

# Linking Collaborative Learning Practice with IMS LD and Service-Oriented Technologies: an Approach Based on Collaborative Learning Flow Patterns

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## Abstract

This paper proposes Collaborative Learning Flow Patterns (CLFPs), which represent best practices in collaborative learning structuring, as a central element of a kind of bi-directional linkage that facilitates that teachers can play the role of designers influencing in the behavior of CSCL (Computer-Supported Collaborative Learning) technological solutions. Additionally, this paper describes a technological approach for achieving such a scenario. That approach is based on the Collage authoring tool that provides CLFPs as IMS LD templates and the Gridcole system, capable of interpreting the resulting CLFP-based LDs and integrating the service-oriented tools needed to support the (collaborative) learning activities as prescribed in those LDs.

## 1. Introduction: context

In the CSCL (Computer-Supported Collaborative Learning) domain collaborative learning practitioners become active players in the process of customizing technological solutions to their particular needs in every educative scenario. This is the so-called participatory design which poses a new requirement to the developers of CSCL tools and systems: how to obtain technological solutions for collaborative learning capable of being modified/adapted/enhanced by collaborative learning practitioners that usually do not have technological skills.

For the achievement of this overall goal, this paper proposes the combined application of a set of concepts and associated techniques that, as depicted in Figure 1, try to establish a bi-directional linkage between collaborative learning practitioners and technologists. Those concepts and techniques can be summarized as follows:

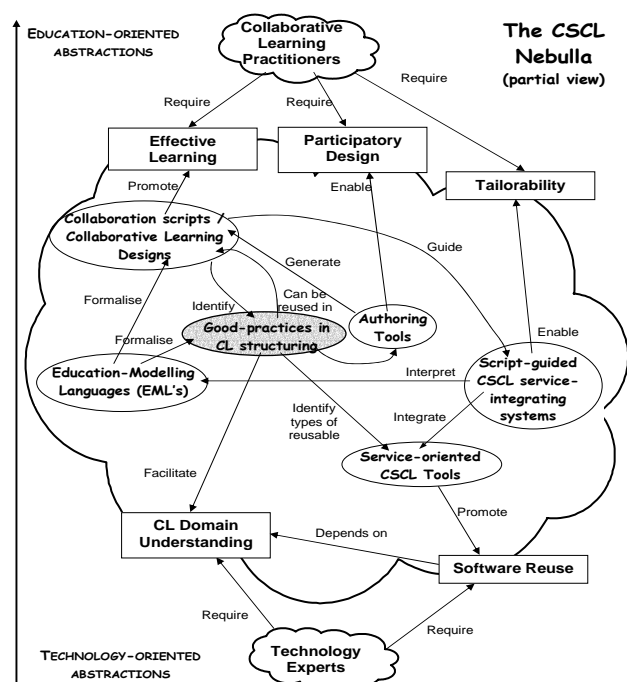


Figure 1. Map of concepts and techniques

- Promoting Effective Learning by designing collaboration scripts that structure potential interactions among collaborating participants.
- Enabling Tailorability (users of a system are capable of adding new functionality to it) by means of script-interpreting (scripts formalized by means of IMS LD) CSCL service-integrating systems.
- Enabling participatory design by means of authoring tools for collaboration scripts: as intended CSCL tailorable systems change their behaviour according to an interpreted script, a modification in the script (by the teacher) implies a modification in the system behavior without requiring a technical intervention.

## 2. CLFPs and implementation approach

For easing the authoring process, this paper proposes the use of the so-called CLFPs (Collaborative Learning Flow Patterns [2]). CLFPs are IMS LD-based formalizations of good practices (shadowed in Figure 1) in structuring the sequence of collaborative (or not) learning activities. The Collage authoring tool [2] promotes the use of CLFPs as the starting point for the creation of new collaborative scripts thus avoiding learning practitioners to start from scratch.

Figure 2 proposes a way of translating to real practice the concepts and techniques contained in Figure 1 using a set of tools (some of them already developed by the authors): a teacher uses the Collage authoring tool, by means of which she may reuse expertise reflected in CLFPs, for creating an IMS LD script. This script is interpreted by the Gridcole system [1]. Gridcole is a tailorable CSCL system capable of interpreting IMS LD and of guiding students and teachers through the flow of learning activities accordingly. For supporting the CSCL activities described by the script, Gridcole searches [4] appropriate service-oriented CSCL tools and offers them to students in an integrated fashion. This implementation process may be enhanced by the use of a group/user management tool, and by a process awareness tool that informs both teacher and students on the evolution of the collaborative situation.

The effectiveness of the collaborative setting (with respect to both design and tool support) should be evaluated [3] using data coming from multiple sources (the involved technological solutions among them).

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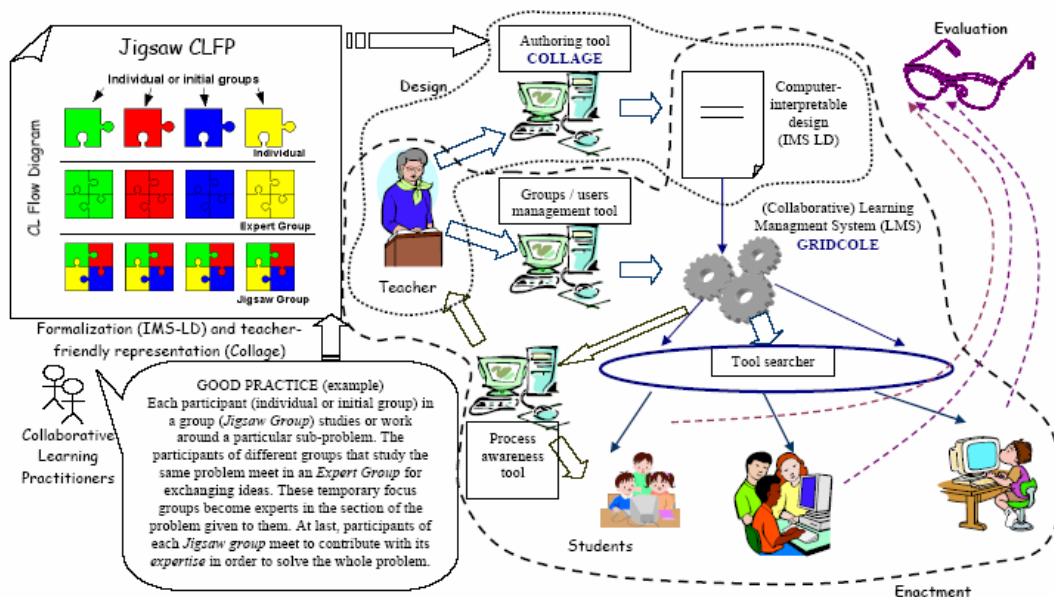


Figure 2. Global outline of the implementation approach