



Web-based Cases in Teaching and Learning – the Quality of Discussions and a Stage of Perspective Taking in Asynchronous Communication

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ABSTRACT

The aim of this study is to examine the quality of asynchronous interaction in web-based conferencing among pre-service teachers. Because all successful communication presumes perspective-taking skills and reciprocal understanding among the participants, we study whether the students are able to reach in reciprocal interaction and thus create educationally relevant high-level web-based discussion. The research project has its foundation in socio-constructivist learning theories, one of the most important principles of which is the idea of apprenticeship in thinking. To create a learning project in web-based conferencing we developed pedagogical practices, which enhance higher-level networked communication and make use of theoretical and expert knowledge. The study combines the power of asynchronous conferencing with peer and mentor collaboration to electronically apprentice student learning. The subjects of the study are pre-service teachers in the United States ($N=40$) 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 point out different levels of web-based discussion. Three kinds were found: *higher-level discussion*, *progressive discussion* and *lower-level 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.

INTRODUCTION

Today, communication technologies make possible various kinds of mediated communication, which increasingly has become part of instructional and

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educational communication. Various web-based learning environments have been developed for educational purposes, and different web-courses have been applied especially to higher education and continuing education courses. 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, 1998; Brown & Campione, 1996; Harasim, 1993). Learners can access virtual classrooms, on-line collaborative groups, learning circles, peer networks, and on-line libraries in a shared space. Students in a global network engage in collaborative learning projects with peers from other regions and countries, sharing their ideas and resources, accessing information in current events and archives, and interacting with experts (Riel, 1993).

There is growing documentation regarding the differences in communication patterns, teacher roles, and student performances when using web-based learning environments in college or higher education settings (Khan, 1997). After reviewing a variety of recent studies, there seems to be a general assumption that web-based interaction is educationally valuable. At the same time most research on the use of web-based communication tools in higher education still lacks theoretical grounding in contemporary learning theory (Koschmann, 1994). Too often, research on technologies for learning emphasizes things like tool features, attractive intercultural designs and technological procedures.

More depth and quality in the electronically networked communication is called for. Studies report how networked interaction in many learning projects results in superficial and experience-based discussion, but does not reach the level of theory-based reflections and argumentation. Yet, theory-based discussions and expert knowledge are crucial for high quality knowledge construction and learning (Bereiter & Scardamalia, 1993). We claim that there is a need to examine and design such a model for networked educational communication, which would require and allow for a higher-level discussion and argumentation. Challenged by this, we developed a pedagogical model for web-based learning and applied it to teacher-education. The model combines asynchronous conferencing with case-based reasoning and peer and mentor collaboration to support apprentice student learning by electronic means. The special aim was to analyze the quality of communication: Are the students able to reach such an interaction which leads them to educationally relevant higher-level web-based asynchronous discussion?

WEB-BASED ENVIRONMENTS FOR EDUCATIONAL COMMUNICATION

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. The difference between talking face-to-face and talking by such remote means as the telephone has been documented in different studies (Sproull & Kiesler, 1986). 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. Studies in e-mail environments suggest differences in comparison with print forms of communication: less structured, less constrained by social conventions, and more spontaneous (Kiesler, Siegel, & McGuire, 1984). There are suggestions that the discussions of subjects in web-based environments are more task-oriented and contain less personal content than in immediate social interaction (Krauss & Fussell, 1990).

Considerable successful results have been received in experiments in Computer Supported Collaborative Learning (CSCL). It is one of the recent ideas to create powerful learning and communication environments in combination with collaborative learning ideas and networked technology. Many advanced technical infrastructure for fostering higher-level processes of inquiry-based interaction have been developed (Barron et al., 1998; Edelson, Pea, & Gomez, 1996; Scardamalia & Bereiter, 1993). Recent studies have revealed that in connection with corresponding pedagogical practices CSCL-environments (such as CSILE, created by Scardamalia & Bereiter) facilitate higher-level cognitive achievements at school (Hakkarainen, Lipponen, & Järvelä, 1999; Järvelä, Niemivirta, & Hakkarainen, 1999; Scardamalia, Bereiter, & Lamon 1994). A possible explanation for successful results is an advanced technological infrastructure for engaging students in a process of generating their own research questions, setting up and improving their intuitive theories and searching scientific information as well as sharing their cognitive achievements.

