Chapter 15
Implementing Computer-Interpretable CSCL Scripts with Embedded Assessment: A Pattern Based Design Approach

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ABSTRACT

This chapter presents a proposal for a pattern-based approach for Computer Supported Collaborative Learning (CSCL) scripts that aims to integrate learning and assessment activities. After a general presentation of the approach, the chapter will focus on a case study which covers the whole life-cycle of a CSCL script with embedded assessment activities. The case, which took place in the context of a computer-mediated learning environment, includes the design, instantiation, enactment and evaluation of the script. Focusing on the relevance of the assessment activities which are integrated in the script, the case study illustrates the complexity of formalizing computer-interpretable CSCL scripts with embedded assessment. The usage of design patterns is proposed as a means of providing support and hiding the

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complexity of creating and enacting such scripts. The case study shows the feasibility of this approach, and provides information about the requirements of CSCL script authoring tools to employ assessment and learning design patterns to support non-expert designers in those tasks.

INTRODUCTION

Scripting in Computer Supported Collaborative Learning (CSCL) has been researched for several years as a way of improving the chances of achieving learning. In spite of the potential benefits of collaboration in learning scenarios, relying on the students to organize their own collaboration processes may result in low quality collaboration. In order to tackle the risks of free collaboration, macro-scripts have been proposed (Dillenbourg, 2002). This type of script describes the pedagogical method used to organize a session of collaborative learning (Dillenbourg & Tchounikine, 2007). A macro-script guides participants (students and teachers) along a learning session by defining the sequence of activities that need to be completed, the roles that the participants may assume, and the tasks assigned to each role. In addition, the script may be completed by external resources, which can be used by the participants to carry out the activities, as well as the description of the learning outcomes expected from the script (Kollar, Fischer, & Hesse, 2006). CSCL scripts may also describe how to form groups, and the distribution of resources among the participants (Kobbe, 2006).

In the CSCL field, technology can play different roles (Suthers, 2005). In this chapter we will look into computer support in the form of guidance for participants in a learning scenario according to CSCL scripts. Learning Management Systems (LMSs) have been used to manage automatically the enactment of the activities planned in the script. In other words, scripts, adequately represented, can be processed by LMSs in order to guide students and teachers along the sequence of activities, providing adequate instructions of the tasks to be done, providing the allocated resources (e.g., documents or collaboration software tools), or handling groups automatically (Bote-Lorenzo, Gómez-Sánchez, Vega-Gorgojo, Dimitriadis, Asensio-Pérez, & Jorrín-Abellán, 2008; Cid, Fuente-Valentín, Gutiérrez, Pardo, & Kloos, 2007). For this purpose, computer-interpretable Educational Modeling Languages (EMLs) have been proposed, such as PoEML (Caeiro, 2008), IMS-LD (IMS, 2003), etc. These EMLs allow the definition of the components that compose a script, such as activities, activity sequencing, definition of roles/groups, resources, etc. With these components, a script formalized in an EML can be interpreted by a software system to guide the participants along the script: indicating the groups that each participants belongs to, the activities they have to carry out, and the resources available for that purpose.

The task of designing collaboration scripts offers the chance of thinking carefully what learning activities are most suitable in order to achieve the expected learning objectives before actually going to the classroom. With a similar rationale, defining the assessment plan to be applied along the learning activities can pursue the same objective: assessment can be used not only to grade students, but to create adequate conditions to promote the learning objectives (Dochy & McDowell, 1997; Shepard, 2000). Actually, the role of assessment in enhancing learning has been thoroughly discussed; assessment can be used to improve collaborative learning, for instance by delivering feedback to students, who can then adapt their work or interaction processes to the feedback (Black & Wiliam, 1998). On the other hand, it has been argued that the teacher should employ assessment results continuously in order