Teach – MS: Developing a management system for m – learning

Köse UTKU

Teach – MS: Developing a management system for m – learning

Köse UTKU
Afyon Kocatepe University,
research assistant,
utkukose@aku.edu.tr

Abstract

Mobile learning is an educational method, which decreases limitations of traditional education by using mobile technologies. With mobile learning, education activities can be done on mobile devices in a fast and effective way. This paper describes a management system designed and developed to help teachers and students to make education activities from anywhere by using their mobile devices. With this system, students can reach to the lesson contents and start to study by only connecting to the Internet. Teachers can share their lesson contents with students and control learning activities that take part in the system. It is also possible to make online lessons by using integrated tools. The mobile learning management system aims to provide an effective mobile application that enables teachers and students to take active part in teaching or learning activities from anywhere by using mobile devices.

Keywords: M – Learning, mobile applications, E – Learning, education technologies.

1. INTRODUCTION

As a result of rapid improvements, new technologies that try to provide better standards for humanity, take an active part in the life. People can use new technologies to make their life easier than before. Works can be done in a fast, safe and accurate way by using different methods and new technologies may give new ideas for people to develop better systems. With these advantages, the technology shows its effects on many areas in our life. Education is one of these areas that use new technologies to improve life standards.

In traditional education, education activities are made in the classrooms where both teachers and students must take active part for a good learning experience. Traditional education allows teachers to contact directly with students and give feedback immediately for activities made. But if the student doesn't take part in the classroom, these features of the traditional education can't work. On the other hand, making education activities with a larger class may cause some problems in teaching and learning (Gibbs and Jenkins, 1992). New technologies are used to solve these problems and provide new and effective educational methods.

Mobile learning (M – Learning) is one of the most remarkable educational methods, which becomes more popular with advance of mobile technologies. It combines two areas: mobile computing and E – Learning (Trifonova, 2003). So, it can be defined as "E – Learning with mobile computational devices". With M – Learning, students can study lessons on a mobile device and remove distance limitations that block learning process. M – Learning combines personal learning with anytime, anywhere learning (Quinn, 2001). It also has a low cost according to the traditional education (Palloff and Pratt, 1999; Preece, 2000). A wireless enabled - mobile device like PDA, Smart Phone or laptop can be used for M – Learning. Wireless technology is another important element supporting learning anytime, anywhere (Hui, Fong and Lau, 2002). M – Learning allows people using different types of effective materials for education and it can be applied to a wide age range of students (Inkpen, 2000; Perlin and Fox, 1993; Sharples, Corlett and Westmancott, 2002; Soloway, Norris,

*SECTION B: applications, experiences, good practices, descriptions and outlines,
educational activities, issues for dialog and discussion*

69

Blumenfield, Fishman, Krajcik and Marx, 2001). Many studies are made to see how mobile devices will help in reaching better education. Because M – Learning is still a new area for education and it is considered as the future of learning (Trifonova, 2003).

This paper presents a management system designed and developed for using in M – Learning activities. The system is named as "Teach – MS (Teach – Management System)". Teach – MS allows teachers to share lesson contents with their students by using the server application of the system. Students can reach to the shared lesson contents by connecting to the Internet with their mobile devices. The lesson content which stored on the mobile device can be updated, thanks to the Internet. Once the lesson content updated, it can be also used as offline. By using Teach – MS, it is possible to view many files on a mobile device. It is also possible to communicate with each online user and make online lessons. The developed system aims to provide an effective, fast and simple education platform that enables teachers and students to take active part in teaching or learning activities from anywhere by using mobile devices.

The rest of the paper is organized as follows: First, basic properties of the developed system were introduced. Following that, working principles and functions of the system were introduced. System applications, preparing lessons, studying with mobile devices, online lessons, tests and student statistics were explained. At last, results of the work, its importance on the education studies, students' ideas about the system and future works were discussed.