In spite of successful instructional design work among cognitive learning theorists, growing evidence still demonstrates that communication in web-based learning environments does not usually facilitate theory-based reflec-

tions, mostly experience- and feeling-based argumentation. Admiraal, Lockhorst, Wubbels, Korthagen and Veen (1998) used computer conferencing with student teachers and their supervisors in the study that focused on the participants' assessment of computer conferencing, their participation and activities, and educational outcomes. They found that during their field experiences, student teachers used computer conferencing primarily to exchange emotional support recognizing similar experiences of their peers. According to the findings, it was less used for reflecting on their teaching and exchanging pedagogical content knowledge.

In his many studies on web-based conferencing in teacher education, Bonk and coworkers (Bonk, Hansen, Grabner, Lazar, & Mirabelli, 1998; Bonk, Malikowski, Angeli, & East, 1998; Bonk & Sugar, 1998) have compared the results of synchronous and asynchronous computer conferencing. Their studies demonstrated that delayed and real-time case collaboration foster completely different social interaction and dialogue pattern. They discovered that while delayed conferencing led to greater depth of discussion and peer responsiveness than real-time conferencing, in both conference formats, a few off-task behaviors and interpersonal comments were indicators of increasing group inter-subjectivity and peer scaffolding.

Findings on computer conferencing in teacher education tell of possibilities to support pre-service teachers' affective and emotional states to teach instead of higher conceptualizations or theory-based reflections. The participants consider computer conferences an ineffective means for the exchange of instructional methods or theory-based explanations (McIntyre & Tlusty, 1995; Merseth, 1991). Hiltz (1994) concluded that while both students and instructors report superior learning opportunities and outcomes, one of the clear messages in the research is that improved outcomes are contingent upon faculty efforts and skill in teaching on-line. The question arises how to structure the whole learning environment and the interaction between individuals in a way that it supports the progressive knowledge construction and high-quality conversation.

THE QUALITY OF SOCIAL INTERACTION AND RECIPROCAL UNDERSTANDING IN ASYNCRONOUS DISCUSSION

For people to communicate effectively, they must solve the mutual knowledge problem (Graumann, 1995; Krauss & Fussell, 1990). According to

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. According to Nystrand (1986), reciprocity involves mutually shared knowledge or knowledge that two or more individuals possess in common. Research on collaborative learning also calls for reciprocity in social interaction. 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. As Resnick, Levine and Teasley (1991) put it, human cognition is so sensitive to social and cultural context that we must find good and elaborated mechanisms by which people actively shape each other's knowledge and reasoning processes.

There is evidence that the teaching–learning process is a complex social situation containing multiple actors, each interacting with his or her own intentions and interpretations (Pintrich, Marx, & Boyle, 1993). For example, studies on learning interaction report difficulties in reaching reciprocal understandings even in traditional face-to-face teaching-learning situations (Winne & Marx, 1982). In asynchronous communication, the participants need to establish what is mutually known in order that messages can be formulated, and the meaning of messages constructed. One could expect the establishment of common ground to be particularly problematic when two or more groups of individuals, who come from different contexts and countries and who have not previously worked together, are electronically brought together to work on a common task. It certainly is, but still the electronic collaboration may reveal that actually they have their own 'mini-culture' with mutually known body of information (Graumann, 1995). For example, in the present study the students mutually know that they are able to use web-based conferencing tools, e-mails, etc., and they have the same educational aims and experiences from field teacher training. To reinforce this shared awareness base, we also created certain pedagogical solutions aimed at increasing mutuality between the students. We provided students with joint theory-based readings, and set up video-conferences for students' synchronous interaction. Students also created their personal profiles for a web-based conferencing environment to introduce themselves.

SOCIAL INTERACTION AND A THEORY OF PERSPECTIVE TAKING

Based on Piaget's (1963) cognitive developmental theory, Selman (1980) suggested that educators need to devise new ways for students to progress beyond their egocentric views of the world, that is to say to grow interpersonally. Selman's developmental construct of social cognition, perspective taking, is the ability to see the world from another person's perspective or infer another's capabilities, attributions, expectations, feelings and potential reactions. 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.

