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Chapter Twelve - Collaboration¹

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Introduction

This chapter explores one of the most central terms used in relation to online and networked learning, collaboration. The term is closely associated with a wide range of social and situated theories of learning and this review can only provide a brief introduction to what can be a complex area. An underlying assumption made here is that it is unproductive to search for one correct definition of collaboration, rather we need to understand how collaboration is used in current debates about education, learning and new digital technologies.

Our account of the usage of the term collaboration begins by examining how two closely associated terms, cooperation and collaboration, have been used and try to draw out what might be thought of as family resemblances in these terms (Wittgenstein 2001). The definitions of these terms have often overlapped. In a review of the literature on cooperative learning and peer tutoring Topping defined cooperation by studying its roots.

CO- means together in company, jointly, in common, equally, mutually, reciprocally, while -OPERATE means to work, act, influence, effect, accomplish, cause or carry out. (Topping 1992 p151)

At about the same time Kaye defined collaborate in a remarkably similar way.

Etymologically, to collaborate (co-labore) means work together, which implies a concept of shared goals, and an explicit attempt to 'add value' - to create something new or different through the collaboration as opposed to simply exchanging information or passing instructions. (Kaye ed 1992 p2)

In as far as a distinction between the two terms can be maintained co-operate has been applied more to a division of labour in which individuals achieve their aims by mutual assistance whereas collaborate has implied a stronger commitment to joint aims as well as mutual assistance. Readers may prefer to use the terms largely interchangeably, as we do in this chapter, or keep them separate (e.g. Crook 1994, Lehtinen 1999). The important point for researchers and users, is that like many other factors discussed in this book in relation to e-learning, the terms cannot be defined clearly and reliably and that they rely for much of their meaning on current usage (See for example chapter two and the discussion in chapter seven on folkonomies).

A further factor used to distinguish between the two approaches has been the role of a person in authority. McConnell argues that cooperative learning situations can be divided between those where an external authority, usually the teacher, enforces cooperation by structure and rewards, and those where the learners choose cooperation without external intervention (McConnell 2000 p7).

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He uses this basic distinction to summarise two views of cooperative learning posed as opposite ends of a spectrum. Each view is composed of a number of dimensions including structure, teacher control, moderation of learning, learner motivation, learning content and assessment. At one end of the spectrum McConnell places the view found: “in the cooperative learning movement in compulsory school education in the USA and Israel.” (McConnell 2000 p16)

This view is at the 'external authority' end of the spectrum in which ‘Cooperation is structured and policed by a teacher’ (ibid. p21). Two reviews of theory and research from the early 1990s are examples of this school of thought (Slavin 1990, Sharan 1990).

At the other end McConnell places the practice of liberal school education more prevalent in the UK. He characterised the UK approach as: “problem or issue based. Learners learn through intrinsic motivation and rewards are largely intrinsic. There is little if any ‘policing’ by a teacher or tutor.” (McConnell 2000 p19)

Topping (1992) also noted that some UK teachers would find the stress on team competition and individual accountability found in the US model alien commenting that: “British approaches, whilst warm, fuzzy and comfortable, demonstrate an organisational looseness bordering on chaos.” (Topping 1992 p153)

