Chapter XX
Diagrams of Learning Flow Patterns' Solutions as Visual Representations of Refinable IMS Learning Design Templates

Davinia Hernández-Leo
University of Valladolid, Spain

Eloy D. Villasclaras-Fernández
University of Valladolid, Spain

Juan I. Asensio-Pérez
University of Valladolid, Spain

Yannis Dimitriadis
University of Valladolid, Spain

ABSTRACT

This chapter introduces the use of diagrammatic representations of learning flow patterns as a means of visualizing refinable IMS learning design (IMS-LD) templates. It argues that the incorporation of pattern-based IMS-LD templates in authoring tools, which graphically guide users to create their own learning designs, offers a solution to the problem of IMS-LD constructs not being familiar to educators because of its technical nature and text-based notation. Furthermore, this solution facilitates the reuse of good practices formulated as patterns, permitting a design process that promotes potentially effective results. This issue is especially important in collaborative learning designs, in which elicitations of desired social interactions are planned beforehand. Based on these ideas, the chapter also presents Collage, an IMS-LD editor which provides templates based on collaborative learning flow patterns (CLFPs), and includes an example drawn from a real scenario that shows the feasibility and usefulness of the approach.

INTRODUCTION

Learning technology standards and specifications are used increasingly to support the professional activity of instructional designers (Rodríguez-Estévez, Caeiro-Rodríguez, & Santos-Gago, 2003). Significantly, the recent IMS Learning Design (IMS-LD) specification (IMS, 2003) highlights the use of computers to facilitate the teaching-learning processes instead of for delivering educational content (Burgos & Griffiths, 2005). That is to say, IMS-LD provides a machine-readable notation (XML language) to formalize learning scenarios that can be automatically interpreted by compliant players or learning management systems (LMS) (Koper & Tattersall, 2005). These formalized scenarios or units of learning (UoLs) are abstract representations of any individual or group-based learning situation (a course, a lesson, etc.). The main benefits of using a specification like IMS-LD are twofold. First, teachers, instructors and trainers can specify the behavior and functionality of a computer-supported learning system by providing a UoL (Bote-Lorenzo et al., 2004). And, second, because UoLs are interoperable and reusable, they can be executed in various compliant systems and in various settings with different participants (Tattersall et al., 2005).

However, as pointed out in Chapter XV, IMS-LD is a notation system that is layered, formal, textual and of a single perspective (Waters & Gibbons, 2004; Botturi, Derntl, Boot, & Figl, 2006). Due to its textual and formal nature, IMS-LD does not look familiar (i.e., cannot be understood intuitively) by the majority of educators, as argued by Harrer and Malzah (2006) and in Chapter XIV of this handbook. For this reason IMS-LD is not really practical as a teacher-friendly design and authoring approach for UoLs, nor is it useful as a means of communication in participatory design teams involving different stakeholders (Griffiths & Blat, 2005). To overcome these drawbacks, visual design languages and tools are envisaged as a solution for the reflective communication and creative generation of designs (see Chapter XXI).

This chapter focuses on the design of IMS-LD-formalized collaborative learning scenarios (or *scripts*) (Hernández-Leo, Asensio-Pérez, & Dimitriadis, 2005). Collaborative learning is a relevant educational approach, whose learning benefits are positively recognized by practitioners (Johnson & Johnson, 1999). This approach highlights the importance of social interaction and active learning processes. Computer-supported collaborative learning (CSCL) is the domain that studies the use of computers and networks as mediation technologies to support collaborative learning (Dillenbourg, 1999). It is worth noticing that the context dependency and social variables involved in CSCL make this domain particularly complex. This fact motivates the agreement of many authors on that CSCL settings need more flexibility (or less rigidity) than traditional, individual instructional sequences (Karagiorgi & Symeou, 2005; Dillenbourg, 2002; Oliver, Harper, Hedberg, Wills, & Agostinho, 2002). On the other hand, it is generally accepted that unplanned collaboration does not necessarily lead to learning outcomes (NISE, 1997; Dillenbourg, 2002). Efficient collaborative learning greatly depends on the effort employed at design time (Goodyear, 2005). Particularly required are systematic approaches to designing CSCL that focus on the elicitations of well-known effective desired interactions (Strijbos, Martens, & Jochems, 2004).

Considering the difficulties of finding an appropriate trade-off between coercion and free collaboration, re-inventing and designing collaborative UoLs for each specific learning situation is costly. A solution to this problem is unraveling content, tools, specific learning tasks, etc., from the structure (the learning flow) of the "CSCL script" (hereafter referenced as *scripts*) so that this structure can be applied and reused in different settings, in a similar spirit to the approach presented in the previous Chapter XIX. The