

Mobile learning experiences and reflections

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< **ABSTRACT** >

This contribution focuses on a mobile learning experience, using the MoULe online environment for collaborative learning. This experience was developed by the University of Milano-Bicocca in cooperation with the National Research Council of Palermo. In this contribution, first we will introduce the context in which we have been working, presenting the results of a survey concerning the readiness of Italian university students to do mobile learning. Following we will present this mobile learning experience in detail.

< **RÉSUMÉ** >

Cette contribution porte sur une expérience d'apprentissage mobile, en utilisant l'environnement en ligne pour l'apprentissage collaboratif le MoULe. Cette expérience a été développée par l'Université de Milano-Bicocca, en coopération avec le Conseil National de Recherches de Palermo. Dans cette contribution, nous présentons d'abord le contexte dans lequel nous travaillons, avec les résultats d'une enquête concernant l'état de préparation des étudiants des universités italiennes vis à vis de l'apprentissage mobile. Nous présentons ensuite cette expérience d'apprentissage mobile en détail.

< **KEYWORDS** >

Mobile learning, university, Italy.

< **MOTS-CLÉS** >

Apprentissage mobile, université, Italie.

1. Introduction

E-learning, as underlined by Hassan and Al-Sadi (2009, p. 4), can be defined as “the utilization of internet, intranet, software, and any other e-media to combine the power of all the new technologies in order to enhance the learning process.” Mobile learning, as defined by Hoppe, Joner, Millard, and Sharples (2003), is e-learning that uses mobile devices and wireless transmission: “M-learning extends the benefits of e-learning (e.g. access to information, learning anytime anywhere) to a much wider range of teaching and learning contexts” (Hassan and Al-Sadi, 2009, p. 4).

Mobile phones and many other mobile devices have become part of our everyday life; consequently it is not strange that people integrate mobile computing into learning to make it more accessible and portable. In Salmon’s opinion (2004), mobile learning is more than a mere moment of technological fascination: it is clearly identified as the fourth generation of the electronic learning environment, where “the value of deploying mobile technologies in the service of learning and teaching seems to be both self-evident and unavoidable” (Wagner, 2005, p. 42). In light of the literature in the field of information and communication technologies (ICT) in education, the university cannot ignore the mobile ICT and cannot refuse to involve these technologies in the learning process. But are our university students, those called by Prensky (2001) “digital natives,” really ready for mobile learning? Are mobile devices already part of their everyday learning process? The frequent use of mobile devices in everyday life does not mean that people - students and teachers - are ready for mobile learning and teaching.

2. The context

In the spring of 2010 we gave a survey about the readiness to do m-learning of Italian university students (Pieri and Diamantini, 2010), using a structured interview concerning mobile devices, e-learning and m-learning. We focused on the implicit and explicit readiness to do m-learning, questioning 174 Italian university students. The most common mobile technology was the cell phone, followed by the laptop computer and the ipod/mp3 reader. The eBook reader seemed to be the latest

used mobile device on the list. All students owned a cell phone, but most of them (87.4%) did not know the operating system of their cell phone.

Concerning the “mobile activities” performed by our sample, Table 1 shows that sending and receiving short text message (SMS) and MMS and making calls are at the top of the list.

Table 1. Type of Mobile Activities in which Students Engage

Type of Mobile Activities	Percentage
Send and receive short text message (SMS) and MMS	99.4
Make calls	99.4
Alarm clock	90.8
Take photos /make films	64.9
Organize your agenda and contacts	48.3
Listen to the radio/mp3	42.5
Surfing the net	29.3
Audio recorder	20.7
Send and receive e-mail	18.4
Use social networks	18.4
Satellitar navigator	14.4
Video calls	2.9

In most cases, our students do not generally use several communications activities such as e-mail and social networking because the costs of internet connections in Italy are still quite high, and our subjects do not spend a lot of money to recharge their mobile phones. They use the mobile phone in particular for activities that do not need an Internet connection.

We asked students which mobile activities attracted them the most and then to evaluate the attractiveness of several mobile activities on a scale from 1 (not interested at all) to 10 (very interested).