One aspect of collaborative learning not addressed in this chapter is assessment. Assessment processes act to inform students of what is important to learn and what is not (eg see McConnell, 2006). Collaborative assessment is particularly important in the context of e-learning communities, where an ethos of collaboration and cooperation exist. In this context, the expectation is for students to engage in helping each other develop, review and assess each other’s course work. It is the collaborative learning and assessment process itself that signals to the students what form of learning is expected of them (McConnell, 2002). In using collaborative learning, practitioners should consider the importance of assessment processes. We need to help students and teachers understand what collaborative learning is, why it is important and why it is being used in any particular circumstance. We need to help them understand the potential benefits to learning of collaboration. Students and teachers should be provided with opportunities for the development of collaborative learning skills, and for gaining understandings of cognitive and emotional development in group processes related to collaborative learning. An understanding of the dynamics of collaborative learning is important for students to be able to participate in group-work and ‘survive’ the experience. We need to provide an appropriate context for collaboration to take place. Collaborative learning has to be integrated into learning in ways that are meaningful and that are clearly understood by students. Learning environments have to be designed as part of this wider context. Reward systems that support and sustain collaborative efforts, and which allow students to take control of rewards to a large degree, have to be provided. These may include: *intrinsic reward systems* in which students play an active part in developing criteria for judging their own and each others participation in the collaborative learning process. Assessment has to include some self-peer-tutor (collaborative) processes aimed at motivating students and ensuring their participation in the collaborative learning processes. As well as *extrinsic reward systems*, such as institutional assessment processes or assessment systems imposed by teachers: these have to be designed in ways that support collaboration and which indicate to students that their collaborative efforts will be seriously taken into consideration. Power and control are at the heart of reward systems. Teachers have to withdraw (some of) their power as unilateral assessors in order to allow students to practice collaborative learning. By practice, I mean students’ ability to live with and learn from collaboration and to take a high degree of control of the collaborative learning process, including making judgements about its intentions, processes and outcomes.

David McConnell

McConnell, D. (2002) The experience of collaborative assessment in e-learning. *Studies in Continuing Education*, 24(1), 73-92

McConnell, D. (2006) *E-Learning Groups and Communities*. Maidenhead, SRHE/Open University Press.

Cowie noted that such chaotic organisation could be found on both sides of the Atlantic (Cowie 1992). Generally cooperation is more often used where the organisation of a group and its tasks are determined by a tutor, teacher or moderator who has some structural basis for their authority whereas, in this usage, collaboration identifies group work amongst peers with little or no direction from someone in a position of power. It should be clear how difficult this can be to apply in an educational setting in which grading and assessment are key drivers. Power is never fully absent and the distinction is not an absolute one. For recent empirical studies that cast light on these issues by examining peer and collaborative assessment see Trehan and Reynolds (2002) and Hodgson (2005).

The area of cooperative or collaborative learning, set out in the early 1990s, has not been clarified by more recent discussion. One of the most quoted attempts to clarify usage has been that of Dillenbourg, who out to provide a common framework for collaboration (1999). Firstly he provided a simple definition of collaboration that he then elaborated by developing a variety of meanings organised into four aspects of learning. The simple definition of collaborative learning that Dillenbourg began with was:

‘a situation in which two or more people learn or attempt to learn something together.’ (Dillenbourg 1999 p2 emphasis in original)

Dillenbourg noted at the outset that each of the italicised terms in this definition can be interpreted differently and went on to identify four aspects of learning related to collaboration (which have parallels with the definitions given in chapter seven) and how each one of these is problematic in its own right:

- The situation – which can be characterised as more or less collaborative.
- The interactions – between pairs or in groups which can be more or less collaborative.
- The mechanisms – claiming that some mechanisms are more intrinsically collaborative.
- The measurement of effects.

(Adapted from Dillenbourg 1999 p9)

Despite Dillenbourg’s best efforts the idea of collaborative learning is still unclear and indeed his clarification can be seen as being located within one tradition of collaborative learning. Dillenbourg’s explicit aim was to bring together research from psychology and computer science, an aim not related to social and situated accounts of learning. Collaborative learning has another large source constituency, one that derives its strength from a social critique of cognition and is related to the cultural turn in the social sciences (Jameson 1998).

