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PhD thesis abstract

Contributions to the Applications of Multimedia Systems in Distance Education

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Bibliography
Considering the dynamic character of Web instruction systems development, we can identify at least two classes of alternative approach types by analyzing the technologies promoted by important software companies:

a. e-Learning technologies;

b. m-Learning technologies.

The first category includes technologies that are created especially for the development of instruction systems designed for students who can access static IT tools connected to the Internet, while the second deals with advanced technologies for creating Web applications designed for students who can access the Internet through wireless mobile devices, these advanced technologies being also available for the Web instruction systems specific to the first category.

Instant access to information from anywhere on the globe started to change profoundly the educational process. Distance education is, probably, the most affected of all education types. The chance to offer materials to the students using the Internet was rapidly exploited. A great number of web sites containing classes, multiple-choice questions, solved problems and so on were immediately created. These methods enjoyed great success because they offered to both students and teachers a flexibility and an efficiency that were hard to imagine in the conventional education system. Being a new and permanently expanding domain, the Internet is not yet used at its real capacity.

This doctoral thesis approaches the aspect of using certain technologies to develop e-Learning and especially m-Learning systems, such as: testing and self-testing of students using IeL platform, designing an integrated m-Learning application, designing and developing database systems for CmL-plus m-Learning platform, designing and developing communication applications under CmL and CmL-plus platforms.

Chapter 1 presents a detailed analysis regarding the DE domain. We present different e-Learning systems with their advantages and disadvantages. We also discuss present tendencies in applying and developing e-Learning and m-Learning systems.

Chapter 2 deals with e-Learning systems architecture, referring directly to the activities of the participants and to the processes that are directly involved in a DE system, as well as to the existing e-Learning models and the equipment that is currently used. We also present some examples of architecture that are used in both e-Learning and m-Learning systems. Several paragraphs of this chapter are reserved for picturing the software application types designed for DE. The particularities of DE specific activities are also analyzed, underlining the means of telecommunication between the partners that are involved in DE. This classification and description is extended in chapters 3 and 4.

My personal contribution to this chapter consists of a original, documented and critical study concerning the main electronic platforms and multimedia applications designed for DE in Romania and worldwide.

Chapter 3 presents the software and hardware requirements for the DE user and the DE provider. It shows the characteristics of multimedia systems and the aspects related to the digital representation of the different type of multimedia data that can be introduced in different academic environments. We also present the management of DE-specific activities, as well as the functionalities of e-Learning platforms, underlining the characteristics of IeL COM platform.

My personal contribution to this chapter consists of the elaboration of the structure of this electronic platform, as well as of defining the relationships and functionalities of every module in its structure.

Chapter 4 presents the results obtained in the field of the development of data storage applications (tutorials) and synchronous (chat) and asynchronous (e-mail and forum) communication designed for m-Learning sub domain. The category of multimedia applications designed for team work is the most frequently used communication form in DE communication.
environments. Among these, the great majority of DE communication systems use online discussion applications (chat).

In this chapter we also include a short presentation of the history of database systems development, along with the description of the development cycle of a software application that allows the role and place of the database to be defined within a m-Learning application. We present the tools used to access m-Learning platforms, as well as the tools used in the access and distribution of m-Learning applications. The description of the structure and functionalities of the m-Learning platform “CmL-plus” is highly underlined, representing the most significant personal contribution within this thesis.

**Chapter 5** presents “CmL-plus”, a platform aimed to extend DE facilities in the m-Learning direction by adding a plus of flexibility to the instruction system, so that the persons involved in this process can communicate by all currently existing means.

The chat option is available only to participants that use PDA devices with Windows Mobile 5 or 6 operation system installed or with special software programs that allow Java Script applications. PDA devices that have Windows Mobile 3 installed give the users access only to e-mail, evaluation tests and message posting.

“CmL-plus” platform may be improved, as regards data management, by modifying the database structure, and also as regards adding of new facilities such as multiple-choice questions with immediate feedback, a personal agenda that can be personalized for a certain user or a target-group, or a whiteboard module. We have to mention that any of these applications requires that the beneficiary of the DE activity possesses a last generation PDA device or mobile phone. Currently, this request generates two major inconveniences:

- Significant financial efforts to acquire such terminals, this meaning important expenses of the DE instruction activity for the student;
- The exclusion of potential students that have older terminals or insufficient means to buy a terminal that is compatible with the new applications previously mentioned.

For these reasons, the upgrade perspectives of the “CmL-plus” platform are seriously limited if it is intended to become of a real help for DE students.

A potential way of developing a PDA application that is somehow related to DE would be to create a software package designed for virtual tours. This field has started to develop a few years ago, the products being addressed to PC users only. Considering the fact that the panoramic views included in these applications show the interiors of art museums, or outstanding landscapes in different geographic locations, one of the essential requirements is a high resolution display. However, taking into account the current trend of taking digital photos using the camera that equips most of modern cell phones, we can expect during the next few years the development of some QTVR-type applications for PDA devices and mobile telecommunications terminals. This type of applications, stored on an m-Learning platform such as “CmL-plus” or other DE –specific similar products, can be used in the documentation activities of the students from architecture or archaelogy faculties, and even of the photo art lovers.

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