

SUPPORTING HISTORICAL REASONING IN CSCL

Abstract. In this paper we focus on how features of a CSCL environment can elicit and support domain-specific reasoning and more specifically historical reasoning. The CSCL environment we use, enables students to collaborate on a historical inquiry task and in writing an argumentative text. In order to support historical reasoning we compared two representational tools: a graphical representation (argumentative diagram) and a linear representation (argument list). As it is assumed that an argumentative diagram can support both cognitive and interaction processes, we expected that using this tool would result in more qualitative historical reasoning, in the chat as well as in the text. However, the results of this study did not show a significant difference in the amount and type of historical reasoning between the two conditions. A possible explanation can be found in the way the students make use of the tool while executing the task.

1. INTRODUCTION

A computer-supported collaborative learning environment is a learning environment in which a large amount of information can be easily accessed, and in which knowledge can be shared and co-constructed through computer mediated communication and joint construction of products. It is believed that these characteristics make CSCL an environment with much potential to provoke and support the construction of knowledge (Lethinen, Hakkarainen, Lipponen, Rahikainen & Muukonen, 2001). However, using a CSCL-environment is no guarantee of productive student interaction or positive effects on learning. Research on collaborative learning has shown that meaningful learning is related to the quality of the interaction processes (Van der Linden, Erkens, Schmidt & Renshaw, 2000). The design of the task and the tools that are available can be considered important factors that affect the quality of the student interaction (Van Boxtel, 2000; O'Donnell, 1999). Our main interest in this research project is how features of task and tools in a CSCL environment can elicit and support interaction processes that contribute to the learning of history.

Studying interaction processes from different (theoretical) perspectives may give more insight in the complex relation between collaborative learning tasks, interaction processes and learning outcomes (Van Boxtel, 2002). In line with Van Boxtel's suggestion we study peer interaction from three perspectives: a domain-specific perspective, an elaboration perspective and a co-construction perspective. First, from the domain specific perspective the main focus is on the content of the student interaction. The domain of history is central in this research project and we are specifically interested in the improvement of historical reasoning within an inquiry task. Historical reasoning implies that students situate historical phenomena in time, that they describe and explain historical phenomena, distinguish processes

of change and continuity, consider the trustworthiness and value of sources and support their viewpoint or opinions with arguments. Reasoning within the domain of history also involves the use of historical concepts. From the elaboration perspective, the importance of elaboration in peer interaction is emphasized. The idea of elaboration is based on the constructivist idea that knowledge is not transmitted or passively received, but actively constructed (Brown, Collins & Duguid, 1989). Processes, such as asking and answering questions, reasoning and argumentation to resolve controversy, elicit elaborate interaction and contribute to the learning process. A third way to study the relationship between student interaction and meaningful learning is to put in focus the co-construction of knowledge. In recent years, especially from a socio-cultural perspective on learning, the joint and situated construction of meanings through communication and the role of mediational tools have been emphasized. When students work on a common task, mutual understanding must be created and sustained continuously (Roschelle, 1992). Knowledge can be co-constructed through the integration of ideas or through productive argument, questioning and exploration. Furthermore, student interactions can differ from each other in the amount of co-construction. Interaction in which one of the students is dominating, or that shows unproductive dispute or the accumulation of ideas without critical challenges is not believed to be valuable for learning (Mercer, 1995). We consider interaction episodes that contain all three above-mentioned aspects important for learning history. We will refer to this by the term '*co-elaborated historical reasoning*'. Thus, by co-elaborated historical reasoning we mean elaborate historical reasoning episodes in which both students equally contribute to the elaboration.

The results of a first study we conducted on historical reasoning in a CSCL environment showed that although the students did reason about history, this reasoning was often of poor quality (Van Drie, Van Boxtel & Van der Linden, accepted). The chat protocols did not show much co-elaborated historical reasoning. The students only briefly discussed their point of view on the historical issue at hand, and which arguments they would use to support their viewpoint. Discussion about counter arguments rarely occurred. The texts produced showed the same pattern. Based on these results we tried to support the quality of historical reasoning in the text and eliciting co-elaborated historical reasoning in the chat discussions. We decided to use a representational tool, an argumentative diagram, to support the process of argumentation within historical reasoning. In an argumentative diagram students can represent different arguments pro and contra and relate these to each other by using arrows. Graphical representations such as an argumentative diagram can be meaningful because of their communicative and cognitive function (Suthers & Hundhausen, 2001; Erkens, Kanselaar, Jaspers & Schijf, 2001). From a communicative function perspective, it contributes to a shared understanding and a joint problem space between co-learners, and enables them to focus on salient knowledge (Suthers & Hundhausen 2001; Veerman & Treasure-Jones, 1999; Crook, 1998). From a cognitive function perspective, a graphical representation can be meaningful for two reasons. First, it focuses attention to central problems, relations and structures in the task, helping to distinguish central, main or core issues from more peripheral ones (Suthers & Hundhausen, 2001). Second, it stimulates the

process of elaboration, for it can refine and structure the content of students' knowledge and makes participants aware of gaps in their knowledge, for instance about what specific relations are present or about the balance between arguments against and in favour of a position (Suthers & Hundhausen, 2002). Based on these considerations we believe that an argumentative diagram can also be a useful tool for supporting argumentation within historical reasoning.

In the study presented here, we compared the use of a graphical representation (argumentative diagram) with a non-graphical representation (argument list). A diagram differs from an argument list in the way the arguments are represented. In a diagram the arguments are represented in a graphical way, which enables students to link different arguments with one another. A diagram gives a more overall view and structures the argumentation. An argument list, on the other hand, represents the arguments in a more linear way and gives less structure to the argumentation. By comparing these two types of representation, we try to get more insight in how the use of these representational tools influence the amount and quality of historical reasoning in the chat and text. We expect that the use of the argumentative diagram, compared to the argument list, will elicit more interaction on the arguments and on the relations between the arguments, and therefore will show more co-elaborated historical reasoning. We expect that the amount of arguments pro and contra is more balanced in the diagram, for the diagram makes the amount of arguments pro and contra more directly visible, whereas in the argument list one has to run through all the arguments on the list and count them. Concerning the learning outcomes, we expect the students in the diagram condition to produce texts of higher quality and have higher scores on the (individual) post test.

2. METHOD

2.1. Design

The main question of this study is in which way the use of a argumentative diagram in a CSCL environment, compared to an argument list, influences the amount and type of historical reasoning in the chat discussions, and how it affects the quality of the texts produced and the individual learning outcomes. Subjects of the study were 60 students from three history classes in pre-university education (aged 16-17). Sixteen student pairs participated in the experimental condition and used the argumentative diagram; fourteen pairs used the argument list. The students were randomly assigned in pairs and to one of the conditions.

The students worked in a computer-supported learning environment called Virtual Collaborative Research Institute (see <http://edugate.fss.uu.nl/vcri>). VCRI is a groupware program that enables students to work collaboratively on an inquiry task and text writing. Each student works at one computer, physically separated from the partner. Communication takes place by means of chat. Figure 1 shows the main screen of VCRI in the diagram condition. Information about the task and relevant historical sources can be found in the database menu. The upper left window contains a chat facility and the chat history. The text (lower left) is a shared text

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