ReCALL **15** (2):202–216. © 2003 Cambridge University Press
DOI: 10.1017/S0958344003000624 Printed in the United Kingdom

The polycontextual nature of computer-supported learning – theoretical and methodological perspectives

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Abstract

This article discusses some theoretical and methodological problems and issues in the study of computer-supported learning activities with special reference to a discourse perspective in research. Special emphasis is laid on finding ways to reach the participant perspective in computer-supported collaborative learning projects, which are by nature polycontextual. By this term we refer to the diverse scenes and situations of learning activities that computer-supported learning involves. We will also address the issue of making claims on effective pedagogies, leaning on the theory of discourse as situated and constructive, which again sets special requirements on what kinds of assumptions and interpretations can and should be derived through empirical analysis of data. Instead of rushed normative guidelines for instruction we should now take time and examine critically what is really happening in computer-supported environments in real-life situations. A look at the particular is needed. An important question to examine, for example, is how students and teachers use these tools in their everyday lives and how these processes are talked about. We will discuss through a number of examples the multimodal and polycontextual nature of meaning making in participant activities during three different university language courses between 1998–2002. This article considers relevant research approaches with the aid of theoretical discussion and examples of analysis.

1 Introduction

The accelerating expansion of the use of new technologies in teaching and learning has led to a huge demand on new pedagogical solutions. This enthusiasm grows partly from encouraging experience and the vision that sees technology as beneficial for learning. Researchers of collaborative learning have seen, for example, that computer-supported learning (CSL) offers effective tools for collaborative knowledge building (cf. Dillenbourg, 1999; Järvelä & Häkkinen, 2002). A common argument for applying technology in learning is that tools for computer mediated interaction and learning provide

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opportunities for a whole new learning culture and thus act as an agent for change. In addition to the above pedagogically grounded arguments, pressure from society outside the academic discussion (e.g. e-learning business, emergence of virtual schools and universities) constantly challenges researchers to provide results that would have instant pedagogic implications. Furthermore, research in this field attracts a fair amount of funding, compared to less popular fields of research on learning and instruction, which probably has speeded up attempts to provide results. As for the research perspective, technology-supported learning environments provide easy access to automatically accumulating quantitative data, which might tempt researchers to draw hasty conclusions on the pedagogic effects of technology.

Instead of presenting rushed normative guidelines for instruction we should now take time and examine critically what is actually happening in computer-supported environments in real-life situations. In other words, a look at the particular is needed. An important question to examine, for example, is how students and teachers use various tools in their everyday teaching and studying lives and how the meaning of computer-supported projects is constructed. This is especially important, as we believe that a close analysis of how computer-supported activities are made meaningful by the participants will provide valuable insights for developing new pedagogies.

This paper discusses some theoretical and methodological problems and issues in the study of computer-supported learning (CSL) activities with special reference to a discourse perspective. Special emphasis is laid on finding ways to reach the participant perspective in computer-supported collaborative learning projects, which are by nature polycontextual. By this term we refer to the diverse scenes and situations of learning activities that computer-supported learning involves. Leaning on the theory of discourse as situated and constructive, we will also address the issue of making claims on effective pedagogies. This perspective sets special requirements on what kinds of assumptions and interpretations should be derived through empirical analysis of data. We will discuss relevant research approaches with the aid of theoretical discussion and examples of analysis. These observations were made in connection with developing three different university language courses between 1998–2002 within the SHAPE (Sharing and Constructing Perspectives in Virtual Environments) project, which is a multidisciplinary research project funded by the Academy of Finland. The projects are reported in more detail in Kuure, Saarenkunnas and Taalas (2002, 2001, 2000a, 2000b).

2 Discourse approach to research on computer-supported learning

In the following, we will describe the theoretical and methodological viewpoints that our approach to researching CSL builds on. The foundation of this approach is based on the perception of the nature of language as shared making of meaning. In other words, interaction is not constituted through an exchange of linguistic items with fixed meanings. Instead, meanings are negotiated in interaction. This starting point has important consequences on our view of the study of computer mediated communication and learning.

