Socio-relational, affective and cognitive dimensions of CSCL interactions: integrating theoretical-methodological perspectives

Abstract: Collaborative learning interactions involve a subtle interplay between social relations, the knowledge being co-elaborated, and empathetic circulation of emotions. CSCL situations involve specific transformations of the relations between these three dimensions, within an inherently open collective process of tool appropriation, the study and theorisation of which is the objective of this symposium.

Introduction and research background

Collaborative learning is not only an inter-cognitive process; it must also be seen as a specific personal, interpersonal and emotional experience (Crook, 1994). Learning from collaboration involves a subtle interplay between cognitive-epistemic processes (knowledge and reasoning, as elaborated, exchanged and negotiated in interaction) and socio-relational processes (aspects of cooperativity, friendship/animosity, politeness and emotion influencing the way students inter-re-act to each other as interlocutors and as persons). Emotions infuse both cognitive and interpersonal dimensions of joint activity, crosscutting the articulation of the intra-and inter-subjective. Students’ own thoughts may arouse pleasure or uneasiness, cognitive dissonance or harmony, and the same applies to their interactive relations with the thoughts, communications and persons of others, within the empathic emergence of socio-cognition. An appropriate balance between the cognitive, the social and the emotional dimensions of interaction is required for effective collaborative learning, since the effort students expend on the interpersonal relation, whether conflictual or irenic, will inevitably interact with their work on the cognitive task.

Although it may be analytically convenient to isolate cognitive and social dimensions of human activity, they are two sides of the same coin: “… research paradigms built on supposedly clear distinctions between what is social and what is cognitive will have an inherent weakness, because the causality of social and cognitive processes is, at the very least, circular and is perhaps even more complex …” (Perret-Clermont, Perret & Bell, 1991, p. 50). Students’ interpersonal relations depend in part on their joint understanding of each other’s cognitive abilities (the social is influenced by the cognitive); and social interaction influences students’ cognitive contributions and understanding (the cognitive is influenced by the social). However, research still lacks precise theories and models of the interrelations between the social and the cognitive (pace Vygotsky), in part because each dimension has been undergoing re-definition in cognitive science. Claims that cognition and consciousness are essentially orientations of social activity, operations with signs (sign-systems being inherently socially shared), situated in socio-cultural practices, distributed across artefacts and socially shared, all contribute to complex reconfigurations of the socio-cognitive.

Affects (experiences or displays of emotions, such as anger, fear, love, hate, jealousy, sympathy, (un)happiness) are integral to cognition and social interaction, since learners who are emotionally aroused may be more motivated and attentive (Kunda, 1990), and perception of others’ emotions can involve an interactive process of empathetic mutual influence (Cosnier, 1994). The roles of emotions can be understood on different ‘levels’ of activity. Thus, expression of emotions can be seen as intrinsically social and cultural (Boehner et al., 2007). On the level of group dynamics, classical work in social psychology established clear relations between the manner of expression of emotions and leadership styles (Lewin, 1948); and Bales’ (1950) early work on interaction process analysis included explicit categories for interventions that increase and release tension in groups. Finally, on the level of communicative acts themselves, the circulation of emotions in interactions relates to the interplay of face-threatening and preserving acts (Brown & Levinson, 1987). Argumentative interactions are of special importance in this context, given their potential for CSCL (Andriessen, Baker & Suthers, 2003) and the fact that modalities of critiques (irrelevancy, contradiction, counterclaim) crucially influence the course of the interaction (Muntig & Turnbull, 1998).

Computer-mediated interactions in CSCL environments represent particular educational situations for the enactment of emotionally-charged socio-cognition. Specific characteristics of these situations, such as physical distance between students, as well as physical and semiotic characteristics (Clark & Brennan, 1991) and affordances (Suthers, 2006) of technologies for collaboration, interaction and communication, create open spaces for the mutual re-configuration of the cognitive and the socio-relational in educational activities. CSCL situations comprise unique tools, such as interaction histories, structured communication interfaces and scripted collaboration (Fischer et al., 2007) that require students to transform the means by which they habitually jointly achieve epistemic activities. However, there is nevertheless a degree of flexibility, openness and unpredictability
in the processes of appropriation of educational tools (Rabardel, 1995; Overdijk & van Diggelen, 2008) that make them appropriate objects for microanalysis since they are undergoing transformation.

The aim of this symposium is thus to explore theoretical and methodological foundations required for understanding the relations between socio-relational, emotional and cognitive dimensions of collective educational activities, in the context of the collective processes of appropriation of CSCL tools and situations.

## Organisation and presentations

The symposium is organised around three main presentations, to be given by experienced researchers working collaborative learning with or without computers. Jay Lemke will be the discussant of this symposium.