Social and situated views of learning have no single source but organise around a set of complementary and contending theories. This is discussed in more detail in chapter six. An accessible introduction to these theories can be found in Lea and Nicoll (2002). Perhaps the most commonly referenced sources include:

- Socio-cultural theories. Originating in the early Soviet theorist Vygotsky who popularised the idea of Zone of Proximal Development (ZPD) and the idea

that learning was a process of internalisation of practices emerging in the social and material world. The key idea from this school in relation to new technologies was the idea of a cultural tool and the mediating role given to material and cultural artefacts in learning. “The inclusion of a tool in the process of behaviour (a) introduces several new functions connected with the use of the given tool and with its control; (b) abolishes and makes unnecessary several natural processes, whose work is accomplished by the tool; and alters the course and individual features (the intensity, duration, sequence, etc.) of all the mental processes that enter into the composition of the instrumental act, replacing some functions with others (i.e., it re-creates and reorganizes the whole structure of behaviour just as a technical tool re-creates the whole structure of labour operations).” (Vygotsky, 1986, pp.139-140). There has been a growth from this root of a number of theories applied to learning including cultural historical activity theory (CHAT), Engeström (1987), Cole (1996) and activity theory (Nardi 1996).

- Situated learning. Emerging from an anthropological approach and most closely associated with the work of Lave and Wenger (1991) and the idea of apprenticeship or more generally legitimate peripheral participation. This set of theories can also be traced back to a foundational article by Brown, Collins and Duguid (1989). It has developed in a number of ways most notably in Wenger’s idea of Communities of Practice (CoPs): “Being alive as human beings means that we are constantly engaging in the pursuit of enterprises of all kinds, from ensuring our physical survival to seeking the most lofty pleasures. As we define these enterprises and engage in their pursuit together, we interact with each other and with the world and we tune our relations with each other and with the words accordingly. In other words we learn. Over time, this collective learning results in practices that reflect both the pursuit of our enterprise and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise. It makes sense, therefore, to call these kinds of communities *communities of practice*.” (Wenger 1998 p 45)
- Distributed cognition. Most associated with the work of Hutchins this bridging theory sets out a claim that cognition is not a localised individual phenomena but rather it is best understood as distributed across individuals, artefacts and representations (Salomon 1993; Hutchins 1995).
- Social constructivism. Constructivism has a long history in educational theory and has been strongly associated with Piaget. Constructivism stresses the active role of knowledge construction and can take an individual or social form. For Piaget, though it is often associated with individual approaches, peer interaction was a key activity and for Piaget and those influenced by him the role of conflict both within the individual and between individuals was an important process in learning (Doise and Mugny 1984, Dillenbourg 1999). Social constructivism provides another link to the ideas of Vygotsky.

As was noted above the development of social and situated views of learning is closely related to what has been called the cultural turn in the social sciences (Jameson 1998). The key feature of this re-orientation of the social sciences has been the central focus on social and cultural factors rather than the individual and their psychology or the biological bases of learning. Factors that were strongly emphasised in behaviourist and cognitivist theories of learning. The above list of social and

situated theories could be organised in a variety of different ways and a search on any one of these terms will often yield overlaps in authors and central ideas. The key point is that collaborative learning is loosely related to a broader set of ideas that emphasises a distinctively social and situated approach to learning, a point echoed in Chapter six.

Philosophical and organisational roots

Researchers in this community have explicitly drawn on a number of key thinkers including Hegel, Marx, Dewey, Bakhtin and Heidegger (Koschmann 1999, 2001; Stahl, 2003, 2004). In some part these discussions relate to the essential focus on meaning making that the authors propose as central to CSCL. Koschmann for example states that:

CSCL is a field of study centrally concerned with meaning and the practices of meaning-making in the context of joint activity, and the ways in which these practices are mediated through designed artefacts. (Koschmann, 2002, p. 20)

Stahl states that:

meaning-making can be treated as an essentially social activity and that it is conducted jointly – collaboratively – by a community, rather than by individuals who happen to be co-located. (Stahl 2003 p523)

The strong case that Stahl argues is that meaning making takes place not just in the context of social practices and mediation through artefacts - it *is* those practices. The point being made here is not that readers need to be well versed in these philosophical debates but that they need to be aware that what might appear to be simple or slight disagreements can at times rest on significant differences at deep theoretical and philosophical levels between divergent disciplinary cultures in psychology, social sciences and computer science and in different philosophical traditions. Collaborative learning is a contentious and problematic area.

