

# Integrating the Learning Management System with Mobile Technology

**Bayan Abu Shawar**

ITC Department  
Arab Open University  
Amman, Jordan

**Jehad Al-Sadi**

ITC Department  
Arab Open University  
Amman, Jordan

**Taleb Sarie**

ITC Department  
Arab Open University  
Amman, Jordan

**Abstract** - *This paper follows the progress of improving the Arab Open University's Learning Management System by integrating it with other online systems; one of the top line topics is to utilize the benefits of mobile technology. We introduce the infrastructure of integrating our learning management system with such technologies. A complete description of the open source learning management system, Moodle is discussed. The benefits of adapting open source platforms in addition to the usefulness of using the mobile technology are presented. Finally, we address the impact of such integration on students and the learning process from an academic point of view.*

**Keywords:** e-learning, open learning, m-education, LMS-SIS, CMC

## 1 Introduction

The growth of Internet-based technology have brought new opportunities and methodologies to education and teaching represent in e-learning, online learning, distance learning, and open learning. These approaches are typically use in place of traditional methods and mean that students deliver their knowledge though the web rather than face-to-face tutoring.

E-learning is a new trend of education system, where students deliver their materials through the web. E-learning is the "use of internet technology for the creation, management, making available, security, selection and use of educational content to store information about those who learn and to monitor those who learn, and to make communication and cooperation possible." [1].

Kevin kruse [17], addressed the benefits of e-learning for both parties: organization and learners. Advantages of organizers are reducing the cost in terms of money and time. The money cost is reduced by saving the instructor salaries, and meeting room rentals. The reduction of time spent away from the job by employees may be most positive shot. Learning time reduced as well, the retention is increased, and the contents are delivered consistently. On another hand, learners are able to find the materials online regardless of the time and the place;

it reduces the stress for slow or quick learners and increases users' satisfaction; increases learners' confidence; and more encourages students' participations.

Recent advancement in mobile technology has improved many areas such as commerce [2]-[5], services [6] [7] and recently in Education. The use of mobile technology in education is also known as "mobile education" or "m-education" [8]. Mobile technologies have provided unique opportunities for educators to deliver educational materials efficiently, and to support the cognitive and social process of student learning. Educational materials can be delivered to students through mobile devices. Mobile technology can also be integrated into learning management system to improve interactivity in the classroom and also in distance learning.

In this paper the e-learning platform of the AOU is described in section 2. The integration process between learning management system and student information system is presented in section 3. Section 4 shows the requirements and benefits of using the mobile technology in teaching. How to enhance the mobile technology in AOU is discussed in section 5.

## 2 The e-learning platform of the AOU

Arab Open University was established in 2002 in the Arabic region, and adopted the open learning approach. AOU has partnerships with the United Kingdom Open University (UKOU) and other national educational institutes, such as MoHE, and international institutions, including UNISCO, to help ensure a high quality of teaching.

An open learning system is defined as "a program offering access to individuals without the traditional constraints related to location, timetabling, entry qualifications." [18].

The aim of AOU is to attract large number of students who can not attend traditional universities because of work, age, financial reasons and other circumstances. The "open" terminology in this context means the freedom from many restrictions or constraints imposed

by regular higher education institutions which include the time, space and content delivery methods.

Freed et al. [9] claimed that the "interaction between instructors and students and students to students remained as the biggest barrier to the success of educational media". The amount of interaction plays a great role in course effectiveness [10]. For this purpose and to reduce the gap between distance learning and regular learning, the AOU requires student to attend weekly tutorials. Some may argue that it is not open in this sense; however the amount of attendance is relatively low in comparison with regular institutions. For example, 3 hours modules which require 48 hours attendance in regular universities, is reduced to 12 hours attendance in the AOU.

