
Opening New Worlds for Collaboration

The philosophy of Heidegger has appeared briefly, but frequently throughout this book. Here, I consider his multi-faceted, but problematic influence in some detail. I argue that by avoiding certain dangers in his approach, we may be able to use what is deeply innovative there to find ways out of the habits of thought that limit our understanding of group cognition and collaboration.

The international, multidisciplinary field of CSCL needs to transcend the boundaries of narrow and incompatible cultural and academic traditions based exclusively on individual psychology, technological engineering or physical science methods. We need new ways to conceive of artifacts that open worlds for collaboration and of group cognition as a phenomenon in its own right. Where do we get our ways of looking at the world, at data, at research challenges? How can we develop new ways, appropriate to the unique promises of CSCL? This chapter discusses ideas from Heidegger, Marx and others that address these questions and may open up a new conceptualization of the CSCL enterprise.

The Diverse Traditions of CSCL

In the past decade, CSCL has grown willy-nilly out of various theoretical and methodological traditions that are mutually incompatible, but that each seem to contribute important insights. As is typical in exciting new fields, CSCL research has demonstrated—perhaps above all else—that relatively straight-forward extensions of traditional approaches imported from other domains are inadequate for addressing the intertwining issues raised by CSCL. Researchers in CSCL have come to the field from diverse disciplines and have brought with them disparate methodological traditions. If CSCL wants to become a truly international and multidisciplinary endeavor in the next decade, it may be helpful to reflect upon the traditions that have been brought to the field and to consider whether CSCL needs to develop its own theoretical framework, appropriate for defining the phenomena and methods of a unique field that transcends academic and cultural boundaries of the past.

When I was invited to be an American guest speaker at a German conference on e-learning in 2003, I started to think about the difference between American and German philosophies and how they had influenced work on both sides of the Atlantic in CSCL, computer science and artificial intelligence. It occurred to me that it might be useful to bring to the German audience (consisting largely of people trained in engineering) something of German philosophy (which I had studied as an American graduate student in Germany). In particular, I felt that Heidegger's philosophy still had potential contributions to make—despite the fact that some of his ideas have already been taken up and despite the serious problems that inhere to his thinking and writing. In addition, I felt that Marx's philosophic method might help to overcome an ideology of individualism that limits insights into the nature of group collaboration. Together, these traditions of

German philosophy might help to move from an “American-style” engineering mentality to a mentality open to what could be most innovative in CSCL.

In this chapter, I would like to consider how we might fashion a tradition that is appropriate and effective for CSCL by considering certain contributions that I think Heidegger and Marx can make to how we look at the world. Ultimately, this will bring us to some thoughts about where traditions come from and how they affect how we do science. I will start by contrasting caricatures of the American engineering mentality, which has influenced CSCL through computer science and artificial intelligence, with German philosophy, which has influenced CSCL through situated action and socio-cultural theory.

The American engineer Claude Shannon developed a mathematical theory of technical communication that helped to design efficient telephone systems (Shannon & Weaver, 1949). He conceived of communication as the transfer of information from a sender to a receiver. This model is often applied to education, seen as a transfer of information from a teacher to a student. It is tempting to view computer support in this way, as a neutral channel for the conveying of educational information from distributed database sources to online student recipients.

In contrast, German philosophy sees education as an intellectual process of personal development (*Bildung*), not as the simple accumulation of received factoids. There is the crucial matter of understanding (*verstehen*). In the case of Martin Heidegger’s philosophy (1927/1996), language is not a neutral medium for transferring bits of information, but an active source of truth that opens up new worlds for us. According to this, we might suspect that CSCL’s job is to design computer-supported environments and media that create new collaboration spaces to bring together people and ideas in ways that stimulate and nurture the building of increased shared meaning and knowledge.

Past efforts at developing computer support for learning started with the engineering model and moved from there to increasingly divergent approaches. Koschmann (1996a) identified the following historical phases of this research:

- Repetitive student drill of atomic facts and algorithmic procedures (computer-assisted instruction, from the 1960’s)
- Tutoring based on cognitive models of individual learning (intelligent tutoring systems, from the 1970’s)
- Hypertext information sources and Logo programming environments for individual exploration (constructivist discovery learning, from the 1980’s)
- Support for collaborative learning and group discourse (CSCL, from the 1990’s)

Computer-assisted instruction took a strongly engineering-type approach and intelligent tutoring focused on individual cognition from an AI perspective. Discovery learning started to talk about opening worlds (virtual mini-worlds) for creative exploration, and CSCL necessarily involves shared worlds. While each of these has its legitimate role in education, the last one seems to hold the most intriguing and intransigent research challenges for us.

What I am here caricaturing as the American engineering mentality is the technology-driven approach. In its naïve form, it reappears in ever software design course where a student is struck by the power of some technical mechanism and then designs based on that idea rather than on an investigation of how that mechanism would actually be used by people in real situations. The whole human-centered design emphasis of human-

computer interaction (HCI) was developed as a field to combat this disastrous tendency. In the more sophisticated form of the engineering approach, subtle AI techniques are implemented to scaffold learning. The research community around the “AI and Education” conferences and publications was quite influential in early CSCL research. The technology-driven approach was still quite apparent at the 2003 e-learning conference in Germany where I presented the ideas of this chapter. As in all contexts of fundamental paradigm shifts, the fact that practitioners adopt a “user-centered” or “socio-cultural” jargon does not necessarily mean they have fully overcome the practices that these terms were invented to counteract.

