Chapter 16
Adoption of B–Learning at Universities in Spain:
The Influence of Environment and Personal Factors

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ABSTRACT

This chapter presents the results of research whose main aims are a) to identify the rates of adoption of b-learning through the use of LMS in universities in Spain and b) to check the influence of external and internal factors on teachers in the use of b-learning. A sample was taken of 495 teachers at 4 universities using an ad-hoc questionnaire tested for construct validity. Multiple Correspondence Analysis (MCA) and Structural Equation Modeling (SEM) were used to examine the data. The results fitted Rogers' Innovation Adoption Model (1995) and corroborated the indirect influence of the environment, the direct influence of self-efficacy and measures to encourage the use of LMS in teaching, as well as certifying the predominance of a range of traditional teaching styles over models of student-based activity.

INTRODUCTION

The new professional competences required by business and the economy today, such as skills to negotiate meanings and viewpoints, reasoning, problem-solving in interdisciplinary teams and lifelong training throughout the professional cycle, make considerable demands on the university education system (Kirschner, 2005; Kirschner, Van Vilsteren, Hummel, & Wigman, 1997; Condie & Livingston, 2007). The literature highlights the importance of the constructivist approach and the

awareness of the benefits of cooperative learning in this context (Fisher, 1995; Perkins, 1993, 2001; Resnick, 1987; Slavin, 1996; Vygotsky, 1978).

Learning Management Systems (LMS) allow b-learning development and provide tools to develop the new educational models. However, the main stumbling block, and one of the greatest challenges faced by universities, is the change in pedagogical culture that comes with ICT use; this calls for empirical studies that enable us to know not just the extent of LMS uptake in universities but also to understand how ICT are affecting university teaching (Al-Adaileh & Al-Mobaideen, 2012; Cortese, 2003; Uhomoibhi, 2006; Imbernón, Silva, & Guzmán, 2011, pp. 107-114).

The aims of this investigation are: a) to gauge the rates of LMS use at public universities in the region of Andalusia (Spain); b) to corroborate the influence of internal and external factors on teachers regarding the use they make of these systems; and c) to know the didactic models developed and used, and their effects on teaching in the classroom and on the evaluation of the technological resources used, all of which will give us a clearer understanding of the new didactic models applied with the use of LMS.

With these objectives in mind, we review the literature to provide us with the theories on which this research is based. Firstly, there is Rogers' Innovation Adoption Model (1995) and its application to the adoption of technologies developed by Zemsky & Massy (2004), which we use to describe how far b-learning through LMS has been taken up at the four universities studied. Secondly, in order to understand how b-learning develops, three factors are presented which influence the willingness of the teacher to use it: self-efficacy and the environmental factors extracted from Social Cognitive Theory, and subjective norm, derived from the Theory of Planned Behavior. Finally, we present evidence of the pedagogical orientation involved in incorporating these technologies into teaching.

The hypothesis and derivative objectives are described in the third section. An evaluation has been carried out to consider the validity of the adoption models for the implementation of b-learning in universities and the analysis of the direct and indirect influence of internal and external factors concerning teachers on b-learning adoption, as well as the pedagogical models that involve LMS usage.

The fourth section focuses on the method. The method used in this study consists of an *ad-hoc* questionnaire based on variables described on the second section of this paper. This questionnaire was applied to a random sample of 495 teachers during the academic year 2009-2010. There are two different techniques included: Multiple Correspondence Analysis (MCA) and Structural Equation Modelling (SEM). The MCA seeks to validate the Rogers model (1995) applied to the use of b-learning through LMS, identifying clusters depending on the frequency of use, technological competence, pedagogical style and institutional support strategies. The second analysis, the SEM, initially presents a factorial reduction, which implies a validity limit for the drawing of conclusions: Its aim is to approach the confirmation of the effect of teachers' self-perception concerning their technological competence about the style of educational use and the potential use of digital resources integrated in the LMS.

The fifth section of this paper is divided between the MCA and SEM. The MCA presents four clusters similar to the uptake cycles identified by Zemsky & Massy (2004) and in similar proportions to the innovation curve presented by Rogers (1995). These clusters are analyzed and interpreted. Through the Structural Equation Modelling, some results interpreted by the MCA are confirmed. Among these statements: the fact that the self-perception of technological competence of university professors has an influence on the frequency of use of digital resources, but does not determine the instructive style. The results also

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