

POSTCOURSE - WWW-BASED COURSE ON DATABASES

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ABSTRACT

The objective of this paper is to report the experience with further development and use of Postcourse – a web-based course on databases.

KEYWORDS

World Wide Web (WWW), distance learning, multimedia techniques, databases

1. INTRODUCTION

The World Wide Web has considerable potential for delivering education programs and the benefits in re-engineering higher education appear promising as follows from several papers presented at CBLIS'99, discussions during the conference and many other sources. The objective of this paper is to report the experience with further development and use of Postcourse – a web-based course on databases. A prototype version of the course was presented at the previous CBLIS conference. Since then major improvements have been made. We used an online questionnaire to gather student opinions and evaluate the course before the final version was prepared. There were some useful suggestions for changes, which we tried to incorporate into the course. First of all, a better introduction of the system was needed. It was not user-friendly enough and those students who did not have much experience with the World Wide Web had some difficulties with logging in, choosing their task etc. Some of the exercises were too difficult; therefore we decided to add extra options for providing help. Besides, new elements were contained in the course – that is lectures-tutorials, past exams, on-line questionnaire.

During the past two years Postcourse has been well integrated with the course on databases and established its role as a valuable supplement for the students. It allows them to set their own pace of work, choose the time when they want to use it and decide which parts of the syllabus they want and need to study.

In the paper we also address implementation issues. Preparing the final version of the course we abandoned the idea of using Java applets and used PHP (Personal Home Page Tool) version 4.0 instead. There are several reasons why PHP was chosen – it allows for a quicker code generation (in comparison to other tools), PHP scripts can be used on different WWW servers and under different operating systems without any changes. And what is most important in the case of our application, it allows for a straightforward communication with Postgres databases, in particular SQL statements can be directly embedded into PHP scripts.

2. STRUCTURE OF POSTCOURSE

The users of Postcourse can be placed in the following groups:

- ‘anyone’,
- learner-student,
- tutor,
- course administrator.

We distinguished the group of students from ‘anyone’ since some parts of the course, that is exercises and online questionnaire, are available only for those users who were given passwords and their access to the course has been authorised.

Tutors are responsible for managing the course that is deciding which materials should be included within it.

The course administrator maintains the course on the web server, that is loads any changes and modifications, as well as authorises the access of the students, as was already noted.

Students register for using Postcourse when they first log in; they enter the name, suggested login and password. Once they are authorised they have full use of all the parts of the course.

The access to exercises has to be limited since exercises require creating databases, inserting and modifying data in tables – and all this is performed on the server. Thus each user with a password is allowed some personal space on the server.



The image shows a screenshot of a web browser window displaying a registration form. The browser's title bar reads "Kurs nielancyjnych baz danych - Microsoft Internet Explorer". The address bar shows the URL "http://hbk.de.usiv.gda.pl/tepiy.html". The form itself is titled "Registration form" and contains the following fields and controls:

- A heading: "Please fill out the following form"
- Input fields for "Name" and "Surname"
- An input field for "Faculty"
- An input field for "Year of study"
- Input fields for "Suggested LOGIN", "Suggested PASSWORD", and "Suggested PASSWORD again"
- A "Submit" button
- A link labeled "Main Page" at the bottom left of the form area

The browser's taskbar at the bottom shows several open windows, including "Kurs nielancyjnych...", "Dokladni...", and "Dokladni...". The system tray on the right shows the time as 12:04.

Fig. 1. The Postcourse login screen.

So far the role of the tutor/course administrator are not really separated but we plan to do this in future since the tasks of the course administrator are of a technical character while those of tutors are of an academic nature – answering students questions that are sent in as e-mails, grading assignments and designing the final version of the course.



Fig. 2. Students' menu.

The students are free to choose the parts of Postcourse which they want to work with depending on their learning strategy.

Interactive tutorials are meant to be a repetition and extension of the knowledge already acquired. Students can review the lectures and with the help of illustrative accompanying exercises observe how the contents of the database are changed by appropriate instructions.

