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Mona Laroussi, José Rouillard

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## ADAPTIVE COMMUNICATION TOOLS FOR MOBILE LEARNING

Mona Laroussi<sup>1,2</sup>, José Rouillard<sup>1</sup>

[mona.laroussi@planet.tn](mailto:mona.laroussi@planet.tn), [jose.rouillard@univ-lille1.fr](mailto:jose.rouillard@univ-lille1.fr)

(1) Laboratoire [Trigone](#) - CUEEP - Bât B6 Université des Sciences et Technologies de Lille  
59655 Villeneuve d'Ascq cedex - France

(2) INSAT Centre Urbain Tunis Nord BP 676 CEDEX 1080 Tunis TUNISIA

### **Abstract**

This paper presents work in progress “an adaptive communication tools for mobile learning”. We identify the benefits and the drawbacks of the mobile learning. We also define the communication in the educational process and how it can be enhanced by the use of PDA.

Personalization and the adaptativity are presented. At the end a technical approach of our tool is given.

### **Introduction**

Mobile learning or mobile education is a "new" way of using wireless and mobile technologies for education.

PDA (personal digital assistant) is a term for any small mobile hand-held device that provides computing and information storage and retrieval capabilities for personal or business use, often for keeping schedule calendars and address book information handy

(PDAs) are rapidly becoming a common technology at work, school, and play. An increasing number of applications are being developed for educational administrators, teachers, and students. Because they are inexpensive when compared to laptop computers, many schools are finding that a mixture of desktop, laptop, and handheld devices can be used to meet a variety of educational needs.

PDAs are not likely to replace other technologies. Instead, they can address specific problems and needs. Palm OS applications allow students to use their PDA as a graphing calculator, word processor, database, test preparation tool, translator and reference resource. Teachers and administrators use PDAs for record keeping, scheduling, and other administrative as well as teaching applications. Additional devices such digital cameras, digital audio recorders, keyboards, GPS devices, and other modules can expand the hardware even more.

In this paper we try to identify the benefits and the drawbacks of the mobile learning. We also emphasis on the importance of the communication in the educational process and how it can be enhanced by the use of PDA. We define the personalization and the adaptativity and we present our research work "an adaptive communication tools for mobile learning".

### **Drawbacks of the mobile learning**

M-learning has been slow to grow because most wireless devices have small screens, low resolution, slow processing, and limited storage capabilities. Likewise, difficulty connecting various types of devices to the same network is a real limitation.

Other limitations that the user perceives are not really WAP limitations but restrictions due to the mobile networks. WAP is still slow and thus it can take up to 2 minutes to access content . The cost of using WAP is another disadvantage.

### **Benefits of the mobile learning**

We can identify the major benefit of using PDAs for students, teachers' and researchers' we can resume it as follows. The use of PDA

- Facilitates the classroom management and the parent communication,
- Facilitates the scheduling group activities,
- Allows the transport of information needed from place to place,
- Makes daily functions and learning activities more student-centered and student generated.

## ***Communication in educational process***

### **Communication**

Students have to find the same classical environment as they have in real life. In this environment students can ask for all questions whenever they need and they discuss a lot together of interesting or pointless subjects.

Mobile learning should also support group communications by offering discussions, forums and shared workspaces where students can exchange documents. We distinguish between asynchronous and synchronous communication facilities. Email is the most important asynchronous way for communication. Probably a little bit less important is synchronous communication like shared whiteboards or audio and videoconferences.

Social contacts are a crucial point in learning situations. Students should therefore be able to present themselves in a personal homepage with a photograph, a list of hobbies and other personal aspects. Such personal presentations are not toys, but they can help the students to get into contact even more easily than in live classroom situations.

There is a great potential in using mobile terminals for communication services.

Whereas the PC has been developed first for accessing and sharing information and hence been used most for individual learning with limited human communication. Mobile technology has been developed specifically for human communication. As communication is regarded an important element in every kind of learning, the use of mobile technology may therefore prove to represent a potential for new kinds of integration between information sharing and human communication which may improve the learning outcome of flexible learning.

### ***Adaptive Personalization***

Personalization[1] is clearly the key to improving user experience, but the term is loosely used by many vendors to describe very rudimentary functionality. On the "wired" web, personalization can refer to everything from specifying the color scheme of a web site to recommending items to purchase. Carriers on the wireless web often use the term for functionality that allows users to put their favorite wireless sites on a customized start page. Content providers, such as news organizations, restaurant guides, and advertisers use the term personalization to refer to the process of selecting a subset of relevant items. The Adaptive Information Server is a unique solution to content personalization. It allows individuals to intuitively receive personalized information that is tailored to their specific interests and preferences. Small screens and slow connections of wireless devices make true personalization critical to user acceptance of mobile applications.

Personalization enables advanced, customized services such as alerts, targeted advertising and games, dramatically improved mobile messaging and others. One of the fundamental improvements brought by personalization technology (in conjunction with mobile data technologies) is the ability to provide various push-based applications in which the network autonomously (e.g. no manual, on-demand user interaction) determines whether to push services toward the user. Services may include content, information, and events notification..