In Table 2 we report the mobile activities that our students would like to do with their mobile phones (% refers to the evaluations greater or equal to 6).

Table 2. Most Interesting Mobile Activities

Most interesting mobile activities	Percentage
Surfing the Internet	62.1
Organize your agenda and contacts	59.8
Taking photos	55.2
Receiving and sending e-mails	45.7
Attending lectures/courses	44.8
Making payments (buses, highways, parking, etc.)	42
Making movies	35.6
Watching films/television programs	35.6
Using social networks	35.1
Managing other devices at home	33.3
Receiving news	29.9

As for knowledge about m-learning, 83.8% of our sample does not know what m-learning is, and of the 174 students surveyed only two (1.2%) have been involved in an m-learning experience before. The interviewer, after giving a definition of m-learning to those who did not know what m-learning was, asked subjects, “would you like to do m-learning?” 44.8% answered yes, and 55.2% answered no.

In fact, when we asked them which of the following m-learning activities they would like to do, the results showed their desire to do m-learning. We asked students to indicate a value from 1 to 10 about how useful (from 1 – useless to 10 - very useful) they would regard some services connected to learning on their mobile phones (% refers to the evaluations greater or equal to 6).

Table 3. Mobile Activities Connected to Learning

Mobile activities connected to learning	Percentage
Having questionnaires to check their preparation	75.3
Having summaries of all the lessons	71.8
Having a virtual space to exchange diagrams, summaries and comments with other students	71.3
Having real-time access to classes from outside the University	65.5
Having “mini-guides”, made by other students, about how to prepare for their exams	60.9
Having a map that shows you classrooms, places and services around you	60.1
A chat system to find those around you who are studying your topics	50.6

We asked subjects if they had done e-learning before this interview: 62 subjects answered yes and 112 subjects answered no. We then asked these subjects their opinion about the utility of e-learning:

- of the 62 subjects who had done e-learning, 59 answered e-learning is useful and 3 answered e-learning is useless;

- of the 112 subjects who had never done e-learning, 68 answered that e-learning is useful, and 44 answered that e-learning is useless.

Starting from the fact that people who have tried e-learning have a significantly different opinion than people who have never done e-learning, we suppose that people are somehow diffident about a new learning methodology, and they can change their opinion after having tried it.

3. Our mobile learning experience

The University of Milano-Bicocca in collaboration with the National Research Council of Palermo realized an m-learning experience, using the MoULe environment for cooperative learning developed by the National Research Council of Palermo. One professor and ten students in

the course of Sociology of Business Innovation participated in this experience. A questionnaire about technologies and the use of technology was administered to the participants at the beginning of the experience, while at the end a focus group was organized with the students to assess their experience.

3.1. Participants

Our sample was composed of 10 Italian University students, 3 men and 7 women, aged between 23 and 30 (mean age was 25.5). All had done e-learning before, but no one had done m-learning before. The questionnaire about the technologies and the use of the technology showed that all participants had an Internet connection in their homes. Concerning the mobile devices owned, (Unnecessary. Consider removing) The most common mobile technologies were the cell phone and the laptop computer followed by the PDA and the Iphone.

3.2. Tools

3.2.1. Software

For the experience we used the MoULe (Mobile and Ubiquitous Learning) system, which was designed by the researchers of the C.N.R. of Palermo. In 2009 MoULe won the Mobile Learning Excellence Gold Award in the Education category and was recognized “as top practitioners on the leading edge of m-learning technology and innovation.” “MoULe is an on-line environment for collaborative learning; by integrating smart phones and portable devices, it enables educational activities based on the exploration of a geographical place. The system includes specific functionalities to search and access information spaces to communicate and annotate places according to their geographical coordinates. Data stored in the system (included data uploaded into it by the users) are enriched by the information concerning geographical localization, so that the system provides users with information specific to the place they are visiting” (from: <http://MoULe.pa.itd.C.N.R.it/>). The system also allows collaborative activities among the students in the field with their mobile device and other students on their desktop PCs. Using the Moodle platform from

desktop PCs it is possible to access the same courses that are visible on the smartphone. MoULe can be used in any kind of didactic activity, including collaborative work, also using learning resources and educational content of specific geographical locations. The MoULe system is designed to allow the acquisition of multimedia materials, such as interviews and notes, taken directly from the territory through mobile devices and publication in real-time on the Moodle learning platform.