Today’s combination of fast computers, global networks, distributed databases and powerful communication software does have the alluring potential to support interactions among groups of people, relieved of the limitations of the past. Group interaction need no longer be moderated by a teacher or hierarchical authority; people can interact with others around the globe; contributions can be made whenever inspiration strikes; the record of discussions can be preserved and reflected upon. Imagine the Open Source development model (Raymond, 2001) scaled up to learning in all kinds of student and virtual communities. However, attempts to design software environments to support cooperative work and collaborative learning bump into formidable barriers. In many CSCL software design studies, social issues of adoption and community practices have overwhelmed the technical innovations. This is typical of applications that try to support interaction and communication in groups.

Consider email, the major success in groupware to date. It has taken a good decade for email to attain widespread adoption. And look how hard it still is, even for expert computer users, to deal with email: spam, privacy, security, contact lists, message management and many other hassles continually plague us. It takes us incredible amounts of time, energy, reorganizing and worry to maintain our email lives. If each new tool for collaboration is going to continue to be this much work for every user, then innovative software will always face insurmountable resistance from users. These are largely cognitive, organizational and social issues, and not simply technical ones.

CSCL systems of the past decade have tried to push to its limit the engineering approach in the extreme form of artificial intelligence algorithms (see part I of this book). These attempts revealed deep-seated problems in the engineering paradigm. Many software designs required the systematic collection of a volume of explicit representations of domain knowledge that far exceeded what was practical. The attempt to formulate heuristic rules based on the tacit practices of experts similarly proved to be misguided, despite the fact that in each of the explored domains people are fluent at problem solving and sharing knowledge in face-to-face settings.

So the software design approach moved toward supporting cooperation and collaboration within human groups. These efforts faced “wicked problems” (Rittel & Webber, 1984) that could not be managed with traditional engineering methods. There were no clear sets of functional requirements, measurable goals for success or even pools of subjects who could meaningfully test prototypes. The evaluation methods of the science of interface design like heuristic evaluation and cognitive walkthrough (Preece, Rogers, & Sharp, 2002) focus more on details of appearance and individual navigation than on the more consequential social issues of groupware and the mediation of human-human interaction. Taking a design-based research approach (Design-Based Research

Collective, 2003), software studies explored specific technical solutions in order to arrive at a clearer understanding of the problems they were designed to solve. Because the problems could not be well-defined in advance, the assumptions necessary for quantitative evaluation methodologies were not present. Due to the costs of building working prototypes adequate for group use, iterations were limited. My own attempts to develop CSCL software faced these problems. For me, at least, they convinced me of the need for analyses of group interaction, for theoretical studies of group cognition and for a view of collaboration environments as sets of artifacts that mediate group cognition. In other words, I concluded, we need a new theoretical framework for conceptualizing the phenomena and issues of our field.

An Appropriate Framework for CSCL

We need to drastically expand the traditional engineering model that focused on technical issues of transmission and that left the interpretation, use and sharing of all content to the unproblematic individual recipient. We have learned that collaborative interaction does not follow the model of rational agents making independent decisions, but involves complexly interdependent processes of group meaning making. In the next period of CSCL research, we need to focus on such non-technical matters as how groupware systems can and do:

- Create and structure communities
- Define and generate educational realms of knowledge
- Give form to intentions and meanings, helping users to come to an understanding of the system's designed affordances
- Impose new tasks and transform existing social practices
- Make life more rewarding, if also more complex

To accomplish this, the CSCL research community should develop appropriate new methods for design, evaluation and theory-building. In the past, we have tried to make use of traditional approaches taken over from other fields: technical engineering, cognitive psychology, single-user productivity software, teacher-centered pedagogy. Significant further progress in supporting collaboration may now require that we recognize the social, collaborative basis of learning and re-think the role of digital artifacts and virtual media within the social practices that constitute learning and other activities. This does not mean throwing away all the methods we know from the past. However, it does mean questioning them, defining their limits and integrating them with complementary views from other perspectives within a larger picture of what is unique to CSCL.

Working with colleagues in the CSCL community and drawing heavily on writers in relevant fields, I have recently been trying to sketch the needed theory of mediated collaboration through analysis of the phenomenon of *group cognition* (see part III). First, I tried to indicate how online communication differs from face-to-face, and how both are more complex than Shannon's model (chapter 14). In particular, I viewed collaborative communication as integral to group cognition. I presented a general discussion of the concepts related to group cognition in terms of building collaborative knowing (chapter 15). Then, I explored the notion of group meaning in more detail, and distinguished it

from individual interpretations of this meaning (chapter 16). I further developed the notion of group cognition as central to CSCL's distinctive focus on collaborative knowledge building in chapters 17, 18 and 19. Now I want to speculate on a direction for future development of the concept of group cognition.

The future is likely to see a proliferation of alternative approaches and methodologies within CSCL, some complementary, others mutually inconsistent. Clarity about the bigger picture may help us to choose among methodologies, adapt them and integrate them effectively. Perhaps an innovative reading of German philosophy, with its social focus, can play an important role as a balance to American-style engineering, centered on the individual user.

