Chapter XV
Using the IMS Learning Design Notation for the Modeling and Delivery of Education

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ABSTRACT

IMS learning design (IMS-LD) is a notation system for learning and instruction. It supports the description of learning processes using a set of standardized concepts, including roles, activities, acts, objectives and prerequisites. With the availability of such a notation, descriptions of learning processes can be shared, critiqued, modified, rated, compared and evaluated. Moreover, the machine-interpretable nature of the notation means that designs can be executed by software to support the dynamic orchestration of multi-learner, multi-role learning processes. This chapter introduces IMS-LD and describes experience with its use, supported by the first generation of tooling. We then combine these experiences with observations on the tools in the light of new developments in e-learning in order to derive a set of requirements for IMS-LD enabled visual design environments.

INTRODUCTION

In a recent paper, Merrill (2006) highlights that training is often created by designers-by-assignment without the use of a systematic process, and that instructional products are often designed without sufficient consideration of the applicable instructional design theory. Other research indicates that even when designers are aware of theories, there appears to be a difference between their practice and instructional design models (Eseryel, Schuver-van Blanken, & Spector, 2001; Kenny, Zhang, Schwier, & Campbell, 2005; Kirschner, Carr, Van Merriënboer, & Sloep, 2002). Part of this problem is the absence of a tradition of the use of notations (Gibbons & Brewer, 2005; Tattersall et al., 2005; Waters & Gibbons, 2004). In order to address this issue, several initiatives have been pursued to derive a modeling language for education (Koper & Manderveld, 2004; Rodríguez-Artacho & Verdejo Maíllo, 2004; Süß & Freitag, 2002). The results of these initiatives, notations for describing educational processes, have been input to standardization processes (Rawlings, Van Rosmalen, Koper, Rodríguez-Artacho, & Lefrere, 2002) and, in 2003, an open technical specification known as IMS learning design (IMS-LD, 2003), was approved by a consortium of universities, system vendors, providers and other e-learning stakeholders.

In Waters and Gibbons' (2004) terms, IMS-LD can be positioned as a notation system. The notation is characterized in Botturi, Derntl, Boot, and Figl (2006) as a layered, formal, textual specification offering a single perspective. This chapter describes the IMS-LD notation system and reviews experience with its use. We then identify a number of requirements for IMS-LD-aware design environments with broad utility, a high degree of usability and support for interoperability.

IMS LEARNING DESIGN: A NOTATION SYSTEM FOR EDUCATION

IMS-LD focuses on the creation of a formal description of educational processes known as a unit of learning (UoL). In practice, UoLs define the set of learning activities, for example courses, assessments, workshops or seminars in a specific pedagogical setting and can serve various functions depending on the learning objective and design (Burgos & Griffiths, 2005; Koper, 2005). A wide variety of pedagogical approaches can be represented by IMS-LD, such as problem-based learning, competence-based learning and game-based learning. Prior to turning to the details of the specification, it is helpful to review the requirements the specification was written to meet:

1. **Completeness:** Describe the teaching-learning process in a UoL, including references to the digital and non-digital learning objects and services needed during the process.
2. **Pedagogical flexibility:** Describe different kinds of pedagogies without prescribing any specific pedagogical approach.
3. **Personalization:** Describe personalization aspects within a learning design, so that the content and activities within a UoL can be adapted based on the preferences, portfolio, educational needs, and situational circumstances of users. In addition, the control over the adaptation process must be given, as desired, to the student, a staff member, the computer, and/or the designer.
4. **Formalization:** Describe a learning design in the context of a UoL in a formal way, so that automatic processing is possible.
5. **Reproducibility:** Describe the learning design abstracted in such a way that repeated execution in different settings with different persons is possible.
6. **Interoperability:** Support interoperability of learning designs.

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