KNOWLEDGE ANYWHERE, ANYTIME BASED ON THE WIRELESS DEVICES

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Abstract: Mobile learning enhances learning flexibility so that you can study while travelling or within short breaks between other two activities (waiting for an appointment). You can thus get ways to integrate learning within your fully scheduled life.

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MOBILE LEARNING ACTUALITY

Mobile learning is a natural consequence of small portable devices’ development, such as PDAs, mobile phones, MP3s and recording devices. There is a trend in combining the mobile phone technology with the calculator’s equipment in order to get both functionalities. One can currently get emails almost anywhere by means of Blackberries and it something natural for a cell phone to have a camera incorporated.

These technologies have been included in courses’ curricula to get extra benefits such as:
- providing administrative messages (tasks should be completed by Friday, for ex.)
- attending group activities while moving from a place to another
- attending quizzes
- checking emails
- providing eLearning materials for self-study when travelling
- data writing or recording when performing a task
- using mobile office applications such as journals, word processor and the calculus sheet
- providing lesson recordings which you can listen to on a music player
- listening to instructions for a special task
- using cameras to record snapshots during train journeys- some cell phones now provide GPS so that you can precisely locate a certain point

Mobile learning enhances learning flexibility so that you can study while travelling or within short breaks between other two activities (waiting for an appointment). You can thus get ways to integrate learning within your fully scheduled life. It is an ideal way if you have to travel a lot.
WHAT WE ARE DOING FOR MOBILE LEARNING

Starting from such a premise regarding its current status but also its perspective in developing the wireless technology as well as services based on this type of technology, a consortium made of “Carol I” National Defense University representatives along with people from the Artificial Intelligence Research Institute from the Romanian Academy and with representatives from Siveco Romania, Advanced Technology System and Expert Trade Company have launched a project entitled „Research regarding the design of an experimental model of a mobile learning-type virtual network with real time access to knowledge and learning, using communication technologies and wireless terminal devices”.

The main objective of the project is to develop scientific research in order to identify the possibilities to extend the educational and instructional system to the segment of continuous formation through the use of cutting edge components from the field of informatics and communication into the mobile medium. The finite product of the project will consist of an experimental model for an integrated mobile learning system which will allow different users, from formal and professional education systems, to access knowledge and learning databases in real time, obeying the “anywhere and anytime” principle. The model will be based on advanced research regarding the identification of methods, means, algorithms and integration procedures of different wireless communication technologies and of knowledge management platforms (e-content). The proposed model, named “Mobile learning – net centric based on knowledge access” – „Access to knowledge and learning database using mobile technologies” will integrate the cutting edge technologies in the field of computers, wireless communication, educational and knowledge management advanced software. The most important aspect of this enterprise is to find the solution to access knowledge databases on different types of wireless terminals (PDA, Smartphone, iPOD, UltraMobile PC, handheld military radio stations etc.) which connect through different communication networks with different specifications and communication protocols.

Therefore, according to the figure above, the m-learning system proposed through this project will allow the connection to knowledge databases, digital content and courses using any type of mobile terminals, regardless of the operating system utilized or the type of communication network used to access the Internet. Equally, the project will study and, in the end, propose a solution to gain bidirectional access, allowing the designated users to add data, information, and knowledge to the structured knowledge databases.
It is well-known that the mobile devices use different operating systems (Windows Mobile; Symbian, Apple etc.) and allow the installation and use of a limited number of applications and services. On the other hand, content standards have always been and still are especially oriented towards classical platforms, mainly utilizing Java technologies to sequence the educational content, which is currently a serious problem of mobile devices. Some of the modern devices are Java compatible, but they allow solely the load of applets for a specific application, not a complete Java model. The project wishes to create not only such applets according to different technologies and e-content development standards, but also to develop an integrated model in E-learning objects or separate content recordings, available on the portal to be loaded together with the useful content. Through this approach, we wish to eliminate the aspects of incompatibility between the different types of mobile devices and operating systems. The research and tests will take into account more standards, but they will mainly focus on the SCORM 2004 standard, considered to be the most developed at the moment.

MOBNET-Learning aims to create the experimental model of a virtual network which uses wireless communication technologies and mobile terminal devices for the real time access to knowledge databases. The achievement of this goal is conditioned by the achievement of the following targets:

1. Defining a new concept regarding net centric mobile learning, which encompasses the users’ total liberty of movement, but permanent access to the information source in order to elevate the level of efficiency of the current activity “mobility – connectivity – knowledge – efficiency”.

2. Identifying solutions to eliminate the access barriers to e-content from mobile devices. In order to accomplish this goal, we need to analyze more standards for the development of digital content and the current technological constraints because of the limited display properties of mobile terminals.

3. Developing reference architecture (Business reference model) of the virtual network based on mobile technologies. In this respect, we will draw up studies regarding the enterprise architecture for an organization in order to define the operational, technical and systemic requirements.