The so-called discursive turn in social sciences turned attention to the ways in which people make meaning in interaction with others. This major shift in perspective called for new kinds of research questions and methods of analysis (e.g. Garfinkel, 1967;

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Gergen, 1973; Potter & Wetherell, 1987). In educational research, there have also been strong traditions resting on interpretive paradigms (e.g. Glaser & Strauss, 1967). The recent interest in discourse and interaction in these accounts is supported by the developments within socio-cognitive (cf. Resnick *et al.*, 1991; Resnick, 1989; Salomon, 1993) and socio-cultural (Lave & Wenger, 1991; Rogoff, 1990) theories of learning. Still, it seems that the concept of 'discourse' as conveying 'talk about learning' seems to have gained a broader interest in research on learning and instruction only recently (cf. EARLI, 2001). Many of these studies, however, seem to imply a discrepancy: although the discourse perspective into activities and learning is acknowledged, the research methods applied often rely on paradigms that assume language as a direct reflection of reality and not as a medium for constructing multiple realities.

Constructionist research perspectives have, indeed, become established in many fields of science, and there is a growing body of research from a discourse perspective on face-to-face situations in classrooms (cf. Edwards & Mercer, 1987; Säljö & Bergqvist, 1993; Sarangi, 1998: Dysthe, 1996; Gutierrez *et al.*, 1999). Within the research of CSL these paradigms are only emerging. However, there is some interesting research being done on CSL, which emphasises the situated character of sense making (cf. Rystedt, 2001; Ivarsson, 2001; Arnseth & Solheim, 2002; O'Neill *et al.*, 2002). In the field of computer-supported language learning the ethnographic work by Warschauer (2000) also provides an interesting perspective, especially in terms of his critical views towards the effects of technologies within pedagogic settings.

Instead of general explanations of certain phenomena, constructionist approaches aim to particularize understandings of the social, as Alasuutari (1995) points out. The aim of the qualitative analysis of empirical material is to provide new insights into how people make sense of the world they live in and what rules of interpretation they use. In the context of the present study this means that instead of trying to verify preset hypotheses of the outcomes of specific pedagogic arrangements (e.g. Does our instructional method promote deeper learning?), we should ask, for example, what kind of perception of the pedagogical activity the participants construct. As Hine (2000) in her study on the Internet puts it, we ought to study the practices through which the virtual community becomes meaningful and perceptible to participants.

Accordingly, we should be alert to the question of where it is that the phenomena we are looking for may occur, and avoid premature definition of the context. By labelling an activity as "a virtual community performing a computer-supported collaborative learning project" we might shut our eyes to the interpretations the participants make. The participants might as well orient to the context of learning as "another unavoidable, rather insignificant study assignment, in a chain of obligatory studies". We should thus ask the data what, indeed, is the context the participants construct, and not let the researcher's initial assumptions restrict the perspective of the study (see Jones, 2002 among others for a treatment of context in computer mediated communication).

The discursive approach has bearings on the methods of data analysis as well. Much of previous CSL research relies on coding schemes, which Alasuutari (1995) sees only as the first step in the path to a full-fledged analysis of social action. At worst, strict protocols may prevent the researcher from seeing potentially meaningful issues outside the predetermined frame. Thus, we can start our analyses by asking which discourses or frames the participants use to make sense of the world. This should then be followed by

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further analytical questions such as how these categories are used, when and which functions they serve (Silverman, 1993). The main function of data collection and analysis is to make the researcher's underlying premises as visible as possible and to challenge the initial framework.