2. TEACH – MS: A MANAGEMENT SYSTEM FOR M – LEARNING

Teach – MS is a system that enables teachers and students to take part in M – Learning activities by using mobile technologies. The system comes with many features and functions that form a learning platform where teachers can manage their lessons and students can study on the subjects. It is a system that combines roles of both teacher and students under a virtual environment. Teach – MS had been developed by using J2M (Java 2 Micro Edition). With this Java platform, developed applications can be executed under different operating systems like Palm OS, Windows Mobile and Symbian OS. The developed system works under two different environments for teachers and students. Teachers can use server application on a computer and students can use mobile application on their mobile devices. Applications are explained more detailed in Chapter 3. Figure 1 shows an overview of the system.
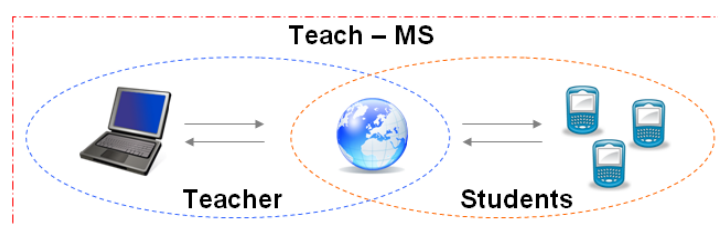

Figure 1. Overview of the Teach – MS learning platform

3. WORKING ON THE SYSTEM

As explained before, Teach – MS has two different applications for teachers and students. Functions that teachers can use give teacher a role as administrator of the system. On the other hand, students can only use the functions connected with learning process. Both teachers and students must have an Internet connection to work on the system. It is better to examine properties of server and mobile application interfaces and general activities performed by users to have more idea about using features and working principles of the developed system.

SECTION B: applications, experiences, good practices, descriptions and outlines, educational activities, issues for dialog and discussion

70

3.1. Teacher – Server Application

The server application allows a teacher to manage lesson contents and activities that were prepared for students. Studies show that activity management is an important feature that can improve and enhance students' learning strategies (Jagoe, 2003). So, the developed system provides many functions to manage activities. As explained before, this application is connected to a web server where information about contents and activities are stored. So, teacher must login to the server system first. After the login process, the teacher must choose the lesson which will be edited. Following that process, the main server application window is shown. If there is no lesson stored in the system, the main server application window is shown directly after the login process. Creating new lesson contents or editing stored ones can be done on this window by using the page: "Lesson Contents". It is also possible to see students' statistics, update the server or creating and editing tests and announcements on the main server window. Figure 2 shows the main server application window.
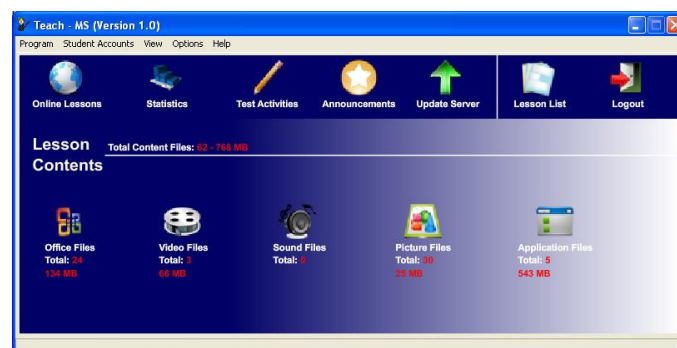

Figure 2. The main server application window

3.2. Preparing Lesson Contents

Main server application window has many function buttons that teachers can use to manage lesson contents. On the page: Lesson Contents, icons for each lesson content type and some statistical information are viewed. By clicking on content icons, a more detailed file list can be seen. Stored files can be opened with defined programs in the system by clicking on their names. If the teacher wants to add a new file, it can be done on this section by using "Add New File" button. It is also possible remove a selected file by clicking on "Remove Selected" button. After preparing lesson contents, the server can be updated with the button "Update Server", to share new contents with students. Figure 3 shows a content file list for video files.
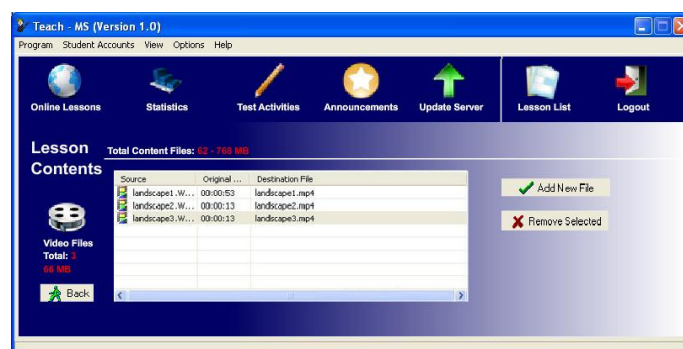