Collaborative learning can be taken to mean learning at the small group level but there are readings of collaboration that situate collaborative learning in wider social conditions. Modern social organisations are characterised by cooperative and collaborative applications of many types of specialised labour. Education in this regard is reflective of general social organisation. Current concerns with making education directly relevant to employment have emphasised teamwork and co-operative and collaborative approaches to teaching and learning (Wolf 2002). The curriculum has come under pressure to become more relevant to current working practices and collaborative learning can be seen as a short step towards team working and key skills for a future in work.

This vocationalist (Goodyear 1999) or technical-rationalist view (Ashwin 2005) is also taken up by Kirschner *et al.* (2004) who emphasise the relationship between both the vocationalist and reflexive views of learning posited by Goodyear (1999) and a need for collaborative learning. The vocationalist view attends to the needs of employers and the kinds of graduates that they wish to recruit, whilst the reflexive view considers that higher education has a role in equipping students with an understanding, a self-reflexive critical awareness and a capacity to take informed but critical action in the world (Barnet 1997). Kirschner *et al.* make the claim that these two views of

learning cannot be responded to by ‘traditional contiguous didactic (academic) teaching and learning settings that are more often than not both individual and competitive in nature.’ (ibid 2004 p4) and go on to claim that collaborative or cooperative learning settings are the only way to achieve the goals of both outlooks.

While collaborative learning often has a focus on the micro analysis of group interaction there are strong links with organisational and broad social issues. The theoretical perspective of cultural historical activity theory has been one of the more active in pursuing such broader organisational issues; see for example Engeström (1999, 2001). More recently there have been developments in the CSCL tradition that call for a greater emphasis on infrastructural, institutional and meso level factors (Arnseth and Ludvigsen 2004; Guryibe 2005; Jones et al. 2006). Collaborative learning takes place in organisational contexts that set the parameters for what is possible. The interactions in a collaborative course or programme take place within the confines of validation criteria for courses and programmes, the institutional requirements for assessment and they make use of technological infrastructures, such as Virtual Learning Environments, that are contextual givens, out of the immediate control of the participants in the collaborative process.

Why collaborate?

A number of answers can be found in recent literature and they indicate widely divergent views about what sorts of measures, if any, could be used to assess collaborative or cooperative learning. Koschmann and Stahl argue that learning is essentially about meaning making. In their view any attempt to measure success in terms of outcome is profoundly mistaken. Koschmann for example argues that:

Traditional theories of learning treat learning as a concealed and inferred process, something that ‘takes place inside the learner and only inside the learner’ (Simon, 2001, p. 210). CSCL research has the advantage of studying learning in settings in which learning is observably and accountably embedded in collaborative activity. Our concern, therefore, is with the unfolding process of meaning-making within these settings, not so-called ‘learning outcomes’. (Koschmann, 2001 p19)

What follows must then be treated with care. Advocates of collaborative learning such as Koschmann and Stahl do not believe it can be supported by claims that it is more efficient or more effective as a learning process, rather they believe either:

- that collaboration is justifiable on other grounds or
- that collaborative learning is more of a descriptive enterprise than it is a moral or ethical advocacy.

This point is closely related to the close association between social and situated views of learning and collaboration or cooperation. For some writers collaboration loses its particular character and it comes to mean something general, like social activity. In this reading collaborative learning means something close to social learning or learning in general as all learning can be described as a social activity. Collaborative learning understood in this way, as social learning, is not an approach that can be argued for it is more like a descriptive enterprise setting out how people learn *in* and *through* social activity. Other approaches see collaborative learning as better than other forms of learning in ways unconnected to measured learning outcomes. For example Yates identifies a ‘democratic theory’ when discussing CMC (Yates 1997).

In such approaches the benefits of collaborative learning are not simply measured by learning outcomes, they are related to a view of social and democratic development.

