Learning Object Metadata Interchange Mechanism

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Abstract

In spite of the current lack of conceptual clarity in the multiple definitions and uses, the term *learning objects* is still frequently used in content creation and aggregation in the online-learning field. In the mean time, considerable efforts have been initiated in the past few years for the standardization of metadata elements for consistent description of learning objects, so that learning objects can be identified, searched and retrieved effectively and efficiently across multiple contexts. However, there are currently a large number of standardization bodies and an even much larger number of ongoing standard initiatives in the learning field, and different learning objects repositories are likely to apply different metadata schemas to meet the specific needs of their intended communities. An interchange mechanism for the conversion between various metadata schemas, therefore, becomes necessary for intensive interoperability.

In this thesis, we first make a brief introduction to the concept *learning objects*, then the term *metadata*, followed by a description of the functional requirements of learning objects, the purposes of metadata, and the importance of metadata for learning objects. After that, this thesis investigates metadata schemas in various fields in general, focused on several mainstream metadata specifications developed for learning objects in particular. The differences among these metadata schemas for learning objects are analyzed and a mapping between their elements is identified. On the basis of literature review, a framework for interchange of metadata schemas is proposed and a prototype to demonstrate the functionalities of the framework is developed. For the high scalability and the high accuracy of the developed system, a so-called LOM-intermediated approach is suggested, and a so-called dynamic-database methodology is adopted. The LOM-intermediated approach significantly simplifies the metadata mapping issues by undertaking the schema-schema mapping in a way of schema-LOM-schema mapping, while the dynamic-database methodology effectively prevents any data-loss resulting as a by-product from the use of LOM-intermediated approach. The prototype currently generates and outputs XML metadata in IMS, EdNA, Dublin Core and LOM. It is a web-based three-tier architecture, using Java technologies for implementation, MySQL as the database server and JDBC for database access.

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