Perspective-taking skills are critical to successful human functioning and involvement in everyday social interaction. We suppose that global networked technologies can influence student perspective taking and raise interpersonal understanding. We also assume that if web-based interaction is aimed at educationally valuable higher-level discussion among the students, the level of perspective taking will correspond to the improved quality of discussion. As the grade of perspective taking in electronic asynchronous discussion improves, the interaction and learning among the students advances. We also believe that the coordination of different perspectives and mutual negotiation produces reasoning in a more general level (Schwartz, 1995).

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 coworkers 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 coordinated (Gurucharri & Selman, 1982; Selman, Beardlee, Schultz, Krupa, & Podorefsky, 1986). As a result of his studies, five developmental levels of the coordination 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 relations. The former concept describes a person's notions of how an individual functions psychologically and the individual's understanding of

internal complexity. The latter concept describes the closely related notions of how these individual perspectives are related and how viewpoints are mutually understood and coordinated (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.

AIMS

This study aims to examine (1) What kind of communication will occur between students within asynchronous web-based conferencing?, (2) What level of discussion patterns will occur within web-based conferencing? and (3) What is the level of perspective taking between the interactors? With these questions we intend to contribute a perspective on the possible contextual and pedagogical features affecting the quality of web-based interaction and increase its educational value.

SUBJECTS

The subjects of the study are pre-service teachers in the United States ($N=40$) and Finland ($N=30$). Finnish students came from two different universities: 20 students from the University of Oulu and 10 students from the University of Jyväskylä. For all these students, the participation in web-based conferencing course is credited as part of their compulsory studies in education. All the students had experiences with field training, studies in educational psychology, and basic knowledge about computers and Internet. This Web-based project lasted for 2 months.

PROCEDURE

Task

In this project, 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. Each case could have been either a success story or a description of a problematic teaching scenario based on fieldwork observa-

tions of 'theory in action'. For example, students were asked to describe a teacher and/or student(s) in a problematic or instructionally interesting situation observed in the field; leaving all the names and places of the situation anonymous. Different levels of expertise in peer and mentor collaboration were provided during the learning process in order to apprentice student learning. Mentoring was organized by senior students from other countries as well as by in-service teachers and faculty members from other universities.

Tools

Electronic case mentoring can be used to foster insights about the global or local nature of educational problems as well as the diversity and complexity of these educational dilemmas (Bonk, Hansen, Grabner, Lazar, & Mirabelli, 1998). An asynchronous web-based tool called Conferencing on the Web (COW) was applied for the learning environment. COW was chosen because it is easily available. COW is a shareware program, which allows users to read, browse and add to multiple discussions asynchronously by using a web browser anywhere in the world at any time. In web-based conferences students could discuss teaching and learning issues related to particular subjects, problems, ideas and observations. COW is organized into three different levels: conference level, topic level and conversation level. The data analysis of this study focus on one particular conference (Finland Cases) designed for case descriptions of Finnish students, on which all the students from Finland and US could comment. The topics of Finland Cases, under which conversations by any Finnish student could be initiated, can be seen in Appendix 2. In order to strengthen the feeling of a virtual community, the web work was supported by two international videoconferences between the two Finnish sites and the American counterpart. In these conferences, the process of creating cases was discussed (Saarenkunnas et al., 1999).

PROCEDURE

The web-based learning project proceeded in the following way:

- (1) The students read a selection of articles in the areas of learning and teaching.
- (2) ISDN Videoconference-meeting of Finland–USA was organized for introducing the students.

- (3) The students created cases in COW. They were asked to produce collaboratively or alone 2–3 short cases on problems they had encountered in schools. They were also instructed to comment on the cases written by the fellow students. Each case created an electronic discussion.
- (4) Different levels of mentoring (peer, experienced teacher, researcher, local and global) were provided.
- (5) The students summarized the discussions and the web work was closed.
- (6) Final videoconference-meeting of Finland–USA was organized and the process of creating cases was reflected.

METHOD

Data Collection

A combination of quantitative and qualitative research methods was employed. Quantitative data included: (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; (2) survey data on subjects' background information; (3) various interviews during the process and; (4) transcript data of students' postings. This paper reports on data set 1 and 4.

Data Analysis

Preliminary Analysis of Each Discussion: The Type of Postings

During the 2 months 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 categories: Theory, New point/Question, Experience, Suggestion, and 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, and the number of cross-references.

