Chapter 19
Diagnostic and Formative E-Assessment in Engineering on a Moodle-Based VLE

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ABSTRACT

Electronic learning is nowadays a reality that has been possible due to the recent advances in technology. Different new Web tools have been developed to be directly applied to the teaching/learning process at all levels, especially in higher education. In fact, e-learning tools are the key elements for carrying out educational innovation when dealing with overcrowded groups of students. This e-tools applied to assessment are analyzed in this chapter. In particular, diagnostic and formative e-assessment implemented on a Moodle-based VLE environment has been introduced in different basic Mechanics subjects, with similar contents but taught in different engineering degrees, in diverse years or with various group sizes. The benefits and underlying problems of this introduction are described here. This has been made in order to compare results of different subjects and to extract general conclusions, which could be extrapolated to any other engineering disciplines.

INTRODUCTION

In the last years, the development of the Information and Communication Technology (ICT) has allowed the creation of new Web tools which can be directly applied to the teaching/learning process. These tools allow the lecturer to experiment with new strategies impossible to carry out using classical teaching methodologies.

In addition, the new generation of students is very interested in information technologies,
circumstance that allows accomplishing changes in the traditional education paradigm, as the introduction of e-learning tools.

Together with the development of e-learning, current trends in teaching methodologies are based on an individual support of the students to be performed by lecturers, turning their classical role of “transmitter of knowledge” into a new one of personal supervisor that guides the students in the construction of their own knowledge. The role of student gains significance in the learning process and his/her active participation is promoted, along with a formative and continuous learning assessment.

In spite of the fact that this motivating methodology introduces a lot of advantages for the students, sometimes the big number of students attending university classes prevents the lecturer from performing educational innovation in a direct manner. In this process, e-learning tools are the key elements able to compensate the lack of resources necessary to carry out the translation to the new educational paradigm when dealing with overcrowded groups of students. In fact, e-learning tools can substitute or complement traditional methods, giving more effective experience to the learner.

In this context, this chapter describes the introduction of e-learning tools in two Mechanics engineering subjects with the aim of performing educational innovation. These subjects have a big number of enrolled students, a factor that hinders the introduction of new teaching methodologies. The main goal of the chapter is to encourage the students to a continuous study of the subjects through the implementation of a continuous assessment methodology, without increasing the academic workload. For this purpose, Moodle-based e-tools (Moodle, 2007) have been used in order to develop diagnostic and formative assessment within both subjects. The first one – diagnostic assessment – provides the instructor with information about students’ prior knowledge and misconceptions before beginning the subject. The second one, the formative assessment, takes place during the learning activity and provides the instructor with information on how well the learning objectives of a given activity are being met. Similar e-tools have been used for both kind of assessment. The methodology explained here is based on previous work of the authors (Mora-Aguilar et al., 2008; Mora-Aguilar et al., 2009).

Remark that the same methodology has been applied in both subjects and the results obtained have been compared. Finally, general conclusions have been drawn that can be extrapolated to other engineering disciplines.

BACKGROUND

To begin with, it will be useful to define some of the terms included in the broad vocabulary that has recently appeared related to e-learning, closely related to the application of the ICTs to the teaching-learning process.

Nowadays, the electronic learning or e-learning (Streng et al., 2008) is experiencing a rapid development. This term includes the teaching-learning strategies that use Web technologies via the Internet as main support. Typically, this type of training involves a physical distance between the transmitter and the receiver, that is, between lecturer and student.

The increase in distance learning courses that have appeared during the last few years is closely related to the popularization of the Internet. In fact, emerging trends in ICT are in line to use web technology to stimulate social relationships with tools such as social networks, wikis, or blogs. For that reason, the concept of social network, also known as Web 2.0 (O’Reilly, 2005), has arisen. Similarly, the term e-learning 2.0 refers to the use of these “social” Web technologies in the field of education.

There are several specific technologies developed for educational purposes, with the two main systems being LMS (Learning Management