Figure 3. A content file list for video files

SECTION B: applications, experiences, good practices, descriptions and outlines, educational activities, issues for dialog and discussion

71

3.3. Student – Mobile Application

Students can make learning activities by using the mobile application on a mobile device. Like server mode, connecting to the system is controlled with a login process. After the login process, a lesson list that contains lessons prepared by the teacher is shown. After choosing a lesson to study, main activity screen is shown. Main activity screen allows students to view lesson contents and make learning activities. Announcements added by the teacher can also be viewed on this screen. The main activity screen was designed simple to ensure a fast and user-friendly interface. Students can use options located on the screen to execute each system tool. Functions of options and system tools are explained more detailed in Chapter 3.4. and 3.5.

3.4. Studying with Mobile Devices

Students can study a lesson by using many options on the main activity screen. It is important to synchronize mobile device with the server before starting studying activities. As default, the application asks to synchronize stored content. But it also can be done manually. Main activity screen is designed and programmed to use in touch screen mobile devices mostly. If the mobile device doesn't have this feature, device controls can also be used. Options located on main activity screen are connected automatically with one device control. They can be read on each option icon or name. On top of the main activity screen the last announcement that added by the teacher can be read in scrolling animation. Under the last announcement, title of the chosen lesson is shown. There are three options located on bottom of the screen: Logout, Synchronization and Settings. By using Logout option, the student can logout from Teach – MS. Synchronization option allows making synchronization with the server manually and last option allows changing system configurations. On middle of the screen, six options are located: Lesson Contents, Lesson List, Online Lessons, Test, Help and Announcements.
The option "Announcement" allows students to view a list of all announcements added to Teach – MS. With "Help" option, Teach – MS Help can be viewed. By using "Test" option, it is possible to take a test prepared by the teacher. Test activities are explained more detailed in Chapter 3.6. "Online Lessons" option is the most important function that is used to join an online lesson session. If there is no available online lesson session, the option is disabled. Online lesson activities are explained more detailed in Chapter 3.5. The option named "Lesson List" can be used to view lesson list to choose a different lesson for studying. Students can use the last option "Lesson Contents" to view added content files. Students can view a content file by selecting it from file list. Files that contain text elements are opened in an editor that has some features like "zoom" and "wide screen" to view files better. Video and animation files are opened in a media player integrated to Teach – MS. Figure 4 shows the main activity screen and some screenshots from viewing different type of files in the system.
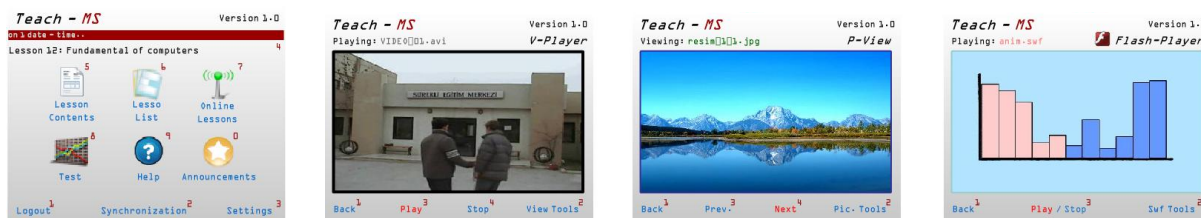

Figure 4. The main activity screen and some screenshots from viewing different type of files

3.5. Online Lesson Activities

SECTION B: applications, experiences, good practices, descriptions and outlines, educational activities, issues for dialog and discussion

72

Online lesson activity is the most important and effective feature of Teach – MS. Teachers and students can communicate and perform education activities in an interactive platform by using this feature. Teachers can open the online lesson window by clicking the button "Online Lessons" located on the main server application window. There are three buttons: Begin Session, Virtual Desktop and Chat on the window. If there is no active online lesson session, Virtual Desktop button is disabled. This button can be used after starting a session with Begin Session button. On the other hand, students can open the online lesson screen by selecting the option from the main activity screen. As explained before, the online lesson option is disabled on the main activity screen, if there is no open online lesson session. After selecting the online lesson option, a screen that contains two options named as: Virtual Desktop and Chat is opened. Figure 5 shows the online lesson window for teachers and screen for students.
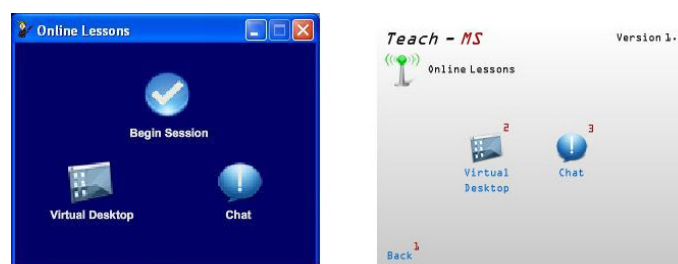