The final stage in German philosophy—before it merged into social science with the Frankfurt School—can probably be identified with Heidegger's later work. It offers a systematic critique of the theoretical presuppositions underlying the engineering paradigm. It also suggests an alternative way of conceptualizing thought, meaning and being. Although it has influenced a generation of social science theoreticians, such as Bourdieu and Derrida, it has still not percolated down to more widespread views.

This chapter presents a reading of Heidegger from the perspective of group cognition as an alternative to the traditional focus on the individual. From this vantage point, Heidegger can be seen as part of a lineage of German philosophers reacting against Descartes' position. Individualism as a focus of philosophy and as a social ideology can actually be traced back to the earliest writings of Western culture, even to the oral epic poems of Homer, with Odysseus as the paradigmatic individual searching for his identity (Adorno & Horkheimer, 1945). The centrality of the individual reached its zenith when Descartes (1633/1999) concluded that the only thing he could be certain about, given his radical questioning, was his own individual existence.

German Idealism's reaction to Descartes started with Kant's (1787/1999) "Copernican revolution," which reversed the relation between the individual mind and the world. It continued through Hegel's (1807/1967) detailed social history of the development of mind: from simple awareness through human mind, to group cognition and world spirit. Marx (1844/1967; 1867/1976) began the transition from philosophy to social science by relating the Hegelian development of mind to political economy and the relations of production, and by carrying out a critique of individualism as social ideology.

The three mainstreams of twentieth century Western philosophy—based on Marx, Wittgenstein and Heidegger—all transitioned from an individualist to a social or group focus. The early writings of Marx (1844/1967; 1845/1967) considered alienated labor as a consequence of capitalist relations for the individual, while his later writing (1867/1976) analyzed the capitalist relations as a social system. Wittgenstein's later *Investigations* (1953) soundly rejected his earlier vision in the *Tractatus* (1921/1974) of propositions in the individual mind in favor of viewing language as social interactions—language games within a social form of life.

Heidegger's work can also be broken into contrasting early and late periods. Heidegger himself talks of a crucial reversal or "turn" (*Kehre*) in the "path" of his thinking after the publication of *Being and Time*. The reversal is in the relation of human existence (*Dasein*) to the world. Heidegger's early work focuses on the individual in an effort to interpret human being in a way that overcomes the duality of Descartes' system. Rather than starting from the solitary thinker as a mind separated from physical reality,

Heidegger systematically considers human existence as thoroughly involved in a meaningful world of engagement.

This is where Heidegger's characterization of artifacts as ready-to-hand enters. Artifacts are not simply present-at-hand, as though a self-contained mental self could stare at them in a material world divorced from meanings. Rather, they are integrated into one's skillful being. Moreover, they are meaningful in terms of their being situated in our already meaningful world; we do not have to somehow project a mental meaning onto a physical substrate:

For example, the artifact at hand which we call a hammer has to do with hammering, the hammering has to do with fastening something, fastening has to do with protection against bad weather. What significance artifacts have is prefigured in terms of the *situation* as a totality of relationships of significance. (Heidegger, 1927/1996, p. 84)

This analysis of artifacts, situation and possible breakdowns has had a widespread influence, including within the theory of software design (Dourish, 2001; Dreyfus, 1972; Ehn, 1988; Floyd *et al.*, 1994; Suchman, 1987; Winograd & Flores, 1986; Winograd, 1996).

The world of *Being and Time* is a social world, with shared meanings and social relationships:

On the basis of this being-in-the-world with others, the world is always the world which I share with others. The world is always the shared world. Being in the world is being there with others. (Heidegger, 1927/1996, §26)

At this point in his analysis, Heidegger briefly overcomes the tradition of individualistic philosophy and can analyze situated meaning and language as based in the community.

Unfortunately, in the very next section of *Being and Time*, Heidegger rejects the social basis of human being in favor of an "authentic" stance of the individual toward his own finitude as the basis of meaning. Adorno, in his *Jargon of Authenticity* (1964/1973), tied this move to a politically conservative ideology. One can see this as a source of Heidegger's infamous and concerning political problems, as well as his philosophical problem of not understanding the social basis of phenomena like language and history (Nancy, 2000; Stahl, 1975a, 1975b).

Up to this point, Heidegger had successfully and rigorously forged an alternative to Descartes' individual, cut off from the material and social world. He had assembled the philosophic tools to begin to analyze language, culture, practices and habits as meaning-structures that are given in our shared world and that we interpret from our personal circumstances and concerns (see chapter 16). But instead of building on this, Heidegger fell back on his conservative heritage and reversed these relationships into projections based on the most individualistic of sources: one's personal relationship to one's own mortality (*Angst*). Heidegger's reversal from the resulting apotheosis of individualism came just a few years later, but too late to save him from entanglement in fascism. I will now skip ahead to briefly review the promising social aspects of Heidegger's later work.

Opening Shared Worlds

The later Heidegger is perhaps best represented by his discussion of the work of art as a special kind of artifact.

Van Gogh's painting is an opening-up of that which the artifact, the pair of farmer's boots, in truth is. This being moves into the unconcealment of its being... There is a happening of truth at work in the work, if an opening-up of the being takes place there into that which and that how it is. (1935/2003, p. 25)

This quotation refers to two very different artifacts: a pair of shoes and a painting of them.