Such benefits have been noted for over 15 years. Cowie remarked in 1992 that cooperative learning was supported by a variety of pressures. She noted a concern with enterprise drawn from an industrial practice focused on job satisfaction and commitment that demanded a workforce capable of a reflective practice in pursuit of improved products. Cooperative learning was seen as a corrective to existing social divisions of power:

Cooperative learning in this sense opens up the possibility of a different balance of power in the classroom where pupils can explore their own meanings and may challenge those of others in a supportive community of peers. (Cowie 1992 p158)

The pressure for a more vocational approach in higher education and the possibility that collaborative and cooperative approaches could mitigate this social pressure has been a recurrent theme. More recently the trend towards networked individualism (Wellman et al. 2003) in what has been described as a networked society (Castells 2000, 2001) has provided a contrast with collaborative learning (Jones 2004, Jones *et al.* 2006). It is an interesting question for CSCL, and collaborative learning approaches more generally, whether this approach to learning is intended to *fit in* with modern social trends or to act as a *counterweight* to them. It is the position of the authors that in terms of educational research we should not adopt a moral stance either for or against collaboration as an ethical choice.

More popularising texts list the benefits perceived to stem from collaborative learning in a series of bullet points under headings such as academic, social and psychological benefits (see for example Roberts 2005 pp 2-4). Based on earlier work by Panitz (2001) the benefits set out are supported by a large reference list pointing to supporting studies. The academic benefits suggested by Roberts include the promotion of critical thinking, involving students in the learning process, improving classroom results and involving students in appropriate problem-solving techniques. Social benefits include; developing a social support system for students, building a diversity of understanding and establishing a positive atmosphere for modelling and practicing cooperation. The psychological benefits claimed were increasing student esteem and developing positive attitudes towards teachers.

It is not possible in a short chapter to comment on the range of supporting research drawn upon by this popular literature. In consequence we focus here on an example that comes from the teacher-focused US school of cooperative learning. The example we have chosen comes from the highly contested area dealing with learning outcomes (see also chapter seven). While research on collaborative and cooperative learning has claimed a number of wider social benefits (see Voice 3) the central claim was one of academic achievement (Johnson and Johnson 1989; Johnson *et al.* 2000; Sharan 1990; Slavin 1990). As Slavin states “In summary, cooperative learning has been shown in a wide variety of studies to positively influence a host of important noncognitive variables. Although not every study has found positive effects on every noncognitive outcome, the overall effects of cooperative learning on student self-esteem, peer support for achievement, internal locus of control, time on-task, liking of class and classmates, cooperativeness, and other variables are positive and robust.” (Slavin

1990 p53). Johnson and Johnson reviewed over 323 studies conducted over 90 years comparing cooperative, competitive and individualistic learning situations. They concluded that:

generally achievement is higher in cooperative situations rather than competitive or individualistic ones and that cooperative effort results in more frequent use of higher-level reasoning strategies, more frequent process gain and collective induction, and higher performance on subsequent tests taken individually (group-to-individual transfer) than do competitive or individualistic efforts. (Johnson and Johnson 1989 p33)

The claim is that cooperative learning is the technique that stands out:

students in the 50th percentile in a cooperative learning situation will perform at the 75th percentile of students learning in a competitive learning situation and at the 77th percentile of students learning in an individualistic situation. (op. cit. p24)

Johnson and Johnson claim that if the lower quality studies are removed, that is studies with a lower degree of experimental controls and rigour, the effects were even more marked. In the more recent meta-review of cooperative learning methods Johnson et al. (2000) conclude on an equally positive note:

The current research findings present a promise that if cooperative learning is implemented effectively, the likelihood of positive results is quite high. Results, however, are not guaranteed. The results of this meta-analysis provide evidence that considerable research has been conducted on cooperative learning methods, that eight diverse methods have been researched, all methods have produced higher achievement than competitive and individualistic learning....

Research into cooperative learning is driven by a formal scientific method that requires measurement and specification of outcomes. It is largely comparative and short term and assumes that we already know what the phenomenon is in order to investigate it.

