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Strategies for collaborative writing and phases of knowledge construction in CSCL environments

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ABSTRACT

Within the framework of research that describes the processes of collaborative knowledge construction in computer-supported collaborative learning (CSCL) environments, the present work has three objectives: (i) the identification of the strategies of six small groups of university students for the elaboration of written products in a CSCL environment; (ii) seek relations between the identified writing strategies and the processes and phases of collaborative knowledge construction in the groups; and (iii) relate these strategies and phases with the learning results obtained by the groups. We carried out a multiple-case study, with the analysis of four different didactic sequences, in two different virtual learning and teaching settings. In each setting, three student groups were studied, where each had to collaboratively develop between four and eight written products. For all the studied groups, the analysis enabled the identification of five types of strategies in the preparation of the elaboration of written products, and four types of phases of collaborative knowledge construction, which are interrelated and also connected with the grades that the groups obtained in each case.

1. Introduction

The study of collaborative processes developed by university students in computer-supported collaborative learning (CSCL) environments has increased considerably during the past decades. This increase has allowed the suggestion of different explanatory models for these types of processes. These models describe this type of collaboration as a socio-cognitive process that is developed in a sequential way (Kanuka & Anderson, 1998), and as an entity structurized in phases of collaborative knowledge construction (Garrison, Anderson, & Archer, 2001; Gunawardena, Lowe, & Anderson, 1997; Harasim, 2002; Xin, 2002). The studies that have resulted in this type of models have typically centred on the analysis of discussion forums. However, these studies have directed much less attention to other types of activities and tasks, and in general to the relation between the tasks given to the student groups and the interaction processes in which they get involved (de Laat, 2006; Kirschner, Martens, & Strijbos, 2004; Lockhorst, 2004).

Within this framework, the present work intends to deepen the comprehension of the knowledge construction processes in CSCL environments developed for small groups of university students that are carrying out tasks of elaborating written products. More concretely, this work is a detailed analysis, through the use of a multilevel analysis model, of strategies for the collaborative elaboration of written products of six groups of university students, in two diverse instructional settings. The work has three objectives: (i) identify the strategies for the collaborative elaboration of written products developed by the different groups; (ii) explore the existence of relations between these strategies and the sequences of phases of collaborative knowledge construction that the groups follow; and (iii) relate the different groups' strategies and phases of construction with the learning results obtained in each setting in the different tasks.

1.1. Theoretical approach

From a sociocultural constructivist point of view, learning processes are described as the construction of shared meanings, and the importance of discourse as a basic mediating tool for this construction is underlined. Learning is realized through guided, active and committed participation in cultural activities where the learning objectives are treated, and the continuous dialogue between the participants

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allows increasingly higher levels of intersubjectivity and the advancement towards richer and more complex shared representations of the tasks and the learning contents (Bereiter, 1994; Daniels, 2001; Mercer, 2000; Vygotsky, 1978; Wertsch, 1985).

This perspective also underlines the situated character of the knowledge, which is understood as part and product of the participants' joint activity and of the context of their use. In this sense, the participants' discursive activity is set within the larger context of the activity. Therefore, a crucial element for understanding how knowledge is constructed has to do with the entirety of the actions of the teacher and the students; that is to say, with what is being done and said by all the participants, throughout the course of the concrete teaching and learning process (see for example Newman, Griffin, & Cole, 1989; Tharp, Estrada, Stoll Dalton, & Yamauchi, 2000; Wertsch, 1985). The joint activity between the participants is, in turn, conditioned by the characteristics of the institutional, social and cultural context in which it is set (Cole, 1996; Engeström, 1999).

In summary, this perspective induces a view on the CSCL as special and complex contexts, in permanent processes of construction and reconstruction by the participants and under the influence of multiple interconnected factors. The study of collaborative processes requires, within this framework, the analysis of the special characteristics of the CSCL environments as interactive contexts of activity and discourse.

As a result of the consideration of the discourse as the basic mediator of collaborative learning processes, much of CSCL research has focused on content analysis of the transcriptions of the online conversation in order to investigate the quality of the interaction process in which the students engage. In general, the objective of the content analysis is to obtain evidence of learning and knowledge construction that goes beyond the manifest content of their contributions (De Wever, Schellens, Valcke, & Van Keer, 2006; Lipponen, Rahikainen, Lallimo & Hakkarainen, 2003; Rourke, Anderson, Garrison, & Archer, 2001; Schrire, 2006).