Tests, which are usually multiple-choice questions, cover most of the subjects of the fundamental course on databases. After a student completes a test the system recapitulates the results and shows, if necessary, the mistakes.

Online exercises are an essential part of the system. They make full use of computer-aided learning. They allow users to work with their own databases. To ensure security this is allowed only for users with passwords.

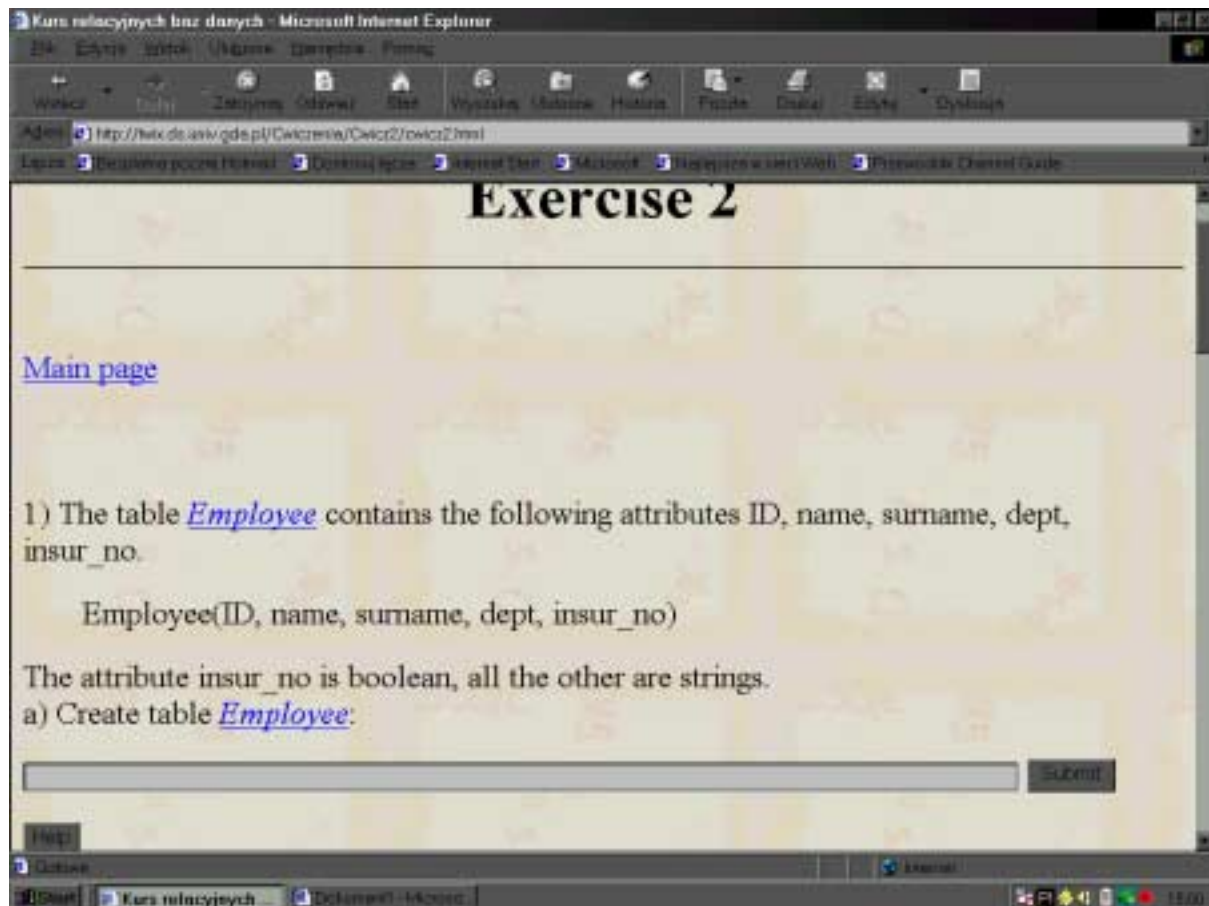


Fig. 3. Example of an interactive exercise.

