LMS INTTIC System using Mobile Technology and Podcasting in Blended Learning

Belkacem Kouninef, Redouane Tlemsani, Sidi Mohamed Rerbal, Abdelhadi Lotfi
Institut National des Télécommunications et des Technologies de l'Information et de la Communication
Laboratoire LaRATIC
Oran, Algéria
bkouninef@ito.dz

ABSTRACT: *Social technology intersection indicates how a mobile device could facilitate communication and collaboration with many individuals and systems – the options available for social interaction using the technical capabilities of the mobile device to send SMS, call a friend, access the internet, etc. Mobile device is the beginning of something new in blended learning. Technology progress in the field of learning has evolved especially with the use of e-learning and now with the emergence of a new concept called m-learning due to mobile technologies, which are probably the most influential technology for teaching and learning in the next decade. Internet access remains inaccessible to most of our students. But almost all students have access to mobile technology. Nevertheless, the m-learning has some constraints in the use of mobile technologies such as the size of the screen which is too small for reading, battery life that is in constant progress but still low for e-learning applications, user interfaces that are not user-friendly on most mobile phones and diversity of mobile devices and the rapidly changing trends suggest producing "LMS mobiles" adaptable to a wide range of mobiles. To avoid redundancy in the reproduction of content that exists in the e-learning environment, we combined in this approach the use of mobile device in the blended learning to offer to our students the opportunity to be mobile and use the mobile as the medium of information.*

In this paper the benefits of mobile-learning and its use in the INTTIC's Moodle platform are presented. A new way to send information to different learners is developed, relying on the multimedia podcasting technology. This latter is still relatively new and not widely known.

Keywords: Blended Learning, Mobile Learning, Learning Management System, Podcasting, Moodle Platform

Received: 29 July 2012, Revised 26 September 2012, Accepted 30 September 2012

1. Introduction

M-learning is a term used to describe any manner of delivering courses or consultations of events spread through e-learning using mobile devices such as Pocket PCs, mobile phones or PDAs.

All the interest of mobile media is the rapid diffusion of short information concerning training management: Ads on mobile phones (eg change of schedule, classrooms, meetings, news on forums, etc...)

Using available tools "*mobiles*" for education may seem uninteresting for the first glance. All course contents cannot therefore

be displayed on such tools. So, we can imagine contents of a "*light type*". For example, "*News*": results to show for an examination or other events, "*notes*" or the opposite, sending SMS and / or email from the platform to a PDA or a PC, etc.

The realities with regard to the availability of computers in deep rural South Africa and other African countries and the challenges facing providers/sponsors to make computers available, have shaped the Universitys e-learning strategy to accommodate the technology profile of the distance education students.

A brief overview will be given of the history of mobile phones in Africa and how this technology has changed Africa. The changes in mobile phone technology will be illustrated. The practical use of mobile phones in the distance education will be discussed. This will include the application of this technology for administrative as well as academic purposes. Examples will be given of both types of applications. This will include results of pilot projects on the use of mobile phones as e-learning/m-learning support tool in a predominantly paper based distance Programme.

2. Moodle Presentation

2.1 Definition

Moodle is a Course Management System (CMS) for producing web-based courses. It is a Free and Open Source Software (FOSS), which means you are free to use, modify, and redistribute it as long as you:

- Provide the source to others
- Do not modify or remove the original license and copyrights
- Apply this same license to any derivative work

Under these conditions, thousands of developers have contributed by adding features and functionalities to Moodle. The result is the world's most popular, free, and feature-packed online learning system. [1]

Many of the features in Moodle are carefully chosen to support a philosophy of learning, called social constructionist pedagogy. Simply stated, this style of learning and teaching is based on four concepts, which are constructivism, constructionism, social constructivism, and connected and separate:

- Students acquire new knowledge as they interact with their environment, your course activities, and other students.
- Students learn more when they construct learning experiences for others.
- When students become part of a culture, they are constantly learning. For example, you and your partner would probably learn more about ballroom dancing when you're in a dance class, versus watching a video together. The interaction with other students and possibly a variety of teachers would enrich and accelerate your learning process.
- Some students try to remain objective and factual, some try to accept more subjective views, and others try to integrate both approaches. Constructed behavior is when a student can choose whichever approach is more appropriate.