Figure 5. The online lesson window for teachers and screen for students

Virtual Desktop is a tool that mostly used in online lessons. On the server application, the virtual desktop interface that allows teachers to make interactive, simultaneous lesson activities can be opened by clicking on the button: "Virtual Desktop". The teacher can drag and drop lesson content files to the interface and show them to the students joined the session. Like Windows desktop, files are shown with their icons and names on the Virtual Desktop interface. Lesson content files that can be added to the interface are listed on the "File to show" list located on bottom-left corner. There is another list titled "File sharing" on bottom-right corner of the interface. The teacher can see a list of files that are being sent by students and accept or decline them. Teachers can also use a tool named "White Board" to write or draw something simultaneously for students. This tool is only used by teachers.

Students can run a simpler version of the Virtual Desktop on their mobile devices. Files added by the teacher to the interface can be opened by selecting them. Students can send a file by using "Send a file" option. Each student can send only one file in five minutes and each file must be under 75 MB. If the teacher sends a message with chat tool, it is also shown for student on this screen. Figure 6 shows the Virtual Desktop for teachers and students with a screenshot from White Board tool.

Figure 6. Virtual Desktop for teachers and students with a screenshot from white board tool

Chat is the other tool that can be used in online lesson activities. This tool allows online users to communicate with each other. Teachers can open both Virtual Desktop and Chat windows

SECTION B: applications, experiences, good practices, descriptions and outlines,
educational activities, issues for dialog and discussion

73

to ensure better activity performance. It is also possible to use only Chat tool to contact with students from the server application. Students can't use Chat tool without joining an online lesson session. But if the teacher sends a message, they can communicate with the teacher from outside of the online lesson session. For teachers and students, Chat tool is opened with a similar list of online users on Teach – MS. Students see a smaller list on their device and they can use touch – screen or device controls to use functions of the chat screen. Users can send messages to the list or make private conversations after choosing a user from the list. Figure 7 shows the chat tool for teachers and students.
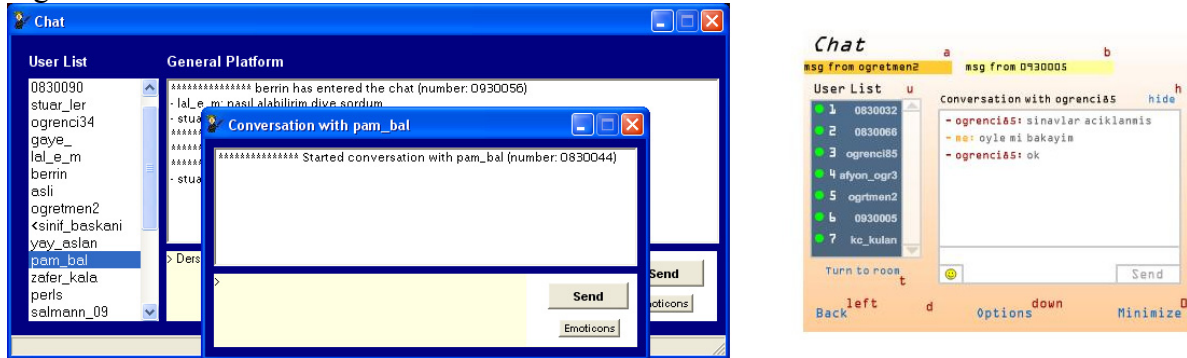