The main functionalities of the MoULe system are:

- information search based on the users' geographical position; collaborative building of information spaces (through wiki technologies and conceptual maps); association of information to a specific point of interest;
- on-site multimedia annotation (photos, text, audio interviews);
- synchronous and asynchronous communication tools (chat and forum), which adapt to the geographical position of the user;
- satellite navigator to visualize the position of users and points of interests; automatic recognition of the points of interest; centralized user monitoring.

Access from the desktop PC is via a standard web browser, identifying the Moodle platform; while a special interface has been designed for access from mobile devices (for more information about MoULe see: <http://MoULe.pa.itd.C.N.R..it/>).

3.2.2. Hardware

The MoULe system, created 5 years ago, was designed on a Windows Mobile platform. Of course, the rapid evolution of mobile technologies makes this system obsolete for many reasons, but the idea and the teaching methodology implemented is not obsolete at all. Currently, the C.N.R. of Palermo is working on an update of the system to make it compatible with different operating systems in use on the most common mobile devices. Unfortunately, this upgrade was not available at the time of our experience. In our experience we used ten mobile devices: five HP 6915 and five I-MATE K-JAM. These devices had several

technological deficiencies that influenced some of the results of experience, as we shall see later.

3.3. The phases of the experience

The experience, which began in March 2010 and ended in June 2010, was divided into two phases.

In the first phase, the researchers of the C.N.R. instructed the teacher on how to use the MoULe technological platform, along with the wiki environment of Moodle for the construction of shared knowledge.

Supported by the researchers of the C.N.R., the teacher designed a learning path for the students. The teacher identified the points of interest (POI) and online resources relevant to each POI. The POIs are limited areas of land that are pre-assigned in the system so that they change depending on whether or not the user is inside a specific area of interest. They were selected from a range of activities that the students had to participate in, in order to exploit the full potential of mobile devices cooperating for learning in the field.

It was decided to divide the ten students participating in the experience into three groups for three different themes and give each group the task of creating a collaborative hypermedia for each specific topic, using the wiki tool, collecting records of the media - such as, images, text or audio interviews - on site in the area where the mobile devices were equipped with satellite tracking systems. Each group had its POI with relevant connected online resources selected by the professor for each POI. The group, thanks to geolocation, could combine the collected materials and interviews in audio format from the place where they were collected, thus facilitating the organization of the materials for the creation of multimedia products, using the wiki tool.

The second phase was designed to test the functionality of the technological system and its educational value in the university environment. Students were given ten mobile devices with antennas for GPS tracking. A mobile device was provided to each student. A national telephone provider using GPRS technology was used for internet

connections. The researchers of the C.N.R. showed the students how to use MoULe, and the professor explained to students the learning path to follow. In the previous experiences conducted by the Group of the C.N.R. of Palermo (Arrigo *et al.*, 2008), the use of smartphones was under the constant guidance and supervision of the researchers; in our case, the mobile devices were given to students who were able to use them independently for the entire experience.

The participants visited the POIs identified by the teacher and used the MoULe system as support to localize the POIs, to access the most relevant online resources identified by the teacher for each POI, to communicate with the other members of their group (in the field or on the desktop computer), for the acquisition of multimedia notes and finally, for the preparation of learning material in the field.

The participants accessed the MoULe system both from mobile devices and desktop PCs. The students in the field could cooperate with other students on a desktop PC, sharing information and coordinating each other with the common aim of realizing the materials following the instructions of the professor clearly and collaboratively. To create the hypermedia wiki the students could reprocess the materials collected from the field on a desktop PC through their mobile devices.