Analysis of the Communication: The Level 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 graphs were researchers' analytic tools which

facilitated to formulate three groups of 25 discussions: *higher-level discussions*, *progressive discussions* and *lower-level discussions* (different levels of discussions are described in a more detailed way in the 'Results'). Two researchers made independent estimates of the levels of discussions. Their classifications matched perfectly with 90% of codings. 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. (For more specific description on a system of categories adopted on the present study, see Appendix 1.) We thought that Selman's theoretical model on conceptions of relations offers a useful tool to analyze the quality of asynchronous discussion on a higher-level than merely focusing on linguistic structures or forms of discussion, since we did not have simultaneous access on students' thoughts (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 focus was on the development of discussion created by them in asynchronous discussion. It must be noticed that we were not measuring students' social cognitive skills or its development during networked interaction, nor did we pay attention to their developmental level of perspective-taking skills. Again, two researchers 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

Overall Description of Quantifications

The total amount of discussions under the conference 'Finland Cases' was 25. The 25 discussions included altogether 342 postings, the average number of postings per discussion being 14. The proportion of postings by mentors was 22% (76) within the whole conference. Figure 1 illustrates the distribution of posting types among different levels of discussion. The number of theory-

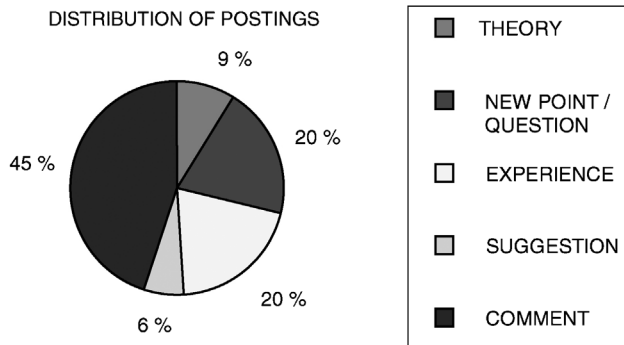


Fig. 1. The distribution of postings between different levels of discussion.

based postings was 9%, new points/questions 20%, experience-based postings 20%, suggestions 6% and comments 45%.

Level of Discussion

In the analysis of the level of discussions, 25 discussions were divided into three main groups: higher-level discussions (24%), progressive discussions (40%) and lower-level discussions (36%). This is illustrated in (Fig 2). Six discussions were found which belong to the higher-level discussions and can be characterized as theory-based discussions with mutual negotiations. The discussions maintained in high-level postings, such as theory-based postings and postings involving new point or question. Comments did not degrade the

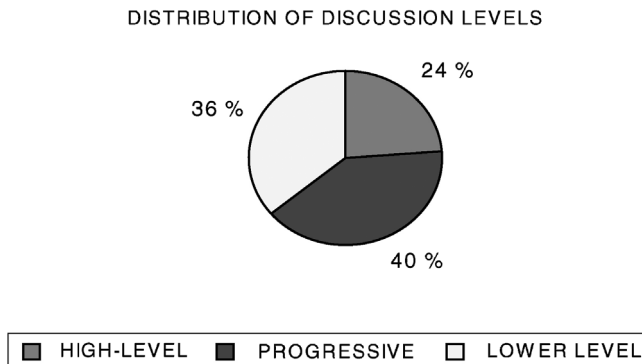


Fig. 2. Distribution of discussions according to different levels.

quality of discussion, but supported the construction of a topic to be discussed. Rich cross-referring was also typical for these conversations.

The second group involved progressive discussions with some cross-references and reciprocity as also generalizations and joint 'knowledge-building'. These 10 discussions involved plenty of comments, as well as experience-based postings and postings with new points or questions. It seems typical that in the course of the discussions, the students' postings were constructed on the previous, mainly experience-based postings, but at the end of the discussion, general thoughts and ideas were rise. However, no theory-based discussion occurred. Another typical feature for the discussions was the rich dynamics in conversation: cross-references and variety in types of postings.

Nine discussions in the third group were mainly comment-based *lower-level discussions* not indicating progressive discussion but rather separated comments and opinions. Students' comments did not take into consideration the earlier discussion, but rather represented each student's independent and often unilateral comment. The amount of other type of postings than comments was minor.

