Levels of Web-Based Discussion: Theory of Perspective-Taking as a Tool for Analyzing Interaction.

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Abstract: The aim of this paper is to present a model how the level of web-based discussion can be analyzed. The model has been developed in an empirical study where we examined the quality of asynchronous interaction in web-based conferencing. Because all successful communication presumes perspective-taking skills and reciprocal understanding among the participants, we studied whether the students are able to reach in reciprocal interaction and thus create educationally relevant high-level web-based discussion. The subjects of the study are pre-service teachers in the USA (N=40) and Finland (N=30) who use an asynchronous web-based tool called Conferencing on the Web (COW) to collaborate in creating joint case-based descriptions in different areas of teaching and learning. The results of the study point out different levels of web-based discussion. More specific analysis of the quality of each discussion level focused on perspective taking in communication. The results support our hypothesis that higher level perspective taking was related to higher level discussion. The relevancy of perspective-taking theory as a tool for analysing web-based discussion is discussed.

Keywords: web-based learning, perspective-taking, electronic discussion

Introduction

The educational potential of computers coupled with networked technology and the Internet has long been recognized. With the extraordinary growth recently in "virtual universities", "virtual classrooms" and distance learning there is an optimistic view that global networks and the use of computers for intellectual communication will further enhance and expand how humans connect, communicate, and create a sense of community (Bonk & King, 1997; Fetterman,1998; Owsten, 1997; Harasim, 1993). The strongest argument for web-based learning has been an access: learning can be made available to students for whom distance or time are the primary impediments to certain studies. Learners can, for example, access virtual classrooms, online collaborative groups, learning circles, peer networks, and online libraries in a shared space. The optimistic view has not entirely shared among the researchers and also critical questions about the quality of web-based learning have been presented (Järvelä & Häkkinen, 1999; Saarenkunnas et al. 1999). Roschelle and Pea (1999) indicate several difficulties for using today's web as a medium for productive interaction: (a) Interactive communication on a web is very much dependent on text. Thus, it is much easier to passively read and view information than to actively create it, (b) Collaborative processes are overemphasized, generalized, and their web-spesific features are not explicated, (c) Asynchroneous communication is very different than face-to-face communication. Some of the most important processes in human communication, like creation of mutual understanding or shared values and goals are hard to reproduce in the web environment.

The ideas presented in this article are especially challenged by the critical questions focused on the web-based interaction. Are the students able to reach in such an interaction, which leads them to educationally relevant higher level web-based asynchronous discussion? For analysing the level of web-based discussion we developed a theory-based tool following the ideas of Selman's sociocognitive construct of perspective-taking. The model and its theoretical basis will be introduced and the practical stages for data analysis are demonstrated in an empirical study of web-based learning in teacher-education.

The Properties of Social Interaction and Reciprocal Understanding in Asyncronous Discussion

Asynchronous interaction without immediate social interaction has many challenges to overcome since communicating parties are faced continuously with the task of constructing their common cognitive environment. A great deal of information conveyed by face-to-face interaction is derived from such things as tone of voice, facial expressions and appearance. The absence of visual information (e.g. missing facial expressions and nonverbal cues) reduces the richness of the social cues available to the participants, increasing the social distance. For people to communicate effectively, they must solve the mutual knowledge problem (Graumann, 1995; Krauss & Fussell, 1990; Nystrand, 1986). According to the researchers in the field of socio-linguistics the mutual knowledge problem derives from the assumption that to be understood, speakers must formulate their contributions with an awareness of their addressees' knowledge bases. That is, they must develop some idea of what their communication partners know and do not know in order to formulate what they have to say to them. Research on collaborative learning also calls for reciprocity in social interaction (Crook, 1994). It seems evident that people acquire knowledge and patterns of reasoning from one another but for some kinds of shared knowledge, individually rooted processes play a central role. In the grounding phase of co-ordinated problem solving, the participators negotiate of common goals, which means that they do not only develop shared goals but they also become mutually aware of their shared goals (Guy & Lentini, 1985). There is a need to find variables that mediate discussions in web environment and also and new ways to separate discussions in categories that are related to quality. How can technology better enable participants to find each other and form collaborative teams around mutual goals, skills and work processes?

