Chapter 3

Computer–Supported Collaborative Learning: A Holistic Perspective

ABSTRACT

The aim of Computer-Supported Collaborative Learning (CSCL) is to integrate research on collaborative learning with the use of Information and Communication Technologies. From a holistic perspective, this chapter covers the research approaches and current trends concerning CSCL. In fact, the CSCL within the education dimension suggests the development of software/applications that bring learners together, offering both creative activities of intellectual exploration, metacognition and social interaction. A clear overview of the field, including a presentation of key-terminology and major issues, along with some important directions and open issues are discussed, towards an effort to offer a more comprehensive view of the current research in CSCL. This contributes to the enhancement of the role of collaborative learning within the purposes of this book.

INTRODUCTION

The field of Computer-Supported Collaborative Learning (CSCL) is interdisciplinary and draws upon a variety of different disciplines (e.g., education, anthropology, psychology, sociology, computer science, cognitive science, communication, artificial intelligence). At same time, works in CSCL are various in their contributions dealing with theorization, analysis, modeling, and design; however, important research that has taken place within CSCL has focused on the micro level of collaborative learning (i.e., single/small groups).

In general, according to Koschmann (1996) the following historical sequence of approaches can be defined: computer-assisted instruction (based on a behaviorist approach); intelligent tutoring systems (based on a cognitivist philosophy); the teaching of the Logo programming language (based on a constructivist approach); and CSCL (based on a socio-constructivist and dialogical approaches).

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Usually, CSCL systems provide a combination of several media and different forms of pedagogical support or scaffolding for collaborative learning. Additionally, they can provide feedback to the learners and support sociability by monitoring interaction patterns. Here, it is important to refer that the role of the computer is seen as secondary to the interpersonal collaboration process among the participants, because the software is designed to support, not to substitute, the human processes.

For several years, theories of collaborative learning tended to focus on how individuals function in a group; however, recently, the group itself has become the unit of analysis and the focus has shifted to more emergent, socially constructed, properties of the interaction (Dillenbourg et al., 1996). Based on empirical investigation, researchers controlled several independent variables (e.g., size of the group, composition of the group, nature of the task, communication media); however, causal associations between the conditions and the effects of collaboration are almost impossible to find. Fortunately, other empirical studies have started to focus less on establishing parameters for effective collaboration and more on trying to understand the role of such variables in mediating interaction in a more process-oriented, requiring new tools for analyzing and modeling interactions. In fact, effects of gender or group composition (i.e., heterogeneous/homogeneous competence levels) can be absolutely different at particular ages, in particular domains and with particular teachers (Dillenbourg et al., 1996).

The change to the group unit of analysis coincided with a focus on the elaboration of a social theory of mind, such as Vygotsky (1980) had begun to underline, clarifying the relation of individual learners to collaborative learning in groups/communities. Individual learners have different developmental capabilities in collaborative situations than when they are working alone; and, at the same time, the concept of “Zone of Proximal Development” (ZPD) is defined as a measure of the difference between these two capabilities (Vygotsky, 1980). Basically, collaboration is seen as a process of shared meaning construction, as an interactional achievement that can be analyzed across sequences of messages from several participants. Methods such as conversation analysis (ten Have, 1999; Meredith & Potter, 2014) or video analysis (Koschmann et al., 2004; Ruggiero et al., 2013) have been used in studies related with collaborative meaning making.

CSCL embraces a more situated view of learning, locating learning in meaning negotiation carried out in the social world rather than in individuals’ heads. In turn, social approaches (Lave & Wenger, 1991) and dialogical approaches (Hicks, 1996) are related to a view of learning as socially organized meaning construction. Taken together, they embrace a basis for a new way of thinking and investigating learning. On one hand, social practice theory focuses on one aspect of meaning negotiation (i.e., the negotiation of social identity within a community); on the other hand, dialogical theories locate learning in the development of meaning within social interaction.

Generally speaking, the purpose for design in CSCL is to create activities/environments that enrich the practices of group meaning making; however, to create an enhanced form of practice a more multifaceted form of design, bringing theories/practices from different disciplines is required. Simultaneously, to support collaborative learning and knowledge building, a more detailed understanding of how small groups of learners construct shared meaning using various artifacts and media should be considered.

The literature review have pointed out that the aspect of collaborative learning that is more complicated to understand is what may be intersubjective learning (Suthers, 2005) or group cognition (Stahl, 2006). In this way, in order to understand how the cognitive processes of participants are influenced by social interaction, an understanding of how learning events themselves occurs in the interactions among participants is needed. Stahl (2006) has argued that small groups are the most useful unit for the study of intersubjective meaning making; however, analysis of large-scale changes in communities may lead to an understanding of social-learning phenomena.
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