Each user has a personal area on the server identified by the login, so that there is no intruding and interference, besides the tasks can be solved gradually at each login session, as the data is always there, at the server.

Past exams are a very popular part of Postcourse, they allow students to test their understanding, receive feedback and then retest their understanding. Thus students can observe that rote learning is insufficient.

3. IMPLEMENTATION

When designing Postcourse it was decided to make it simple and platform independent - so that it can be used by any of the popular browsers, not necessarily the latest version. Our students who are mainly working teachers have all kinds of equipment, sometimes new school

laboratories, which they can use for their studies as well, and sometimes only a stand-alone PC at home.

Postcourse makes use of the following software tools:

- operating system – Linux,
- web server - Apache,
- database management system – Postgres,
- user's interface – HTML.

Apache is one of the most popular WWW servers for the Unix environment. It has a modular structure, which allowed us to incorporate modules needed for the system, that is PHP (Personal Home Page Tool) and the Postgresql module. The first one is responsible for performing authorisation, interpreting students' answers to tests – checking and displaying incorrect information, if any. In case of online exercises PHP module is performing the following actions:

- syntax analysis of the text filled-in by a student,
- if the text is syntactically correct then PHP sends a suitable statement to the Postgresql module,
- Postgresql module performs the action on the appropriate database (that is the one identified by the login of the user) and sends back to PHP the information on the result,
- PHP interprets the result, which is either the acknowledgement of a database transaction or information on encountered errors.

4. EVALUATION

Our experience of using Postcourse with teachers gaining further education is limited since it has only been available for two academic years. However, our initial observations are encouraging. Students appreciated the enhanced access to support materials and information. Because they had access to exam questions and answers they were able to test their own understanding and learn more deeply. Most students have gained a better understanding of the subject compared to previous years and got better results during the exams.

The observations confirm that students largely had positive perception of the interactive features, self-testing and monitoring facilities and appreciated the ready access to online information.

The main problems, as reported in the questionnaire, were the following:

- lack of prompt feedback by the tutor,
- technical problems,
- ambiguous instructions.

The first one seems to be the coherent feature of this type of teaching. As far as the last two problems are concerned, we tried to improve the online help and eliminate all of the mistakes pointed out by the users.

4. FUTURE WORK

Since our experience with using Postcourse is quite encouraging further developments of the system are planned:

- develop software tools to enable tutors to prepare new tests and exercises, as well as create new pages,
- extend the group of tutors willing to use Postcourse as supplementary material for database courses; this requires picking the right people those who are enthusiastic and willing to spend some time to get acquainted with the system,

- increase access for students, that is ensure efficient, seven-days-a week access to the server – so far Postcourse is placed on an experimental server working on predetermined days only,
- monitor students' experience with using Postcourse.

5. CONCLUDING REMARKS

The feedback given by our students shows that Web-based courses are valuable resources for learning, giving immediate answers and allowing for self-paced studying.

REFERENCES

1. A.E Blackhurst, R.M Hales – Using an education server software system to deliver special education coursework via the World Wide Web,
<http://serc.gws.uky.edu/www/ukat/TopClass/tc.html>
2. J. Jędrzejowicz – WWW-based course on relational databases, Proc. CBLIS'99 (paper H3),
3. J. Muelver – Creating Cool™ Web pages with Perl, IDG Books Worldwide, Inc 1996,
4. P.W Wright – Use of information and communication technology in education, some emerging areas of interest and related issues, Proc. CBLIS'99 (paper A2),
5. Personal Home Page Tool
<http://www.php.net>
6. Postgres
<http://www.postgresql.org>
7. J. D Ullman, J. Widom – A first course on database systems, Prentice-Hall 1997,
<http://www-db.stanford.edu/~ullman/fcdb.html>

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