Chapter VIII

Using Semantic Web Technologies within E-Learning Applications

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Abstract

This chapter reveals how the Web has improved e-learning as well as some of the problems that came along with it. It argues that the main problem is the gap between two groups involved on Web-based learning. The first group spent its energy studying learning processes, although they are not concerned with reducing the costs and the work necessary for the development and management of such systems. On the other hand, the second group aims at facilitating the construction and management of the courses, without turning its efforts toward learning subject. In this chapter, the union of technologies developed by both groups, such as intelligent tutoring systems, adaptive hypermedia, learning management systems, and learning objects, is discussed. The proposal to put together the four technologies is based on Semantic Web technologies, aiming to solve problems faced by developers, teachers, and learners of Web-based learning.
Introduction

The terms e-learning and computer-supported learning (CSL) are used to refer in general to the use of technologies of information and communication to make available instructional modules. One form of e-learning is the Web-based learning (WBL), in which the instructional contents are accessed through Internet or intranets. The term came from the integration of the Web and the systems of e-learning, developed in the ‘70s and ‘80s, which were locally carried out at the students’ computers.

Two large groups of researchers were developed, with the birth of WBL. While the first one’s purpose was to facilitate the students’ learning process, the second aimed at studying methods and tools able to facilitate the courses’ construction and management. Studies carried out by the members of the first group helped to create technologies such as intelligent tutoring systems (ITS) and adaptive hypermedia systems (AHS). Researchers from the second group were responsible for the birth and progress in learning management systems (LMS) and learning objects (LO).

Although the progress obtained by both groups is significant and useful, it is known the lack of consolidated results from the union of the benefits reached in each one of them. It is clear that the means offered by LMS and LO to the people responsible for building and managing courses do not improve the students’ learning. On the other hand, it is noticed that the benefits provided to the students by ITS and AHS make courses construction and management an arduous task. This prevents these technologies from being incorporated in the majority of the systems existent today, due to the difficulty to reuse instructional and adaptive techniques present in ITS and AHS.

This chapter’s objective is to identify and discuss the main advantages and problems related to each of the technologies used in WBL. In addition, some proposals based on the Semantic Web (SW) to solve such problems are presented. We intend to show that SW can be the key to combining the advantages obtained by LMS, LO, ITS, and AHS with a view in developing the adaptive learning systems based on Semantic Web.

Background: E-Learning and Web-Based Learning

In the last decades it was noticed the insertion of the computer as a supportive tool to learning as well as the terms computer-supported learning and e-learning.