# Chapter 2.25
# Innovative Approach to Teaching Database Design Through WWW:
## A Case Study and Usability Evaluation

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## ABSTRACT

The objective of this chapter is to describe the Postcourse project, which is an e-course on database design. It can be reached via the World Wide Web and allows authorized students to create and work with their own databases placed on the university server. The system has been created from scratch, as no authoring package offered tools to interact with databases, which is the innovative feature of the project. The evaluation performed after the system had been used for two years proved that it is a valuable material for self-paced work.

## INTRODUCTION

The World Wide Web has considerable potential for improving delivery and quality of education programs, and the benefits in re-engineering higher education are widely recognized. Educators have been quick to spot this potential and thousands of Web-based courses and other educational applications have been made available on the Web. Unfortunately, according to many researchers, the currently available Web-based courses and other innovative approaches based on Internet technologies are often poor in educational content. The e-education is a relatively new technology and the online courses are often developed by computer-enthusiastic staff who are not necessarily knowledgeable about educational concepts, or by educators who lack the computer knowledge.

The objective of the chapter is to describe, analyse and, possibly, learn the lesson from the experience of creating a Web-based course on database design, which makes full use of the interactivity offered by the Internet. The first version of the course was reported in (Jedrze-jowicz et al., 2001). The core part of the course, called the Postcourse, is exercises, which require creating and updating the databases stored on the university server. Thus the Postcourse makes use of the educational model of teaching by doing. This paradigm, translated into the fully implemented solution, means that students can interactively design, develop, and test their database projects through Internet. The described feature can be considered as an innovative approach extending the existing range of e-education models.

The chapter is organised as follows. We describe the context of use of the course—that is, the subject, the students who enrol for the subject and the online part that is the Postcourse. We give a general description of the Postcourse, comment briefly on the implementation issues and concentrate our attention on usability analysis and evaluation. The latter is based on ideas and methodology proposed in Nielsen (1993). Using Nielsen's approach, heuristic evaluation of the Postcourse usability was performed and its results are duly reported. Evaluation process has been supported by data obtained from a questionnaire, which is placed on the Web site of the course. In the last part of the chapter, the plans for future developments are sketched and some general conclusions are presented.

Our experience of using the Postcourse to train groups of teachers gaining further education on post-graduate courses 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.

## CONTEXT OF USE: STUDY SITE AND THE STUDENTS

The starting point for developing an e-learning course, from the pedagogic point of view, is to identify the target group of recipients. The target group is characterised by describing their learning situation. In this case the target group are students who take part in three-semester, post-graduate courses for teachers aimed at further education in computer science. Usually around 70 teachers enrol for the course. The teachers spend five weekends in each semester at the university having lectures and tutorials in a traditional format. The majority of the work has to be undertaken by students in between the teaching weekends. To ease the task, varied materials are being prepared by the teaching staff. An introduction to database systems is an important component in the curriculum of the course. The course is based on one textbook (Ullman & Widom, 1997). When teaching this subject, a common belief of tutors was that some form of online teaching would be particularly useful in assisting students since they are of differing abilities and background in computer science. Some of them work as computer science teachers and their knowledge of the subject is often impressive, and some have never had anything to do with computers and have to struggle to keep pace with the rest. Besides, they are mature learners comfortable with independent learning, thus well prepared for online learning. An online course 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.

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