# Chapter 3.16
# Modeling Learning Units by Capturing Context with IMS LD

**Johannes Strobel**
*Purdue University, USA*

**Gretchen Lowerison**
*Concordia University, Canada*

**Roger Côté**
*Concordia University, Canada*

**Philip C. Abrami**
*CSLP, Concordia University, Canada*

**Edward C. Bethel**
*Concordia University, Canada*

## ABSTRACT

In this chapter, we describe the process of modeling different theory-, research-, and best-practice-based learning designs into IMS-LD, a standardized modeling language. We reflect on the conceptual and practical difficulties that arise when modeling with IMS-LD, especially the question of granularity and the necessary and sufficient elements of learning design. We propose a four-layer model both to ensure the quality of the modeling process and as a necessary step towards a 'holistic' consideration and integration of the design process. These discussions speak to the core of IMS-LD integration, address the question of usability and end-user friendliness, and urge that more research and design needs to be conducted not only to mainstream (a) the use of IMS-LD and related visual instructional design languages, but also (b) the debate on appropriate and best instructional design practices.

## INTRODUCTION

Instructional design is essential for every teaching, training, or instructing position. Where other design fields, like architecture, industrial design, and engineering, have very precise languages to communicate and share design specifications

within their respective communities, the field of education does not possess such languages (Gibbons & Brewer, 2005). In the field of education, forms of sharing innovations include lesson plans and learning objects, products which implicitly embed design considerations, but do not explicitly address them. Crucial information on the context, the embedded instructional strategies, the theoretical foundations of the design, and the reflections of the teachers or designers are either not explicitly captured as in the case of learning objects, or are not accessible through a general standardized language as in the case of lesson plans.

In the last couple of years, the field of education saw several attempts to fill this gap by developing specific metalanguages or visual instructional design languages (VIDLs; see Botturi, 2005 for an overview). IMS-LD, an extension of the educational modeling language (EML) specification, is a prominent representative of VIDL. IMS-LD was developed to allow lesson plans and best practices to be structured using a common language based on a formal representation, to exist within an XML schema, and to be archived in a machine readable and searchable repository.

As powerful as the design language is, instructional designers, instructors, or teachers are still left with a variety of design decisions, which are not captured by the design language. For example: Which design is the most appropriate for a specific learning outcome? How much detail should be included in the design specification? Which elements are flexible or need to be modified by the context of the implementation? What context information does the design have to include to provide meaningful and sufficient information to subsequent designers, instructors, and so on? In view of these concerns, there are two purposes of this chapter:

- To provide a critical analysis of different design decisions that are pertinent for the use and implementation of IMS-LD, in-

cluding: (a) the questions of boundaries, granularity, and details of the design; (b) the modularity and reusability of smaller learning objects within larger learning objects; (c) sufficient and necessary conditions of a successful reuse of a learning design; (d) the usefulness of detail in the design and reuse of learning designs; and (e) particulars of mapping of activities through IMS-LD.
- To provide a four-layer evaluation model for determining the quality of IMS-LD design. These four layers are: (1) syntax and grammar; (2) best design approaches to model a certain activity; (3) how accurate is the model representing what the learning design was; and (4) how well the models match sound theories or evidence-based research. These two purposes aim to reflect on the usefulness of IMS-LD as a communicative device to share and communicate learning design issues, including the variety of different ways to design the same instructional activity.

This chapter describes the experience developed over a year-long project in which best practice, theory-based, and evidence-based learning designs were formally described with IMS-LD. The presented arguments will be illustrated with a variety of designs, modeled from theories and activities, including behaviorist, cognitivist, and constructivist models, problem-based learning, and lesson plans from the area of K–12 education.

## BACKGROUND

## IMS LD

The purpose of educational modeling languages (EMLs) and the IMS Learning Design (IMS-LD) specification is to support the crafting of diverse

## Related Content

Humanistic Teaching During the Pandemic: Education Beyond the Lesson
Nadia Ainuddin Dahlan, Melissa Malik, Khadijah Said Hashim, Fatin Aliana Mohd Radziand Farhana Wan Yunus (2023). *Cases on Responsive and Responsible Learning in Higher Education (pp. 73-91).*
www.irma-international.org/chapter/humanistic-teaching-during-the-pandemic/319542

Case Study Methodology: An Analysis of Effective Methods in Business Cases
Bela Florenthaland Ashley Ismailovski (2019). *Case Study Methodology in Higher Education (pp. 60-82).*
www.irma-international.org/chapter/case-study-methodology/230239

Critical Online Conversations for Global Educators: Andragogical Considerations and Assessment Strategy
Linyuan Guo-Brennan (2020). *Handbook of Research on Online Discussion-Based Teaching Methods (pp. 128-144).*
www.irma-international.org/chapter/critical-online-conversations-for-global-educators/254769

Learning Chinese in a Role as News Broadcaster: Is This a Worth-Trying Teaching Method?
Ju-May Wen, Hai Dung, Eric Zhi Feng Liu, Chun-Hung Linand Shihping Kevin Huang (2021). *International Journal of Online Pedagogy and Course Design (pp. 15-35).*
www.irma-international.org/article/learning-chinese-in-a-role-as-news-broadcaster/266393

Preparing to Teach with Flipped Classroom in Teacher Preparation Programs
Beverly B. Rayand Angiline Powell (2014). *Promoting Active Learning through the Flipped Classroom Model (pp. 1-22).*
www.irma-international.org/chapter/preparing-to-teach-with-flipped-classroom-in-teacher-preparation-programs/94405