ABSTRACT

This chapter is devoted to the application of Web-based multimedia tools as a complement to traditional e-learning resources to improve the quality of teaching in two senses: adapting lesson contents to improving the understanding and increasing the motivation of the students. The authors present a set of practical tools that have achieved successful results in their courses and that, together, provide a more proactive teaching methodology based on interactive and mobile learning materials. These tools can be divided into two main groups: simulations and interactive videos, directly related to the process of studying, and quizzes and questionnaires, useful to adapt the teaching to the objective comprehension level. In addition, the authors point out the advantages of providing the students with more familiar multimedia materials suitable for being transported and consulted in mobile devices. A basic point of this methodology is that all these resources are available through a Web-based interface, so that the interaction does not depend on the physical presence of the students. Finally, the authors must point out that with their methodology they are focused on monitoring learning, which is achieved directly with online questionnaires, but they have also performed resource monitoring, in terms of degree of satisfaction and practical use. This is achieved, in this case, through the use of surveys and from the analysis of the statistics provided by the Web-based application.
INTRODUCTION AND BACKGROUND

Nowadays, it is not usual to find on-line courses in which their contents and materials are only a “virtualization” of traditional classroom-based courses. In those on-line courses, the student reads from the computer monitor the same material that in traditional settings would be read on paper. These kinds of platforms are more “e-reading” than e-learning systems as commented in Reichert et al (2004). The goal of the latter should be to allow a more active and effective learning and, therefore, they must incorporate more advanced materials, resources and activities. As a consequence content design in an e-learning platform should be carried out following these main features:

• Adequately meeting the needs, capabilities and possibilities of the student.
• Clarity and quality of the information presented.
• An adapted structure for its correct understanding and assimilation.
• Interactivity with the student.

The first three points have been widely studied both in e-learning and traditional learning, but interactivity with the students becomes an extremely interesting topic in e-learning because traditional practices, based on physical interaction, are not applicable here. In this sense, we can find several examples in the bibliography of e-learning interactive systems that mainly use videos, simulations and games as interactive materials. Thus, we should highlight the LBA “Learning by asking” system presented in Shang et al (2001), where authors develop a multimedia based e-learning system that combines video lectures, PowerPoint slide presentations and lecture notes. This system promotes high levels of interaction by allowing learners to access individual video segments directly.

Another promising system has been developed in INETELE (Interactive and Unified E-Based Education and Training in Electrical Engineering) Project in Weiss et al (2004). The objective of this project is to obtain an optimized lecture tool for teaching basic and some advanced topics of electrical engineering to a class of students, as well as a program for self-learning and distance-learning without direct presentation by a teacher. In this context, the authors use a web-based package presenting the information with interactive animations and simulations.

A third type of interactive material used in e-learning is computer games. Connolly et al (2006), have commented on their popularity in e-learning contexts, mainly through online games, over the past few years. This kind of games range from text based ones to those that incorporate 3D graphics and virtual worlds (e.g., MUDs and MOOs) where the interaction takes place with many players simultaneously connected (Graven et al, 2005). Virtual communities that facilitate knowledge sharing and creation (edutainment) are very popular in this online game context as explained in De Freitas (2007). Examples of these learning environments are “Supercharged”, used to teach high level physics concepts, “Savannah”, a mobile game that introduces young learners to natural history concepts, or “The Racing Academy game”, a racing car physics simulation designed to support learning communities in the field of engineering and science.

The work presented here is based on our experience (see Sanchez-Maroto et al, 2006 or Bellas et al, 2007) in the application of web-based multimedia software tools for e-learning with two main objectives: to monitor the learning of the students in a more realistic way and to improve the individual learning providing more motivating and familiar elements. All of these tools were accessible through the web-based e-learning platform Moodle.

The multimedia tools we have used are basically videos, simulations and on-line questionnaires. This way, we include two of the three typical materials that are present in the main interactive
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