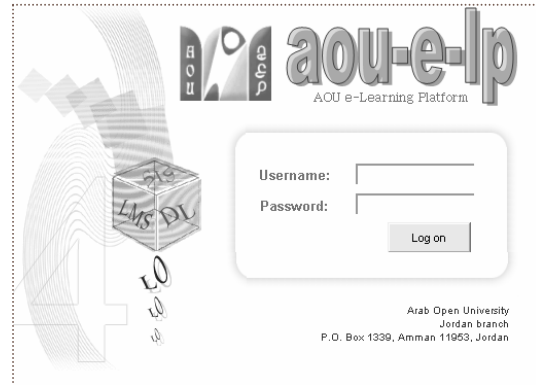
At the beginning the AOU used the FirstClass system as a computer mediated communication (CMC) tool to achieve a good quality of interaction. The FirstClass tool provides email, chat, newsgroups and conferences as possible mediums of communication between tutors, tutors and their students, and finally between students themselves. The most important reason behind using FirstClass was the tutor marked assignment (TMA) handling services it provided. However, the main servers are located in the UKOU which influences the control process, causes delays, and totally depends on the support in UKOU for batch feeds to the FirstClass system [11].

To overcome these problems, AOU use Moodle nowadays as an electronic platform. Moodle is an open-source course management system (CMS) used by educational institutes, business, and even individual instructors to add web technology to their courses. A course management system is "often internet-based, software allowing instructors to manage materials distribution, assignments, communications and other aspects of instructions for their courses." [19] CMS's, which are also known as learning management systems (LMS) or virtual learning environments (VLE), are web applications, meaning they run on a server and are accessed by using a web browser. Both students and tutors can access the system from anywhere with an Internet connection. Moodle provides many learning tools and activities such as forums, chats, quizzes, surveys, gather and review assignments, and recording grades.

Moodle was used in AOU mainly to design a well formed learning management system which facilitates the interaction among all parties in the teaching process, students and tutors, and more over to integrate the LMS with the student information system (SIS).

In addition that Moodle is easy to learn and use, and that it is popular with large user community and development bodies. Moodle is flexible in terms of:

- Multi-language interface,
- Customization (site, profiles),
- Separate group features, and pedagogy.



**Figure 1. The unified image of the AOU e-learning systems**

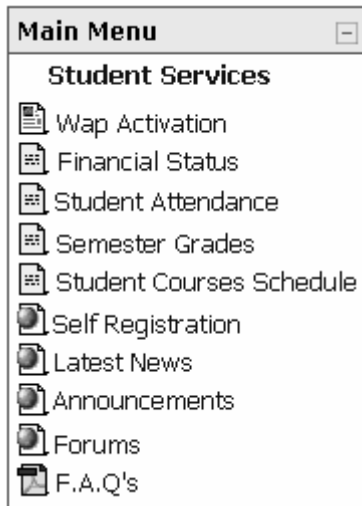
The unified image of the e-learning platform of the AOU from the starting web page shown in figure1, the users will be able to:

- Connect to the SIS, where they could do online registration, seeing their grades and averages as presented in figure2.
- Perform learning activities through the LMS, such as submitting assignments, do online quizzes, etc.
- Retrieve resources through AOU digital library subscriptions.

### 3 Integrating the LMS with SIS

The learning management system (LMS) is software that automates the administration of training events. The term LMS is now used to describe a wide range of applications that track student training and may include functions to:

- Manage users logs, course catalogs, and activity reports
- Provide basic communication tools (email, chat, whiteboard, video conferencing)
- Manage competency (e-Tests, e-Assignments)
- Allow personalization (user profiles, custom news, recent activity, RSS)
- Enable monitoring activities (QA, accreditation, external assessment).



**Figure 2. The SIS of the AOU**

The usefulness of the LMS could be summarized as follows:

- Simplicity, easy creation and maintenance of courses.
- Reuse, support of existing content reuse.
- CMC, TMA, Tests, Progress, learner involvement.
- Security, secure authentication/authorization
- Administration, intuitive management features
- Technical support, active support groups
- Language, true multi-lingual
- Affordability, maintenance and annual charges.

The student information system (SIS) is an Oracle based program which provides the necessary information such as students' information, courses registered, faculties, grades, etc. LMS integration with SIS (or LMS-SIS) is a system used inside the university to reducing accessing time, automatically generating accounts, minimizing faults, mistakes and errors to null, obtaining availability of requirements and simplifying registering, entering and filling process as shown in figure 3, [12].

The system is intended to satisfy the special needs and methodology adopted at the AOU. The SIS is flexible enough to adapt to the specific needs of branches while maintaining a unified standard that facilitates the interoperability of the system amongst branches and the headquarters.