Quality of Communication

Three different levels of discussions were found in the qualitative analysis. Because we were interested in the quality of discussions in terms of their educational value, more specific analysis was conducted based on social cognitive theory of perspective taking (Appendix 1). Each of the three levels, higher-level, progressive level and lower-level conversations were analyzed in detail in order to understand reciprocal understanding and perspective taking stage of each level of conversation. We wanted to better understand the characteristics of each discussion level, whether perspective taking is observable in electronic communication, and what is the possible contribution of electronic communication to the quality of discussion?

From all 25 discussions (Appendix 3), none of the discussions reached the highest stage 4 (Societal-Symbolic Perspective Taking). Five discussions (20%) were in stage 3 (Mutual Perspective Taking), nine discussions (36%) in stage 2 (Reciprocal Perspective Taking), nine discussions (36%) in stage 1 (Subjective Role-taking), and two (8%) discussions in stage 0 (Egocentric, Fig. 3). Higher-level discussions were either in stage 3 or in stage 2. In these discussions, Mutual or Reciprocal Perspective taking were apparent. Students recognized the value of other students' opinions and considered the topic of discussion from a variety of different viewpoints. The communication

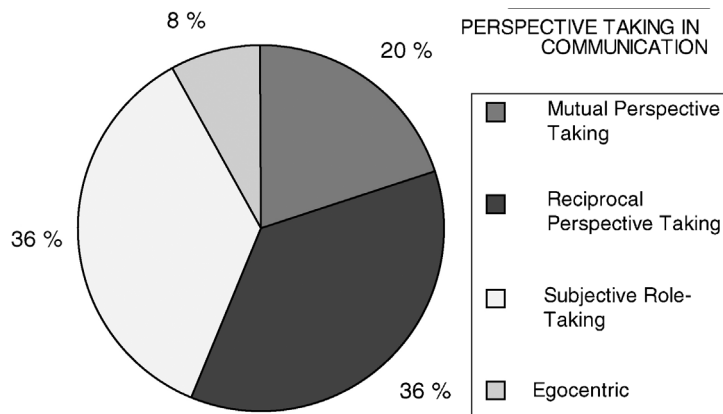


Fig. 3. Distribution of discussions between categories of perspective taking.

progressed from mutual understanding to more general argumentation and conclusions. Excerpt 1 describes Mutual Perspective taking (Stage 3) in asynchronous discussion. We use Excerpt 1 also to demonstrate the COW discussion. Because of space limits, only the most illustrative parts of the discussion have been chosen to demonstrate the level of perspective taking.

EXCERPT 1. of discussion 216/1 “Non-native ESL teachers abandon their mother culture?!?!”.

1. Case-author: Hanna (Finnish student) Date: Feb. 20 8:31 AM 1998

... Scollon and Scollon claim in their book ‘Intercultural Communication: A Discourse Approach’ that non-native ESL teachers have neglected the linguistic and cultural aspects of their MOTHER CULTURE. ..WHAT DO YOU THINK?

2. Author: Annu (Finnish student) Date: Feb. 20 8:56 AM 1998

This is an interesting question and I think it ties with who or what has the ownership to what kind of ‘knowledge’ ... I have often wondered that being, for example, a non-native ESL teacher is one of the most tedious jobs one could think of: You’re not an expert in English because you are not the native speaker of the language; neither are you the expert in your native language because you don’t have a formal degree which would justify you being an expert. So it’s like standing on no-man’s land.

3. *Author: Tim (US mentor, researcher) Date: Feb. 23 8:07 AM 1998*

That is an interesting idea Annu; one is a king or queen in neither land. So, should we try to have an expertise that everyone wants and respects, or try to get multiple forms of knowledge or general skills for which you really will be worth more, but paid and respected less? Hmm . . . I think from a societal standpoint, having some knowledge about many topics is more important since we have too many experts and specialists already. In a global community like COW, we need more well-rounded people like all of you perhaps.

