Chapter 3

EDUCATIONAL MODELING LANGUAGES
A Conceptual Introduction and a High-Level Classification

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Abstract: Creating good quality learning resources is not sufficient for an optimum learning experience. Equally important is having a more enabling learning process involving not only the delivery of learning materials but also other activities that the learner must carry out to meet the learning objectives proposed by the instructor (tutoring, tests, reading books, etc.). Educational Modeling Languages (EMLs) are the cornerstone of e-learning because they provide a language that can be used by the instructors to formalize their own teaching process so that it can also be interpreted by computers. In this chapter we provide a conceptual introduction and a high-level classification of some of the proposed EMLs.

Key words: Educational Modeling Language (EML), Learning Design (LD), learning process, activity, learning object.

1. INTRODUCTION

In the past few years the popularity of the Internet has facilitated new ways of learning, numerous educational tools and applications have appeared and e-learning has come into being. In this context, the idea of reusable resources (i.e Learning Objects, LO (Downes 2001; Koper 2003)) appeared, leading to the development of several specifications and standards to represent learning content (IEEE-LOM 2002), as well as educational resources, and methodologies to facilitate the development of learning materials (Fernandez-Manjon and Sancho 2002; Martinez-Ortiz, Moreno-Ger et al. 2005). The aim of these initiatives was to decrease the total cost of producing and maintaining good quality LOs, thereby promoting their
reutilization among companies and institutions. To allow this interchange, different initiatives have arisen (e.g. Instructional Management Systems -IMS-, Advanced Distributed Learning -ADL-, Aviation Industry CBT Committee -AICC-, etc). In the past and also in the present there has been an ongoing and active research into how to get the most out of LOs and regarding how to create LOs that can be adapted to different learner needs (Martinez-Ortiz, Moreno-Ger et al. 2005), or how to enhance motivation and engagement among authors is underway. For instance, in our research group we are betting on game based learning (Moreno-Ger, Martinez-Ortiz et al. 2005; Martinez-Ortiz, Moreno-Ger et al. 2006) providing teachers with a set of tools and a methodology to develop their own small games that can replace an LO inside a unit of learning.

However, most recent works (Koper 2000; Weitl, Süß et al. 2002; Paquette, de la Teja et al. 2005) show that creating and reusing good learning materials, although important, is only one aspect of the whole story. In the words of Prof. Koper (Koper 2000): “providing adequate knowledge is not enough: it has to be learned”, meaning that the learning process is not only a simple transfer of knowledge. When a course is being designed, it is necessary to decide not only what learning material will be used, but also in which order this material will be shown, and which other activities are needed (i.e. self-assessment, problem resolution, tutoring, class discussions, etc.) during the learning process. Therefore, one of the most prominent trends in the development of e-learning software is to provide means for describing these learning processes. As introduced in this chapter, this can be done by using suitable Educational Modeling Languages (EMLs).

The rest of the chapter is structured as follows: Section 2 provides a general overview of the concept of EML. Section 3 proposes a three-category high-level classification for EMLs, and summarizes the most relevant ones. Section 4 surveys the de-facto EML standard (IMS Learning Design -IMS-LD-). Finally, section 5 closes this chapter.

2. EDUCATIONAL MODELING LANGUAGES

The generalization of the term Educational Modeling Language (EML) in e-learning comes from the work developed at the Open University of the Netherlands (OUNL). They analyzed the diversity of Learning Management Systems (LMSs) in use and tried to address the shortcomings of e-learning systems derived from the lack of application of instructional and pedagogical theories. As a result they designed and put into practice the language called EML-OU.