Research does not have to settle for describing how things are, however. Researchers should pay attention to the practical use of their work as "application is very much on the agenda and should not be relegated to an optional extra" (Potter & Wetherell 1987:175). We wish to emphasize, however, that the application of research findings is here seen as achieved through a process of dialogue, weighing the gains and losses of different pedagogic approaches. As Silverman (1997: 36–37) points out in relation to conversation-analysis-inspired research on counselling, interpretations and applications need to be weighed against the goals as well as the adopted theoretical and methodological standpoints in question. In other words, suggestions and recommendations for instruction and learning are to be seen as results from continuous dialogue between participants in the activity, be they researchers, teachers or students. The choice of the researcher whether to do research 'on', 'for' or 'with' the subjects of the research determines the research questions, data collection and methods of analysis (cf. Cameron *et al.*, 1993).

3 Multimodal and polycontextual aspects of computer-supported learning

Our previous research on computer-supported learning activities among university students on an international web-supported course (Kuure *et al.*, 2002) showed that when constructing common goals or shared understanding for the learning activities the students have multiple resources of interpretation available, both visual and textual, in the web-environment alone. In addition to the online resources, encounters outside the web-work (e.g. informal discussions between the students) are equally important sites for meaning negotiations. Although much can be traced from electronic databases, they only reveal a small portion of participant activity. Especially when we wish to develop educational practice, concentrating the analysis of activities within a single medium considerably limits the possibilities of drawing pedagogical conclusions. In the following, we will discuss in the light of empirical analyses the challenges that the notions of multimodality and polycontextuality pose for the research of computer-supported learning. The theoretical discussion below is supported by analyses of data (chapter 4) collected during two different university courses in the years 2000 and 2002.

Although research on CSL concentrates largely on electronic text, the analysis of mere textual elements gives us an incomplete picture of how participants engage in interpretative work to accomplish the meaning of activities. There is a growing interest, however, deriving from the work of Hodge and Kress (1988) and Halliday (1978) on the notion of multimodality, which refers to the multiple forms that all language use comprises (cf. Kress & van Leeuwen, 2001). This discussion takes a critical stance towards monomodal research frames (e.g. Kress & van Leeuwen, 2001). As Lehtonen (2002) points out, currently prevalent theories of meaning primarily focus on oral and written communication. Still, language is never 'mere words'. Instead, it always comes in material forms, which contribute to the shared construction of meaning. All language is multimodal. Goodwin (2002) suggests that visual elements should receive attention –

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Fig. 1. Shared and local activities link to each other in multiple ways.

not in isolation but as the systematic practices of seeing used by participants as embedded in other meaning making activities.

This perspective is especially relevant in the study of computer-supported activity. It helps us to understand the diversity of real-life situations of learning and work in technology-mediated settings, which typically involve numerous modes and media. Even when we write, we do not use bare words, but also typographical means such as font size or capital letters to convey meaning. Thus, a multimodal analysis of CSL should bear in mind all the resources for meaning making that we have available through all our senses in addition to the customary analyses of written or spoken text. To widen the scope of analysis, we should ask what the resources for meaning making in computer-supported activity really are.

When the perspective broadens, the relevant unit of analysis changes from discourse to what Scollon (2001:3) treats as mediated action. He points out that there is no action without participation in different discourses, and, vice versa, no discourses without concrete, material actions. The focus is on social actors as they are acting, not linguistic detail alone. Jones (2002) shows that the uses and meanings of computer-mediated communication have in fact very little to do with the actual words typed into computer screens. His study also pointed out that the context of computer-mediated communication is often much more important than is regarded in most work on CMC. Jones (2002) suggests that analysts need to adopt a polyfocal perspective: a perspective which encompasses multiple modes and makes use of multiple methods, which begin with people's actions and experiences around texts.