Despite the earlier comments with regard to measured learning outcomes and meaning-making the research into the learning outcomes of cooperative learning has been widely used to support the introduction of Computer Supported Cooperative/Collaborative Learning (CSCL) (see for example Kaye ed 1992; Kaye 1995; McConnell 2000; Crook 1994; Jonassen 1996, Roberts 2005).

Why Collaborate? The technological imperative

The debate about technology and learning has often had a technological determinist impulse behind it. The technology deployed in society either necessitates or encourages particular types of education and learning. Such an approach has been widespread, appearing in both policy statements and in academic discourse (Jones 2002, Clegg et al. 2003, Peletier 2005). At a more specific level text-based computer conferencing has been identified as a technology that inclines its users towards cooperative or collaborative learning techniques (Kaye 1992, Kaye 1995, McConnell 2000, O'Malley 1995). In two complementary texts issued as part of the NATO ASI series, conferencing was identified as a key area for research into collaborative

methods with its own specific design issues based on its asynchronous nature (Kaye ed 1992, O'Malley ed 1995).

...the features of asynchronous conferencing systems which seem particularly suited to distance education are overcoming space/time/access constraints; the text-based nature of the medium is consonant with the skills of textual analysis and composition which are part key features of the distance learners repertoire; messages or parts of them can be reused in many ways; it provides facilities for self-help and cooperative working. (O'Malley 1995 pvi)

The emphasis on distance in this approach is refined elsewhere to indicate any kind of separation, through distance or:

separated more by the conventions of their everyday work-lives than by any major physical barrier. (McConnell 2000 p1).

The key areas of agreement are that computer conferencing has definite characteristics that incline its users towards cooperative and collaborative methods. More recently work has been undertaken examining collaborative learning supported by synchronous and mobile technologies, examples of this research can be found in recent CSCL conference proceedings (Wasson et al. 2003; Koschmann et al. 2005). The key question for research into CSCL is in determining the character of the relationship between tools and artefacts and social and organisational forms. A key finding of CSCL research is that the technical is not an independent factor and that technology does not in any simple sense cause educational effects or any particular social or pedagogical responses.

Individuals classrooms and computers

Sharan (1990), outlining the reasons for the rapid dissemination of cooperative learning, noted that:

Classrooms are, first and foremost, social settings inhabited by relatively large groups of students.

He goes on to outline cooperation as a form of classroom management:

By basing the learning process on the interaction among small groups of students formed within existing classrooms, cooperative learning incorporates the social dimension of the classroom as a component of its basic procedures. (Sharan 1990 p286)

The basic structure of a computer network separates students and teachers by time or by distance and situates them in relation to individual machines. Even where special designs have been made for Collaborative Learning Laboratories, see for example Koschmann et al. (1996 p107), the machine remains an individual work area. Crook (1994) roughly divides the use of computers for learning by examining the social configurations through which computers enter into learning activities. His approach is explicitly related to a concern that computers may isolate learners. The social configurations he outlines are often reduced to four main categories; learning *with*, *at*, *around* and *through* the computer (Crook, 1994). These social configurations are not necessary outcomes of the technology and the technology could facilitate an extension of the idea of distance and open learners as individual and autonomous rather than cooperative and collaborative (Thomson 1998). Collaborative and cooperative

learning in a computer supported setting begins from a less intuitively strong position in relation to work as a social activity than cooperative learning in the traditional classroom.

Working together using computer-mediated communication is done apart and as Kaye explains it is contrary to many common educational practices.

One reason why collaborative learning appears to be more commonplace in the work environment than in many parts of the formal educational system may be because, in our culture, the latter is mainly based on recognition of individual achievement within an essentially competitive environment (collaboration between schoolchildren, in certain circumstances, is still sometimes labelled as ‘cheating’). (Kaye 1992 p3)

The process of education has long been recognised as an encouragement to learner isolation:

What is learned, then, is passivity and alienation from ones self and others, and that the most fruitful relationships with people will be as be as passive and impersonal as the solitary interaction with the computer. (Krueger *et al.*1989 p114)

Higher education, without even considering computers, is still organised with lectures as the dominant mode of teaching in many disciplines. The physical space defined in most lecture theatres is one that suggests an individual relationship to the speaker and doesn’t allow for easy social interaction and collaboration amongst peers. Assessment is organised to generate individual grades within each course unit, level and eventually the degree class and collaboration can be seen by students focused on their grades as unproductive, threatening to achieving students and an unnecessary burden.