Moodle is open source software, so new modules are constantly being developed and contributed by the Moodle community.

Well the good news is that you're likely to be kept wide awake in e-learning courses, both online and mobile. You're going to be engaged and active in ways that you may never have expected from an educational setting. All the things you love about learning, connectivity, social networking, and Web 2.0 applications can be found in a well-designed course that uses Moodle as its learning management system.

A course that has been built in Moodle encourages learners to engage with the material on many different levels.

Learning takes place in many ways and in many places, and above all, there is a built-in flexibility that allows the learner to approach the material in ways that work for him/her. [2]

2.2 Tools and Features

The acronym Moodle stands for Modular Object-Oriented Dynamic Learning Environment. It is modular because you can add and remove modules. The programming paradigm used to create Moodle code is the Object-Oriented paradigm. It is dynamic because it can be used interactivity for information delivery, in a changeable and flexible way. It is a learning environment

designed for teaching at many levels.

The following table maps Moodle features to their instructional functions [3].

Moodle feature	Instructional function	Learning theory
Book	Knowledge base, core instructional material, content repository, and comprehension	Schemata-building
Assignment	Organization	Conditions of learning
Chat	Interactive, collaborative learning,comprehension, and evaluation	Social learning, communities of practice, and Emulatory learning
Choice	Classification, application, analysis, and comprehension	Schemata
Database	Analysis and collaborative learning	Experiential learning and social practice
Forum	Collaborative learning, analysis,and synthesis	Social practice, communities of practice, and experiential behaviorism
Glossary	Comprehension and schemata-building	Schemata and conditions oflearning
Quiz	Comprehension and analysis	Schemata, emulatory learning, and behaviorism/operant conditioning
Wiki	Collaborative learning, application, synthesis, and evaluation	Social learning, socialpractice, and communitiesof practice
Workshop	Application and evaluation	Social practice and experiential learning
Timetable	Organization	Conditions of learning

Table 1. Moodle features

3. INTTIC-moodle Experience

The National Institute of Telecommunications and Information Technology and Communication based on its experience in e-learning (participation in the development of a platform for e-learning LMS INTTIC, with the University of Nantes, the implementation and administration of this platform since 2006.

But, since January 2010, our e-learning research team took initiative to forward itself towards using Moodle for its rich tools and good accessibility [4]. (See figure 1)

According to the nature and objectives of our team, we want to create an e-learning system that responds to three major axes of interest:

3.1 Blended learning

This learning solution is claimed to be "*the most prominent instructional delivery solution*". In our case, it is mainly directed to

students who attend courses at the institute and need additional materials and skills. The combination of face-to-face learning with typically web-based educational technologies can enhance the quality of learning and teaching with lower price and human resources. The proposed solution use both asynchronous media like email, forums, weblogs or wiki in conjunction with synchronous media like text, chat or video conferencing.

3.2 Distance learning

The audience targeted by this type of education is employees from companies and institutions who need certification in certain courses (IT technologies, computing, networking …). These students are not (most of time) present at site, so the e-learning center must provide access to learning when the source of information and the learners are separated by time and distance, or both.

3.3 Continuing education

It is post-compulsory education (in addition to that received at secondary school), that is distinct from the education offered in universities (higher education). The number of students who may take these courses is unknown in advance, so the solution proposed must take a big number of students into consideration. This training is dedicated to the company's' personnel wanting to improve in the technological fields.

Figure 1. Module creates in INTTIC-Moodle

4. Hardware and software context

Experiential learning in Moodle can take place in a traditional e-learning space and it can also occur in a mobile learning environment. When the course content connects concepts to one's prior learning, or involves actual field work, data collection, and peer interaction via a mobile device, the experience can be quite powerful.