The notion of polycontextuality is familiar from the activity theoretical framework (cf. Engeström, Engeström & Kärkkäinen (1995), and especially Leander (2002) in relation to classroom interaction). We will, however, use the term more generally to refer to the diverse scenes and situations of learning activities that computer-supported learning involves. As was suggested above, research on computer-supported learning easily remains within the analysis of the activities on-line instead of treating the topic as a more complicated combination of contexts and phenomena. This trend may be due to the lively public talk around new environments of learning which deals with developing

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"modern" Internet-based learning and teaching in contrast with what is regarded as "traditional" classroom learning. In other words, it seems that such discourses are reflected in current views on what is regarded as an appropriate field site for doing research. However, as Jones (1999) points out, the on-line and off-line worlds are tied to each other and Internet users are as much a part of physical space as they are of cyberspace. Figure 1 illustrates the linking between on-line and off-line contexts.

There is, indeed, a considerable amount of ethnographic and ethnomethodological research done on virtual communities that concentrates on life on-line (cf. Baym, 1995a; 1995b; Markham, 1998; Ten Have, 2000). The discussion on how identities, for example, are negotiated in virtual interactions, provides useful perspectives on research into computer-supported learning activities (e.g. finding suitable partners for activities through various processes of membership categorization). When developing functional pedagogies, research on a single medium does not cover a broad enough range of social contexts. This is especially true in mixed-mode learning projects, which integrate computer-supported learning with face-to-face interaction: the virtual learning environment is not divorced from other social spaces, such as classrooms and institutions. In such projects a great deal of the active negotiation of the purpose of the activities and interpretative work is done in various encounters between participants – students and teachers – outside the web environment. Therefore, only a limited interpretation of the richness and complexity of meaning making processes can be traced in the computer-mediated interactions (Kuure *et al*., 2001. 2002). To study learning interaction in mixed-mode projects means that we will have to record activities in formal and informal student gatherings and pair work on the computer. A wide range of data provides us with a richer environment for observation. The complexity of context in web-supported learning activities is not a surprising revelation, however. Gutierrez *et al*. (1999) have shown that even traditional classrooms are polycontextual.

When considered from a discourse point of view, 'context' cannot be described as a stable setting, structurally definable through a set of variables. As Goodwin and Duranti (1992:6) point out, context is "a socially constituted, interactively sustained, time-bound phenomenon". In connection with computer-supported learning this means that it would be a harsh simplification to describe the context of computer-supported learning as a

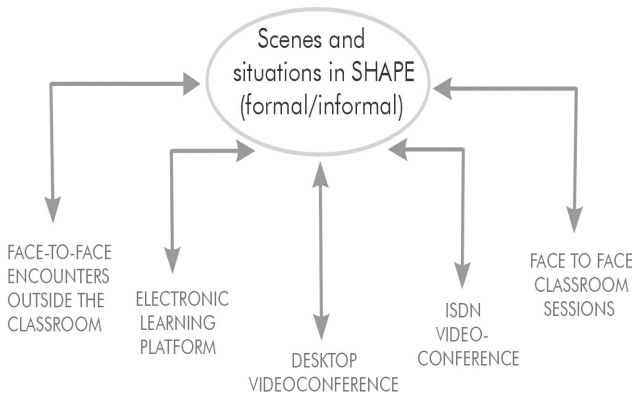


Fig. 2 The diversity of learning scenes and situations in SHAPE.

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Number of readers	Participant enters/re-enters discussion	Thread ↓	Participant leaves discussion	
44	A, B, C, D, F, G, H, I, J →	A	H, G →	→The first message is accessed by all writers (ABCDFGHIJ) but E
29		B		
29	G, E→	C	B, C, G →	
23		D		
16		E		→ H reads the first message and leaves to re-enter again later, after which he leaves immediately again
21	G →	A		
15		A		
14		D		
12		F	F →	
11		G	D, G →	→Only A and D write more than one message
9	H, D →	H	H, D →	
10		I	E, I →	
4		J		→ Only A and J read the whole discussion
6	E →	A	A, J →	

ACEG students (local site), D student (distant site), FHI students (international), B participant observer, J teacher

Fig. 3 Participation in a computer supported discussion.

combination of different activities in virtual learning environments. The participants talk contexts into being. A closer analysis of talk around computer-supported learning would give us a fuller picture of the context as the participants conceptualise it. Each learning situation is unique: different participants in a seemingly similar constellation of computer networks and pedagogies produce different interpretations of the situation.