The individual or isolating possibilities of computer-based learning has also been noted as a factor in teacher resistance to the introduction of new technologies (Cuban 1986, 2001; Crook 1994). The use of computer-mediated communication (CMC) has two apparent disadvantages, in that it takes place outside of the social context of the classroom, ‘apart’ from others and it takes place in relation to a device or machine. The claims for computer conferencing as a cooperative or collaborative medium have to be assessed against their use within an existing individualised practice, where communication takes place between separated learners in a process with machines that may incline the user towards isolation.

Recent research in CSCL

In recent years the developing field of CSCL has grown into an international movement with its own conference series and from early 2006 a new international journal (see Box 1). Several reviews of CSCL have taken place in Europe and these can provide an overview of both the pedagogical roots of collaborative learning and the technological tools applied in this area (Lehtinen *et al.* 1999; Lehtinen 2003; Lakkala *et al.* 2001). The current state of theory is still that CSCL is an emergent paradigm.

In sum, even if the stress in CSCL research is on socially oriented theories of learning, there is still no unifying and established theoretical framework, no agreed objects of study, no methodological consensus, or agreement about the

unit of analysis. Positively considered, this ambiguity can be seen as reflecting the richness or diversity of the field. Negatively interpreted, it seems that the field is proceeding along increasingly divergent lines. (Lakkala et al. 2001 p8)

This is not only at a scientific or theoretical level it is also reflected in practitioners' accounts in the UK (Jones et al. 2000, Jones and Asensio 2002).

Overall practitioners identified collaboration as an aim but were concerned that it was difficult to achieve and difficult to conceptualise. Collaboration and participation were both features that exemplify the gap that practitioners experienced between expectations and outcomes. (Jones et al. 2000 p25)

CSCL is a field that still needs a great deal of development before it becomes a common practice in education.

Srijbos, Kirschner and Martens (2004) provide an overview of CSCL in higher education. Perhaps a particularly useful chapter is the conclusion, which summarises "What we know about CSCL and what we don't (but need to) know about CSCL." The headings with which they summarise what we know include the following:

- **It's all about learning** - The authors argue for what they call a 'probabilistic perspective' on design. That is they argue that we know that causal approaches to design do not work but that design is still possible in CSCL environments. Other authors have pointed to the problem of unpredictability in collaborative environments and in conducting collaborative tasks (e.g. Jones 1999). Jones reports students simulating collaboration online whilst co-present and seated around four computers. We know that design of CSCL, whilst necessary and achievable, is complex and emergent rather than deterministic and predictable.
- **Learning, collaboration and assessment** - The probabilistic nature of design carries over into assessment and the understanding, sharing of knowledge and learning that takes place. This approach is supported by research in a UK context. For example Jones and Asensio report the unpredictability of students' understandings of written assessment instructions for a collaborative task. (Jones and Asensio 2001).
- **What is meant by 'support'** -The overall claim is that we know that: "...CSCL implementation is not limited to introducing a new technological environment, but rather that it requires the alignment of technology with learning/teaching objectives which is not readily accomplished in technical environments used by higher education institutes." (Strijbos et al. 2004 p 250)
- **Technology and interaction** - The focus of design requires a shift from interface design to interaction design, and the focus on usability may need to expand to include the utility of a system in a specific setting.
- **Learning through collaboration supported by computers** -The aim should be to increase the alignment of the various elements in a CSCL setting by systematic design so that the *probability* of desired outcomes is increased.