Starting with this content analysis, various authors have suggested models that characterize the processes of collaborative knowledge construction in virtual environments as a sequence of phases of collaborative knowledge construction. Amongst these models, it is worth highlighting that of Garrison et al. (2001), Gunawardena et al. (1997), Harasim (2002) and Xin (2002), which have been revised and adapted by various authors in different works (de Laat & Lally, 2003; de Laat & Lally, 2005; Kanuka & Anderson, 1998; McLoughlin & Luca, 2000; Schellens & Valcke, 2005; Schrire, 2006).

The different models' theoretical perspectives do not entirely coincide, and they identify varying numbers of stages or phases. Nevertheless, all these models describe collaborative knowledge construction in virtual environments as "a logically sequenced developmental process" (Kanuka & Anderson, 1998) of sociocognitive character. This process goes from divergence between the participants' ideas and contributions to convergence of shared meanings and comprehensions, so that each stage or phase represents a higher level of sociocognitive complexity than the previous.

According to these studies, collaborative knowledge construction in virtual environments requires high levels of continuous interaction and reciprocal communication between the participants, allowing argumentation, negotiation, discussion and the joint construction of meanings. Within this kind of interaction, different interpsychological mechanisms that favour the constructive potential of the interaction between the students may occur. This is, for instance, the case of the socio-cognitive conflict (Doise, Mugny, & Perret-Clermont, 1975), conceptual controversies (Johnson, 1981; Johnson & Johnson, 1979), to consider others' perspective (Järvelä & Häkkinen, 2000; Selman, 1980), formulate one's own point of view (Webb, 1983; Webb, 1991; Cazden, 1988), give and receive help (Webb, 1991), the coordination of roles and the mutual control over the work (Blaye & Light, 1990; Forman & Cazden, 1985; Mercer, 2000; Miyake, 1986; Tharp et al., 2000), the exploratory talk (Barnes, 1976; Mercer, 1995; Mercer, 2000) or the progressive discourse (Bereiter, 1994; Scardamalia & Bereiter, 1994; Scardamalia & Bereiter, 2003).

However, these types of models have paid limited attention to the concrete task that the participants carry out and to the larger context of the joint activity where they are acting. A large number of authors point out the task that is being carried as one of the key variables that can mediate in the interaction patterns in which peers are involved when they collaborate in small groups (for example, Cohen, 1994; Dillenbourg & Schneider, 1995; Strijbos, Martens, & Jochems, 2004; Van Drie, Van Boxtel, Jaspers, & Kanselaar, 2005). This corresponds to the requirements of an ecological, sociocultural and situated view on the processes of knowledge construction (Stodolsky, 1988; Tharp et al., 2000).

In this article we focus on the effects that a specific type of task, the elaboration of written texts, can have on the processes of joint knowledge construction in CSCL environments. Collaborative writing is a very specific collaborative activity that differs from others in that written language is both the group's product and its means for communication between the writers (Cerrato, 2003). The products provide a joint working space for the participants' continuous process of construction and reconstruction. Even though the sub-processes involved in the composing of a joint document are similar to those involved in writing text that is not shared – planning, translating and reviewing (Flower & Hayes, 1981), the authors of a shared text have to make explicit their ideas in order to be able to take decisions and reach agreements with other authors. The negotiation of ideas and of the text converts itself into a need in collaborative writing (Lowry, Curtis, & Lowry, 2004). The collaborative mode reflects joint meaning making (Saunders, 1989). Co-construction of knowledge implies that meanings are extended, deepened or transformed because participants build on each other's contributions (Van Drie et al., 2005) throughout the whole writing process.

1.2. Methodological approach

The present work constitutes a multiple-case study (Yin, 1989) that includes four didactic sequences based on online collaborative activities with university students. Various revisions of the methodology of investigation in CSCL (see for example, Schrire, 2006; Stahl, Koschmann, & Suthers, 2006; Xin, 2002) point out case studies as an appropriate strategy for the analysis and interpretation of the interactions between the participants in CSCL environments.

The four instructional sequences that are studied correspond to two different teaching and learning scenarios, developed at two different institutions and using different virtual platforms. In each of the two scenarios, two consecutive didactic sequences (DS)[1] have been studied, with the end purpose of exploring in detail the temporal evolution of the collaborative processes.

[1] A didactic sequence (DS) is defined as a process that includes all the typical components of a teaching and learning process – goals, contents, teaching/learning activities and assessment activities – and in which it is possible to identify a beginning, a development and an ending.