Design and Execution of Dynamic Collaborative Learning Experiences

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ABSTRACT

The Computer Supported Collaborative Learning (CSCL) is a research domain whose methodological instances are vaguely recognized and even more rarely modeled. The purpose of this paper is to present a new approach for the construction of dynamic collaborative learning experiences and their devolution inside an Intelligent Tutoring System. The presented approach is based on the concept of “pedagogical templates,” instructional artifact based on the CSCL scripting used to design learning experiences by applying principles of participatory learning and social media. In order to experiment this approach, a tool purposed to design and execute dynamic collaborative learning experiences has been developed and experimented in formal e-learning settings.

Keywords: Adaptive Learning, Computer Supported Collaborative Learning (CSCL) Scripts, Learning Design, Learning Experiences, Learning Methods, Pedagogical Templates

INTRODUCTION

The research field on Technology Enhanced Education (TEE) suggests that the collaborative dimension of a learning experience is one of the most important elements to take into account in order to ensure a high level sustainability of e-learning (Wilson et al., 2006). The Computer Supported Collaborative Learning (CSCL) today is a well recognized concept in literature and is evolving in parallel with the development of models and methods that support the design of efficient networking activities and processes.
in different learning contexts and groups (Dillenbourg & Fischer, 2007).

Particularly, in a formal learning context, an efficient collaboration process must have a well structured model to adhere to, with predefined rules and objectives connected with specific learning activities. It is widely acknowledged that in the CSCL the spontaneous collaboration through standard collaborative software does not necessarily lead learners to play functional and complementing roles that can foster group discussion, knowledge sharing and argumentation (Wilson et al., 2006).

Nevertheless, structuring the collaborative learning process in an appropriate way is relevant, since free collaboration does not necessarily produce learning. Moreover, the unguided collaboration among team members can lead to detrimental learning. As stated in Laurillard (2008), “never before there has been such a clear link between the needs and requirements of education, and the capability of technology to meet them.” This is also true with respect to the difficulty implied in modeling collaborative learning processes and in defining and structuring groups or flows of collaborative activities.

In order to overcome this difficulty, the scientific community has recently developed and sustained the validity of new theoretical approaches related to the CSCL scripts (Griffiths et al., 2005). The CSCL (or collaboration) scripts are didactic scenarios that specify a sequence of collaborative phases through complex instructions. Different authors define CSCL scripts as “instructional sequences” that organize learning activities into phases. Each phase is defined by specific items: the activity (or activities) that learners have to perform, the group composition, the assignment of roles (to learners within the group), the interaction modes and the phase timing. These scripts are fundamental to guide collaboration.

The CSCL environments have to include more applications to support collaborative activities and to make the preparation of the CSCL script easier.

WHEN teachers engage students in collaborative learning, they give global instructions such as “do this task by group of 3.” These instructions are completed with implicit expectations with respect to the way students should work together. The teacher’s way of grading collaborative work strengthens this implicit contract. A collaboration script is a more detailed and more explicit didactic contract between the teacher and the group of students regarding to their collaboration mode. Most scripts are a linear sequence of phases. Each phase specifies the task that the students have to perform, the composition of the group, the way that the task is distributed within and among groups, the interaction mode and the timing of the phase (Dillenbourg, 2004).

The CSCL scripts are expected to facilitate learning by guiding peers collaboration and engaging all participants in activities that trigger the activation of their cognitive and metacognitive processes. The scripts need to be designed by an authoring tool able to formalize the learning activities in collaborative workflows. This tool has to respect several educational design requirements which we have identified in the CSCL literature: namely, group composition, role and resource distribution, coordination and flexibility. Each requirement implies a different challenge.

In this paper we present a novel approach to design and deliver dynamic collaborative learning processes and a tool able to apply such approach. The design process will not start from scratch but basing on the use and integration of pedagogical templates based on CSCL scripts. Pedagogical templates or patterns are used in order to capture and communicate recurrent learning design problems and opportunities (Goodyear, 2005). Each pattern describes a problem that occurs repeatedly and the solution core to that problem (Alexander, 1977).

The templates can be applied to instructional design at two levels: for learning materials and multimedia production, i.e., to define patterns
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