The list of things we do not know but need to know includes:

- **Face-to-face versus computer mediated?** - Research too often remains in the rut of comparing face-to-face with computer-mediated communication. Increasingly students experience an educational environment that is interpenetrated with

technology at all levels and it remains true that for some purposes face-to-face is the best option. Research needs to provide a basis for good choices of when to use different technologies and how to use them to achieve particular ends.

- **Retrospective versus prospective analysis?** - Strijbos et al. (2004) make a claim for what they call prospective analysis, the testing of falsifiable hypotheses, rather than a reliance on 'retrospective' analysis of events that are 'usually *not planned*' (p254). We would disagree with this analysis because we still know *too little* about what happens in the day-to-day practice of teaching and learning. However we think Strijbos et al. are right to focus on this issue as the underlying question motivates both of our responses – how can good research inform practice so that we can achieve more predictable/reproducible results?
- **Small groups and group dynamics?** - The authors call for CSCL to revisit social psychology as they suggest it is a valuable resource for understanding small group dynamics that are essential to CSCL. We would add to that the need for incorporating understandings of practice and meaning making, often informed by ethnomethodology, an approach focused on 'making the learning visible' (Stahl 2003, 2004).
- **Analysis of communication and interaction?** - The changing styles of research into communication and interaction are noted with a move from surface analysis of content to a need for a deeper understanding of the nature of communication. Both quantitative and qualitative approaches are identified as possible approaches but the key for Strijbos et al. is that reliability remains a prerequisite for drawing conclusions and replicating experiments. We agree that the issue raised is important to CSCL but disagree with the solution offered. The positivist stress on reliable and replicable results sits uneasily with the probabilistic and complex nature of CSCL described by the same authors. We argue that we need to have an emphasis on developing new methods of research and analysis for complex and emergent systems.

Conclusion

In conclusion this discussion about collaboration takes place at time when two fundamentally different views of the Internet and the web are reflected in views about e-learning. These can be characterized as the broadcast and the discussion perspectives². For those concerned that e-learning might assist in the de-professionalisation, commercialisation and commodification of learning, the new networked technologies are yet another broadcast medium. Content is king in this view and the key technologies involve individualisation, delivery, re-use and the packaging of materials as learning 'objects'. The network is important in this view as a cost effective delivery mechanism. In contrast the discussion perspective that emerges out of the cooperative and collaborative learning tradition we have discussed in this chapter sees the network as primarily a communication medium. The key feature of the new technology in this view is its capacity for interactivity, understood as allowing for communication between two or more participants in a dialogue or conversation. The classic components of cooperation and collaboration, discussion, dialogue and community are now possible without the traditional constraints of time and place. The potential for collaborative learning is extended by new technologies to a broad new constituency. The discussion around networked technology naturally

² I am grateful to Martin Weller for this formulation which can be found in an internal Open University Virtual Learning Environment Report on Phase 1, November 2004.

mirrors the long standing division between instructivist or transmission approaches and constructivist or situated views of learning. These viewpoints lead to profoundly different approaches as to how and to what extent networked technologies are employed in education. Our hope is that this chapter has provided its readers with a solid basis on which to evaluate the contribution of a cooperative or collaborative approach.

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Voices

Voice 1

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Voice 2

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Voice 3

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Finding out more about CSCL.

Conferences and professional associations supporting CSCL.

The most important of these is the International Society for the Learning Sciences. Membership of this body carries with it subscription to the new *International Journal of Computer-Supported Collaborative Learning*. <http://www.isls.org/>

A related international conference in the UK is the Networked Learning Conference series. Papers from previous conferences can be accessed from this site. <http://www.networkedlearningconference.org.uk/>

Book series.

The Computer Supported Collaborative Learning Series published by Kluwer Academic Publishers is a good source of current material.

Related work including some focused explicitly on education can be found in the CSCW Series printed by Springer.

Web site

This web site of the Collaborative Learning Project, linked to Tom S.Roberts at Central Queensland University, provides a good and quite comprehensive introduction to the CSCL area in Higher Education. It includes maintained links to online papers and conferences.

<http://clp.cqu.edu.au>