For example, the users (98% institute students have a telephone) are increasingly mobile (More than 50% students pass more than 40% of their time apart from the classes or lecture theaters) and want to be able to reach their information systems whatever the place where they are. The applications must thus be adapted to meet this new need.

We will see the various elements to be taken into account in this step.

With dimensions material, one can distinguish three categories:

1. The PDA's (Pocket PC, Palm, etc.)
2. Mobile phones (Sony Eric, Nokia, etc)
3. Ipod' s (Podcating)

A recent PDA has of a INTEL PXA270 processor, 64 to 128Mo RAM, SD ports as well as Wifi and/or Bluetooth. PDAs are all different, using the operating systems Palm, Symbian, Windows mobile, etc. There is PDAs which can connect directly to the network wireless telegraphy, by GSM or GPRS; The majority of PDAs can post the text messages, MP3 sounds and JPEG pictures. PDAs have a web browser normally, like the 3G and 4G mobile phones [5], [6] to take the messages directly on Web sites. It is the Web which is the easier way to communicate with PDAs.[7] [8]

The mobile phone is very widespread (The subscribers number on the mobile phone in the world should pass the bar symbolic system of the 4 billion by the end of the year, according to the estimate of the International Telecommunication Union (ITU)). The mobile phone performances are more vertiginous, even if the manufacturers current tendency is to propose apparatuses all-in-a increasingly powerful having the same functionalities as a PDA. It is moreover from now on possible of surfer on Internet using technologies GSM, GPRS or UMTS [9] [10].

The iPod is launched with a capacity of 5 Go, the model of fifth generation can contain up to 80 Go. The iPod is an electronic instrument designed by APPLE. It is a portable reader of its numerical (numerical walkman), built around a hard disk of reduced size (2 inches). One cannot transmit the files directly to the iPod network. The iPod cannot receive the files through a computer, connected with a cable. Side connectivity, Bluetooth and Wi-Fi are required, which makes these apparatuses particularly interesting on INTIC-Moodle platform since we have a broad and fast cover. Whatever the performances of these apparatuses. Certain technical limitations inherent in their reduced sizes must be taken into account during the development, namely: The size of screen is limited.

With dimensions networks: Through Internet, there is no problem for networks GSM/GPRS, on the other hand with Wifi, the disconnections are frequent and nothing guarantees that the user will be always in a covered zone. With dimensions software: A mobile application can function in connected mode, or disconnected mode, for the 1st mode the permanent network availability, for the second periodic loadings fashion and program.

5. Blended Learning

Blended learning has been defined in complex ways but generally assumes a combination of real time and online interaction, often through the medium of integrated learning management systems. The concept of blended learning is defined in a variety of ways with different dimensions of the blend identified by Singh and Reed (2001), Driscoll (2002), Osguthorpe and Graham (2003), and Oliver and Trigwell (2005), among others.

Singh and Reed (2001) recognized that a blended learning program may combine one or more of six dimensions: offline and online learning; selfpaced, live and collaborative learning; structured and unstructured learning; custom content with off-the-shelf content; work and learning; and ingredients of the blend: synchronous physical formats, synchronous online formats, and selfpaced, asynchronous formats. Driscoll (2002) pointed out four different ways in which blended.

It is a fact that the success of distance education depends largely on student support services provided to its learners who encounter feeling of isolation, lack of peer-peer interaction, lack of proper intimation from study centre, lack of proper academic support and hurdle of distance from the study centre to list a few.

Students' reactions to the acceptance, type and length of podcasts were researched and analysed.

6. M-Learning Approach

The use of the current "*mobile*" tools to make teaching can appear without interest. The connection speed on mobile devices can be slow. Using a small hand-held device is not really ideal for accessing say, distance course materials on moodle. (p sherma et all 2010) One obviously thinks to read courses on as small tools as phones or PDA and one include/understand the difficulty quickly. All course contents could not thus be posted on this kind of tools. One can thus imagine light contents of "*summarized* " type, "*the points to be seen for an examination*", etc.