Figure 20-1 goes approximately here



Figure 20-1. Van Gogh's painting *Farmer's Shoes*.

What has van Gogh's painting revealed about the shoes? It makes visible the nature of the shoes as artifact. The shoes, which in daily life sit unnoticed in a dark corner, are themselves the center of the nexus of people, places, activities, history, hopes, skills, materials and affordances that are made visible by the working of the art work. Works of art are not objective mathematical dimensions or sources of sense data pixels, but are networks of meaningful relationships as structured by personal, group and social activities and concerns.



Figure 20-2. Giacometti's sculpture *Standing Figure*.

The painting itself evokes the life of the farmer who wears these boots as she trudges through the plowed field in them and then places them aside at the end of a weary day. The remarkable quality of art work is that it makes visible the very nature of the things that it displays; it sets their truth in work by unconcealing them from their taken-for-granted invisibility in everyday life. Heidegger's analysis of the work of art rejects the dominant view that centers on the role of the individual person who experiences the work. Traditional aesthetics—even that of Hegel or Dewey—talks about the active role of the observer as source of the work's power, value and connotations. Heidegger reverses this perspective and sees the work as itself an agent that sets things into work.

Figure 20-2 goes approximately here

The sculpture of a human figure by Giacometti, although standing alone on a small pedestal, defines a human space of movement around it. It opens up a space for activity, for life, for other people and for the artifacts that go with them according to Heidegger:

Sculpture: an embodying bringing-into-work of places and with this an opening up of realms of possible living for people, of possible persisting for the things which surround and concern people. (1969, p. 13)

Works of art are special kinds of artifacts. Thanks to their unique capability, they make visible for Heidegger and others the nature of artifacts. All artifacts have some of the same power as works of art, just not so dramatically visible—in fact, their hidden, taken-for-granted, tacit mode of working is often necessary for their effectiveness. Artifacts can generally play an active role of opening up a world and gathering together the material, social and artifactual furniture of that world. Heidegger extends the artifact-centered view of the world to bridges, jugs and other artifacts.

A bridge, such as the renowned *Alte Brücke* of Heidelberg, joins the banks of the Neckar river, defining their separation and carrying people across. Its massive red stone construction anchors the bridge in the river valley, while relating it to the castle and cliffs above of the same stone. The sculptures carved into the pillars evoke the history and ancient leaders of the town. The elements of running water below, blue sky above, durable stone building blocks underneath and human commerce across are brought

together harmoniously in the meaningful space that the bridge opens up and structures for them (Heidegger, 1951/1967).

A ceramic jug for wine opens a similar kind of world. The jug gathers within itself the fruits of the labor of skilled vineyard workers, long hours of summer sun and drenching rains. The porous container chills and aerates the wine properly. Its carefully crafted spout transfers the wine to glasses without spilling a drop, while its handle allows it to be manipulated effortlessly with balance and grace. Both jug and contents contribute to a hard-earned end of the work day or to a festive pause in the life of the village (Heidegger, 1950/1967).

Heidegger's favorite art form is poetry. Poetry makes language visible (see Heidegger, 1959/1971). Poetry is a source for the creation of new expressions and new forms of speech. Poetry also opens up worlds, and it can name the elements that it brings together in those worlds. For Heidegger, language speaks (*Sprache spricht*). It is not so much that people use words to express their ideas, but that *language speaks through us*.

Consider the collaborative discourse that was analyzed in chapters 12 and 13. What took place there happened largely through the power of language, the mechanisms of discourse. Utterances built on each other. Words gathered richness of meaning through repetitive usage. The discourse itself provided an opportunity for all this to happen.

Or consider this book. It is not a "brain dump" of ideas that already existed in my head. The writing of the book opened a world for the development of the ideas it contains. Its gradually developing manuscript provided a persistent artifact that elicited diverse thoughts and joined together various ideas—far more than I could ever keep in mind. The Heideggerian approach helps us to overcome the subjective view of writing as an externalization of mental contents and to see the book itself as opening a world of discourse and as gathering within itself a multitude of ideas. To the extent that it is an effective work, the book makes issues visible to an audience and invites readers and writers to reconfigure its meanings from their own interpretive perspectives.

This view of artifacts as opening up worlds of meaning and interaction contrasts with the technological or engineering approach that dominates the modern world view. Engineering looks at artifacts as instruments and raw materials to be rationally organized by people to meet their material and economic needs. The methods of modern science and technology correspond to the ontology of our epoch of the history of Being, and Heidegger looks toward a post-industrial ontology that would be less alienating (Heidegger, 1953/1967).

Heidegger's analysis suggests an approach to CSCL that conceives of collaboration environments as active worlds, rather than assuming that individual people are the only interesting source of agency. How can we go about developing a methodology for CSCL research in keeping with this shift in the locus of agency?

A Methodology for Analysis

The approach taken by Marx in his life's work provides a model of abstracting from empirical analyses and then using the abstract categories, structures, concepts and insights to return to concrete observation with deeper understanding, interpreting the phenomena from the newly acquired theoretical perspective. In his early studies, Marx dealt with historical instances of revolution and counter-revolution. He found that there

were social forces at work that were not adequately understood, but that posed barriers to significant liberation and social change.

