

HISTORY AND DEVELOPMENT OF COLLABORATIVE LEARNING AND E-LEARNING IN EUROPE: LESSONS LEARNED

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From promises to reality

Information and Communication Technology (ICT) has a dual role in our information society. On the one hand, ICT is assumed to cause partly unpredictable changes in our future information society and in its educational contexts in particular. Increasing challenges of rapidly changing, knowledge-intensive and technology-oriented working life presuppose that facilities for life-long learning and continuous competence development are guaranteed for people in different phases of life. On the other hand, with the aid of ICT, solutions can be built for answering in these challenges. Considerable expectations have been set for the use of new technologies in education at the beginning of this millennium.

The history of e-Learning is short, and it can be characterized by rapid changes in technology development. This has been also the biggest problem of e-Learning. In the history of this field, there are several acronyms such CAI, ITS, ODL, e-Learning, m-Learning etc., which illustrates the dominating nature of technology-driven approaches. What changes rapidly is the technology, not the basic processes of learning. It is a bit worrying that e-Learning is sometimes interpreted in a narrow-minded way by referring to process of delivering digital information and study material to people by the means of communication media. This kind of notion oversimplifies the notions of knowledge and learning.

The most optimistic views suggest that global networks and the use of computers for intellectual communication will further enhance and expand the ways in which humans connect, communicate, and create a sense of community. However, also more critical

questions about the possibilities and quality of virtual learning environments have been presented. Since traditional models of distance learning have not inspired researchers and teachers to develop innovative pedagogical practices, research and development work of the field has started to focus more on creating many-sided pedagogical practices, utilizing ICT, that can support students in their efforts for deeper-level learning and interaction.

Integrating collaborative learning and e-Learning

One of the essential requirements in the rapidly changing society is to prepare learners for participation in socially organized activities. Pure focus on individual cognition has set a stage to shared, interactive and social construction of knowledge (Greeno, 1998), and new learning environments are often based on collaborating and sharing expertise (Koschmann, 1996). Research on collaborative learning and the use of Information and Communication Technologies (ICT) has been integrated in the emerging research area called Computer-Supported Collaborative Learning (CSCL). Research results of computer support for collaborative learning have, however, been contradictory, and several studies have indicated collaborative learning to be far more complex phenomenon and difficult to realise in real-life settings than what has often been thought (Baker, 2002; Häkkinen, 2001). Collaborative processes are often over-generalized, and any tools for communication and correspondence are called 'collaboration tools' (Roschelle & Pea, 1999). The problem is that if almost any interaction situation is called collaborative, it is difficult to judge whether and when people learn from collaborative situations (Dillenbourg, 1999; Littleton & Häkkinen, 1999).

Two traditions that have strongly contributed to the development of CSCL tradition are research on cooperative and collaborative learning AND Computer-Supported Cooperative Work (CSCW). By CSCL we usually refer to using ICT (usually shared spaces and communication tools) to support collaborative forms of learning. CSCW, on the other hand, reveals issues about the collaborative nature of work supported by groupware. The latter tradition has excluded the issues of learning, but has provided basis for developing groupware tools for learning purposes as well as interesting contexts for knowledge-intensive work and learning at work.

Research on CSCL

Considerable successful results have been received in experiments in Computer Supported Collaborative Learning (CSCL). It is one of the recent ideas to create powerful learning and communication environments in combination of collaborative learning ideas and networked technology. Many advanced technical infrastructures for fostering higher-level processes of inquiry-based interaction have been developed (e.g. Scardamalia & Bereiter, 1994). Recent studies have revealed that in connection with corresponding pedagogical practices, CSCL – environments (such as CSILE, created by Scardamalia & Bereiter) can facilitate higher-level cognitive achievements at school (Scardamalia & Bereiter, 1994; Hakkarainen, Lipponen & Järvelä, 2002). A possible explanation for successful results is an advanced technological infrastructure for engaging students in a process of generating their own research questions, setting up and improving their intuitive theories and searching scientific information as well as sharing their cognitive achievements.

On the other hand, scaling up the models of intensive pilot experiments of CSCL have proved to be extremely difficult to be implemented more broadly. In a more realistic studies and practical experiences the following phenomena have been very typical: short discussion threads, descriptive and surface-level knowledge instead of finding deeper explanations for phenomena, difficulty in generalizing knowledge approached from multiple perspectives, difficulty in making inquiry questions that would evoke elaborated explanations, and difficulty in reaching reciprocal / mutual understanding.

Understanding the concept of collaboration

In order to be able to design powerful CSCL environments, we need to understand the process of collaborative interaction itself and its contribution to learning. Collaborative learning is nowadays a fashionable phenomenon, but collaboration among students in various learning settings (e.g. in classrooms) is much more complex phenomenon than what has often been thought. Let's just think about the following typical cases of collaborative learning:

- “Free-rider effect”: one team member just leaves it to the others to complete the task

- “Sucker effect”: a more active or capable member of a team discovers that (s)he is taken for a free ride by other team members
- “Status sensitivity”: active or capable members take charge and have an increasing impact on the team’s activity and products
- “Ganging up on the task”: team members collaborate with each other to get the whole task over with as easily and as fast as possible

This makes one ask why collaboration does not happen more often? What makes it so difficult? And why is it, on the other hand, so tempting as a spontaneous phenomenon among small children?

