Chapter 8.4
A Comparative Study on LMS Interoperability

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ABSTRACT

A Learning Management System (LMS) plays an important role in any eLearning environment. Still, the LMS cannot afford to be isolated from other systems in an educational institution. Thus, the potential for interoperability is an important, although frequently overlooked, aspect of an LMS system. In this chapter we make a comparative study of the interoperability features of the most relevant LMS in use nowadays. We start by defining a comparison framework, with systems that are representative of the LMS universe, and interoperability facets that are representative of the type integration with other broad classes of eLearning systems. For each interoperability facet we categorize and identify the most representative remote systems, we present a comprehensive survey of existing standards and we illustrate with concrete integration scenarios. Finally, we draw some conclusions on the status of interoperability in LMS based on our study.

INTRODUCTION

Interoperability is the ability of different computer systems, applications or services to communicate, share and exchange data, information and knowledge in a precise, effective and consistent way (Martínez & Navarra, 2007). In the eLearning field this topic is extremely important since there is the need for all systems that typically compose an eLearning environment to communicate and share data consistently.

The LMS plays a central role in any eLearning architecture. Choosing an LMS can be a challenging task for an organization. Several studies have been conducted to analyse and evaluate these types of systems from pedagogical and in-

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stitutional perspectives (Pantel, 1997; Britain & Liber 1998). However, we are not aware of any study to evaluate the interoperability of LMS with other systems typically found in an educational institution.

A major issue in LMS interoperability is the eLearning standardization. The concept of course, student, educational resource, summary or grade must be formally described in order to be shared among all the systems in an educational institution. For instance, the difficulty to reuse of a course in schools with LMS from different vendors (or even from the same vendor) is an apt example of the problems found currently in the majority of the LMS. These interoperability issues affect the flexibility of the teaching-learning process and lead to a decrease of end user satisfaction and learning success.

In this chapter we make a comparative study of the LMS support for interoperability. This study is part of an effort to select an LMS on which to base the development of eLearning systems integrating heterogeneous components. We chose two LMS vendors - Moodle and Blackboard - since combined they a have a significant share of the LMS market and they follow different approaches to LMS development, namely open source and commercial. We analyse the interoperability features in these LMS split in two *facets* reflecting the broad classes of systems of a typical LMS operational environment. These broad classes are Learning Content Management Systems and Academic Management Systems.

This chapter starts by tracing the evolution of LMS. We proceed with the selection of the systems representative of the LMS universe and of a methodology for comparing them based in interoperability facets. The following two sections analyse separately the learning management content facet and the academic management facet. For each facet we categorize and identify the most representative system, the existing standards and the interoperability issues regarding the communication with the LMS. In the final section we draw conclusions on the results of this study.

LMS EVOLUTION

The evolution of eLearning in the last decades has staggering, from the early monolithic systems developed for specific learning domains to new systems featuring reusable tools that can be effectively used virtually in any eLearning course. These types of systems evolved from Content Management Systems (CMS). The CMS was introduced in the mid-1990s mostly by the online publishing industry. This type of system can be defined as a data repository that also includes tools for authoring, aggregating and sequencing content. The main goal of these tools is to simplify the creation and administration of online content (Nichani, 2009). CMS are focused on content with the main purpose to store information and provide access to it. CMS content is organized in small self-contained pieces of information to improve reusability at the content component level. These content components when used in the learning domain are called “learning objects” (LO) and the systems that manage them are called Learning Content Management Systems (LCMS).

Nowadays, an LMS plays a central role in any eLearning architecture and can be defined as software application for the administration, documentation, tracking, reporting of training programs, classroom and online events, and training content (Ellis, 2009). Typically it is used by two types of users’ groups: learners and teachers. The learners can use the LMS to plan their learning experience and to collaborate with their colleagues; the teachers can deliver educational content and track, analyze and report the learner evolution within an organization. There are open source systems, such as Moodle, Sakai,.LRN or Dokeos, and commercial systems such as WebCT/ Blackboard or Desire2Learn.