4 Computer-supported learning and interaction from participant perspective

In the following section, we will provide two different analyses of computer-supported learning situations. The first presents an analysis of student participation in a web-based discussion and illustrates the importance of a multimodal approach in relation to computer-supported learning activities. Through the second analysis of a piece of interaction around a computer-supported learning activity we will show how the students, indeed, orient towards multiple contexts. These examples come from the context of university collaboration under the name of SHAPE, which combined computer-supported work with face-to-face situations during various courses for students of languages and teacher education. The web-discussions in SHAPE aimed at joint investigation of problems in the fields of pedagogy and languages. In practice, the student task was to write problem descriptions, discuss these problems with others and then write a short reflective summary on the contents of these discussions (see Kuure *et al.*, 2001 for a detailed description of the pedagogical set up). Figure 2 outlines the combination of the different contexts in which the learning activity in the above-mentioned courses was situated.

Figure 2 presents an overall set-up of the activities in connection with the courses referred to in this article. The learning activities stretch wide and combine different media. Already this rough look at the different localities and activities, both off-line and on-line, points towards the essentially polycontextual nature of computer-supported learning. Therefore, the analysis of learning activity in such situations also has to take into account the wider contexts of activities.

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The first of our analyses focuses on the student activity in the discussion on an electronic learning platform. Methods of analysis often assume that threads in computer-mediated discussions are read like text in a book: from top to bottom. This is how we have grown used to approaching text and this is also the reading supported by most software. Much analysis approaches the threads in the above-described linear fashion: the researcher makes conclusions based on how a thread develops, for example. If we look at real people acting in real situations, however, we notice that this is not how most participants of computer-supported discussion act. Text in computer-supported discussion is approached more as a complex entanglement of messages rather than linear, time bound sequences. The following analysis of participation in a threaded discussion exemplifies the multiple ways in which students join the discussions in a web-based environment (see Figure 3).

Figure 3 illustrates a conversation thread in an electronic learning platform. The thread is one of several dozen that were produced during casework between Finnish and American university students in the spring of 2000. The capital letters (from A to J) stand for participants and their postings in the thread. In this particular thread, participant A initiated the discussion by writing a case-description on a problematic issue in education. Later in the thread A wrote more, as the assignment led the case-writers to conclude with a mid-phase synthesis and a final summary of what came out of the discussion. The other writers (CEGDFHI) in the thread are participants who have also each written their own cases elsewhere in the electronic learning platform. J is the teacher and B is a participant observer, who was also actively involved in the discussions.

The first analyses of the thread focused on the flow of discourse as cohesive and coherent and the role of contributors in this discussion. For the researchers, the sequence of messages provided a coherent whole, turn by turn. The messages from different participants seemed to connect with each other and build on previous contributions. On the basis of an analysis of the textual elements it thus seemed that the postings form a collaboratively produced cohesive exchange of ideas. At this point, it would have been easy to assume, firstly, that this is the reading that all the participants construct and, secondly, that this reflects the learning process of the whole group.

However, a look into the database to find out who had actually accessed the messages changed our interpretation radically. The reader statistics showed that our (the researcher's) first interpretation of the collaborative construction of this discussion thread was inadequate. According to the data, only A, who initiated the discussion, and J, who was the teacher of the course, had read or accessed all messages in the thread. The first messages in this thread were accessed by several people, who never contributed to the thread later on. Patterns of participation among the writers of this case discussion varied a lot. Participant H, for example, dropped in to read the first message and left the discussion to appear back later on to write his contribution. Interestingly, he had not accessed the intervening messages in the thread at all and, in spite of that, had managed to produce a coherent contribution, in the middle of the discussion thread. As the figure shows, he only produced his comment and left the discussion (as indicated by the arrow symbol in the figure).

