Computer-Supported Collaborative Learning: Basic Concepts, Multiple Perspectives, and Emerging Trends

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Introduction (1)

- CSCL: Computer-supported Collaborative Learning
- The field is concerned with how ICT might support collaborative learning
- The research questions addressed in CSCL include
  - How individuals learn with specific tools
  - How small groups interact and develop shared meanings over time
  - How institutions change and create new conditions for teaching and learning
  - How opportunities for learning change as society adopts new models for education

Introduction (2)

- Scaffolding: teacher models the learning task, gradually fades away and shifts responsibility to the students
- Mediating artifact: Role of the technology

Background

- CSCL is a new and emerging field in the educational sciences (Stahl, Koschmann & Suthers, 2006)
- The term of CSCL was first publicly used at an international workshop in 1989
- In 2006 the international journal of CSCL had its inaugural issue
- There are two main traditions within the learning sciences
  - Cognitive psychology
  - Socio-cultural perspective

Research approaches in CSCL

Ludvigsen&Mørch have grouped CSCL research into

1. Systemic approach
   - Cognitive perspective on learning
2. Dialogical approach
   - Socio-cultural perspective on learning and development

Systemic approach (1)

- The unit of analysis is the individually acting and thinking agent
- Two important cognitive processes are internalization and transfer
- About how spesific features of technological systems support or constrain collaboration and to what extent these features will enhance students' capacities to solve problem in different domains (Arnseth & Ludvigsen, 2006)

Systemic Approach (2)

- One of the most influential approaches within the systemic approach is knowledge building
  - Model for distributed collaborative learning that is based on how professional scientists work to solve problems
- The activities students engage in when doing knowledge building can be formulated as a scientific inquiry process
- Studies in this area demonstrate that students who are engaged in knowledgebuilding develop a deeper understanding of the domain under study (not all students benefit)

Systemic approach (3)

The systemic approach gives useful guidelines for how we can build scaffolds for cognitive processes like hypothesis generation, data interpretation, and scientific explanation. However, this model based approach to learning and cognition needs to be supplemented by a situated approach from a social and cultural perspective to provide a full account of CSCL

Dialogical approach (1)

- Based on the idea that learning is a socially organized activity
- The unit of analyse is a group of individuals interacting to accomplish a shared goal
- Mediation by tools to support learning is essential
  - Both physical and abstract tools mediate human activities, but the main abtract tool is language

Dialogical approach (2)

A dialogical approach to CSCL provides new analytic concepts to analyze how students and teachers interact in collaborative learning. The dialogical approach gives broader insights and explanations concerning the developement of traditional skills, and pays paricular attention to skills such as those for communication, coordination, information sharing, collaboration, negotiation, critquing, and decision-making, and how to design CSCL tools to support these activities.

Design-based research

- Design based research is prominent in the field, authors differentiate between
  - Pedagogical Design
  - Technology Design

Pedagogical Design

- The development of DBR has been on theoretical and methodogical levels
- Methodology level: DBR suggests parnerships among researchs and educators with the goal of conducting reflective inqury, testing and refining learning enviroments, and defining new design principles based on prevous research
- Theoretical level: design principles is the practical application of what we know about learning

Technology Design

- The link between DBR and technology design is harder to establish
- There is a implied link between design principles and technological affordances in that technology propose solutions to the design
- The basic idea of design principles in DBR is that we make use of what we know about previous research on learning when we design new learning environments

The computer's role in CSCL

- Mediating artifact (ICT when seen from the point of view of social science)
- Shared work space (groupware for learning)
- Peer-to-peer (handheld devices for student interaction)
- New collaboration environments (e.g. Web 2.0)
- Design of new features into existing tools and environments, like
  - software critics (more on this on May 13)

From AI to collaboration support

- Scaffolding
  - Subject domains
  - Scientific inquiry
  - Presence of others (social awareness)
  - Collaboration in virtual environments
- Levels of feedback
  - Mirroring, meta-cognitive support, guidance (see Soller et al 2005)
- Intervention technique
  - Pro-active, re-active, passive
  - Selecting among them depends on the approach (systemic vs. dialogic), the scaffolding domain, and the severity of making "wrong moves" before feedback

Open issues and directions for further work

- One of the aims of CSCL is to improve educational settings with the scaffolding techniques for collaborative learning
- CSCL has contributed to how schools can become better places for teaching and learning, and it is through the adoption and use of technology as a mediating artifact that it has achieved this status
- Systemic and dialogical approaches provide directions for how educational practicies can and should be changed