Social Interaction and a Theory of Perspective Taking

We assume that an important construct for reciprocal interaction is perspective taking. Based on Piaget's cognitive developmental theory, Selman (1980) has outlined a social cognitive developmental model of five distinct stages with increasing abilities to take into account alternative viewpoints. In our study, Selman's (1980) developmental theory of social cognitive skills offered a theoretical basis to develop a tool for exploring the level of electronic discussion. Selman and his colleagues have studied the ontogenesis of interpersonal conceptions as a function of developmental levels of social perspective taking. They have defined it as the ontogenetic process by which a child comes to understand the way psychological points of view between self and the other are co-ordinated (Gurucharri & Selman, 1982; Selman, Beardslee, Schultz, Krupa & Podorefsky, 1986). As a result of his studies, five developmental levels of the co-ordination of social perspectives is defined: Stage 0: Undifferentiated and Egocentric, Stage 1: Differentiated and Subjective role-taking; Stage 2: Self-Reflective/Second Person and Reciprocal perspective, Stage 3: Third-Person and Mutual Perspective Taking, and Stage 4: In-depth and Societal-Symbolic Perspective Taking. Descriptions of concepts at each level are divided into sections on persons and on relations. The former concept describes a person's notions of how an individual functions psychologically and of the individual's understanding of internal complexity. The latter concept describes the closely related notions of how these individual perspectives are related and concepts of how viewpoints are mutually understood and co-ordinated (Selman, 1980). In other words, in his structural description of categories Selman describes each level with two different conceptions; the style conceptions of persons and conceptions of relations.Selman's original category descriptions (Selman, 1980) were used for developing a system of categories for analysing the level of discussing in asynchronous electronic discussion, but the categories were adopted to the new context. It was created so that after studying the theoretical basis of perspective-taking, the researchers made a first draft of a category so that they discussed the most typical elements of electronic discussion in general and in different perspective-taking stages in particular. The category system was revised after becoming familiar with the data of students' web-based discussions, so that the contextual features of the electronic discussion were involved (See Järvelä & Häkkinen, 1999).

Aims

The aim of this paper is to develop a model how the level of web-based discussion can be analyzed. The model has been developed in an empirical study where the quality of asynchronous interaction in web-based conferencing was examined and the following questions presented: *(1) What level of discussion will occur within web-based conferencing? and (2) What is the level of perspective taking between the interactors?*

Research Design

Subjects, Task and Tools

The subjects of the study are pre-service teachers in the USA (N=40) and Finland (N=30). Finnish students came from two different universities: 20 students from University of Oulu and 10 students from University of Jyväskylä. In a web-based course the students constructed case-based descriptions in the areas such as motivation, multicultural education and technology in education as well as the change these practices impose on the traditional teaching and learning practices. Different levels of expertise in peer and mentor collaboration were provided during the learning process in order to apprentice student learning. An asynchronous web-based tool called Conferencing on the Web (COW) was applied for the learning environment. (See Saarenkunnas et al., 1999).

Method

Data Collection

A combination of quantitative and qualitative research methods were employed: 1) computer-generated usage of statistics that illuminate the nature, time and volume of participation (the amount of messages, replays, frequencies etc.), as well as the distribution of discussions among the users, and 2) transcript data of students postings.

Data Analysis

Preliminary analysis of each discussion: The type of postings

During the two month period the students produced 25 different discussions involving 10-30 postings in each discussion. First, the category of the type of postings was searched. The types of postings were grouped into the following categorizations: Theory / New point, Question / Experience / Suggestion / Comment. The categories were formulated from transcript data by the researchers. Second, cross-references between the student postings within discussions, and mentors' postings were marked. Third, quantifications were made such as, the number of postings by mentors, the number of each type of posting, the number of cross-references.

Analysis of the communication: the level of discussions

Preliminary analysis provided the necessary detailed information needed for analysing the levels of discussions. Graphs were drawn, which demonstrate the progress of a discussion, dynamics of different type of postings, mentors' role, and cross-referring in each of 25 discussions. The Figure 1 demonstrates the graph used as a tool to organise the detailed data.
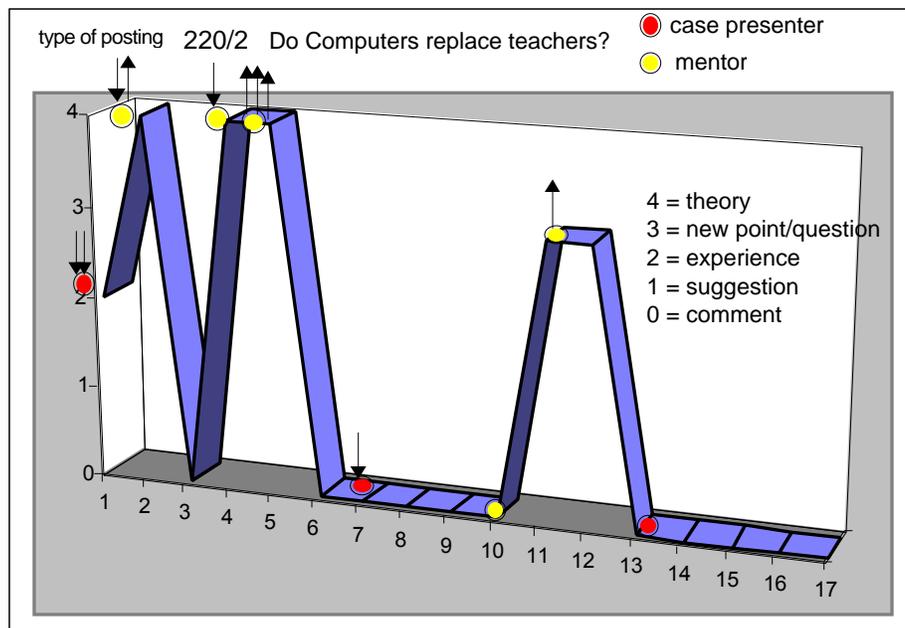