Indeed, although these tools are increasingly powerful, our problem remains topicality, the screens size remains too small for the reading. The autonomy battery well in constant improvement remains weak compared to the awaited uses for the e-learning, the user interfaces are not convivial on the majority of mobile phones and finally the diversity of the mobile apparatuses and the tendencies fast change insist to think of producing "*mobiles LMS* " able to adapt to a whole mobile line of goods rather broad.[12]

6.1 Current events consultation in INTTIC-Moodle

This application makes it possible students to quickly consult short information concerning current events management on the mobile phones. (Figure 2).

Figure 2. Current events consultation

6.2 Grades results Consultation

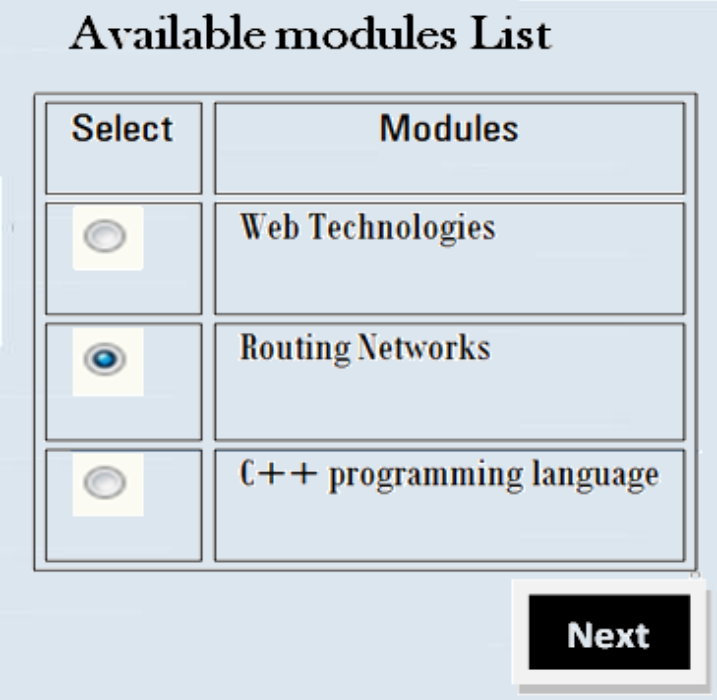
This application concerning grades management makes it possible to the students to consult their grades starting from their mobile phones. There are two consultation possibilities: by module and/or by education level. (Figure 3).

Figure 3. Grades results consultation

6.3 SMS/Email sending in Moodle towards the mobile

The connection costs remain still high. However the work advantages on mobile are numerous and with media use, the training concept in any time and any place will be real. It will be based on the new society practices which like to make profitable empty times, which appreciate to consult by short moments to avoid displacement. Since the mobile, it is possible to get informed about the current events its module and/or general. (Figure 4). [13].

Internet is not accessible for all students, but almost students have access to mobile technology. Short Message Service is exactly what it sounds like it is, a text message sent to students. SMS is beginning of a change in education; wireless is a particularly attractive option for blended learning.



Select	Family name	First name	Tel	E-mails
☐	ABDEDDAIM	Taki Eddine	0774829687	teabdeddaim@hotmail.com
☑	BAH	Mahamadou		bah_mahammadou@yahoo.fr
☐	BOUALAOUI	Abderrahmane		
☐	BOUKROUH	Rostom		
☐	DJELLOULI	Mohamed Adnane		
☐	FEKIRA	Ferdaous		ffekira@ito.dz
☐	HAMDAOUI	Mohamed		
☐	KENNOUCHE	Taki Eddine	0661225487	
☐	KOUADRI	Ali		
☐	MEKKAOUI	Hicham		
☐	OUAMRI	Hicham		
☐	RIHANE	Mohamed		
☐	SOUALMIA	Abdelbasset	0550669688	ss_chevalier@voila.fr

Next

Figure 4. SMS/Email sending process in 4 steps

6.4 Technologies

In the case of contents diffusions on "*mobile*" tools, it is necessary to separate the contents and the form from the documents to be produced by the professors. This with an not rewriting aim several times the same contents. XML proves to be a language adapted to that. It is indeed enough to assign several different forms with contents XML to have postings different according to types' of support.