In his middle studies, Marx conducted detailed grounded research into the development of capitalist forms of production. During this period, he formulated his methodology in his rough draft (*Grundrisse*) study. He dismissed the commonsense approach of simply accepting what seems to be empirically “given” in favor of deriving analytic concepts from the given phenomena and using these to build up a rich analysis of the concrete as complexly mediated:

It appears to be the correct procedure to start with the real and the concrete, with the real precondition, thus e.g. in economics to begin with the population. ... But if I were to begin with population, it would be a chaotic representation of the whole and through closer determination I would arrive analytically at increasingly simple concepts; from the represented concrete to thinner and thinner abstractions until I reached the simplest determinations. From there it would be necessary to make the journey back again in the opposite direction until I had finally arrived once more at the population, but this time not as the chaotic representation of a whole, but as a rich totality of many determinations and relationships. (1858/1939, p. 21)

Then in his late study of *Capital*, Marx began with the “cell form” (1867, p. 15) of capitalist society, writing in the opening section of the original edition:

The *form of value of the product of labor* is the most abstract, but also most general *form* of the *bourgeois* mode of production, which is thereby characterized as a specific kind of social mode of production and is thus simultaneously historically characterized. (1867, p. 34f)

For Marx, the analytic cell of capitalist society is the mediation of the value of the *commodity* (an artifact produced for sale). Any commodity in modern society has both a use value (based on its affordances) and an exchange value (based on the labor time necessary to produce it). For instance, the components of activity systems for learning and working (e.g., schools and factories) have their exchange value (i.e., political and economic) aspects. In particular, supports for collaboration have their considerations of power and profitability that have not been made thematic here, but that must not be ignored in a fuller analysis. The critique of the ideology of individualism, the private property relations of information and the intellectual division of labor are all part of this.

For Vygotsky (1930/1978), the analytic cell of human cognition is the mediation of thought by linguistic and physical *artifacts*.

For this book, the analytic cell of collaboration is the mediation of *group cognition as discourse*. This result has emerged gradually from my work in CSCL during the past decade. I have certainly not yet provided a systematic analysis of this mediation, but perhaps I have supplied a number of theoretical terms that could contribute to such an analysis. I have undertaken a journey from concrete experience with groupware prototypes to an abstract understanding of collaborating with technology. The analysis itself requires much more empirical study—the equivalent of Marx’s years of self-sacrificing research in the British library or the years of experimentation that Vygotsky would have needed to flesh out his vision if he had not died so young. From such a more fully developed theory of collaboration, one could then ascend back to a concrete understanding of collaborative learning and working—but this time as a rich totality of

visible mediations—that could guide the design, analysis and deployment of collaboration software and associated social practices. This suggests an agenda for the next decade.

The path of research in this book roughly followed the sequence of Marx's work. The shift of approach to providing computer support for collaboration through fostering group cognition—seeing the group, rather than the individual, as agent—took place gradually through the three parts of the book:

- In part I, case studies of software design increasingly took the form of viewing software as a medium that opens up and supports group communication and collaboration—or fails to do so. This led to an attempt to experience and understand how innovative software prototypes function (for the user as well as the designer) as mediating artifacts.
- In part II, the analysis of interaction was approached as the making visible of that which happens in discourse, without objectifying and reifying utterances as quantifiable expressions of individuals' thoughts. This took the form of a micro-ethnographic study of a small group of students collaboratively learning about the meaning or affordances of a digital artifact with which they were working.
- In part III, theoretical reflections explored the concept of shared meaning and group cognition as related to the speaking of language in discourse. A network of related concepts was explored, including: artifacts, situation, mediation, meaning, interpretation, tacit knowing, explicit knowing, perspectives and negotiation.

While I think that systematic empirical study of small group, computer-mediated collaboration is necessary for advancing work in CSCL, compiling facts and statistics about those facts is not enough. When Marx poured over the detailed financial ledgers and other documents that revealed the formation of capitalism in England, he not only collected data, but he uncovered layer upon layer of social mediations through which the meaning of that data about the prices of linen and working conditions contributed to a history of social transformation resulting in commodity production and the private ownership of the means of social production. The socially-established meanings and institutional structures that Marx analyzed through a combination of empirical data collection and brilliant critique of prevailing ideologies provides a theoretical framework that is still essential (taking into account subsequent social mediations) for understanding today's phenomena like agribusiness, globalization or technology-driven progress. That sort of theory is needed for CSCL: a theory of collaboration that provides an appropriate conceptual framework for designing groupware and analyzing its use.

Differenz, différance, different

In Heidegger's terminology, we need to investigate Being as well as beings. For instance, it is not enough to compare software environment A with system B as empirical things that may influence learning outcomes. We need to think about the Being of those artifacts: how do they function within the collaborative interactions that pass through them? What kind of space do they open up for collaborative learning? Do they structure time and space effectively for their users? Are their environments conducive to social interaction, creativity, fun and learning? If we are focusing on group discourse, then we

want to know how CSCL environments open up a world of discourse and how they structure it. From conversation analysis (CA), we know the importance for interaction of discourse structures like turn-taking (Sacks, Schegloff, & Jefferson, 1974) and repair (Schegloff, Jefferson, & Sacks, 1977). From our experiences with CSCL, we know that these structures are drastically transformed through computer mediation. Different systems transform them differently. For instance, in chat and threaded discussions, strict turn-taking is not required; in chat, among several active participants, this can lead to confusion, while the threads of asynchronous forums are designed to avoid such confusion.