In the history of research on collaborative learning, several researchers have anchored their research on two main traditions: namely Vygotsky’s (1978) sociocultural approach and neo-piagetian ideas of socio-cognitive conflict. Whilst the study of collaborative learning has a relatively brief history, there have nevertheless been substantial changes in the nature of the research being undertaken in this field. Different notions of collaborative learning vary from perspectives focusing on individuals that participate in group activities to perspectives focusing on groups that consists of individuals.

Collaboration necessitates that participants are engaged in a co-ordinated effort to solve a problem or perform a task together. This coordinated, synchronous activity is the result of a continued attempt to construct and maintain a shared conception of a problem (Roschelle & Teasley, 1995). In many of the studies demonstrating positive effects of social interaction for individual learning (Light, Littleton, Messer & Joiner, 1994; Roschelle & Teasley, 1995), collaborative learning has been interpreted as a single learning mechanism. In contrast, recent research on collaborative learning has called for more exact use of terminology related to the specific forms of collaboration (Dillenbourg, 1999). Collaborating participants learn if they generate certain collaborative activities (argumentation, explanation, mutual regulation etc.), which trigger learning mechanisms such as knowledge elicitation and reduced cognitive load. It is relevant to ask what then makes students engaged in these kinds of collaborative activities, what the role instructional support is and how the circumstances for potential collaboration are made for more optimal. There is an evident need to move beyond simple demonstrations of the advantage of group conditions and focus on studies that seek to understand the processes

of collaborative interaction itself and its contribution to learning (Baker, 2002; Crook, 2000).

Lessons learned

On the basis of the history of collaborative learning and e-Learning, there are several lessons that can be learned. First of all, focus of the basic mechanisms and processes of learning in novel learning environments should be the focus. At its best, collaborative e-Learning environments can support cognitive, social, motivational and affective processes of learning. For example, shared workspaces and communication tools can provide a natural setting for explanation, knowledge articulation, argumentation and other demanding cognitive activities. They can also enable sharing and distributing cognitive load and bringing thinking out in open – in other words they can function as a collective memory for a learning community helping the storage of the history of knowledge construction process for revisions and future use.

However, in order to reach these benefits, several pedagogical and contextual prerequisites for successful collaborative learning situation have to be fulfilled:

- space for negotiations and misunderstandings
- need for collaboration (real group tasks)
- reaching mutual understanding, shared values and goals (common ground)
- cognitive conflicts instead of social conflicts
- cognitive diversity
- symmetry of knowledge and status
- group commitment and motivation

From the viewpoint of technology, networked environments used in different learning environments provide a learner a relevant platform for communicating and sharing knowledge. Instead, more advanced technological solutions to support many problematic issues in virtual interaction, such as lack of sense of co-presence or difficulties reaching shared understanding in the distributed teams are still missing (Fischer & Mandl, 2001; Gutwin & Greenberg, 1999; Häkkinen, Järvelä & Dillenbourg, 2000). This is one of the big challenges for collaboration between developers of learning platforms, researchers and practitioners.

Although the scientific community has regarded the principles of CSCL highly promising, they are extremely difficult to implement among teachers and other practitioners. A typical scenario is that although teachers and students have access to computers, technology is not intensively used. And if it is used, it often supports less advanced pedagogical practices (transmitting and copying information). If culture of CSCL is to emerge, it often happens in special 'light-house' projects supported by researchers rather than modifying and revising good practices to be a part of a new culture of schooling. So, what is clear is that research, development and training related to e-Learning is distributed. New sustainable pedagogical practices require long-term commitment to develop them in close collaboration between teachers and researchers. They emerge from interaction of practitioners and researchers, they are not found ready-made, but the change of the learning culture is slow and long-term effort.

There is, however, hope to get researchers and practitioners to get closer together. For example, in a large survey among Finnish schools and teachers year 1998, Finnish teachers did not regard collaborative learning as an important application of computers. Situation has, however, changed during the last four years, and e.g. in the recent international SITES'M2 study, the most advanced and innovative pedagogical practices using ICT in Finnish schools were somehow related to collaborative learning. One reason for this is a long-term collaboration of teachers and researchers in the area of CSCL.

In addition to technical (access and skills) and pedagogical (models and practices) infrastructure, also consideration of social and epistemological infrastructure should be emphasized. The first one refers to the integration of ICT use to core educational processes of the whole community, curriculum, assessment etc. The latter one refers to explicit thinking and awareness of the conceptions of learning and knowledge that we want to facilitate with the aid of technology.

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