Aspects of students' monitoring function in a CSCL environment

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ABSTRACT

A CSCL learning environment specially designed for increasing 6th grade students' control of their learning was studied through analysis of the students' written and oral comments in inter-dyad and intra-dyad conditions respectively. It was found that most of the monitoring process of the activity was taking place in the intradyad oral discussions and that the metacognitive character of the latter correlates with the quality of communication in the dyad.

KEY WORDS: Computer Supported Collaborative Learning, Metacognition, Collaboration

INTRODUCTION

Research in the design of learning environments for the teaching of science has lead to effective design principles. For example in a recent experiment Vosniadou et al. (2001) a learning environment to teach science (mechanics and astronomy) to fifth and sixth grade students showed significant difference between the experimental and control groups in pre-test, post-test comparisons. In this environment the students expressed and supported their ideas using models, representational symbols, and measurements, working in small groups and presenting their work to the classroom for debate. However this environment did not provide the students with many opportunities to have control over their learning and to develop cognitive monitoring skills. The monitoring of the classroom and the decisions about learning content and learning activities was under the control of the teacher. Given the importance of developing intentional learners (Vosniadou 2002), we designed, a learning environment that gave students greater freedom to decide on their own learning activities, and to plan and monitor their learning. In this environment there was integrated a software designed for the support of CSCL, WebKF (Scardamalia & Bereiter 1994) which scaffolded students in creating and using a public database where much of the discussion was taking place. Our investigation focused on how monitoring was realized and whether it correlated with the quality of collaboration among the students.

METHOD

In the context of this project, students in a 6th grade classroom in a big private primary school at the outskirts of Athens (Kollias, Vosniadou & Ioannides 1999; Kollias, Vlassa & Vosniadou 2001) participated in an inquiry focusing on the workings of the internal heating system of a building. The intervention took place in one of the computer rooms of the school and lasted one hour a week for 12 weeks.

The design of the collaborative learning environment was directed by the following general principles:
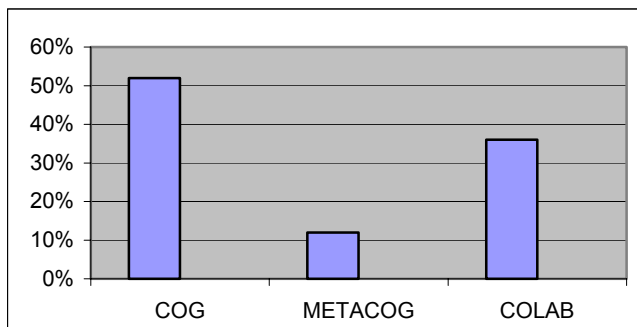
    1. To encourage the expression and use of prior knowledge for knowledge building and conceptual change through the use of Knowledge Forum

    2. To use collaboration to increase motivation and to promote the development of metacognitive and self-regulation skills. The students worked in dyads to find the information and to design the models. They then combined in larger groups of three to work on their final project presentations to the class.

    3. To promote the teacher's role as a facilitator of students' knowledge-building activities and to move students into a more constructivist epistemology of science. For this purpose, the teacher agreed not to provide direct information to the students but to guide them in their search for information.

    4. To transfer planning responsibilities to the students in order to promote the development of self-regulation and metacognitive skills. In order to achieve this goal, the students had to find information, organize it, design a model of the heating system, and present it to the rest of the class in collaboration with other students.

In order to find out what was the quality of collaboration in the dyads, and whether this had on effect on the dyad's work, students were videotaped, taped, and were observed by the experimenters at various times as they discussed in the process of constructing their models and planning what to put in the Knowledge Forum.

RESULTS AND DISCUSSION

An examination of the Knowledge Forum data base showed a large number of cognitive notes focusing on explanations. As can be seen in figure 1, over 50% of the notes were categorized as "cognitive," as opposed to "metacognitive" and "communicative".

Figure 1: Distribution of Notes in the Knowledge Forum Data Base
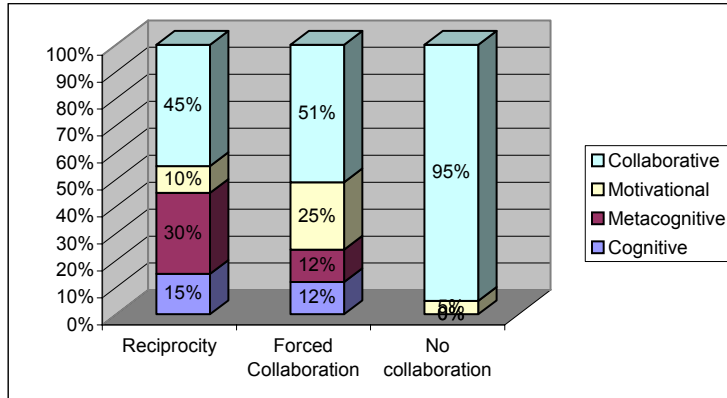

Cognitive notes were either explanations (about 20% of the cognitive notes were explanations) or descriptions, clarifications and specifications. Metacognitive notes focused on the monitoring and evaluation of the cognitive activity whereas the communicative notes were socially oriented. It appears that the students were using WebKF mostly to explain, clarify and describe phenomena, and not to plan and organize what they were going to write in their notes.

On the contrary, a great deal of the metacognitive activity seemed to take place in the conversations that took place between the children in the dyads, where the children talked about what they were going to write in the notes. The students' interaction was analyzed both in terms of the Discourse Types that appeared in the verbal exchanges and the Collaboration Style of the dyad. Three categories of Collaboration Style were identified Reciprocity, Forced Collaboration and No Collaboration.

Four categories of discourse were identified to take place in the student dyads: Cognitive, Metacognitive, Motivational, Collaborative. Figure 2 shows the relationship between Discourse Type and Collaboration Style in the dyads.

As can be seen, a large percent of the discourse in all the dyads centers on the challenges of collaboration. But this discussion is predominant in the No Collaboration Style, compared to the Forced Collaboration and the Reciprocal Collaboration Styles.   The children in the No Collaboration Style, cannot go beyond talking about how to collaborate to talk about anything else. In the Forced Collaboration group in addition to talking about how to collaborate the children seem to spend some time on Motivational Discourse. These children are asking why they are doing what they are doing, what they need to do in order to complete the task, and who is going to do what. In contrast to the above, the children in the Reciprocal Style can talk about the task itself and engage in the planning and monitoring necessary to do the cognitive work.

Figure 2: Relation between discourse types and collaboration style

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