications are integrated within the communicative processes of human beings (e.g., Castells, Fernández-Ardèvol, Linchuan Qui, & Sey, 2007; Goggin, 2012). Scholars such as Pachler, Pimmer,

and Seipold (2011) claimed that these “mobile devices have the power to transform the way we learn and work” (p. 4). However, mobile learning, which is defined as “the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies” (Sharples, Taylor, & Vavoula, 2007, p. 225), deemphasises the technology. Instead, mobile learning is about how people learn in multiple settings by using technologies for communication. However, this research field has discussed mobility in terms of physical space, technology, conceptual space, social space, and learning as dispersed over time (Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sánchez, & Vavoula, 2011). Projects have “shown how mobile technology can offer new opportunities for learning that extend within and beyond the traditional teacher-led classroom. Yet, the very diversity of the projects makes it difficult to capture the essence of mobile learning” (Sharples, Arnedillo-Sánchez, Milrad, & Vavoula, 2009, p. 233). Much of the research performed hitherto comprises studies of applications on mobile phones and how such devices relate to formal educational settings. Recent technologies, such as smartphones, social media, and tablets, have expanded the possibilities for mobile participation in learning. Research has shown that such technologies have the possibility to impact and support learning (Kukulska-Hulme et al., 2011; Traxler, 2009).

However, “one consequence of rapid technological development is that the theoretical framework for mobile learning has not yet been established” (Peng, Su, Chou, & Tsai, 2009, p. 172). As scholars within the field of mobile learning have also published work within the field of technology-enhanced learning (Kukulska-Hulme et al., 2011) there is an intersection between ideas discussed within these fields appears. One such idea is the possibility of designing for learning, for example, in terms of arranging or orchestrating learning in formal and informal educational settings. Though Swedish scholars, including Lundin, Milrad and Spikol (Kurti, Spikol, & Milrad, 2008; Lundin & Magnusson, 2003; Milrad et al., 2013), have had an international impact in the field of mobile learning, few Swedish studies have focused on the development of mobile learning in higher education. However, from an international perspective Kukulska-Hulme et al. (2011) discussed projects of mobile learning in higher education settings. In their review of European projects they found three categories of mobile learning use: reinforcement of learning and support through podcasting, provision of additional communication channels for students and teachers, and scaffolding and supporting off-campus learning through portable handheld devices. Nevertheless, while development within the field is rapid more research with such focus is necessary to understand the potential for the development of higher education.

## **Design of mobile learning in higher education: The MUML-project**

In line with the arguments discussed above for mobile learning the development project discussed in this paper, Mid Sweden University and Mobile Learning (MUML), aims to develop models for teaching in and competence in the creation of mobile and blended higher education settings. The focus is on educational development that should be realistic to implement in a wide range of higher education settings by emphasising deployment of everyday technological solutions. One reason for this approach is that many students use such technologies in their everyday life and therefore should be able to use them in their studies. By integrating such technologies in higher education settings the university is up-to-date with current technological and societal development. Such an approach will also help higher education institutions be prepared for future development.

The project tested mobile applications and devices in two different academic departments: the Department of Education and the Department of Information and Communication Systems. From these departments, four three-year first-cycle programmes – *the Bachelor Programme in Behavioural Science*, *the Teaching Programme in Early Years Education*, *the Primary School Teacher Education*, and *the Mobile Applications and Network Services for Android* – were chosen to help investigate the potential of mobile learning for students and teachers. Overall, these programs supplied the project with educational settings characterised by blended learning. This means that participating in teaching and learning is a blend of meetings between students and teachers performed on campus as well as online through learning management systems and other distance-based applications.

Due to the different departments and disciplines that were involved, the chosen programs supplied the project with a wide range of technological and educational knowledge and experiences. They also provided the project with opportunities to deploy different technological solutions and equipment. One program provided the students and teachers with Android-based smartphones. The other three programs equipped teachers with tablets and allowed them to utilise department equipment to provide the whole class with tablets, if necessary for a particular educational situations. In other words, all four programs had the opportunity to include university-owned equipment in teaching. Moreover, the project encouraged trials for which students and teachers utilised their own equipment, a so-called bring-your-own-device (BYOD) approach (Sharples et al., 2009). Through this approach the project has gained knowledge about authentic educational processes where teachers encourage students’ use of

applications and devices that they feel are useful for supporting learning. As mobile learning is closely linked to contextual aspects the project also encouraged teachers to include such aspects in their planning. This means utilising mobile applications and devices in ways that enhanced authentic learning situations. The trials in the courses were supervised by a group of experts within the field of technology-enhanced learning. These experts could provide scaffolding for the teachers pertaining to educational as well as technological issues.

