

Analysis of the Possibilities and Effects of Implementing Interactive Application for Mobile Terminal Devices in m-Learning System at the Faculty of Transport and Traffic Sciences

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Abstract. *Interactive application for the provision of real-time information to students using mobile terminal devices, called FPZmobile, has been developed at the Faculty of Transport and Traffic Sciences, University of Zagreb. The basic idea was to develop an application that would provide accurate and updated information related to the Faculty and the students' achievements (seminar papers, practical work, quizzes, etc.) during their study, in a form adjusted to being displayed on mobile terminal devices, such as mobile phones, PDA devices or smartphones. Since the target users of the application are the students, the decision was made that it would be best to develop an application that would be used on a maximum number of mobile terminal devices, so that its use would provide access to relevant information at any moment, regardless of the user's location or the user's terminal equipment.*

FPZmobile application has been developed within Java 2 Micro Edition (J2ME) platform intended for mobile terminal devices. The reasons for this selection result from the fact that there are numerous different operation systems on the market of mobile terminal devices, and all of them support the applications developed in J2ME software environment.

Working with the application is simple and intuitive, and it is based on the main menu. By selecting the item "Consultations" from the main menu, the user opens the search interface which offers the possibility of searching the Faculty teaching staff base. The search model has been developed that allows the user to input incomplete information i.e. part of the surname for the searched person. The trial versions of the application led to the conclusion that it is of extreme importance to allow search in such a way that it is sufficient to enter only the first letter or several letters into the search field, for the search to give a positive result. In case the user inputs inexistent attributes under the search criteria, they are additionally processed by

checking the similarity with the existing attributes from the base. Thus, the search results are presented to the user in the form of approximate results guiding them to the correct solution. The obtained information about the requested teaching staff are displayed to the user and include: photo, name and surname, professional title, term and location of consultations, contact information, various notes and the basic information about the Faculty.

For the moment, the distribution of FPZmobile application has been made possible via web portal "<http://mobile.fpz.hr>". In case the application has been stored on the personal computer, the application has to be transferred to the mobile device, and installed according to the mobile device manufacturer's instructions.

Since FPZmobile applications practically represent a new module in the e-Learning system of the Faculty, great care was taken in the security of the application and the method of accessing the central database. The mobile terminal device and the FPZmobile application at the user's side, and the Structured Query Language (SQL) of the Faculty database on the server side, communicate by means of one of the communication technologies supported by the mobile terminal device. For security reasons the data are sent to the user side by means of software script which accepts and processes the requested data and forwards them to the user to the mobile terminal device acting as a communication intermediary. Complete security solution of the Faculty e-Learning system has been developed at a high sophisticated level and offers a number of countermeasures to maintain the stability and integrity of data, naturally, with an acceptable residual risk.

The FPZmobile application in the Faculty e-Learning system has been used already for two academic years. The survey carried out in this research studied the frequency and the method of using various types of mobile terminal devices

and their respective J2ME applications. The results of the carried out survey represent the basis for further scientific research work, which will consist of developing a multi-criteria model for the selection of the mobile terminal device for real-time information.

Based on the analysis of the users' requests collected through the survey, further development and upgrade of FPZmobile application has been defined. One of the relevant research results is certainly the level of presence of manufacturers and the model of mobile terminal devices, which can be used to determine the primary focus for further development and testing of the application. The mentioned research categories allow very good development and adjustment of the application for the mostly used devices which will enable development and testing of the user interface and the possibility of receiving and installing the application on the mostly used devices.

Very encouraging are the results that indicate that the majority of students have at least once started the Java application and transferred application between two mobile devices which is sufficient information that a great majority of students is familiar with starting and installing the Java application. The research results show that there are very few students who are informed about the possibilities of transferring data from the Internet to their mobile devices. Although the research results clearly indicate a growing trend in the number of subscriptions between the users and telecommunication service providers (postpaid) compared to the proactive tariff payment model (prepaid) of telecommunication services, the number of users who use the telecom operator service of data transmission is far smaller than originally expected. The reason for that lies in the quite high price and tariffs for data transmission and it will be necessary to inform and educate the students about the possibilities and price classes when using the data transmission service.

Important information that will affect further development of the application and the introduction of the new options into the application itself are also the textual remarks in the carried out survey (in the box: additional remarks) which cannot be simply quantified, but some contain extremely important information that may greatly contribute to further improvement, both of the module accompanying m-Learning as well as the entire FPZ e-Learning system. Most of the remarks express wishes for

the introduction of real-time information about the terms of lectures and exams and about possible information on the results of quizzes and exam terms by using mobile phones.

The quality of information contained in the application has been assessed by the students with very good grades as well as the simplicity of installation, work and use of the application. The user interface has been assessed by the students as very good. Lower on the scale of grades is the information up-to-datedness which is not the result of the operation of the application itself but the level of up-to-datedness in the work of the teaching staff who are not familiar with the existence of the FPZmobile application and the principles of work or are not aware of the data updating process through DMS application and its importance.

The research results are the basis for good continuation in developing the application, the entire e-Learning system, education of students and teaching staff as well as for carrying out continuous and regular survey which will be adjusted to the current level of the development of mobile communication technologies and devices.

Keywords: e-Learning, m-Learning, ICT, J2ME, mobile

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