Figure 7. The Chat tool for teachers and students

3.6. Test Activities

In Teach – MS, students can take a test stored in the system while studying a lesson. Each test must be prepared by the teacher. It can be done by using "Test Activities" button located on the main server application window. The teacher can choose a test to edit or create a new one. Same functions are used for creating or editing a test. Each question in the test can be defined or edited on the "Questions" window. A common type of test item is a multi-choice question, which some possible answers are provided to choose (Haladyna, 2004). Each test in Teach – MS contains twenty five questions with five possible answers. Teachers can use a rich text editor to write questions, text box controls to define possible answers and radio buttons to define correct answer. Figure 8 shows a screenshot from the Questions window.
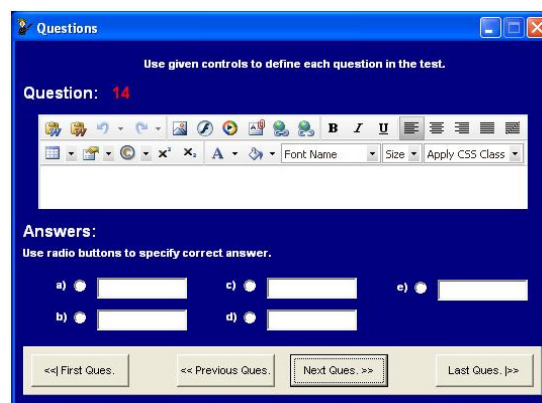

Figure 8. A screenshot from the Questions window

Students can take a stored test by selecting "Test" option from main activity screen by using their mobile devices. After selecting the option, a list screen that shows prepared tests for selected lesson is shown. By selecting a test name, the test can be started. There is a limitation of thirty minutes to finish answering questions. Students can answer each question by using

SECTION B: applications, experiences, good practices, descriptions and outlines, educational activities, issues for dialog and discussion

74

touch screen feature or device controls. After finishing the test, a screen that shows results of the test is shown to students. On the result screen, students can see their total points with a list that shows correct, incorrect and not answered questions. Figure 9 shows screenshots from Test and Test Results screens of the mobile application.
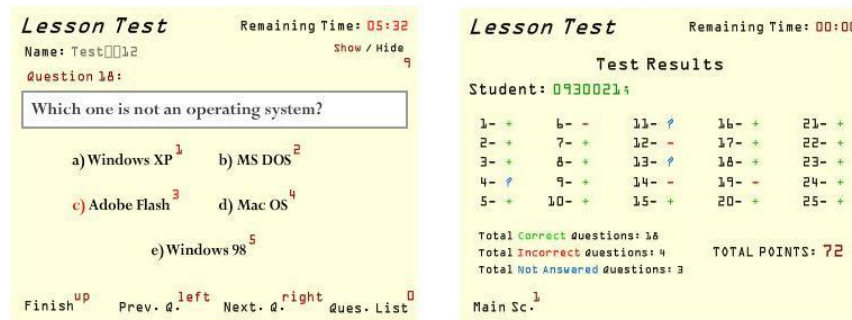

Figure 9. Screenshots from Test and Test Results screens

3.7. Student Statistics

It is important to store information about students' activities in the systems like Teach – MS. This function allows teachers to check students' learning levels (Wang, Liu, Horng and Chen, 2003). In Teach – MS, teachers can view some statistical information about students' activities made in the system. System shows that how many times lessons, lesson contents and online lesson tools had been used. It is also possible to view results of each tests taken. This feature can be used by only teachers on the main server application window of Teach – MS.

4. CONCLUSIONS

Teach – MS provides a simple, fast and effective M – Learning system, which teachers and students can use to reduce limitations of the traditional education and take an active part in lesson activities. Teachers can manage lesson contents, control online lessons and view students' statistics by using Teach – MS. Students can begin learning process immediately after connecting to the system with their mobile devices. They can view files such as document, video and sound files with integrated tools. Students can also check their learning level by taking tests prepared by the teacher. Teachers can examine results of the tests to have more idea about students' learning levels.

The mobile application of the system has a simple interface that aims to provide an easy to use M – Learning system for students. The system can be executed on any Java enabled mobile device. It is recommended to use Teach – MS in a touch screen mobile device but the application can also be used with mobile device controls. Only necessary functions and buttons are placed on each application to provide comfortable using experience for users.

Online lesson tools take teachers and students to an interactive platform where they can communicate with each online user and perform lesson tasks easily. With Virtual Desktop, students can see what their teacher does on the screen and give feedback for any subject. By using both Virtual Desktop and Chat tools, an interactive classroom environment can be created. All of these features and functions are used to form a mobile, virtual learning environment. Teach – MS provides a successful management system, which can be used to reduce limitations of traditional education and enable users for M – Learning activities. Teach – MS can be used for any lesson or subject that will be taught.