This implies to be able to structure the XML data in Moodle in particular the course contents. This decision would involve a surplus of rigidity on the formalism level used by teachers. This solution thus appears adapted better to the "*advertisements*" or "*planning*" data which are easily structured and which do not urge the teachers to do themselves the structuring.

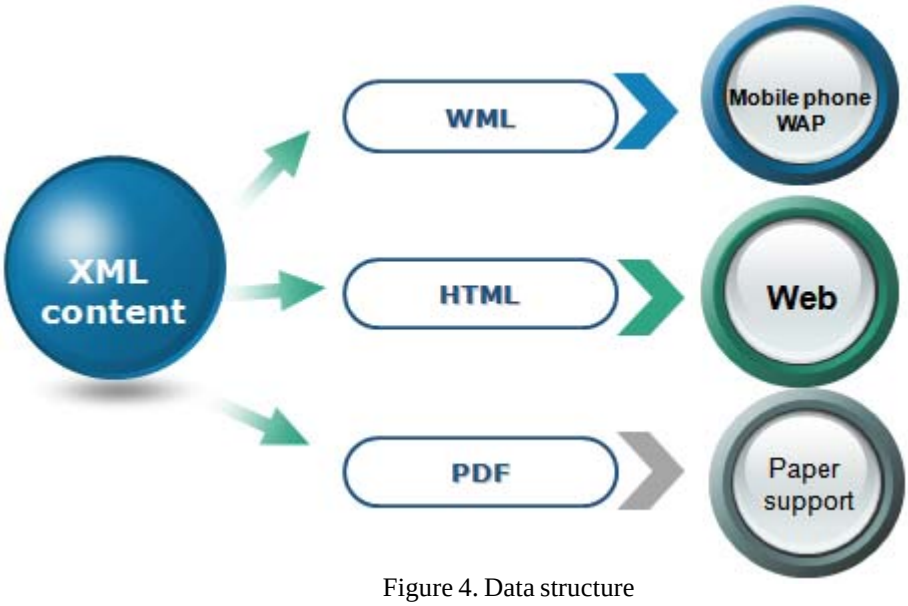


Figure 4. Data structure

The WAP [8] thus represents a true revolution of the telecommunications world, bringing the vastness the world Web and the mobility closer to the mobile phone.

The purpose WAP is to provide an Internet access to terminals like mobiles, PDA. It makes it possible to develop applications

conceived to function through communication network wireless telegraphy. The WAP makes it possible to connect the mobile network of telephony and Internet network. By choosing this solution, the Inttic-moodle platform will have to thus manage the data in a hybrid base (relational but whose insertions contain files of the type XML) or relational plus a system of export towards XML.

6.5 Podcasting process

The teacher will be able to prepare fast videos in order to facilitate the learning comprehension using podcasting [10] a means of sound files diffusion.

Figure 5. Podcasting Tool

To listen to numerical audio contents will not easily replace the reading, listening on line presentations or any other means of receiving information has to learn [14].

Nevertheless, here some points which show podcasting contribution [15] in teaching. Some learning prefers to obtain information "*orally*": the podcasting would then make it possible to provide has learning supports from courses (audio) which are adapt to them.

To provide the students complements with course notes at lectures time, unquestionable student are not able forcing has to note all teacher significant remarks, podcasting could be uses like oral complement service of teachers.

To help the students who do not have yet a level sufficient for all to include/understand in presentiel (ex: Arabic student). Thanks to this use, the podcasting can then be an excellent revision means course and to help the teachers has to improve in their presenting manner has the oral examination course.

7. Results and Discussions

The structure and the activities composing the system are the result of two years of experimentation during which many improvements were produced.

By looking at the two experiences, we propose the use of two courses in Moodle platform.