Heidegger's later work dwells on what he calls the "ontological *Differenz*": the relationship between beings and (their) Being. (Ontology is the study of Being.) Already, in his early *Being and Time*, Heidegger (1927/1996) contrasted a view of artifacts like hammers as meaningful components of a network of useful and ready-to-use tools with a Cartesian view of them as physical objects extended in space and simply present to our passive perception. As we saw above, the hammer is an integral part of a lived world, which opens up a space for our human activity. The Being of the hammer as something usefully available for a range of possible applications involves the network of other artifacts and human purposes that make up our human and social world. The relationship of a being to its Being is even clearer in the later examples like the jug and bridge discussed above. The Being of the jug is not its clay materiality, its having been crafted by a potter or its presence in front of a user, but is its work of opening up a space in which it brings together within the user's life the wine as a gift of the heavens and earth that have nurtured the vineyard. The Being of the bridge across the Neckar similarly opens a world in which the banks of the river appear and are spanned, allowing the townsfolk to pass back and forth, under the ever-changing skies and above the flowing waters. The Being of the jug or the bridge is a dynamic process that plays a unique role in structuring and making available a lived and shared world, a humanly meaningful environment within nature.

The ontological *Differenz* is not a solved problem according to Heidegger, but, rather, the most challenging task for reflection today. A jug and a bridge are both part of our lived world, but they are not identical. The possibilities that are opened by the Being of a jug are not those opened by the Being of a bridge. How is it that the one has the Being of a jug and the other that of a bridge? Or, viewed along another dimension, how is it that the jug may under different historical conditions have the Being of a spatio-temporal manifold, a formed lump of clay, a craftsman's creation, a commodity worth 13 Euro, a source of wine, or an heirloom?

Analogously, we can ask, what is the Being of a given CSCL environment? Is it the technological functionality of the software? Is it the affordances of the user interface? Is it a role in a larger activity system? Is it involved with how group discourse is mediated within the environment? Does it have to do with the place of technology within modern life? Is it the opening of a world where groups that never before existed can come together and interact? Is it an unending network of meaning and meaning-making possibilities? Perhaps Heidegger's question of Being and his problem of the ontological *Differenz* blend into our question of CSCL theory and our problem of how to conceptualize group mediation in order to guide system design. For instance, if the Being of a CSCL system is taken as involving how it mediates group cognition instead of how it

can be used as an instrument to optimize individual learning, then that would have significant implications for the design, adoption and assessment of the system.

Derrida (1968/1984) takes up the problematic of the ontological *Differenz* in his reflections on *differánce*. He relates it to Saussure (1959) and his distinction between (spoken) speech and (formal) language. Speech is the kind of thing that CA studies, or that we analyze when we look at the talk-in-interaction captured in a video transcript, a discussion forum or a chat log. Language, on the other hand, is the formal system of structures that defines a natural language like English that is used in speech. In a sense, a formal language does not exist in the world; it is an abstraction from a great many instances of speech that can be said to take place in that language. Chomsky (1969) made this particularly clear by developing mathematical models of languages and in defining linguistic competence as distinct from actual speech. It took a revolutionary reversal by CA to start analyzing actual speech utterances rather than sentences invented by linguists, which were supposed to appeal to one's linguistic competence. Derrida's point is that a speech utterance—despite its empirical priority—depends entirely upon a system of language for its meaning or its Being.

Language can be viewed as a massive system of distinctions, or *differánce*. When someone makes an utterance—even a silent utterance of consciousness expressing self-awareness—that act relies for its meaning on the whole structure of this complex language. Derrida agrees with Heidegger's critique of the Cartesian view of Being as (physical, temporal) presence and concludes that the Being of beings is determined by formal systems of distinctions, e.g., the meaning of a particular utterance is determined by language as a system of differentiations:

Thus one comes to posit presence—and specifically consciousness, the being beside itself of consciousness—no longer as the absolutely central form of Being but as a “determination” and as an “effect.” A determination or an effect within a system which is no longer that of presence but of *differánce*. (Derrida, 1968/1984, p. 16)

Sources of Being

Language is only one of the structures that determines the Being of beings. Society is another one—or a set of such structures. Society is not a being that can be found somewhere present in the material world; it is an immense and evolving set of distinctions, rules, institutions and meanings that make some actions possible and others impossible, which condition the actions that we do make and give them their significance and consequences. Just as a language is continually being created by the population that speaks that language, so society is being reproduced and transformed by the activities that take place within it. In trying to make sense of radical social change (and its failures), Marx noted,

Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past. The tradition of all the dead generations weighs like a nightmare on the brain of the living. And just when they seem engaged in revolutionizing themselves and things, in creating something

that has never yet existed, precisely in such periods of revolutionary crisis they anxiously conjure up the spirits of the past to their service and borrow from them names, battle cries and costumes in order to present the new scene of world history in this time-honoured disguise and this borrowed language. (1852/1963, p. 15)

Here Marx has identified the recursive nature of the Being of beings. History is neither something divorced from historical activities nor identical with them, neither simply determinate of them nor determined by them. Rather, history is made by people and it simultaneously delimits and defines those new activities that could transform it. When someone introduces a new term into the language, that term is defined by the very language that it is changing. In a sense, the language itself is speaking through the poet and transforming itself; society is acting through the social activist and evolving itself. Both Garfinkel (1967, p.33) and Giddens (1984a, p.25) identify the reflexive and recursive nature of Being that defines and delimits the beings through which Being comes to be and to evolve.