As mentioned above, students were working on the PC using the learning platform Moodle to access MoULe. During the experience the students used the tools for:

- communication - to ask for more details (through photographs or multimedia) on certain aspects and/or to provide information to colleagues in the field;
- specialized research - to search for didactic materials concerning the POIs;
- creation of collaborative content - to edit the hypermedia;
- display of the geographical distribution - to localize and then coordinate colleagues operating on site.

3.4. The evaluation of the experience

At the end of the experience we held a focus group to assess the experience. The discussion started from the MoULe experience in general, then identified the critical issues and strengths of the MoULe system and of the mobile devices used and lastly asked students suggestions about possible improvement for the MoULe system. In the final part of the focus group the moderator asked the students to express their views on the future of m-learning.

The focus group lasted about ninety minutes with the presence of an observer who collected field notes and also a videotape. We made a content analysis of the transcriptions.

3.4.1. Critical issues and strengths of the MoULe system

The transcriptions revealed that the MoULe platform did not always work optimally; the main problems of MoULe were:

- the slowness;
- the uploading process of the pictures was problematic;
- the window to modify the text was unusable, “the window to modify the text was too small and too slow and unfit to write a text”;
- the fact that “if two people are modifying the text at the same time, you lose everything.”

The participants identified several limitations concerning the notes: “I tried to create a note, which was a bit special, and I wanted to copy and paste it from the internet, but the MoULe platform didn’t give me permission to do this.”

The participants appreciated the chance “to give feedback with pictures. It was really wonderful to have the possibility to geo-reference photos.”

After overcoming some difficulties regarding the wiki, students appreciated it: “the wiki was very useful for group work” and “I looked at my wiki and I liked it.”

Some of the problems encountered by the students originated from the fact that the technology they used was a bit outdated. Our students were accustomed to high speed internet connections, even from their mobile phones. The slowness of the system was due to the fact that its operation required a bandwidth that was not always available. Moreover, unlike what happened in previous experiences in Palermo, continuous technological assistance of the MoULe's designers was lacking. For this reason the students in some cases had "to come up somewhat with solutions themselves." Other difficulties arose from "improper" use of the system: Moodle and MoULe systems are designed to "do some good things" but when you force them to "mimic" features which the students were probably used to in other environments as, for example, "uploading videos from YouTube on the wiki" or "customizing the graphical user interface" or having "a tutorial such as Skype," often the system did not respond. "Initially the students had a tendency to use the devices like cell phones (in fact, in the first testing sessions the chat tool was the main tool used by the students, perhaps for its similarity to text messaging), but during the learning experience their behaviour underwent a considerable change: they used the multiple channels more carefully and according to their learning needs" (Seta *et al.*, 2008. p. 163).

Other issues are directed to the core of m-learning, which is still in a transition phase between the "traditional" e-learning with its features (such as forums and chats) and a future yet to be built.

3.4.2. Some suggestions to improve the MoULe system

In light of their experience, the students made some suggestions for possible changes to improve MoULe:

- add a storage space and a repository, a chat next to the wiki, an update by e-mail concerning the changes, a function that indicates if someone else is working on the wiki, "a calendar where the group can organize its work," and a tutorial;
- provide the possibility to modify and upload videos, photos images and audio files: "It would be nice to have simple functions for uploading images and videos and to be able to copy and paste from internet along with a "browse function" to upload your documents from the wiki";
- give the possibility to customize the graphical interface.

3.4.3. Critical issues and strengths of the mobile devices used

The devices were judged by the participants as being a bit old and slow. Some participants noted the limits of the device used in the MoULe experience; they thought the best mobile device to do m-learning on was the iPhone. Young people are often “techno-centric”: for them it’s the technology that makes learning easy. However, MoULe was exactly the opposite because it did not try to make learning easier, but more complex because collaboration and negotiation were mediated by an invasive and limited technology (Seta *et al.*, 2008).

