

E-learning in Web Environment

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Abstract: This paper presents an e-learning system written for the distance learning and self-testing of Internet technologies. Through the use of this application the processing of the test exercises is automated and made faster.

Keywords: e-learning, distance learning, Internet

1 Introduction

The growth of the Internet has brought on great changes in business and communication between people. With the use of the Internet distances are diminishing and everything is accessible to everyone. New ways of learning have appeared, the tendency to graduate via Internet is ever growing. E-learning can be defined as instructional content or method of learning by use of electronic technology. It can be realized through storing and distributing education material on CD-ROMs, IBT (Internet Based Training) and CBT (Computer Based Training).

This paper first gives a basic definition of e-learning and distance learning, then follows a detailed description of the application of this system, including the advantages and possible disadvantages of its use. The paper is rounded up with a conclusion and eventual expansion possibilities.

2 E-learning and Distance Learning

Distance learning is an integral part of e-learning, it allows present-day students to acquire an education without having to move out of their offices or away from their home computers. Communication is achieved by way of an electronic teacher, and in specific cases there is a possibility for real-time communication to take place. The electronic teacher is an application hosted on the web server. It contains a number of questions to which the student sends their answers. Communication happens via the student's web browser.

What any e-classroom has to offer to its users is a reliable communication software and a simple and obvious tutorial to the given software. Providing an efficient interactive material and high-quality source of information is the responsibility of the team of experts who compile the course material, always in cooperation with a supervisor who acts as a link between the team and the users.

While electronic teaching methods open up a range of new possibilities, there are certain areas that cannot be wholly presented and studied in exclusively by electronic means. In such cases a combination of traditional teaching methods and e-learning is recommended. On the other hand, e-learning still has certain limitations and obstacles to overcome, due to the fact that complete guide and manual that would satisfy all users' needs for the effective use of various types of materials, does not yet exist.

3 Description of this Application

One of the students' problems arising during their studies is that, when they have a question, often the teacher cannot be found. In such cases the solution may be to refer to the teacher via e-mail, but if the answer is needed immediately, this is not the optimal solution. An alternative is the realization of a 24-hour info-service. Besides providing the students with the needed answer, this system ought to enable the students to test their knowledge, and by this, prepare them for their upcoming exam. The implementation of this service may not be local. Access is to be given to all students, especially those residing in another town than the educational institution.

At the Polytechnical Engineering College a similar problem as described above had occurred. With the subject 'Internet Technologies' the need arose to supply the students with a quality service, accessible at all times for questions, testing and preparing for the exam. Conversely, the teacher would also be able to organize tests and colloquiums via this system.

To meet this demand, an e-learning application was developed by the name 'E-xpert'. It can be found on the address www.vts.su.ac.yu/~chole/expert. The goal of the system is to enable students to learn, practice and test their knowledge of Internet technologies outside the classes, at home by using the Internet. The possibilities include reading the topics, analysing the examples and program codes, practice their obtained skills using the online editor and testing themselves.

The technical requirements for the realization of such a system from the part of the College are Internet server, database server and web application. The user has to have access to a PC, the Internet, a valid e-mail address and a web browser by which he communicates with the service. The techniques with which the application is developed are as follows:

- HTML markup language
- PHP server side script language
- Java Script client side script language
- SQL language for database management
- MySQL database server
- Apache Web server
- UML object oriented modelling

The implementation of this service specifically emphasizes two very important items, security and user-friendly interface. The application is created in manner to capture its user not only with its content, but with its high quality graphical design.

Registracija

Upišite svoje podatke. Sva polja su obavezna. Nakon slanja podataka dobićete e-mail sa vašom korisničkom lozinkom.

ime:

prezime:

zanimanje:

e-mail adresa:

adresa stanovanja:

mesto stanovanja:

poštanski broj:

država:

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Figure 1

The student as the basic user visits the web location of the service. To access the server, he first needs to complete the registration. The fields of registration form need to be filled in with the personal data of the user: first name, last name,

occupation, valid e-mail address, address, town, post code and country, as seen in Fig. 1. All fields are to be filled in. After receiving the data, the system checks the given data, if a user with the same data already exists. If a user with the same e-mail address is registered, the user will receive the appropriate message and the process of registration is aborted. If it is a new user, the system generates a new password and sends it via e-mail to the user. The user can sign in with his e-mail address for the user field and the attained password for the password field. Should the user forget his password, the system has the option to re-send the user's password to the appropriate e-mail address.

