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Face-to-face versus computer-mediated communication in a primary school setting

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Abstract

Computer-mediated communication is increasingly being used to support cooperative problem solving and decision making in schools. Despite the large body of literature on cooperative or collaborative learning, few studies have explicitly compared peer learning in face-to-face (FTF) versus computer-mediated communication (CMC) situations. In the present study, the effects of the use of cooperative FTF groups versus and CMC groups on the interactive behavior and task performance of 42 dyads of sixth grade Dutch primary school students working collaboratively on a mathematics task were examined. The results show the FTF dyads to provide significantly more high-level elaborations than the CMC dyads when solving the mathematics problems. In contrast, the CMC dyads provided about three times as many regulative utterances and about twice as many affective utterances as the FTF dyads. The FTF dyads attained higher performance scores than the CMC dyads, and they were also relatively more satisfied with their cooperation.

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Computer-mediated communication (CMC) is increasingly being used in schools as an environment for cooperative or collaborative learning (Gunawardena, Lowe, & Anderson, 1997). CMC has been promoted as a means to improve communication

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and collaboration between students. CMC has also been promoted as a means to facilitate the sharing of knowledge and understanding among students who are not working together in a FTF situation (Lipponen, 1999). An important question is how CMC affects interaction patterns in a collaborative learning group while solving a cooperative task when compared to FTF communication. In this study, interactions within FTF cooperative learning groups are compared to interactions within CMC cooperative learning groups.

Numerous studies show collaborative learning to enhance not only student achievement but also their social development (Cohen, 1994; Dillenbourg, 1999; Johnson & Johnson, 1994; Slavin, 1996). Both field and laboratory studies on the achievement effects of collaborative learning have been conducted for every major subject and all grade levels. The result is widespread consensus among researchers on the positive effects of collaborative learning on student achievement (Slavin, 1996). In recent years, the question of just how collaborative learning enhances peer interactions and group work has resulted in a new area of research referred to as computer-supported collaborative learning (CSCL).

In the CSCL literature, authors often speak of collaborative learning as opposed to cooperative learning and a distinction is made between collaboration versus cooperation. Collaboration involves the mutual engagement of participants in a coordinated effort to jointly solve problems together while cooperation typically involves a division of labor across participants and thereby each person being responsible for a portion of the problem solving (Dillenbourg, Baker, Blaye, & O'Malley, 1996; Roschelle & Teasley, 1995). This distinction is largely untenable, however, because cooperation often involves shared work as well (see for example, Cohen, 1994; Johnson & Johnson, 1994; Kagan, 1994). That is, the terms cooperative learning and collaborative learning are used very loosely and often interchangeably in the cooperative learning and CSCL literatures. In the present study, both terms cooperative learning and collaborative learning will be used interchangeably to refer to learning environments in which small groups of students work together to achieve a common goal. To achieve the common goal, however, it is recognized that the different members of the group may choose to take responsibility for different sub-tasks and therefore work cooperatively or tackle all parts of the problem together and therefore work collaboratively (see also Underwood & Underwood, 1999).

Perspectives on learning in cooperative or collaborative groups have been strongly influenced by sociocognitive theory based on the work of Piaget (1926) and socio-cultural theory based on the work of Vygotsky (1978). Both Piaget and Vygotsky emphasized the role of the social context in the construction of knowledge and the complementarity of the active child and the social environment in the co-construction of knowledge. Moreover, both Piaget and Vygotsky maintained that peer interactions provide rich and necessary contexts for students to revise their current cognitive systems. That is, reflection on peer reactions and perspectives provides a basis for students to revise their cognitive systems and such revisions can, in turn, lead to the establishment of new meanings (Cole & Wertsch, 1996; De Lisi & Goldbeck, 1999; Hogan & Tudge, 1999).

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