

## Chapter 3.3

# Supporting Virtual Collaborative Learning using Collaboration Scripts and Content Schemes

**Birgitta Kopp**

*Ludwig-Maximilians-University, Germany*

**Heinz Mandl**

*Ludwig-Maximilians-University, Germany*

### ABSTRACT

*Collaborative learning is used as a key principle in several approaches for designing virtual learning environments (e.g. CTGV, 2000). This is due to the fact that collaboration seems to foster individual knowledge acquisition (Lou, Abrami, Spence, Poulsen, Chambers, & d'Apollonia, 1996), improve knowledge application (De Corte, 2003), and increase social competencies. But collaborative learning is not always successful (Salomon & Globerson, 1989). Virtual learning places great and varied demands on collaboration, which means that learners often do not know how to collaborate adequately. In such cases, it is necessary to provide support. This chapter focuses specifically on two structuring methods, namely collaboration scripts and content schemes. To gain further insight into the topic, the authors will first describe the technical aspects of virtual collaborative learning. In the second section, the authors will depict the learning processes and outcomes of collaboration. Thirdly, they will discuss the theory and research on the structuring methods. The chapter ends with conclusions and practical implications.*

### INTRODUCTION

Virtual collaborative learning is being used increasingly in different contexts: in schools, in universities, in higher or in further education. This is due to the fact that collaborative learning

has several benefits, e. g. fostering individual knowledge acquisition (Lou et al., 1996), supporting knowledge application (De Corte, 2003), and encouraging the acquisition of social competencies. But collaborative learning is not successful in itself (Salomon & Globerson, 1989). There are some pre-conditions necessary for ensuring

DOI: 10.4018/978-1-4666-0011-9.ch3.3

that collaborative learning will have a positive effect. In addition, virtual learning places even more demands on learners, who must handle both the technique as well as the physical absence of the collaborating partners. They must learn how virtual learning is connected to different ways of collaboration. In virtual collaboration, interaction occurs mainly through written forms. This specifically results in four main problems.

Firstly, the coordination must be more explicit in virtual collaboration to result in effective collaboration and a joint group solution (Ellis, Gibbs, & Rein, 1991). Especially in asynchronous scenarios, it may take more time for learners to respond to their group members' contributions (McGrath, 1990). Secondly, social presence is different in computer-supported learning environments. As such environments involve less communication channels than face-to-face learning scenarios (e. g. mimic, viewing direction, voice, clothing-styles, etc.), it is necessary to express missing nonverbal cues in different ways, such as using emoticons to create social presence (Gunawardena & Zittle, 1997). Thirdly, access to the information and knowledge of the collaboration partners is mediated and limited by the computer, which makes the development of transactive memory (Moreland, 2000) more difficult (Krauss & Fussell, 1990). Transactive memory is defined as meta-knowledge about the knowledge and information of the individual group members (Clark & Carlson, 1982; Wegner, Giuliano & Hertel, 1985). Transactive memory is only developed when groups communicate for the purpose of exchanging and sharing information (Hinsz, Tindale, & Vollrath, 1997). A fourth problem concerns the lack of references for individual contributions as there are time delays in replying to entries as well as insufficient references to the content (McGrath, 1990). Virtual communication lacks the non-verbal and para-verbal signs which regulate face-to-face communication. Therefore, there are a large number of messages which do

not make reference to the preceding message (Friedman & McCullough, 1992).

Therefore, it is necessary to provide support in the form of structuring. There are two main ways of structuring the communication: collaboration scripts and content schemes. Collaboration scripts structure the collaboration process by giving learners different tasks or sub-tasks. Content schemes focus learners on content-specific aspects which are relevant for the task solution by structuring the task. The task is generally structured through the computer interface. Each of these methods has a different effect on learning processes and learning outcomes.

This chapter provides an introduction to the characteristics of virtual collaborative learning. These consist of learning outcomes, the technical aspects of virtual learning and the collaborative learning processes. In the second part, we will show two different ways of supporting virtual collaborative learning: collaboration scripts and content schemes. Thirdly, we will describe the direction of future research. The chapter ends with conclusions and further implications.

## **VIRTUAL COLLABORATIVE LEARNING**

Collaborative learning is defined as "a situation in which two or more people learn or attempt to learn something together" (Dillenbourg, 1999, p.2). In virtual collaborative learning, collaborative learning is mediated by the computer. This means that learners only interact with the help of the computer. The main technical differentiation of collaborative learning which is supported by computers concerns synchronicity. This specifically involves learners collaborating synchronously while sitting simultaneously in different places in front of a computer or asynchronously, when learners are collaborating not at different points in time.

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