The personalization could be decomposed into three different aspects[4]:

- According to the user
- According to the peripheral
- According to the context[3]

It seems conceivable to model this principle in the form of a three dimensional matrix. Each one of three aspects will represent then an axis of this matrix. In a concern of light, the three dimensional matrix can be schematized by a three axes graph. So, one leaves the hypothesis

that every point of the graph resulting from an intersection of projection of each of the axes will represent a case of personalization. (Figure 1) [5]

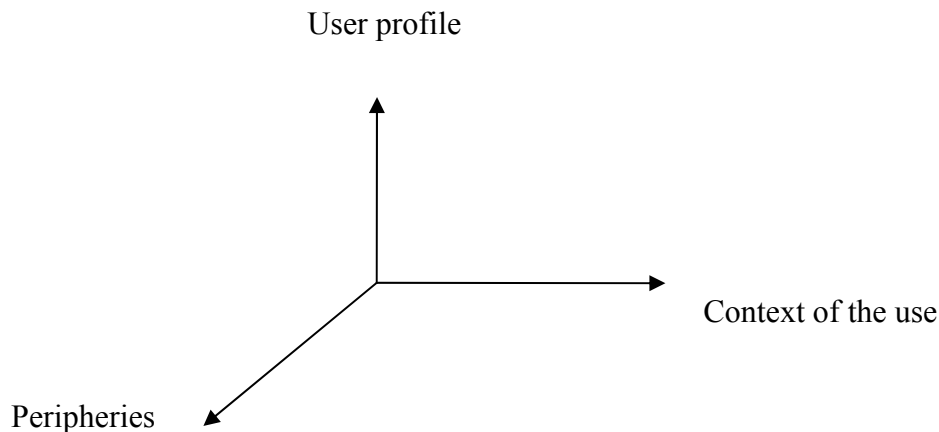


Figure 1: General scheme of personalization

### ***Adaptive communication tools for mobile learning***

The system that we plan to develop is an interface communication for mobile communication tools. In our project we offer to the user a studio of tasks allowing the fast creation of communications tools (Diary, Forum, Shared spaces, White board, chat.) The designer will have the possibility to choose the root task of the task (validate a formula) and then sub tasks which composing it and also links between the tasks and the subtasks. He/she will also choose the environment on which it is going to turn and which user will be intended.

#### ***Scenario of use***

The virtual campus of the figure 2 includes behind the classical components -server, terminals- nomad components (PDA, mobile phone.). The responsible for this campus wishes to install tools of communication among various users. A tool of communication which takes into account various profiles of the users (profane, average, expert), various devices to use (cellular telephone, PDA, PC, etc.) and which takes into account the role of every actor (teacher, tutor, student, secretary). In addition this utility should get back the information which would already have been saved. Our tool offers to this responsible the possibility of selecting the needed basic tasks to add the adaptativity to the profile in the role and to the device and to get back information beforehand saved by the user. Our first application concerns the diary.

#### ***First approach of implementation***

The designer chooses between the main tasks those desired to compose the agenda; to each task an associated XML code is generated.

Once this part finished the designer chooses the adaptativity needed to be added and an XSL file will be applied to the first XML file to produce another XML file. A filter exists to get back the various information to format it and then reuse it. [2]

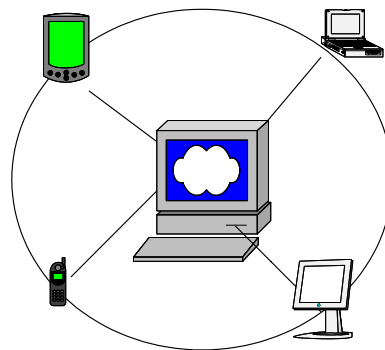


Figure 2: virtual campus multi-device

We can mention as main tasks(not exhaustive):

- ❑ Show the schedule sorted by occupation
- ❑ Show the schedule sorted by (day, week, month)
- ❑ Show the schedule sorted by role (secretary, student, teacher)
- ❑ Attribute different colors to each type of appointment
- ❑ Write an time
- ❑ Validate an appointment
- ❑ Propose another possibility
- ❑ Synchronize an appointment between two or more devices.

### Future work

This work is in progress we think that we can finish this first part before the end of the year. This work will be followed by an evaluation and can be used in some virtual campus.

This work will be followed by an implementation of another tool of communication (Forum, White board).

### Conclusion

We think that our tools will encourage students to keep track of their progress each day, those tools prevent the students from making excuses about forgetting homework assignment or project.

The tools favor communication and collaboration. This is done by permitting the sharing via beaming information, organizing, collecting and sharing data.

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### Bibliography

- [1] **DERYCKE A** et **ROUILLARD J.** *La Personnalisation de l'Interaction dans des Contextes Multimodaux et Multicanaux : une Première Approche pour le Commerce Electronique. Internal document.* 2002.
- [2] **ROUILLARD J.** Dialogue et Multimodalité. Revue RIHM – Revue d'interaction Homme-Machine. Vol2 N°1, pp.99-125. 2001.
- [3] **TARBY J.C.** One Goal, many tasks, many devices : from abstract user task specification to user interfaces. In handbook of tasks analysis chapter 32. In edition. 2002.
- [4] **THEVENIN D., CALVARY G., COUTAZ J.** La multimodalité en plasticité. Rencontres Jeunes Chercheurs en IHM, RJCIIHM2000, Vannes, Mai 2000, pp. 71-74.
- [5] **LAROUSSE M.,** Reuse of web adaptive pedagogical components, proposed in APCHI'02 Beijing China, November '2002