The Evolution of CSCL Research: from Design to Orchestration

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The evolution of research on CSCL

(1990-1995) Productive social interactions can be engineered by carefully designing CSCL environments.

(1995-2005) The growth of a scientific community

(since 2005) Collaborative activities are getting integrated within physical, virtual and mobile spaces and teacher orchestration

Aim

We summarize two decades of research on CSCL

1) The collaboration among peers can be 'designed' shaped by the CSCL environment
2) Affective and motivation aspects that influence collaborative learning have been neglected
3) CSCL activities are integrated into larger pedagogical scenarios and have to be orchestrated in real time by the teacher

1. Collaboration among peers can be designed

Collaborative learning is not a recipe

- Collaborative learning often leads to better results than learning individually (Johnson & Johnson, 1999), but not systematically.
- Asking students to work together is not enough (Järvelä & Häkkinen).
- Collaboration per se does not produce learning outcomes; its results depend upon the extent to which groups actually engaged in productive interactions.

Aiming for effective interactions

- "Under which conditions do specific interactions occur?" and "Which interactions are predictive of learning outcomes" (Dillenbourg, Baker, Blaye & O'Malley, 1996)
- Three main categories of interactions have been found to facilitate learning: explanation, argumentation/negotiation and mutual regulation

➧ *to create conditions in which effective group interactions are expected to occur*

What matters is the effort required to construct shared knowledge

- How do learners build a shared understanding of the task to be achieved?
  - co-construction of shared understanding (Roschelle & Teasley, 2005)
  - building collaborative knowing (Stahl, 2004)
  - co-argumentation (Baker, 2002)
  - negotiating of shared meaning (Pea, 1993)
  - construction of common knowledge (e.g. Crook, 2002)
  - exploratory talk (Mercer, 1996) or
  - coordination (Barron, 2003)

…effort to construct shared knowledge

- The very "motor" of collaborative learning (Schwartz, 1995)
  - The intensity of interactions required for detecting and repairing misunderstandings.
- Knowledge convergence
  - Although the learners quickly adapt mutually in interaction, share surprisingly little knowledge after collaboration (Fischer & Mandl, 2005; Jeong & Chi, 2007).
- This issue is still open!

Media effectiveness is a myth

- Each time a new media enters the educational sphere, it generates over-expectations with respect to its intrinsic effects on learning.
  - E.g. the use of online asynchronous communication tools (e.g., Schellens & Valcke, 2005; Goodyear et al, 2004).
- New artefacts (PDAs, mobile phones) or new tools (WIKIS, Blogs,…) emerge.
- Spesific argument for the choose and use of tools are needed

2. Affective issues in CSCL: The neglected aspect of motivation

CSCL & motivation

- Many definitions demonstrate the nature of collaboration as something where cognitive, social and emotional aspects are tightly intertwined (e.g. Negotiating shared meaning)

- However, these definitions do not as such explain the role of motivation regulation in socially shared activities.

Collaboration is not spontaneous

- Learning through collaboration is not something that just takes place whenever learners come together.
- In any joint venture, team members need to be committed to ongoing negotiation, and continuously update and review of progress and achievement.
  - *A shared goal for the joint activity (Roschelle & Teasley, 1995).*
  - *Emotion control (Järvenoja & Järvelä)*
  - *Interest (Sansone et al., 1992)*
  - *Self-efficacy and collective efficacy (Bandura, 1995)*
  - *Self-regulation (Winne et al., 2006)*
  - *Socially shared regulation (Järvelä & Järvenoja, 2007)*

Challenges of self-regulation in CSCL

- Emotions are often aroused and their regulation is needed (Järvenoja & Järvelä, 2005).
- Socio-emotional appraisals can compete with goal-oriented action (Boekaerts & Corno, 2005).
- Individuals are expected to affect each other in a positive way and to regulate themselves (Roschelle & Teasley, 1996).
- Groups can face multiple types of social challenges (Blumenfeld et al., 1996; Salomon & Globerson, 1989; Webb & Palincsar, 1996).
- The challenges may also derive from the cognitive processes required in collaborative learning (Mäkitalo, Häkkinen, Järvelä & Leinonen, 2002; Feltovich et al.,1996).

How learners regulate motivational challenges in CSCL? (Järvelä, Volet & Järvenoja, 2006; Järvenoja & Järvelä, 2007, Näykki & Järvelä, 2007)

1. **self-regulation**
   where the individual aims to regulate her-/himself

3. **co-regulation**
   where some or all of the group members co-operate to regulate others

4. **socially shared regulation**
   where the students regulate themselves consensually with each other

3. “CSCL will disappear as a distinct pedagogical approach” - CSCL activities are integrated into larger pedagogical scenarios

Orchestrating activities

(Fischer & Dillenbourg, 2006)

- Orchestration as the process of productively coordinating supportive interventions across multiple learning activities
- Orchestration covers different forms of coordination:
  - *activities at different social, contextual and media levels*
  - *scaffolds at different social levels*
  - *self-regulation and external regulation.*
  - *individual motivation and social processes*

Future research issues

(1) *How to ensure knowledge accumulation in CSCL orchestration research when concepts and methods become increasingly heterogeneous?*

(2) *How to conduct basic research given that the complexity of interacting factors is increasing?*

(3) *How to create new forms of interaction of CSCL researchers and CSCL practitioners?*