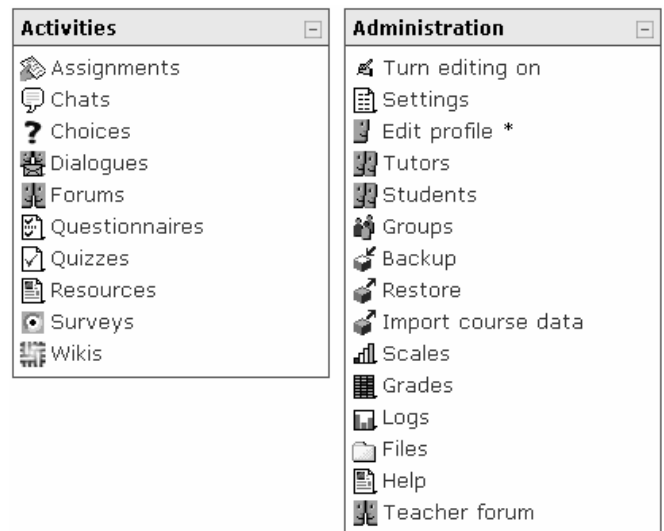
The SIS performs all aspects of students' information functions from filing an application to admission up to graduation, within the AOU methods. The SIS deals with all the entities involved and facilitate an easy and reliable way of the entities to perform their functions.



**Figure 3. The LMS of AOU**

To fit the AOU requirements and specification, a number of modifications and customizations were made (see Figure4), including:

- Log records. Logs are replicated into other isolated tables, to increase performance, and to keep track records for long period, while removing these log records from original tables.
- Some facilities and activities are added.
- Students attendance and absences sheets are provided.
- Grades customizations (fractions) excel sheets are available.
- Randomly captured assignments for quality assurances purposes.
- WAP (wireless application protocol) services (grades, schedule, financial issues, news) are presented.



**Figure 4. LMS course activities and administration**

## 4 Requirements and benefits of adopting the mobile technology in education

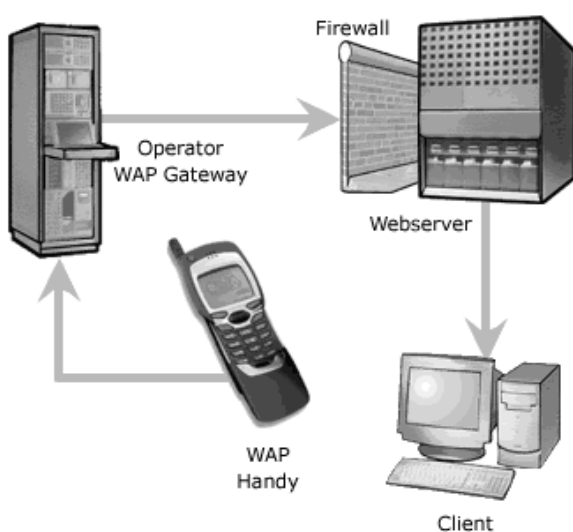
Computer-based learning environments are increasingly becoming commonplace at colleges and universities. Myers and Talley [13] classify the computer-based technologies into two categories:

1. Online course management systems and specialized collaborative environments that allow electronic communication of classroom instruction materials to students, among students and between student and instructor;
2. Wireless network systems that allow faculty and students with mobile computers to communicate with their campus networks.

Mobile and wireless technology has been served in many domains such as commerce, and education. Mobile learning "M-learning" is e-learning delivered through mobile computational devices. So mobile learning can provide online learners with capabilities to get instant notification on e-mail, access learning sites, report data from the field, and collaborate with learning colleagues. [1].

M-learning does not replace traditional learning; it just represents another way of learning. Siau and Nah [8] listed the usefulness of mobile technology for both students and tutors. The students' benefits are:

1. The education materials are available for students regardless of where they are;
2. Education materials can be delivered to students based on their needs and preferences.
3. Students can communicate and interact with peer students and educators in real time.



**Figure 5. The infra structure of enhancing the mobile technology**

The benefits for tutors are presented by providing a new means of education delivery as well as adding a new dimension for student-tutor interaction. For example, wireless classroom response systems can be integrated into classroom instructions to gather students' responses and provide instantaneous feedback to students on their performance. This could improve classroom interactivity, enhance teaching effectiveness, and promote student learning.

