Chapter 7

TARGETING LEARNING RESOURCES IN COMPETENCY-BASED ORGANIZATIONS
A Semantic Web-based Approach

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1. MOTIVATION AND PROBLEM DESCRIPTION

Recent standardization and specification efforts in the area of learning technology (Friesen, 2005) have resulted in a considerable improvement in the interoperability of learning resources across different Learning Management Systems (LMS) and Learning Object Repositories (LOR). Examples are the ADL SCORM and IMS Learning Design specifications, which provide shared languages to express the packaging of learning contents and learning activity designs respectively, among other elements. The central paradigm of such reuse-oriented technology is the notion of learning objects (LO) as digital reusable pieces of learning activities or contents. This represents an opportunity for organizations to devise more effective mechanisms for targeting learning activities internally as a way of improving their capacity to respond to the changing business and technological environments and also to the evolving customer needs.
However, transportability of digital learning objects across platforms is only a basic step towards higher levels of automation and possibilities of delegation of tasks to software agents or modules. Such advanced technology requires richer semantics than those offered by current metadata specifications for learning resources (Sicilia and García-Barriocanal, 2005). Semantic Web technology and the use of ontologies are able to provide the required computational semantics for the automation of tasks related to learning objects as selection or composition. In general, they enable new possibilities to enhance organizational learning or even fostering systemic learning behavior inside the organization (Sicilia and Lytras, 2005). In addition, Semantic Web Services (SWS) provide the technical architecture and mediation facilities for semantic interoperability required for selection and composition of learning objects in a distributed environment in which there are potentially many heterogeneous repositories (Lama et al., 2006).

Within the context described, the dynamic search, interchange and delivery of learning objects within a service-oriented context represent a major challenge that needs to be properly addressed. In short, this entails the technical description of the solution in terms of SWS technology, and also the provision of the ontologies, facilities and components required to extend and enhance existing learning technology systems with the advanced capabilities provided by computational semantics. Semantic Web Services provide the required conceptual representations, along with the capabilities to translate and integrate diverse systems that share the common goal of reusing learning objects. A Semantic Web Service engine integrated with existing standardized LMS technology will extend the possibilities of learners, tutors and instructional designers with semantic search tools capable of asking for and retrieving learning objects from any provider that registers itself as a Semantic LOR.

Semantic Web Services, as conceived in the WSMO framework\(^\text{41}\) provide the required ontology-based representation flexible enough to specify realistic learning needs and exploit domain or specialized knowledge in the process of search for learning objects (Lama et al. 2006). A key feature of WSMO is the ontological role separation between user/customer (goal) and Web Service. This matches the concept of learning tasks being separate concept in learning literature. However, before a SWS architecture can be fully exploited, there is a need to devise the underlying framework for the expression of learning needs and their subsequent use for selecting learning resources. This chapter addresses one concrete way of expressing such learning needs in terms of competencies, which are especially adequate for organizational learning.

\(^\text{41}\) http://www.wsmo.org/