There are several possible explanations. Participant H could have read the preceding messages peeking over the shoulder of another student. It is also possible that he just read the subject lines of other contributions in the thread and decided to contribute on the basis of that, and that it was just a coincidence that the message linked to the flow of

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other messages so fluently. However, this is a very good example of how student participation takes many forms and that students approach texts in computer-supported learning platforms in various ways. For participants A and J, the discussion formed a coherent whole when judged on the basis of the access (reading) statistics. Other participants, both readers and writers, peek in and move to new arenas. H, for example, participated more forcefully in a discussion that he had initiated himself elsewhere.

On the basis of the analysis above, we consider it likely that apart from the researcher only a few if any students read all threads as a chain of postings, which progresses in time and builds a coherent whole. Therefore we cannot assume, for example, that the learning process the students undergo could be reached with monomodal research frames, which concentrate on the text alone. Nor can we base assessment of students' learning only on those activities that are visible in the electronic platform. We do admit that some aspects of the process can be reached through methods that concentrate on analysing the progress of threaded conversations. However, the situated accomplishment, i.e. how messages are produced and interpreted, cannot be reached through an analysis of a single medium. Understanding how participants interpret the interaction is of vital importance, especially in the case of research that aims at developing successful pedagogical practices. In the analysis of meaning-making activities, or the situated production of discourse, conversation analysis has proved to be useful in the study of computer-mediated interaction, as it examines language production and interpretation *in situ* (eg. Raudaskoski 1999; McIlvenny 2001).

Our second example provides an analysis of the situated accomplishment of the notion of community. Building or supporting virtual communities has been a strong trend in developing pedagogies for computer-supported learning activity (cf. Renninger & Shumar, 2002). At its worst, this work seems to assume that if we offer a joint virtual space for a group of students, they automatically form a virtual learning community. Our research shows, however, that even in virtual pedagogic contexts students first of all portray themselves as members of their local, physical communities and only secondly, orient towards a membership in a virtual community. Whether these communities are constructed by the participants as "learning communities" or maybe as "obligatory participation in another university course" is another interesting question.

The data excerpt below presents a complex situation where a group of people in two dif-

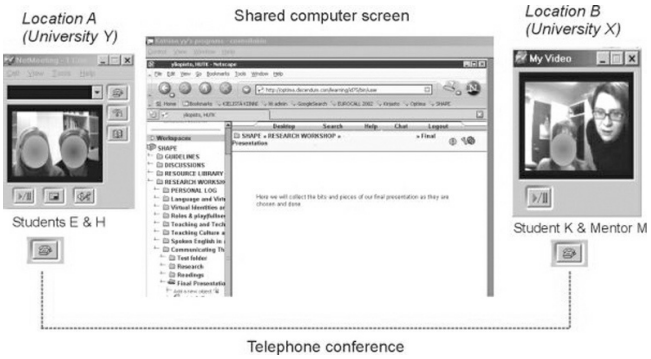


Fig. 4. A computer supported joint working space.

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ferent locations (Universities of X and Y) negotiate a timetable for their shared project. Location A involves two future language teachers. The second site, location B, consists of a language student and her mentor. The students in the situation form a small group, who ordinarily work together on an asynchronous web-based learning platform. Here they are in a computer-mediated synchronous meeting. Several different media are involved, since the activity is carried out through a combination of a telephone conference and a desktop videoconference including a shared computer screen (via Netmeeting). In other words, the participants share several computer applications at the same time as they talk to each other via the telephone. The situation is illustrated in Figure 4.

