

Chapter 17

Modeling for Instructional Engineering

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ABSTRACT

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 - Building a Competency Profile
 - Instructional Modeling: The Learning Scenarios
 - Media and Delivery Models
- Delivery Models for a Virtual Campus
 - Building Delivery Models
 - Types of Delivery Models
- A Tutoring Scenario for Web-Based Courses
 - Online Tutor's Needs
 - Tutoring Scenario Based on Competency Improvement
- Tools for Web-based tutoring
- A Design Process Model for Competency-Based Learning
 - Action Research Model
 - Competency-Based Instructional Engineering Model

Instructional Engineering has been presented in chapter 8 and in (Paquette 2004) as a method integrating principles and processes from Instructional Design, Software Engineering and Knowledge Engineering. As such, Visual Knowledge Modeling is at the heart of the instructional engineering where it serves to represent the knowledge, the learning scenarios, the structure of educational material and the delivery processes that support learning. But as we will see in this chapter, Visual

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Modelling can also be used to model the very processes of the learning design activity.

In this chapter, we will present four applications developed with the MOT modelling technique, using or extending the MISA Instructional Engineering method. The first one is an extensive application of the MISA method in order to specify a complete professional training program at the Quebec Bar School, based on a competency profile built through visual knowledge modelling. The second one applies visual modelling to represent a variety of delivery models for virtual campuses, from technology-based classroom and blended learning models, to completely on-line learning models and workplace performance support systems, each model describing the actors, their tasks and the resources they use and produce. The third application focuses on the very important tutoring tasks, proposing a process model to thoroughly support on-line tutors, a central aspect of any delivery model. The last one, focusing on the designers' tasks, is an adaptation of the MISA method itself through an action research process conducted at the Canada School of Public Service. It integrated competency modelling with learning resource management tasks, and their seamless integration into a community of practice environment already used by that organization.

17.1 BUILDING A COMPETENCY PROFILE FOR A PROFESSIONAL TRAINING PROGRAM¹

This section illustrates the visual modeling approach embedded in the MISA instructional engineering method presented in chapter 8, applied to the elaboration of a professional training program. The LICEF team was contracted by Tecsalt-Eduplus, a Montreal-based company, to plan a reconstruction of the complete one-year professional training program for the Quebec Bar School. This one-year program trains law graduates in professional practice in order to be received as lawyers in the Province of Quebec.

The project spanned over a year and a half. Working meetings of our team members with an Expert Committee, composed of 12 experienced lawyers, allowed us to build a relevant knowledge model for the domain of law practice. This model served to identify associated cognitive and socio-affective skills, as well as the performance conditions required of novice lawyers at the start of their professional practice. A set of competencies was elaborated and its content was distributed over a number of courses to set their objectives and select the required knowledge and resources. Later on, a media and delivery model have been built in the form of an on-line training prototype.

This project is certainly the most complete application of the MISA instructional engineering methodology and the MOT knowledge modeling up until now. The process described herein can be applied to other professional training domains where high-level knowledge and competencies are at stake.

Modeling Knowledge

The following paragraphs describe how the knowledge model and the competency profile were created in order to guide the pedagogical development of the program.

Information about the knowledge domain was gathered during group sessions with the Expert Committee and face-to-face sessions with some of its members. All members filled questionnaires in. The consultation of different content documents used in the program served to enrich this information. In working meetings, the teams identified a set of relevant knowledge and, in further steps, the specific cognitive and socio-emotional skills associated with the main knowledge. Moreover, the conditions of performance under which skills should be targeted were also defined.

Systematically, the analysis of obtained data led to a document synthesizing a competency profile that was validated by the Expert Committee. The validation process brought new elements to ad-

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