4. An essential component of this project is the study of psycho-pedagogical aspects both regarding the structure of the educational content and the definition of an instructional design model. We wish to avoid the mistakes made by other studies in the field which focused on developing specific content for mobile terminals, and, therefore, we want to develop a singular type content open to users regardless of the utilized terminal (desktop, laptop, PDA, etc.) This objective is particularly difficult, but we strongly belief that we can solve this aspect at least for one standard SCORM 2004.

On an international scale, M-learning has represented a field of interest for at least 8 – 10 years and the studies and applications are especially oriented towards their applicability in formal education as a complementary solution of the methods and forms of organizing learning and developing communication capabilities in groups. The most advanced accomplishments are in USA, Australia, South-East Asia and in Europe, especially in the Great Britain. The results published so far refer to the exchange capabilities of the educational content and thematic messages, especially created for mobile devices. Different solutions can also be found regarding the compatibility of educational content based on JAVA technologies with PDA and SmartPhone which allow JAVA applets. At EDUCA Conference in Berlin, some preliminary results of a project were presented as they focused on creating specific content for mobile devices “Devices and Desires: Opportunities, Barriers and Solutions for Flash-Enabled M-Learning”. The proposed project brings forward the idea to create the integrated model of a network which uses mobile devices and accesses the same type of content similar to the one of stationary devices. From this point of view, the current project can be considered a pioneer in the field.
On a national scale, there are some theoretical attempts to define the concept, present some aspects, but no one has published clear solutions to solve the problems. These solutions can be found at the Polytechnic Institute in Bucharest, but especially in Cluj and Timișoara. This aspect owes to the fact that the ICT educational market in Romania lags in European states, as the economic organizations and higher education institutes are not interested in this aspect.

Project contribution to developing knowledge in the field, including the novelty, originality and the complexity of proposed solutions. Even if the use of web capabilities of mobile devices opens up new opportunities to content delivery, a system capable of providing mobile services should solve some important problems, which will constitute the focal points within this project:

- Bandwidth: usually the connections of a mobile device provide a bandwidth inferior to the fixed ones. Implementing 3G standards will reduce these limitations but will increase the cost.
- Battery: the battery capacity is a constraint for mobile devices.
- Capabilities: screen area, memory, processing capacity.
- Input: mobile devices have different input capacities, but generally they are more constraint than desktop terminals.

In a system centered on content service and manipulation, the web service technology can considerably simplify the process of aggregating and processing information. The fact that web services are an interacting technology is important when the interaction between heterogeneous systems becomes necessary.

Web services represent a viable way through which mobile devices can use the processing power of work stations. The JSR-172 specification defines the API of web services used for Java 2 platform, Micro Edition (J2ME). As the mobile devices are programmed especially from the customers’ point of view (service consumers), only a subset of the web service invocation API (JAX-RPC) and a subset of JAXP (Java API for XML Parsing) are contained in this specification.

**OPPORTUNITIES AND SPECIFIC ISSUES OF THIS PROJECT**

The opportunities enabled by the project is to develop scientific research, to identify the possibilities, to extend the educational and instructional system into the continuous formation segment through the use of high-tech components from the information and communication field in the mobile environment.

The project focuses on the inter-sectorial cooperation between groups of civilian and military experts who work in complementary fields, the development of institutional partnership between universities/academies -- research institutes -- small and medium-sized enterprises, establishing scientific and technological clusters integrated at the regional level, which will allow the development of new scientific directions on the selected theme in order to connect the research within this project to the European/worldwide exploration.
SPECIFIC ISSUES

1. Research regarding the tendencies in technological development and the diversity of public education offers, especially in the field of continuous formation and connection to modern tendencies in the EU in order to import the good practice and identify the integration or compatibility solutions between different technologies so that we can increase the diversity and efficiency of the e-service segment.

2. Studies and research on the description of a theoretical and experimental model of a new concept regarding the educational system, enriching the classic characteristics with those related to the mobility and the real-time access to knowledge. We wish to propose a model of instructional design for the educational content for the purpose of achieving WEB-WAP compatibility.

3. Research and experimentation for the purpose of developing software instruments meant to develop digital content easily accessible and available to users who are on the move and utilize different types of mobile devices.

4. Development of a new business model especially meant to organizations that have interventions in vast or unreachable geographical areas. This business model is based on the strictly secured bidirectional access to a knowledge portal, from which a user can get solved cases taken from similar previous events or a database of good practices and in which he can add his own experience and problem-solving patterns.

5. Development of new specific applications to be used on mobile commercial or specific devices, which should allow the access to e-content and its use in best conditions.

6. Transfer the results of sectorial research in education through shaping the thematic content and the addition of psycho-pedagogical instrument so that the use of educational processes will become efficient.

7. Design of technical documentation and application guides of the proposed and tested solutions in other fields for the purpose of expanding the results of this project to other thematic areas of public interest (energy, healthy food, environment etc.)
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