

Chapter 8

Collaborative Learning Design within Open Source E-Learning Systems: Lessons Learned from an Empirical Study

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ABSTRACT

This chapter addresses a number of serious ‘collaborative learning design’ problems faced by adults within the context of e-learning systems and outlines some innovative solutions. Specifically, thirty-three Computer Science students at the Hellenic Open University participated in an experiment aimed at designing collaborative learning courses for Computer Science concepts within MOODLE, a well known open source Learning Management System. The systematic study presented in this chapter argues and specifies that these Prospective Computer Science Professionals (PCSPs) have serious difficulties with the formation of both collaborative learning activities and collaboration procedures, and with realizing them within e-learning settings. The proposed solutions emphasize the design and development of a set of computer-based collaborative patterns reflecting diverse collaboration methods. These patterns are content free and could be used as scaffolding elements for the design of collaborative learning activities for online and blended courses. Specific examples of possible implementation of these patterns within well-known Web-based open source environments that support learning design are also presented.

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INTRODUCTION

E-learning has provided education with many benefits in terms of flexible opportunities to learn anytime and anywhere as well as to communicate and collaborate virtually throughout the world (Harasim, Hiltz, Teles & Turoff, 1995). Recent studies of e-learning have pointed out that involving learners in collaborative learning activities could positively contribute to extending and deepening their learning experiences, test out new ideas, improve learning outcomes and increase learner satisfaction, at the same time decreasing the isolation that can occur in an e-learning setting (Palloff & Pratt, 2004). Furthermore, collaborative learning situations can provide a natural setting for demanding cognitive activities which can also trigger collaborative learning mechanisms such as knowledge articulation as well as sharing and distributing the cognitive load (Dillenbourg, 1999). Within the context of online collaborative learning, students could also be provided with opportunities to be motivated to actively construct their knowledge (Scardamalia, & Bereiter, 1996) and to enhance their diversity and their understanding of the learning concepts in question as well as to acquire a sense of belonging online (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000).

However, many teachers remain unsure of why, when, and how to integrate collaboration into their teaching practices in general as well as into their online classes (Panitz, 1997; Brufee, 1999). Here, it is also worth mentioning that the abundance of theoretical considerations and models that provide teachers with resources for 'learning design' remains largely unused in their real teaching practices (Fosnot, 1966; Brufee, 1999). At this point, we shall use the term 'learning design' to indicate all the elements of learning activity design, e.g. a learning task to be posed to the students, a set of questions, the group formation, the learning materials to be used by

the students, learning assessment, etc. (Koper & Tattersall, 2005).

The essential role of suitably-designed tools to support teachers in their mindful and appropriate 'learning design' has been acknowledged by many researchers (Lloyd & Wilson, 2001; Babiuk, 2005; Kordaki, Papadakis, Hadzilakos, 2007; Kordaki & Daradoumis, 2009). In fact, teachers require more specific support in their learning design practices, such as specific tools and good examples of lesson plans. Thus, teacher encouragement and support for learning design is clearly needed. To this end, the role of learning design patterns has been acknowledged as essential (McAndrew, Goodyear, & Dalziel, 2006). Learning patterns looks to work on Architectural Patterns (Alexander, 1979) as a way to capture knowledge from designers and share them with practitioners.

Especially when it comes to Computer Science (CS) Education, educators have adopted a rather deficient approach to 'learning design', possibly because CS Education is a recently-developed scientific discipline. Yet, learning design should be an essential part of CS teachers' education. A number of studies have investigated CS teachers' opinions on CS curricula and on teaching and learning in CS as well as their real classroom practices (Kalyva, & Kordaki 2006; Kordaki & Kalyva, 2006). In addition, some studies have investigated the role of CS teachers in the formation of collaborative learning activities (Voyatzaki and Avouris, 2005). However, studies investigating Prospective Computer Science Professionals' (PCSPs) attempts to design learning courses incorporating 'computer supported collaborative learning design using some essential, specific and context free collaboration methods' have not yet been reported. Specifically, these methods are referred to: *Brainstorming* (Osborn, 1963), *Student Teams Achievement Divisions* (STAD; Slavin, 1978), *Jigsaw* (Aronson, Blaney, Sikes, Stephan & Snapp, 1978), *Group Investigation Method* (Sharan & Hertz-Lazarowitz, 1980), *Co-op Co-op* (Kagan, 1985), *Guided Reciprocal*

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