Throughout the trials valuable experiences developed that could be implemented on a larger scale at a later stage. In these trials the project helped adapt the learning management systems to mobile learners; developed models for teaching in blended and mobile educational settings; and provided the university with guidelines for further implementation of mobile learning. Overall, the project had the purpose of conducting trials based on the following principles. The project ran for two-years and included three phases: preparation, trials, and evaluation. These phases comprised several features that included cumulative and iterative ideas of project design. Here, the idea of cumulative design meant that features of an earlier phase should inform features of later phases. By iterative design the project meant that loops were built into the design. Therefore, features appeared recurrently in the name of recycling and sharing good experiences and thereby provided means to further development of ideas.

The first preparation phase of the project were conducted during the second half of 2012 and comprised three different features: reviews of the field of mobile learning, participation in conferences on mobile learning, and sampling of courses for trials that followed in the first of the two semesters of the subsequent phase.

The second phase included eight different features that were performed during the spring and fall semester of 2013. Two of these features were recurrent from the preparation phase: participation in conferences on mobile learning and sampling of courses for the subsequent semester. The point of such iterative design was that it should inform the project by providing opportunities to learn from earlier experiences. Beyond these two features this phase also comprise the following:

- Modification of the learning management system: A dialogue between the project and the IT-department incorporated members of the project sharing their experiences.
- Competence development: A course in mobile learning led by experts on technology-enhanced learning experts was provided for the involved teachers. This feature informed the involved teachers' planning of their teaching.
- Planning of trials: Teachers prepared the trials they would conduct in their courses. This feature was integrated with competence development and concerned how mobile learning should be integrated within study-guides, organisation of teaching, and development of assignments, lectures, seminars and workshops.
- Conducting trials: The teachers conducted trials and documented their experiences in the project's wiki-space.
- Seminar: All involved teachers met on a regular basis in a seminar. Experiences and ideas from the conducting trials in different courses were shared and discussed.
- Evaluation of teaching: Each course evaluated the results and experiences of the trials. Good ideas were selected for re-use.

These features of the trial phase were first performed in the spring semester and repeated in the fall semester. During the spring semester two courses were included in the sample, and in the fall semester seven courses were included. The project was designed to be cumulative, meaning that experiences from the trials during the spring should inform the trials performed during the fall semester. From that perspective the teachers involved during the spring semester were intended to help introduce mobile learning to the teachers who became involved in the project for the fall semester.

The third phase of the project occurred during the spring semester of 2014. This phase focused on evaluation of the experiences from the project. This phase comprised three features. One of them, participating in conferences on mobile learning, is an example of the iterative and cumulative character of the project. At this time the project was intended to be ready to public discussions of the experiences from the trials. The other two features were the writing of an evaluation report for the university, and the production of a learning object. These two features were intended to include guidelines and recommendations drawn from the experiences and knowledge developed during the project. The learning object, for example a wiki, was intended as a resource that could be used by other teachers at the university for wider implementation of mobile and blended learning.

## Conclusions

This paper shows how projects of mobile learning could be designed, particularly such projects that aim to develop learning in blended mobile higher education settings. This development was supported with the help of a technological approach that included the bring-your-own-device concept as well as the deployment of university-

owned well-diffused wireless portable equipment. The embrace of both these approaches to technology would offer the possibility to go beyond the traditional classroom in the higher education setting by offering a multiple blended learning setting (Sharples et al., 2009; Sharples et al., 2007). As the diffusion of mobile devices is increasing the thoughtful design of such projects is important for universities that aim for a successful wider implementation of mobile learning in their courses and programs.

The MUML-project is an example of how such implementation could be prepared. The design of this project contributes to the field of mobile learning with a holistic perspective on implementing projects by exploring what mobile learning could offer a university through a cumulative and iterative design. Such a design should comprise research reviews and early trials to inform the preparation, performance and discussions of mobile learning trials in a small sample of higher education courses. This design secured a wide range of learning about mobile learning through the project by building on the experiences of participating teachers from different departments and disciplines (Mor & Winters, 2007). Moreover, the design incorporated knowledge developed within the field of mobile learning. Through such design the project aimed to transform learning in higher education and help capture the essence of mobile participation in blended higher education settings (Pachler et al., 2011; Sharples et al., 2009).

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