4. *Author: Mari (Finnish mentor, experienced teacher) Date: Feb. 23 10:46 AM 1998*

I am about to make a bold claim which you can freely disagree with. I find the concept of 'native-speaker of English' pretty problematic. Native of which culture? The English-speaking world is really wide and in a sense we, the foreign-language speakers, can claim a membership to the club of 'natives' . . . The concept of culture is a problem when we talk about teaching English. EFL teachers, more or less unanimously, agree that teaching 'culture' should be a part of every language-learning programme. If we think of English, what should these 'cultural studies' include? . . .

5. *Author: Hanna (case author, Finnish student) Date: Feb. 24 8:40 AM 1998*

Mari (and others), I am glad that you made your 'bold claim'. I think that my own cultural awareness about the Finnish culture became more important to me after I had studied English for some time. I agree with Annu about the tedious task of standing on both sides of the fence, if you get my meaning. And I also think that I have gone through a phase which might be called 'The-grass-is-not-always-greener-on-the-other-side', meaning that I have found out that no one culture is really that superior to the others, and I believe that to an EFL teacher this is a healthy attitude. . .

6. *Author: Mari (Finnish mentor, experienced teacher) Date: Feb. 25 3:18 AM 1998*

Hanna (and others), I fully agree. A couple of questions I think we ought to think about in here, or things that I would like to discuss: What would this cultural awareness that ESL teachers need be like? What would our teacher studies at the university be like if we took English as it is, a world language?

The quality of communication in *progressive discussions* was mainly in Stage two (except one Stage 3 and two Stage 1 discussions). The discussions were characterized with reciprocal perspectives, so that, especially, thoughts and feelings were considered from variety of viewpoints contributing to the progressive quality of discussion. Like “*I agree with Anne’s comment that you can not motivate anyone. I have been to many leadership workshops, and from them I have learned that . . .*”. However, in these discussions general conclusions, evaluation or suggestions were rare.

Lower-level discussions were all in Stage 1, but two discussions in Stage 0. The discussions were restricted on subjective perspectives so that students either produced very egocentric, usually feeling-based opinions or responded to earlier postings with “I agree. . .”- like postings without paying attention to the point that the other students may or may have interpreted the same situation or experience differently. In these discussions, the postings remain very scattered and actually there was no progressive discussion at all.

DISCUSSION

The results of this study point out different levels of web-based discussions. Three levels were found: higher-level discussions, progressive discussions and lower-level discussions. More specific analysis of the quality of each level conversation focused on perspective-taking in communication. Since perspective-taking skills are critical to successful human functioning and involvement in everyday social interaction, we supposed that global networks can give an impact on student perspective taking and raise interpersonal understanding. The results show that the stage of perspective taking in electronic communication was generally rather low. None of the discussions reached the highest stage, societal-symbolic perspective taking, but most of the discussions indicated mutual or reciprocal perspective taking or even subjective role-taking. However, typical was that higher-level discussions involved communication with highest stage perspective taking and constructive discussion, while lower-level discussions were mostly egocentric and superficial. Thus, the results support our hypothesis that high-level perspective taking was in relation to higher-level discussion.

In the present study, we applied Selman’s socio-cognitive theory on perspective taking for creating a system of categories on analyzing the quality of web-based discussions. The theory gave us a 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 (Reed et al., 1998). Ackermann (1996) describes cognitive growth as an equally important process of 'diving in' and 'stepping out' to reach higher understanding. Individual cognitive growth and developing perspectives presume that persons describe experiences to themselves and others and in doing so make it more tangible and precise. According to Ackermann (1996) and Piaget and Inhelder (1967), people cannot learn from their experience as long as they are entirely immersed in it. They need to step back, and from a distance reconsider what has happened to them. They must take the role an external observer, or critic, and must revisit their experiences as if it were not theirs. For this, case-based conferencing on a web is a relevant environment because students can reach many different perspectives to a single case that they have constructed. Internet-based activities in which students ultimately develop relationships with students from other cultures should have some influence on the learners' sense of the world (Sugar & Bonk, 1995).

IMPLICATIONS FOR FUTURE RESEARCH

Since our data pointed out the relation of the perspective-taking stage with the level of discussion, the results prompt us to consider the contextual and pedagogical features of web-based learning environments. 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: How do virtual social groups emerge as a result of web-based communication? What is the quality of collaboration and how collaboration is formed? Are there certain pedagogical factors that contribute on the development of different levels of discussions? What are the possible contextual and pedagogical contributors for high-quality conversations? Why do other conversations remain in lower level? How can perspective taking be enhanced in web-based conferencing?