The history of CSCL provides a relatively simple example of the dialectic of Being and beings. Methodologies, definitions of data and key terminology have been brought into this multidisciplinary domain by researchers and authors from diverse fields. But somehow, certain terms have been accepted and not others. Lave and Wenger's (1991) influential book, for instance, proposed terms like "peripheral legitimate participation," "social practice" and "situated learning," but the terms that stuck were "communities of practice" and "socio-cultural." This may have been a result of how the book entered into group interactions within CSCL gatherings and related community discussions. Some terms simply have greater resonance within a body of discourse; they are adopted by practitioners and become guiding concepts, buzz words, hype or jargon. The being of individual contributions merge into the Being and *differánce* of a discipline. This Being is then reified and acts as an autonomous institution that provides a conditioning context for subsequent beings.

In discussing linguistic or social "structures" as analyzed by Heidegger, Derrida, Garfinkel or Giddens, I do not intend to conjure up immutable forces or abstract relationships divorced from social interaction. This is not a variety of structuralism. These structures are historically evolving aspects of the socio-cultural context. Their rules and preferences are results of small-group interactions and are made relevant and interpreted within these interactions. Taken for granted as rules of polite society, for instance, socially accepted values and rules can be used as resources in accounting for behavior (Garfinkel, 1967). In other words, these "rules" are not unmediated causes of human and group behavior, but socially constructed habits (Bourdieu, 1972/1995). They are not predictive like the laws of physics, but reflect patterns of the expectations and rationalizations that people often use in their interactions with other people. The appearance of structures as objective, ahistorical edifices is an illusion that must be deconstructed by critical theoretical analysis.

Although Garfinkel's ethnomethodology arose largely as an alternative to structuralism, it still must recognize the role of structural properties of the concrete context. As a matter of research methodology, it insists that features of the context can only be considered to the extent that they have been made relevant by the interactions of the members who are acting in the context. But that insistence on grounding the analysis in the interactional data does not eliminate the problem of describing the structural

properties of the context that are made relevant by the members. For instance, if racism or sexism is referenced in the interaction, then issues are thereby brought in that go beyond the immediate interaction. Similarly, conversation analysis has worked out organizational features of talk and interaction based on empirical utterances and conversations. However, if they demonstrate a pattern of organization or a preference for certain interactions over others (e.g., Sacks *et al.*, 1974; Schegloff *et al.*, 1977), then one can still ask where these patterns or preferences come from. What is the Being, the system of distinctions, the historical pattern, which delimits how people behave in their concrete interactions?

A variety of answers can be given as sources of Being. The structure of conversational turn-taking seems to be a natural response to the fact that our auditory attention and short-term memory cannot deal well with more than one person speaking at a time; therefore, our conversational speech has developed simple conventions for indicating when and how sequential turns can change. These conventions were practiced as we began to engage in social interactions, and are part of our socialization. Many techniques that support communication and intersubjectivity are established through mechanisms like, for instance, peek-a-boo games between mother and infant or the kind of mutual recognition interactions that led to the pointing gesture in Vygotsky's (1930/1978, p. 56) analysis of the genesis of symbolic artifacts. Lakoff (1987) details how much of the underlying meaning of our mother tongue is grounded in our being embodied within the world and in metaphors that extend our bodily sense of orientation. Habermas (1981/1984) argues that there is an ideal speech situation, and that many conversational patterns aim to approach this ideal or to follow its logic; others reflect forces that systematically distort that goal. Then there are what Marx referred to above as the "traditions of all the dead generations," sedimented in the tacitly understood connotations of the words of our language. Of course, there are many languages, dialects and jargons of cultures, subcultures and groups; these bleed into each other, contributing to each other's expressiveness, shaping how reality reveals itself to communities and passing on ways of conceiving.

The question of the origin of Being is not just an academic matter. Members to conversations take up this question themselves. As Garfinkel (1967, p.33) puts it, actions that violate conversational norms are "accountable." For instance, someone who violates the preference for self-repair may be taken to account for being rude. Violators of other norms may be considered aggressive, shy or—in extreme cases—insane. People commonly account for conversational behaviors by appeal to standards of politeness or manners. These standards play the role of a folk theory of the Being of conversational utterances.

It is also possible to empirically investigate the source of Being in this sense. In fact, this is just what chapter 13 did, analyzing a collaborative interpretation of a list artifact in a computer simulation of rockets. The discourse analyzed there pivots around the exclamation, "This one's different!" Brent, normally a quiet, reserved boy, thrust his body forward past his fellow students and pointed with his whole body, lifting himself out of his chair and gesturing resolutely at the computer screen, with his pencil extending his body almost into the monitor. Everything, his body, demeanor, gaze, arm, pencil and words pointed at a spot on the screen. The teacher had asked, "You don't have anything...?" and the students had unanimously responded, "No" (there isn't anything).