The attributes of mobile devices are operating system, large graphical display, touch screens, connectivity, memory, programmability, and personal information manager (PIM) functionality [14]. Recent evolutions on laptop computing have led to what is called TabletPCs, which is digital pen-based mobile PCs that use digital ink enabled software, and it is used in teaching [12], the general structure of enhancing the mobile technology with e-learning is shown in figure 5.

However, the availability, mobility, and performance of wireless technology depend on five major areas [15]:

1. Platform, the majority of PDAs and cellular phones being produced have embedded in them some type of Web browsing technology.
2. Connectivity, the true wireless connectivity is wireless Radio Frequency (RF). The wireless communication categories are Wireless Local Area Network (WLAN), and Wireless Wide Area Network (WWW). Training sites at corporations and students at universities use wireless connectivity to facilitate access to information, information exchanges and learning [16].
3. Wireless Middleware, provides services specific to the world of wireless and handheld computing. Wireless middleware services are secure communication management, synchronization, message processing and management tools [14].
4. Back-End System, handheld and wireless computing extends the reach of corporate data and corporate transaction engines. The data stored on a Web site, mainframe, UNIX server, or an Oracle database.
5. Security, in a wireless world, security includes communication links, integrity of the channel, and accuracy of transactions.

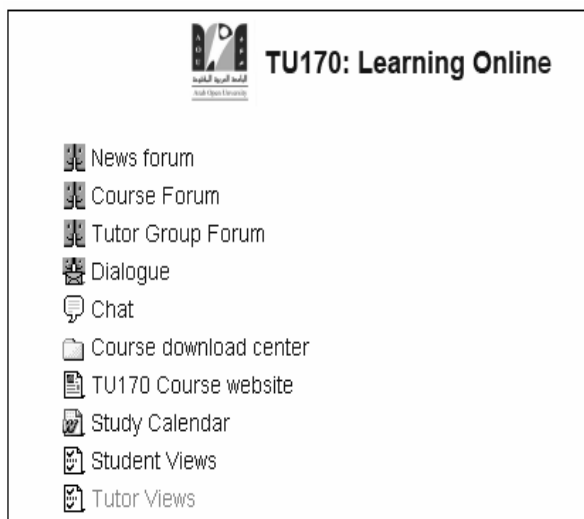


Figure 6. Tu170 course (AOU) with its forums

## 5 The vision of integrating LMS with the mobile technology in AOU

Tutors and students interact via forums as shown in figure 6. There are mainly 4 types of forums as follows:

- News forum is used to announce important dates, such as final exams time table, and other news related to AOU.
- Course forum, is used by the tutor to send lecture notes to all students who are registered in a specific module.
- The tutor group forum as shown in figure 7, is used as an interacting media between tutors and students. Any message send by the tutor in the tutor forum could be accessed by all students registered in this module with this tutor. At the same time, if student send a message to the tutor or to another student, this message could be read by all.
- Dialogue forum, is used to add some privacy in student/tutor relationship, in which messages in these case will be not be accessed by all, only between both parties.

The new activity to be added is to ask a student if he/she wants to receive the tutor group forum messages through their mobile devices, if yes, then the sent messages will be delivered to the system as well as the students' mobiles.

In the same manner, the chatting is done through the website; it could be done using the mobile.

Moreover, any announcement via the LMS can be directly transmitted to the intended receivers' mobiles to guarantee a full awareness of such announcements.

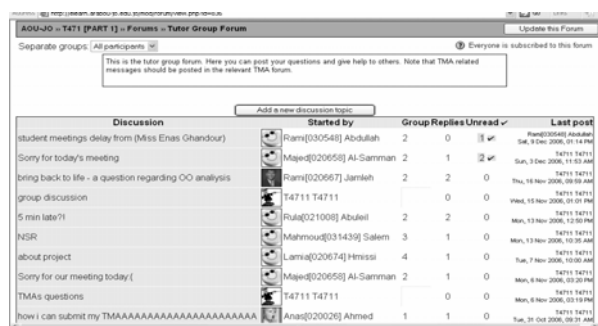


Figure 7. tutors group forum view

## 6 Conclusions

We have presented in this paper the improving progress of the Arab Open University's Learning Management System. A full description of integration the learning management system with other existing online systems such as student information system and human resources is presented. A major trend topic for the past few years is to utilize mobile technology in deferent applications including e-learning. We introduced the infrastructure of integrating our learning management system with such technologies. A complete description of the open source learning management system, Moodle has been discussed. The benefits of adapting open source platforms in addition to the usefulness of using the mobile technology have been presented. Finally, we have addressed the impact of such integration on students and the learning process from an academic point of view.