In order to support higher learning, the pedagogical models for web-based interaction should be based on a solid base of learning theory. The tool alone neither supports nor hinders high-level interaction; it is the users of these environments and the pedagogical models applied who make the difference.

Because of the limited amount of data we cannot find exact explanations for different levels of conversations. In this study, we declined analyzing the data at the individual student level; so information about student abilities and background information is not available. Instead, we sought to emphasize certain pedagogical and contextual features of the learning environment, which may have contributed students on sharing meaning.

CONCLUSIONS

Firstly, the mentors did not have externally distinctive roles in web-based conversation. The mentors represented expertise in different fields and apprenticed students into many contexts and perspectives. The mentors applied their rich experience spontaneously, added theory-based comments more in narrative than instructive form. Also, in the process of constructing joint cases and shared knowledge in a networked environment, the mentors' responses cover only a small fraction of a whole interaction. Most problem-solving and interaction is done in student interactions (Kuure, Saarenkunnas & Taalas, 1999). Secondly, traditional views of conversational coherence describe the immediate sequencing and referencing of ideas and topics (Scheggloff, 1991). Because of the way asynchronous computer conversations are implemented, the learners do not answer immediately. Participants are able to wait to answer until they have composed what they wish to say. This study points out that theory-based readings can give an impetus to constructive conversation, because students can support their experiences with theory-based argumentation. Thirdly, the interaction process is not inherently situated in a web-based environment, nor is knowledge construction derived exclusively from writings or notes on a web. This study shows that different contextual resources, such as readings or videoconferences, and pedagogical solutions, such as peer/group or mentors' contributions are important to create shared understanding. Web-based learning should not be considered only in global networks, but should also be seen in a broader social context.

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APPENDIX 1

A system of categories developed from the theoretical ideas of Selman (1980) for analyzing the depth of discussing in a synchronous electronic discussion.

Stage 0: *Egocentric.* Students present very subjective and egocentric opinions and expressions. They do not pay attention to the point that the other student may or may not have interpreted the same situation or experience differently. Conceptions of relations of perspectives are very limited. Because most of the students present their own egocentric opinions and experiences, the electronic conversation does not progress, but the postings remain very scattered.

Stage 1: *Subjective Role-taking.* The subjective perspectives and other student perspectives are clearly differentiated. Students opinions, experiences and feelings are unitary. The discussion is constructed of one-way conception of relating to perspectives. Students respond to postings of conversation with like postings.

Stage 2: *Reciprocal Perspective Taking.* Students recognize and value the uniqueness of each person's opinions and expressions in conversation. A two-way reciprocity of thoughts and feelings, not merely actions, is typical in discussions. Students consider the case of an electronic conversation from a variety of viewpoints and conversation progress, but still different perspectives are not taken into account enough.

Stage 3: *Mutual Perspective Taking.* Students coordinate the perspectives of self and others and thus the topic in conversation is seen from the perspective of a third person or generalized. Each one has his/her own experience about the topic under discussion. Relations are viewed as ongoing systems in which thoughts and experiences are mutually shared. The electronic conversation progresses from mutual experiences ('my points') to more elaborative argumentation and develops to discussions about more general points, in education or society, for example.

Stage 4: *Societal-Symbolic Perspective.* The students conceptualize subjective perspectives of persons toward each other at existing not only on the plane of common expectations of awareness, but also simultaneously at multi-dimensional or higher level of communication. In conversation, they can abstract multiple mutual perspectives to a societal, conventional, legal or moral perspective in which all the individuals can share.

APPENDIX 3

COW Finland Cases

Topics

Number	Topic Name	Number of conversations
200	Alternative Teaching Methodologies	2
201	Assessment and Evaluation	2
202	Big Global Problems	1
203	Classroom Management and Discipline	6
204	Co-operative Learning	1
205	Foreign Language Teaching and Learning	3
206	Culture in the Classroom	1
207	Intercultural Communication	0
208	Learner-Centered Instruction and Constructivism	2
210	Local Problems	1
212	Motivation	2
214	Multicultural Education – Ethnic Minorities	1
216	My Own Topics (use as a last resort)	1
219	Teaching Methods	2
220	Technology (Computers and Learning)	4