### Table 1: Organisation of the symposium

<table>
<thead>
<tr>
<th>Duration (mn)</th>
<th>Title</th>
<th>Presenter(s)/coordinators</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Introduction to the symposium</td>
<td>M. Baker (CNRS-Telecom ParisTech), J. Andriessen (Wise &amp; Munro Learning Research)</td>
</tr>
<tr>
<td>15</td>
<td>1st presentation: “Socio-cognitive tension-relaxation in argumentative CSCL interactions”</td>
<td>J. Andriessen, M. Baker, K. Lund (CNRS-University of Lyon)</td>
</tr>
<tr>
<td>15</td>
<td>2nd presentation: “Identifying and overcoming tension in interdisciplinary teamwork in professional development: Two cases and a tool for support”</td>
<td>P. Sins (University of Utrecht), K. Karlgren (Karolinska Institutet, Stockholm)</td>
</tr>
<tr>
<td>15</td>
<td>3rd presentation: “Affect and its expression within computer ecologies for learning”</td>
<td>C. Crook (University of Nottingham)</td>
</tr>
<tr>
<td>10</td>
<td>Discussant intervention</td>
<td>J. Lemke (University of Michigan)</td>
</tr>
<tr>
<td>25</td>
<td>Questions and discussion with the audience</td>
<td>M. Baker, J. Andriessen</td>
</tr>
</tbody>
</table>

### 1st presentation: “Socio-cognitive tension-relaxation in argumentative CSCL interactions”

Authors: J. Andriessen, M. Baker, K. Lund

One pedagogical goal of collaborative argumentation-based learning is to encourage students to broaden and deepen their understanding of a space of debate (Baker et al. 2003). Since deepening cognitive conflicts can create tension within interpersonal relations, students need to manage its release whilst preserving an effective collaborative working relation (Andriessen, Baker & van der Puil, in press). We present and compare data from three different situations of argumentative interactions. The first involves argumentation in distant CSCL, by dyads of secondary school students. The second involves 13-14 year old students engaged in a design project taking 16 weeks of 2-hour meetings; interactions are oral, with coaching by several teachers. The third situation involves secondary students debating in small groups in the classroom, using face-to-face networked collaboration. We analyse argumentative interactions in each situation in terms of patterns of tension/relaxation, in relation to the breadth/depth of the argumentation. This allows us to relate developments in the socioemotional dimension of collaboration to the form and content of the argumentative interaction. We then present an analysis and comparison of (the absence of) the three argumentative practices in which the activities were embedded in order to propose a framework for understanding the relationship between argumentative practice and the management of social tension in collaborative learning tasks. Our analysis shows that interpersonal tensions resulting from one cognitive conflict can take time to subside, thus creating a higher threshold of tension for subsequent conflicts.

### 2nd presentation: “Identifying and overcoming tension in interdisciplinary teamwork in professional development: Two cases and a tool for support”

Authors: P. Sins & K. Karlgren

A central interest in developing professionalism resides in the potential for practitioners to learn from and with one another in ways that support transformations of their knowledge practices. However, negotiation between multiple perspectives, interests, practices and traditions intertwines cognitive-epistemic with socio-relational and affective aspects, which may lead to tension and conflict. While tension can disable learning, we argue that identifying these tensions should be viewed as a significant source for change and development. We will present two cases, which show similar patterns. Tension in medical teams is a threat to patient safety. However, an uncritical attitude does not foster learning, and instructors at simulation training courses may therefore put focus on tensions through questioning. Eventually learners may develop skills in analysis, which cover explanations and strategies and which provide a fruitful approach to the problems. The second case investigated teacher-researcher collaboration at a secondary school, and focuses on the design of a learning module. Identification of tensions during meetings helped participants to focus their efforts on the root causes of problems, which led to a
reconceptualisation of the current work practices. This subsequently helped team members to deviate from established norms and improve their practices. We will present a video annotation tool with which learners can make annotations that serve the role of mirroring material: letting learners use the tool to annotate video recordings of their teamwork can highlight underlying tensions. An advantage is that problems do not risk being overlooked and instead become a starting point for change.

3rd presentation: “Affect and its expression within computer ecologies for learning”
Authors: C. Crook
Affect is widely accepted as a (somewhat neglected) force in the motivation of study – whether to animate it or obstruct it. Moreover, collaborative interactions have been identified as a significant study arena in which affect is generated. So, the synchronies of collaborating engagement may be a source of positive affect, while the tensions of coordinating an agreed trajectory of problem solving may be a source of negative affect. Consideration of such emotions in the CSCL community tends to dwell on the iconic CSCL case of synchronous conversation around a computer screen (either face to face or across networks). Yet this configuration may have become a fairly unusual context for joint study. Accordingly, any theorising of affect and CSCL may need to notice looser structures whereby technology coordinates students into collaborative arrangements. Findings will be presented from two projects in which individuals were invited to reflect on the personal experience of study. In the first, 20 undergraduates kept voice diaries over a two-week period. In the second, focus groups of secondary school pupils discussed their learning with special attention to social software. These reflections are analysed in relation to the expression of affect. Affect is frequently expressed, but rarely in relation to collaborations, an exception being negative affect arising from enforced group work. Yet the widespread positive affect associated with recreational use of social software suggests new structures of CSCL that might re-capture the positive affect of joint study.

References