Then Brent emphatically pointed out that there was one: “This one’s different.” His actions and the deictic phrase, “this one’s,” served to open a space for shared consideration and to focus the group discourse on it. As if Brent had studied Heidegger on ontological *Differenz* and Derrida on *differánce*, he characterized his discovery simply as “different.”

The ensuing collaborative moment involves the small group of students interactively explicating what is here meant by “different” and confirming this as an acceptable description of something on the computer screen. The characterization of a rocket pair on the monitor as different started as a personal interpretation by Brent. As Heidegger defined it, interpretation is a matter of laying something out *as* something. This involves making explicit something that was already there in one’s tacit pre-understanding (see chapter 4 in this book). Brent made explicit that the rocket pair should be seen *as* different. The group discourse then went on to make matters even more explicit. The term “different” pointed back to the teacher’s explication of “anything” *as* same engine, *different* nose cone. The group made explicit that they were now talking about rockets one and two, and that these rockets had the same engine (but different nose cones) as required. The group developed a shared understanding through the development of a logical argument using a sequence of cognitive moves: proposals, arguments-against, clarifications, explications, arguments-for, agreements, conclusions. The rational sequence of argumentation was made by the group as a whole. Through their collaborative interaction, the group learned to see the list as structured in a way that they had not previously been able to see it. That is, the Being of the list in the sense of its structural properties was transformed by the group discourse. The meaning of the beings in the list (the individual rockets and their descriptions) was created or revised in this interaction. The system of differentiations and relationships among the rockets was literally transformed when Brent dramatically declared that a key one was “different” and the group took up his proposal, explicated it and adopted it as shared meaning.

The re-interpretation of the list was not arbitrary. The list could not simply be interpreted in terms of *any* differentiations that anyone came up with. The differentiations of the first boy were systematically compared with the reality of the simulation list and with the differentiations of the teacher’s guiding question, and found to be lacking validity. The list artifact talked back to the group. This “back-talk” (Schön, 1992) of reality was essential to the process of “creation/discovery” (Merleau-Ponty, 1955) that created a new structure. It uncovered the structure as visible to the group by discovering it in the list, so that in the end the first boy could say, “I see. I see. I see.” Retrospectively the group took the list structure as having always already been there—they created this meaning and interpreted it as a discovery.

This is a lay person example of respect for the empirical. As a science, CSCL must, of course, be founded on a systematic respect for the empirical. However, this does not mean blindly accepting narrow methodological definitions of the empirical from sciences that investigate very different realms of reality—for instance, realms in which human interpretation, interpersonal interaction and shared meaning do not play such a central role.

A New World for CSCL

Given a Heideggerian view of artifacts as agents for opening worlds of interaction, meaning and Being, what are the implications for collaboration design, analysis and theory? One aspect of Heidegger's artifact-centered approach is to minimize human willful agency—let the artifact do its work and be itself (*Gelassenheit*); let the event of mediation (*Ereignis*) unfold and become what it wants to be by gathering together and appropriating what is appropriate to itself. There is a shift of agency. For CSCL, this could mean shifting from individual rational actors to the group discourse as the primary unit of analysis.

My work—like that of others (e.g., Linell, 2001; Wegerif, 2004; Wells, 1999; Wertsch, 1985) concerned with CSCL theory—has increasingly focused on a conception of group cognition as shared discourse. It is not so much individuals or even sets of individuals who build collaborative knowledge, but effective instances of group discourse. Shared knowledge is not so much built through deductive sequences of people's mental ideas, as through the workings of language and social interaction. The way to foster this involves designing and creating artifacts, social settings, activity systems, cultural standards, community practices and societal institutions that open up worlds of structured group discourse. Let the discourse unfold. Let it gather together elements, concepts and perspectives that can mix productively. Let group cognition emerge from the working of the discourse, through which the cognition is mediated.

According to this focus on group cognition as discourse, computer support for collaboration in the next decade should:

- Focus *software design* on user communities and interacting groups, rather than primarily on individual users and their personal psychology. That is, groupware should be designed to meet the social needs and support the actual and potential practices of communities by opening effective worlds for collaborative knowledge building. It should provide powerful artifacts for mediating their group discourse.
- Develop *evaluation methodologies* for collaborative learning based on the group unit of analysis. Suggestions for doing this and examples have been advanced by video analysis and ethnomethodology (see chapters 10 and 18 along with chapters 12, 13 and 21).
- Articulate a *theoretical framework* that situates software in its socio-technical context, drawing on traditions of German philosophy and social thought. Approaches to this have been offered by derivatives of the three mainstreams of philosophy: Marx's methods as developed in activity theory, Wittgenstein's philosophy of language as applied in conversation analysis and Heidegger's analysis of artifacts as interpreted in terms of group cognition and shared worlds.

This chapter has tried to open up the discourse concerning support for collaborating with technology by bringing together diverse traditions and by situating the topic within a theoretical framework of mediating group cognition. Hopefully, this discourse will continue and will help to open up new opportunities for effective CSCL work in the coming years and for a more collaborative world generally.