

ABSTRACT

Improving the Expressiveness and Utility of the IMS Learning Design Specification Using Learning Services, a Graphical Editor, and Design Templates

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The IMS LD specification provides a notation for encoding the pedagogical structure of lesson plans. This standard enables instructors to create lesson plans that are interoperable documents that can be reused. Such reusable lesson plans can aid successful learning. However, several problems surrounding the specification must first be addressed in order to further its adoption. The purpose of this thesis is to address the issues of pedagogical expressiveness, lack of tooling and support for educators in IMS LD and thereby encourage its adoption by the e-learning community through improvement of the IMS LD specification.

The issue of pedagogical expressiveness was addressed by the development of a Service Integration Framework (SIF) for integrating new learning services that are not defined in the specification. Lack of tooling was dealt with by the design of a graphical editor, Edify, based on the development of a mapping of concepts familiar to teachers to IMS LD concepts. Finally, the issue of support for educators was solved by the use of IMS LD templates that are created from learning theories and best practices via the use of pedagogical design patterns. The methodology used in this thesis followed the software engineering steps of analysis of the issues, design of the solutions, implementation and testing of the solutions and a final evaluation of the work.

The result of this thesis includes the development of a SIF in a way that does not break the specification, a mapping that is crucial for the design of a teacher-friendly editor and, an approach for creating pedagogically sound IMS LD templates. In addition, three learning services were created for the SIF along with several IMS LD templates. The main contribution of the thesis is the improvement of the specification through the three solutions, which could lead to wider adoption by the e-learning community. This thesis has also advanced knowledge in the field of computer science through improvement of the process of creating and reusing Instructional Designs using educational technology.

Keywords: Learning Design; Instructional Design; Learning Services; Graphical Editor; Graphical Mapping; Pedagogical Design Patterns; E-Learning; IMS LD; Pedagogy; Templates.