Chapter 6

Developing a Method for the Design of Sharable Pedagogical Scenarios

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ABSTRACT

This chapter presents a research that adopted the Design and Development Research (DDR) approach for the development and validation of a theoretically-grounded and pedagogically-inclusive instructional design method aimed at the creation of reusable and interoperable pedagogical scenarios. The first phase grounds the research in a theory of instructional design that aligns with other related design disciplines, and decomposes the design problem into layers of artifact functionalities. This theory corresponds to software-engineering-infused instructional design methods also known as courseware engineering. The second phase explores ways to integrate an educational modeling language within an instructional design method for enabling the representation of pedagogical scenarios of computational nature. The third phase presents an initial developmental solution, which is tested in a case study. The fourth and final phase extends the development and validation of a solution by way of a two-round Delphi method. Each phase is followed by reflections on the lessons learned during the DDR process.

INTRODUCTION

The research presented in this chapter is based on the assumption that sharing pedagogical know-how (Dziel, 2008) improves teaching practice, and, therefore, learning experiences. Facilitating the sharing of pedagogical know-how supposes finding ways to make it explicit in a comprehensible manner, thus assuring communicability of the design generated. This issue can be framed within the field of instructional design with special attention paid to the design output.

When made explicit, the planning of a teaching and learning situation may be documented in
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different ways according to the preferences of the teacher or designer. The concept of a pedagogical (or learning) scenario tries to capture main aspects of the envisioned situation. A pedagogical scenario describes a process of interaction between teachers and learners within a specific social setting and learning situation. Each participant in their role performs a series of activities directed towards learning, using resources and evidencing acquired knowledge and competencies. Formalized pedagogical scenarios are also interpreted as learning flows, a concept that explains teaching-and-learning process through concepts of workflow management: actors, roles, goals, activities, resources, rules of progression, and outcomes (Klebl, 2006). Pedagogical scenarios expressed in a formal way and through a shared language facilitate their interpretation and possible adaptation to other learning situations, thus ensuring reusability.

Studies about the ‘actual practice’ of instructional design (Rowland, 1992; Henri, Gagné, Maina, Gargouri, Bourdeau, & Paquette, 2006; Ertmer, Stepich, York, Stickman, Wu, & Zurek, 2008) contend that both expertise and theory are applied in the planning of learning solutions. The former is almost entirely the domain of the teacher, while the latter is usually found in specialized literature that requires a significant amount of effort and skill for translation into concrete educational solutions. Either eliciting professional knowledge or instantiating theory into easy-to-(re)use pedagogical scenarios supposes a considerable challenge.

Efforts have been made to develop languages for representing pedagogical scenarios. These ‘educational modeling languages’ (EML) are intended for the description of teaching and learning processes in a standardized way for sharing (Botturi, Derntl, Boot, & Figl, 2006). Moreover, EML was intended to be computable and, consequently, to produce pedagogical scenarios ready for implementation and execution in compliant learning management systems. Pedagogical scenarios expressed in a computational way could be published, adapted and improved upon. There has been much interest in EML and the some of the languages developed include OUNL EML (Open University of the Netherlands) (Hermans, Manderveld, & Vogten, 2004), PALO (Rodriguez-Artacho & Verdejo Maillo, 2004), EML (Botturi, 2006), coUML (Derntl & Motschnig-Pitrik, 2008), poEML (Caeiro-Rodriguez, Llamas-Nistal, & Anido-Rifón, 2007), and CPM (Nodenot & Lafortede, 2006). The IMS Learning Consortium, an international organization for learning standards, officially adopted the OUNL in 2003 and published it as the IMS LD specification (LD, for learning design) (Koper & Manderveld, 2004).

Despite much effort, the specification has not yet gained wide recognition among the teaching community at large. A wide and general implementation of the IMS LD specification is being sought by developing designer-friendly tools (Kinshuk, Patel, & Oppermann, 2006; Koper & Bennet, 2008) as well as add-ons for the IMS LD specification that would cover a wider range of learning situations (Botturi & Stubbs, 2008). However, all these developments do not provide features to enable designers to concentrate on actual design tasks instead of the specification itself. The available tools are intended to address specific and rather limited aspects of the design activity. Technological solutions have failed to adequately address the complex instructional design endeavor. A deeper understanding of the nature of learning design as a “design activity”, should draw a more accurate portrait of the design problem, and help guide the development of appropriate and coherent solutions. The design of pedagogical scenarios could be successfully brought about if addressed through a domain-specific modeling language combined with an instructional design method that provides guidance for its implementation.

For the purpose of our study we have adopted a design and development research (DDR) approach (Richey & Klein, 2007), specifically the type II that involves “the production of knowledge with
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