Our data suggest that the virtual learning community is *one* of the many contexts the participants negotiate into being in their interactions. The following data excerpt demonstrates an event where virtual group identity is talked into being. E and H are students from location A (University of X). K, another student, and M, who is the mentor of the group, join in from location B (University of Y).[1]

(1)
1. E: ---I don't know if anyone else apart from us works in mixed groups hah hah () [but
2. M: [no they don't
3. E: yeah hah () [I sort of .hah] thought so
4. H: [hah hah]
5. M: ACTUALLY SOMEONE DOES () Tiina does apparently [(unclear)]
6. K: [(unclear)] oh that I have not ((seen))
7. them () do nothing hah
8. M: yeah (.) there is nothing happening there yet =
9. E: = what what that Tiina does ()
10. M: teaching and technology group ()

With 'us', on-line one, participant E refers to a virtual community, which she herself is a member of. This community, formed by E, H and K, is present here in this situation. E further defines this group by calling it a 'mixed group', which means that the members of the group come from the two geographically distant universities. K adds to the group identity by contrasting it with 'them' (line 7), which is given a name in line nine by M as 'teaching and technology group'. M and E (lines 5 and 9) produce Tiina as the representative of this other group. Thus, this excerpt shows that a group, which could also be called as a virtual community, is made real in the talk of the participants. But this is not the only community that the participants refer to. When the situation develops, we see that the members of this computer-supported learning situation skilfully construct a scene

1 The following lists the transcription notation applied in this paper:

(n)	Parenthesis mark silences, numbers within them duration in seconds
(.)	A very short silence
INITIALS	More volume than in the surrounding speech
[	Overlapping speech
=	Connected speech
hah	Laughter
---	Omitted text
((comments))	Comments by the transcriber

The data extracts are translations from the original Finnish conversation. Due to translation problems some clarifying words are offered in double brackets.

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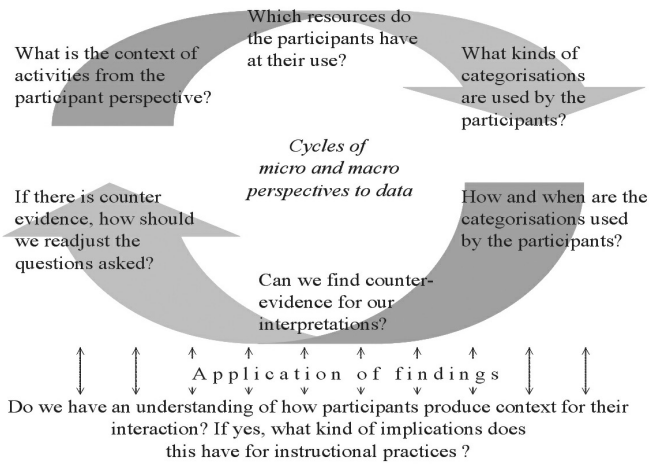


Fig. 5 Researching computer supported learning and interaction.

where various contexts and group identities interact. This context reaches far wider than the abstract notion of a virtual learning community. Directly after this instance of "we the virtual community" – talk, another community is brought up (see below).

(2)
1. E: yeah (.) who are the members ((of that group)) in our location .hah .hah
2. ((clicks on the computer screen)) (.) that is well ((creaky voice))
3. () in our location we are a little overloaded we really have not chose
4. (.) ch ch chose (.) ((clicks on the computer screen)) chosen this thing se well ()
5. K: yes this is obligatory for you
6. E: yeah(.)
7. H: [quite right]
8. E: [yeah ((clicks on the computer screen))]

When E continues her speech (line 1), 'we' is given a new meaning. Here 'our' and 'we' refer to the course participants in her local offline site, in the University of X. K affirms this on line five with 'you', positioning herself as a member of another group, which is not the virtual community they share. The discussion continues along same lines. The participants construct memberships of several different communities continuously: this can be seen even in a data excerpt as short as this, let alone looking at larger stretches of group activity. Therefore, it would be a crude generalization to look at computer-supported learning as an activity performed by one unified virtual community alone. What would be of interest, though, is when it is that the participants bring forward the membership of a virtual learning community. This could shed light on how the participants make use of and assess the activities provided by computer-supported learning environments.