4.1. Survey

SECTION B: applications, experiences, good practices, descriptions and outlines, educational activities, issues for dialog and discussion

75

In order to discuss about success of the developed system, students were asked to rate 7 questions on a scale of 1 to 5. In the survey, questions are all about using functions of the system and their effects on education methods in mobile learning. 100 students have answered the survey. Table 1 shows the survey questions and students' responses for each question.

Table 1. Survey questions and students' responses

SURVEY

The developed system: Teach – MS;

1. Is an effective system for M – Learning.   **5.** Provides good human-computer interaction.

2. Provides effective learning tools.   **6.** Provides a good management system for teachers.

3. Has user friendly, simple interfaces.   **7.** Is a fast learning platform for students.

4. Allows making effective online lessons.

Please rate the given questions on a scale of 1 to 5.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1	*2*	*3*	*4*	*5*

Ques. No.	Number of students giving response as					Total responses
	1	2	3	4	5	
1	78	19	3	0	0	100
2	72	20	7	1	0	100
3	82	16	2	0	0	100
4	77	16	5	2	0	100
5	65	25	9	1	0	100
6	74	15	8	3	0	100
7	76	22	2	0	0	100

Results of the survey show that most of students strongly agree or agree to the given comments about the system. We can say that the developed system is successful at teaching and learning activities in M – Learning, according to the students that answered the survey.

4.2. Future Works

There are some works in progress that will improve features and functions of the system. The most important features and functions that will be added to Teach – MS can be listed below:

- Communication with online users will be done by using cameras.
- More advanced tools that allow teachers to control students' activities will be added.
- Teachers will be able to create learning materials by using integrated developing tools.
- More advanced options and statistical tools for tests will be added.
- Some tools like mini-encyclopedia, dictionary and private diary will be added.

*SECTION B: applications, experiences, good practices, descriptions and outlines,
educational activities, issues for dialog and discussion*

76

References

Gibbs, G. and Jenkins, A. (1992) *'Teaching in large classes in higher education: how to maintain quality with reduced resources',* London, Taylor & Francis Group

Haladyna, T.M. (2004) *'Developing and validating multiple-choice test items',* New Jersey, Lawrence Erlbaum

Trifonova, A. (2003) 'Mobile Learning – Review of the Literature', University of Trento Technical Report

Hui, C., Fong, A.C.M. and Lau, C.T., (2002). 'Unified personal mobile communication services for a wireless campus'. *Campus Wide Information Systems, XIX (1),* pp. 27-35

Inkpen, K.M., (2000). 'Designing handheld technologies for kids'. *Personal Technologies, III (1&2),* pp. 81-89

Jagoe, A. (2003) *'Mobile location services: the definitive guide',* New Jersey, Prentice Hall

Palloff, R. and Pratt, K. (2001) *'Lessons from the cyberspace classroom: the realities of online teaching',* San Francisco, Jossey-Bass

Perlin, K. and Fox, D. (1993). 'Pad: an alternative approach to the computer interface', in Cunningham, S. (eds). *Computer Graphics: SIGGRAPH.* Proceedings of the 20st Annual Conference on Computer Graphics and Interactive Techniques – Anaheim 1-6 August 1993. New York, ACM, pp. 57-64

Preece, J. (2000) *'Online communities: designing usability and supporting sociability',* New York, Wiley

Quinn, C., (2001). 'Get ready for m-learning'. *Training and Development, XX (2),* pp. 20-21

Sharples, M., (2000). 'Disruptive devices: mobile technology for conversational learning'. *International Journal of Continuing Engineering Education and Lifelong Learning, XII (5/6),* pp. 504-520

Soloway, E., Norris, C., Blumenfield, P., Fishman, B., Krajcik, J., and Marx, R., (2001). 'Handheld devices are ready at hand'. *Communications of the ACM, XLIV (6),* pp. 15-20

Wang, C., Liu, B., Chang, K., Horng, J. and Chen, G. (2003). 'Using mobile techniques in improving information awareness to promote learning performance', in Devedzic, V., Spector, J.M., Sampson, D.G. and Kinshuk (eds). *ICALT.* Proceedings of the 3rd IEEE International Conference on Advanced Learning Technologies – Greece 9-11 July 2003. Washington, IEEE Computer Society Press, pp. 106-110

SECTION B: applications, experiences, good practices, descriptions and outlines, educational activities, issues for dialog and discussion

77