After succesful login the user opens the main page which provides information about e-learnig and the main menu with available options. (Fig. 2)



Figure 2

The main menu has 15 lessons of Internet Technologies. A lesson contains pure text and programm example codes. Every lesson guides the user step by step through the new material and the presented examples. For practical exercises there is an online editor which enables the users to do some exercises, practice writing codes, then see the result of their codes.

The central part of application is testing. (Fig. 3) The system provides two various kinds of test. The first is the, so called entry test, and the second the real test. The

first test contains 6 questions and the user has 60 seconds to answer them. The questions are true or false tasks. After having finished the test, the system checks how many correct answers that user has achieved and based on that it determines the level of candidate's knowledge. If the user has achieved less than two correct answers he cannot continue for the real test. If the number of correct answers is between 2 and 4 user's level is intermediate. The advanced level is granted for 5 or 6 correct answers. The user has the possibility to re-take the entry test.

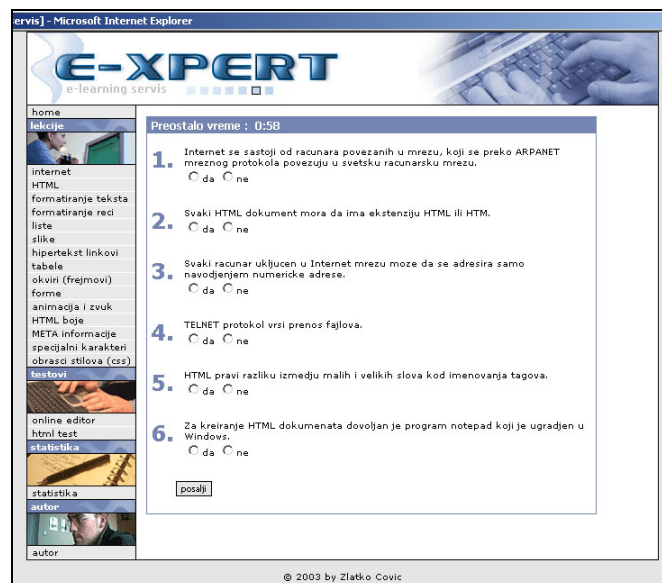


Figure 3

The system generates random questions for every test. The real test is a multiple-choice test consisting of 20 questions. The questions have the same level of difficulty as student's knowledge level. The user is given 45 seconds for every question. He chooses between offered answers. (Fig. 4) The number of answers ranges from two or four. Each question has only one correct answer.

After the last question is finished, the system generates a report of the test success. To pass the test successfully, it is necessary to give correct answer for 70% of questions. In case the user failed the test, system shows the list of lessons where the correct answers can be found. The user may try to pass the test again after 24 hours. During that period he can learn and find correct answers in the suggested lessons.

The system follows and archives all tests that every user had. Every user can look at his archive which shows the date of testing, the number of correct and incorrect answers and the percentage of effectiveness. (Fig. 5)

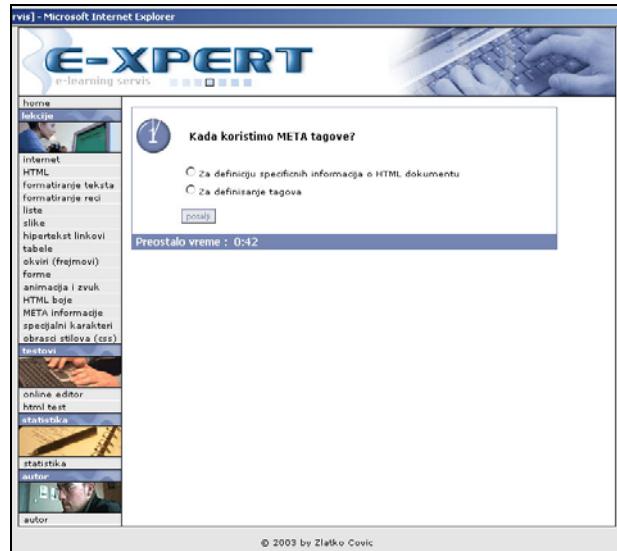


Figure 4



Figure 5

Conclusion

Through the use of this system the processing of test exercises is automated and made faster. Teachers solved the problem that every student needs to have different tasks and questions at the exam. The results are presented immediately after the test.

With this system students have a modern multitask 24-hour system for learning and testing.

This system is now being tested at the Polytechnical Engineering College in Subotica. It helps the students of Internet technologies to master material better and faster.

Further development of this system would be the expansion of the teaching area. The system will cover other areas of engineering, as well, future system would have an independent module for each subject. The teacher of the subject would be the administrator for his or her own module.

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