## 7 References

- [1] Mikic, F., & Anido, L. Towards a standard for mobile technology. Proceedings of the International Conference on Networking, International Conference on Systems and International Conference on Mobile Communications and Learning Technologies (ICNICONSMCL/06) - Volume 00. Pp. 217-222, 2006.
- [2] Siau, K., Lim, E, Shen, Z. "Mobile Commerce – Promises, Challenges, and Research Agenda," Journal of Database Management, vol. 12, no. 3, pp. 4-13, 2001.
- [3] Krogstie, J., Lyytinen, K., Opdahl, A., Pernici, B., Siau K., Smolander k.. "Mobile Information Systems - Research Challenges on the Conceptual and Logical Level," Lecture Notes in Computer Science – Advanced Conceptual Modeling Techniques, vol. 2784, pp. 124-135, 2003.
- [4] Siau, K., Shen, Z. "Building Customer Trust in Mobile Commerce," Communications of the ACM, vol. 46, no. 4, pp. 91-94, 2003.
- [5] Galanxhi-Janaqi, H., Nah, F. "U-Commerce: Emerging Trends and Research Issues," Industrial Management and Data Systems, vol. 104, no. 9, pp. 744-755, 2004

- [6] Siau, K., Shen, Z. "Mobile Commerce Applications in Supply Chain Management," *Journal of Internet Commerce*, vol. 1, no. 3, pp. 3-14, 2002
- [7] Siau K., Shen, Z. "Mobile Communications and Mobile Services," *International Journal of Mobile Communications*, vol. 1, nos. 1/2, pp. 3-14, 2003.
- [8] Siau, K., Nah, F. *Mobile Technology in Education*, *IEEE Transactions on Education*, Special Issue on Mobile Technology in Education, Vol 49, No.2, 2006
- [9] Freed, K. *A History of Distance Learning*, Retrieved June 25, 2004 from <http://www.media-visions.com/ed-distlrn.html>
- [10] Rovai, A.P., & Barnum, K.T. On-line course effectiveness: an analysis of student interactions and perceptions of learning. *Journal of Distance Education*, 18(1), 57-73, 2003.
- [11] Hammad, S., Al-Ayyoub, A.E., & Sarie, T. Combining existing e-learning components towards an IVLE. EBEL 2005 conference.
- [12] Abu-Shawar, B., Al-Sadi, J., & Hourani, A. Integrating the Learning Management System with other Online Administrative Systems at AOU, *Proceedings of The 2006 International Conference on Algorithmic Mathematics and Computer Science (AMCS'06)*, June 22-25, 2006, Accepted, Las Vegas, USA.
- [13] Myers, S., & Talley, D. Looking beyond the Whiz-bang technology: using mobile learning technology tools to improve Economic instruction. `In AEA/CAI sessions at the ASSA annual meetings, Chicago, 2007.
- [14] Sbihli, S. *Developing a successful wireless enterprise strategy*. New York: Wiley Computer Publishing, 2002.
- [15] B. Sasidhar, & B.V. Kumar. The effects of mobile devices and wireless technology on E-learning. *Sunway Academic Journal*. Vol 2, pp. 45-53, 2005.
- [16] G. Rogers, & J. Edwards. *An introduction to wireless technology*. Upper Saddle River, NJ: Prentice Hall, 2003.
- [17] Kruse, K. The benefits of e-learning. 2003. [Online] : [http://www.executivewomen.org/pdf/benefits\\_elearning.pdf](http://www.executivewomen.org/pdf/benefits_elearning.pdf)
- [18] [www.lmuaut.demon.co.uk/trc/edissues/ptgloss.htm](http://www.lmuaut.demon.co.uk/trc/edissues/ptgloss.htm)
- [19] <http://alt.uno.edu/glossary.html>