

Implementation of Information and Communication Technologies in the Teaching Process at The Faculty of Traffic and Transport Sciences

Peraković, D., Kavran, Z., Remenar V.

Faculty of Traffic and Transport Sciences, Zagreb, Vukelićeva 4

dragan.perakovic@fpz.hr, zvonko.kavran@fpz.hr, vladimir.remenar@fpz.hr

Abstract. *The project of introducing the E-learning system at the Faculty of Traffic and Transport Sciences (FPZ), started several years ago through the project of implementing the WebCT environment. The restrictions in the application led to the development and introduction of the Faculty's own LMS (Learning Management System) which represents a modularly developed system called e-Student. The base for the performance of the FPZ e-Learning system is the information and communication infrastructure of the Faculty of Traffic and Transport Sciences. The computer network is divided into several logically separated units. The access of the computer network to the Internet has been provided by means of the Croatian Academic Research Network (CARNet) infrastructure. Computer access from the decentralized FPZ locations, such as the building in Vukelićeva Street and the building in the Zagreb district – Siget, the teaching centre Lučko and the teaching centre in Zadar towards the central location of the Faculty, the building in the Vukelićeva Street, has been provided by various access networks, CARNet or T-COM network with the application of a virtual private network. Our own developed application of the SMSCentar, based on the application of T-mobile operator of the mobile network, has enabled the distribution of various data to the mobile network users. The advantage of one's own developed solution is reflected in complete knowledge of the system thus enabling relatively simple upgrading of the system with new functionalities and possible adjustment to changes, and elimination of the observed disadvantages and errors in the system operation, which is relatively difficult and time-demanding on the existing remote learning systems. Due to the modular approach in the building of the system, the adding of new functionalities in the system has been simplified, reducing the time of system idleness to a minimum. The current system functionalities are divided into two basic groups: functionality for the work with students (E-learning) and the*

functionality which insures support to other segments of the Faculty operation. The basic developed programme modules can be classified as Content Management System (CMS), Document Management System (DMS) and Customer Relationship Management (CRM). Each of the mentioned basic modules is applied both for the requirements of the e-Learning system and monitoring of the successful attendance of classes and for other FPZ operation functions. The work of the entire system is based on the SQL database. Also, the Authorization and Control System (Cro: SAN - sustav autorizacije i nadzora) has been developed and introduced as the system for controlling the work carried out on the faculty public computers, and the support in realizing the programme of the practical part of the lessons. The SAN system consists of the modules: SAN Server, SAN Applications, SAN Client, SAN Administration and FPZBrowser which currently control and administer three computer classrooms and public computers at the Faculty premises. The application of DMS central interface of the Faculty provides the authorized access of the staff members to the sub-modules: control of the work at computer laboratories (control of access to lessons, etc.), administration of e-Learning system (publication of teaching materials, checking and grading of seminar papers, etc.) and the document management module within the Faculty (ordering of equipment, report on failures, updated on-line directory, etc.). By using the WEB interface, the e-Student system provides the students with authorized access to teaching materials, exercises, drills and work instructions. Apart from the mentioned, the system provides support to applying and working on the seminar papers and different forms of testing knowledge (e-Blic, e-Test, e-Kviz). The SAN system with smsCRM application (Customer Relationship Management via SMS service) and by means of the SMSCentar application opens the possibility of a whole series of information services for students and FPZ staff members, based on

interactive communication by means of SMS messages. Currently, the interactive services are available to students relating to the usage of the computer classroom, the service of obtaining the computer status in the computer classrooms, and the service of reserving the term for using the computer in the computer classroom.

The analyses of exploitation data show a substantial increase in the system usage. In the academic year 2005/2006 the statistical methods of system usage analysis have indicated a significant increase (almost 790% compared to the academic year 2004/2005). The data obtained by statistical analyses also indicate the fact that the work of the students and the teachers during the Faculty after-hours (weekends, holidays, night, etc.) increased. About 16% of the entire work was performed on weekends, i.e. Saturdays and Sundays whereas about 23% of the total work was carried out between 8 p.m. and 8 a.m. The survey carried out among the students and teachers showed that they are satisfied with this method of providing exercise-lessons, working on seminar papers, carrying out pre-testing, learning, etc. Further development of the system will move towards connecting the systems e-Student, DMS, SAN and SMSCentar with other Faculty systems that are implemented in working with students, and these are the systems "Studomat" and "ISVU", and the application used for the Faculty accountancy service. Connection of all the Faculty systems into a single system will allow a substantially faster and easier work both for the students and for the Faculty staff. The results of the connecting would be reflected in the unique access data, username and password allowing access to each of the systems, students' data exchange among systems, and unique single electronic file for each student. The harmonization of the visual identity with the system user requirements will significantly facilitate the usage of the system for the end users. The increase of exploitation and the connection of all the systems into a single entity raise the problem of security of the system itself. Web applications are available to anyone from anywhere in the world, at any time, which makes them an interesting target for ill-intentioned users. However, the same damage to the system may also be done by the users with the attribute of non-intentionality and their ignorance may cause significant damage to the system. Therefore, both groups of users have been considered with equal attention during the

development of the security policy. In order to provide protection against ill-intentioned actions, counter-measures have been undertaken against all the currently known methods of attacking the information system, primarily for attacks on web applications which includes countermeasures for the so-called "SQL inject" attacks, "Cross Site" i.e. "XSS" attacks, "Direct Denial of Service" i.e. "DDOS" attacks and attacks related to different possible virus infections and similar adverse programmes. In order to provide protection against the actions of users with attributes of non-intentionality the system has been designed so as to be as intuitive as possible to the end user, performing periodical adjustments based on continuous user surveys. The users can access only the data, documents and processes that are related to their work in the system based on the assigned privileges for working with the data. Since new types of attacks occur almost daily against reliable and safe work of the system that carries the functionalities applied in the FPZ e-Learning system, it was proven that the great advantage is the fact that the product is the result of one's own work and engagement. It is possible to "patch up" the identified failures in the very system, computer or operative system of the computer almost in real time, thus raising the security level of the system.

Keywords: Internet, web, e-Learning, security, ICT, SMS

References

- [1] Fallon C., Brown S. E-Learning Standards: A Guide to Purchasing, Developing and Deploying Standards - Conformant E-Learning. Boca Raton: St. Lucie Press; 2002.
- [2] Peraković D., Šarić S., Kavran Z. Web-Based Applications For Improving The Quality Of Studies. Conference Proceeding of 15th Conference on Information and Intelligent Systems. Varaždin, 2004., p. 27-33.
- [3] Peraković D., Kavran, Z., Remenar V. The Impact Of Introducing E-Learning System In The Teaching Process At The Faculty Of Traffic And Transport Sciences. Conference Proceeding of 17th International DAAAM Symposium. Vienna, 2006., p. 299-300.