Figure 1. An example of a graph used for organizing the detailed data

Because each graph organises multiple information, such as posting types, mentors scaffolding and overall cross-referencing, it was possible to see the dynamics of different pieces of information and to take them into consideration when evaluation the level of discussion. The graphs were researchers' tools, which facilitated to formulate three groups of 25 discussions: deeper-level discussions, progressive discussions and lower-level discussions. *Deeper–level discussions* can be characterised as theory-based discussions with mutual negotiations. The discussions maintain in higher level postings, such as theory-based postings and postings involving new point or question. Comments do not degrade the quality of discussion, but support the construction of a topic to be discussed. Rich cross-referring is typical. *Progressive discussions* involve some cross-references and reciprocity but also generalisations and joint "knowledge-building". They have plenty of comments, but also experience-based postings and postings with new points or questions. In the course of the discussions, the students' postings are constructed on the previous, mainly experience-based postings, but in the end of the discussion general thoughts and ideas are usually risen. No theory-based discussion occurs. A typical feature for the discussions is the rich dynamic in conversation: cross-references and variety in types of postings. *Lower-level discussions* involve mainly separate comments and opinions. Students' comments do not take into consideration the earlier discussion but rather represents each student's independent and often unilateral comment. The amount of other type of postings than comments is minor. For confirming the validity of the analysis, two researchers made independent estimates of levels of discussions. Their classifications matched perfectly with 90 % of coding. The 10 % of contradictory analyses (3 discussions) were negotiated until unitary estimation was reached.

Specific analysis of a quality of communication: a stage of perspective-taking in discussions

The particular attempt was to find out what stage of perspective taking occurs among the students in asynchronous discussion. The aim was also to examine the possibilities and constraints for either high or low level of discussion. We adopted Selman's perspective taking categories when developing a coding category for the postings by the students. We thought that Selman's theoretical model on conceptions of relations offers a useful tool to analyze the quality of asynchronous discussion in a higher level than merely focusing on linguistic structures or forms of discussion since we did not have simultaneous access on students' thoughts (cf. Howell-Richardson & Mellar, 1996). Selman's theory is strongly tied to children's development. In our study we did not focus on the development of individual students, rather the development of discussion created by them in asynchronous discussion. It must be noticed that we were not measuring students' social cognitive skill or its' development during networked interaction, nor did we pay attention to their developmental level of perspective taking skills. Again, two researcher made independent estimates for coding and this time classification matched perfectly in 80 % of coding. The 20 % of contradictory analyses were discussed until unitary estimation was reached.

Results and Discussion

The results of this study point out different levels of web-based conversations. Three levels were found: higher-level conversations, progressive conversations and lower level conversations. More specific analysis of the quality of each level conversation focused on perspective taking and reciprocal understanding in conversations. The results show that the stage of perspective taking in conversations was generally rather low. None of the conversations reached the highest stage, societal-symbolic perspective taking, but most of the conversations indicated mutual or reciprocal perspective taking or even subjective role taking. The theoretical insight of reciprocal understanding, in general, and Selman's perspective taking theory, in particular, helped us to develop a model for analysing web-based interaction. The theory gave us useful framework to explore possible cognitive growth or developing perspectives on web-based learning. This theoretical "tool" was important because our data did not allow us to consider students' thought processes or social interaction processes where two or more students negotiate meaning during web-based learning. The same categories of social perspective taking, as the five stages in the original theory, might not always be applicable to the analysis of web-based discussion. Therefore, it is necessary to evaluate how well the original categories could be applied to the web-based discussion or how the original categories needed to be revised in order to apply to other contexts. The researcher needs to have a strong theoretical understanding of the theory of perspective taking in order have continuous interaction between the theory and the contextual features of the data. Because the origin of perspective taking theory comes from very different tradition than web-based learning, there is a danger that the model of analysis will be used in a superficial and mechanic way. In order to avoid that "a graph tool" was

developed to enhance the data structuring and facilitating deeper understanding of it. One of the weaknesses of using the perspective-taking theory as a model for analysing the web-based interaction is that it is very difficult to evaluate the real perspective taking level from a written web-based discussion. We need to find methods for receiving data of students' own interpretations and of contextual situation. The relevant method could be videotaping, stimulated recall interviews, reflective group discussions or classroom observation. In future, our aim is to examine the strategies people employ in an effort to establish common ground in situations where students are collaboratively working with web-based environments.

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