Traditionally, a fair amount of research on instruction has approached the problem of developing new pedagogies with experimental designs aiming at causal explanations between pedagogic activity and learning. They base their arguments on statistical relationships between a pedagogic set up and learner performance. Such approaches involve causal explanations of the type "method x seems to provide good learning results". Depending on the research approach and research questions, experimental designs may

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offer some advice on how to proceed with developing holistic models of pedagogy.

However, 'average students' are a rare species and learning in interaction is such a complex process that it cannot be reached through generalisations alone. Developing new pedagogies involves a wide scene of interacting activities, which are in intricate relationships with each other. Therefore, what research devoted to developing new holistic pedagogies needs to focus on is the details of participant activity. This would require questions of the following kind: How and what kind of meanings do the participants negotiate in the activity? What are the resources they draw from? Learning, as any social activity, is indeed "constitutively interactive and irremediably situated" (Hemmings *et al.*, 2000:227).

5 A model for researching CSL

In the following, we will make a synthesis of the suggested research approach that was illustrated through the analyses above. Figure 5 illustrates the cycles of micro and macro perspectives into the data and the questions we should ask in the study of computer-supported learning and interaction.

When developing new pedagogies for new technologies, we should start with a look at the contexts and categorisations the participants produce. Instead of assuming that there is a virtual learning community at work we should consider, for example, what kind of group identities the participants refer to. The resources the participants have at their use for meaning making are an interesting question as such. We have to bear in mind that the resources that the teacher intentionally brings into the environment represent only a fraction of the resources that are actually used by the participants. Only after we have reached a picture of "what is going on" in and around the learning activities can we start considering the pedagogical implications of our research. Development of instructional practices is thus very much on the agenda, but unlike in experimental settings, only after we have gained an understanding of the ways in which the participants make the learning activities meaningful (cf. Vehviläinen, 1999; Silverman, 1993). The approach is cyclical, since we should be ready to discard any interpretations we make and look for new explanations, and thus we need to engage ourselves in a long-term research process.

It seems that the phenomena connected with computer-supported learning and interaction need to be considered more carefully from a participant point of view so that the activities, whether on-line or off-line, are treated as aspects of a wider framework of activity. Consequently, a central question in adopting a research position is not only reflected in the selection of the field site, but also in what kinds of decisions are made concerning the methods of analysis and interpretation. It also seems that the nature of the structure of web discussion needs more exhaustive attention, as it does not follow the sequential organization of face-to-face talk. Moreover, since these activities are multimodal by nature, we need to take into consideration other modalities as well as textual interaction.

6 Conclusion

This paper has examined the theoretical and methodological perspectives in researching computer-supported learning, grounding its arguments on the theory of discourse as

https://doi.org/10.1017/S0958344003000624 Published online by Cambridge University Press

social action. In this attempt, the theories that emphasize the polycontextual and multimodal aspects of discourse proved to be particularly fertile. We claimed that in order to develop new pedagogical practices we need first and foremost to understand how real people act in real situations of computer-supported learning. According to our view, the context of computer-supported learning encompasses more than the computer-mediated environment. The off-line and on-line worlds connect in various ways and do not exclude one another. Taking into account the fundamentally multimodal nature of language, we need to rethink the relations between the word and other dimensions of expression.

We suggest that to develop new instructional practices we need research approaches which would provide us with a broader understanding of how the participants make learning activities meaningful. To provide new insights, we should thus try to better understand how the phenomenon of CSL is culturally constructed: how people talk computer-supported learning into being and which resources they draw upon in making meaning. What such an approach would look for is not the causes of actions and events. Instead, it would raise as the object of inquiry the ways in which participants of learning events make the activities meaningful. This, in turn, may shed some light on the actual practices of learning and teaching. We would like to suggest that instead of chasing new learning solutions as the primary task, we should stop and have a look at how web-environments are being used and incorporated into the daily lives of our students. Gaining a better understanding of how students make computer-supported learning activities meaningful will in turn help us to develop new pedagogies for meaningful teaching and learning.

Acknowledgements

This research was supported by a grant from the Academy of Finland.

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