Length of times	***rate of sending SMS***	***Number of students***
One year	51%	105
2 *years*	80%	183

Table 2. Mobile phone use

Podcasting	***Using time* (*hours*)**
Anywhere anytime access	120
Interactive classroom	35
Mobile phone communication	88
Multimedia data capture	24

Table 3. Mobile phone use

7.1 1st Experience: mobile process

The self-reported number of times that respondents indicated that they sent a text is contrasted with the actual recorded number of text messages.

7.2 2nd Experience: Podcasting process

In following table, we range a number of different m-learning activities in three months in the second year of use with podcasting approach.

From this work for considering m-learning, we can see that podcasting alone will not education since is largely perpetuates the traditional didactic.

8. Conclusion

When one speaks today about education, one speaks especially about 4 C, to develop the thought criticizes, collaboration, the communication and creation and it is all the object of the mixed program of training.

In a context marked by communication and information technologies development used in education and especially applications development using mobile technologies. We are witnessing the emergence of the e-learning in parallel to m-learning where the coexistence of these two environments makes it possible to develop learning independently from the time and place restrictions. Mobility becomes a data processing key factor [16]. The mobile phones become genuine small computers and offer still under-exploited capacities. In this paper, we tried to take account of the specificity of the m-learning so that the students of owner institute can profit from this training technology and to place at their disposal a mobile platform Learning Management System. Through this system, the teacher can prepare audio and video sequences for his/her students downloadable from their iPods. This is especially useful for stranger students who suffer from language difficulties.

In future work, we want to exploit all available tools and features in Moodle and to profit from its technical advantages.

References

[1] Dougiamas, M., Taylor, P. C. (2003). Moodle: Using learning communities to create an open source course management system, *In*: Proceedings of world conference on educational multimedia, hypermedia and telecommunications, 3.

[2] Cole, J. R., Foster, H. (2007). Using Moodle: Teaching with the popular open source course management system. O'Reilly Media, Inc.

[3] Rice, W., Nash, S. S. (2010). Moodle 1.9 Teaching techniques.

[4] L. Etaati, S. Sadi-Nezhad and A. Makue. (2011). Using Fuzzy Group Analytic Network Process and ISO 9126 Quality Model in Software Selection: A case study in E-Learning Systems, *Journal of Applied Sciences*, 11(1) 96-103.

[5] Zhao, Y. (2002). Standardization of mobile phone positioning for 3G systems, *IEEE Communications Magazine*, 40 (7) 108–116.

[6] Zahrani, M. (2010). Towards the 4th Generation Mobile Trends in Applied Sciences Research, 5 (1) 29-38.

[7] Buyukkokten, O., Garcia-Molina, H., Paepcke, A., et Winograd, T. (2000). Power browser: efficient Web browsing for PDAs, *In*: Proceedings of the SIGCHI conference on Human factors in computing systems, p. 430–437.

[8] Greenberg, S., Boyle, M., Laberge, J. (1999). PDAs and shared public displays: Making personal information public, and public information personal, *Personal and Ubiquitous Computing*, 3 (1) 54–64.

[9] Katz, J. E., Aakhus, M. A. (2002). Perpetual contact: Mobile communication, private talk, public performance. Cambridge Univ Pr.

[10] Faggion, N. (2002). Le GPRS: du WAP à l'UMTS. Dunod.

[12] Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation, *Computers & Education*, 49 (3) 581–596.

[13] Vanaja, M. (2010). SMS Advertisement: Competitive to Gulf Market?, *Asian Journal of Marketing*, 4 (3) 131-143.

[14] A Alsaffar, A., Namheh, E. (2011). Secure Migration Service for Mobile IPTV Using DCAS, *Information Technology Journal*, 10 (11) 2044-2051.

[15] Nataatmadja, I., Dyson, L. E. (2008). The role of podcasts in students' learning, *iJIM*, 2 (3) 17–21.

[16] Mamlook, R., Aljumah, A., Farooqui, N. K. (2011). Knowledge on the Move, *Journal of Applied Sciences*, 11(16) 3062-3069.