3.4.4. An overall evaluation of the experience

In light of this experience, the students thought that m-learning was a “useful” and “interesting” training methodology with good prospects, but still little known. “In the past six months I was commuting by train from another city to the University. I always had a French course downloaded on my mobile device. And I thought that course was m-learning. This experience showed me that m-learning is something more!”

From the pedagogical point of view, mobile technology is a kind of technology that is portable and enables users to communicate with each other, create and manage learning processes that are not limited to a particular location (Lam *et al.*, 2010). It offers some unique characteristics that are not available with other communication technologies in terms of mobility of time and location (Greenfield, 2006). In light of this experience and our previous mobile learning experiences, we can confirm that, as underlined by several scholars (eg. Georgiev, Georgieva & Smrikarov, 2004), the m-learning advantages compared to e-learning are:

- it can be used everywhere at any time (smaller size and lighter weight than desktop PCs);

- it ensures greater student involvement since m-learning is based on technologies that students already use every day. It is common opinion in the mobile learning field that it is best to use students’ own mobile devices and not loan them a mobile device for the period that they have for the mobile learning experience (Kukulaska-Hulme, 2007), but this is difficult because, as underlined by Safaa and Mahmoud (2008), the lack

of a common platform (eg. different sized screens - horizontal screens with some handheld computers, small square screens with mobile phones, etc) makes it difficult to develop content that will work well anywhere and on every device;

- using GPS technology, as in the MoULe case, m-Learning can provide location dependent education. We agree that, as underlined by Jeng and colleagues (2010, p. 8), “the situated learning environment utilizes the strength of mobility and brings context awareness learning materials for the mobile learner and coacher. In this environment, the mobile learner can have the awareness of group membership which could increase the learning motive or improve the learning efficiency.”

4. Conclusions

One student said that, on one hand, “m-learning is too much a victim of the technological evolution. It is still in its infancy,” “five years ago the same thing [the MoULe platform and the devices used in the experience] would have been fantastic. Now people have different expectations. Facebook is what people expect; in Facebook they can do everything without knowing anything. Users now have the capacity of the ECDL [European Computer Driving Licence] and the expectations of Facebook.”

In light of this experience the participants would like to have a single mobile device given by the university; they wish that “m-learning wouldn’t only be for one course, but for all the courses of the university.”

This experience helped the students and the professor to develop a new way of thinking for didactic activities and a new way to develop cooperative work, inside and outside the classroom, with mobile devices, through MoULe, and by desktop PCs, through Moodle. As emphasized by the researchers of C.N.R “MoULe has been developed taking into consideration the following points”:

1. “mobile learning was more a promise for the future than a consolidated learning reality” (Vahey and Crawford, 2002);

2. mobile platforms to support complex and structured learning processes were not available;

3. the learning potential of mobile devices seemed to be considered mainly connected to their “portability” (Yang, 2002; Cutshall *et al.*, 2006), but rarely did people take into consideration the geographical localisation and the “augmented reality” that mobile learning offered (Klopfer and Squire, 2004; 2008);

4. research in the mobile learning field began to underline the need to overcome every technocentric determinism, and to promote a holistic view of the introduction of mobile technologies in the learning processes (Roschelle and Pea, 2002; Sharples *et al.*, 2005). The need to consider the whole educational context required the design of didactic activities which were well integrated with the other everyday learning activities ;

5. rarely before MoULe was it possible to find mobile learning experiences in which mobile learning and learning in the classroom, or in the lab or at home were well integrated. The mobile learning experiences before MoULe were designed mainly for overcoming some logistic problems (we are in the field, we don't have access to a desktop Pc connected to the Net), or for situated informal learning, like “inquiry learning” and “participatory simulations” (Koschmann, 1996; Colella, 2000)” (Seta *et al.*, 2011, p. 2).

In light of these issues, MoULe was designed to be a system that is at the same time a technological platform for mobile learning and also a flexible environment which can support meaningful didactic activities. The researchers of C.N.R. who designed MoULe adopted a paradigm which considered learning as a situated and complex activity in which the students have to consider and explore three dimensions at the same time: the physical/geographical, social and epistemic dimensions (Seta *et al.*, 2008).

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