Chapter XI

Using Ontology as Scaffolding for Authoring Teaching Materials

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Abstract

The purpose of this study is to conduct teachers to author a teaching material by using visualized domain ontology as scaffolding. Based on a content repository management system (CRMS), mathematics ontology to support teachers for authoring teaching materials is developed. Although the domain ontology of mathematics at secondary school level in Taiwan provides structured vocabularies for describing domain content, those teachers who want to create a knowledge-rich description of domain

knowledge, such as required by the "Semantic Web," use ontology that turns out to provide only part of knowledge required. In this chapter, we examine problems related to capturing the learning resources or learning objects (LOs) on a CRMS. To construct ontology for a subset of mathematics course descriptions, the representation requirements by resource description framework/resource description framework schema (RDF/RDFS) was implemented. Furthermore, a visualized online authoring tool (VOAT) is designed for authoring teaching materials on the Web. Finally, discussion and future research are addressed.

Introduction

Learning objects (LOs) (Wiley, 2001) are a promising way to create modules of reusable learning content associated with metadata (Yang & Tsai, 2002). The high-quality content, composed by learning objects, has been proven to be the most important requirement for a successful e-learning activity. However, developing educational resources such as a teaching material frequently requires significant efforts from teachers as well as support from a team of skilled professionals. To respond to the stern realities of high development costs and restricted budgets, developing learning object repositories offers a robust and sustainable strategy.

Learning objects in a content repository management system (CRMS), a SCORM-compliant learning object repository, can be used to support effective search mechanisms and provide advantages for teachers and course developers. A digital course is generally presented as hierarchical for flexibility in terms insertion and deletion. The amount of LOs on CRMS has dramatically increased as time proceeds. It raises an issue that a teacher might have trouble to deal with LOs while he/she uses keywords or form-based slots to acquire LOs on a CRMS.

Several initiatives are trying to resolve practical difficulties related to reuse of learning object technology. These arise in the indexation and retrieval of material (ARIADNE, 2001), creation of new learning content based on individual learning requirements, or development of standards, specifications and tools (ADL, 2002; IMS, 2000; LTSC, 2001). Stimulated by these initiatives, several computer-based training vendors have implemented their own tools, which have begun to provide teachers with wide range of LOs. Up to date, it, however, is still far away for teachers to author their teaching material since guiding authoring is not always supported.

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