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Michael J Baker, Peter Reimann

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Editorial Notes: Revitalising foundational concepts

Michael Baker & Peter Reimann

Introduction

Koschmann (1996) proposed that CSCL constituted an “*emerging paradigm*” (our italics), in the sense of Kuhn (1962), i.e. a framework, or “pattern” (Greek: *paradeigma*) of concepts, questions, methods and results that structure research, at least within what is termed *normal science*. Supposing that Koschmann was right: is the CSCL paradigm still emerging, or has it emerged? The latter would propose a more or less porous wall of incommensurability between CSCL and previous paradigms, such as educational psychology focussed on the individual and quantitative measures of learning. This is still open to debate in our field. The question of the status of CSCL as a fully-fledged paradigm, incommensurate with previous ones, turns on to two main fundamental questions: (1) Reductionism. Can the group of learners be studied purely as a (complex) function of the characteristics of individual learners of which it is composed, or not? In other terms, is the group reducible to a set of individuals? The work of Stahl (e.g. 2006) is enlightening with respect to this question. (2) Tool-mediation. Does technology simply support, channel or influence collaborative learning activity, or does it fundamentally transform, mediate it? Is technology an ‘add-on’ to, an amplifier of, existing activities or should technology-mediated-activity be considered *sui generis*, the tool transforming the very structure of the activity?

Although these questions are not presently resolved in CSCL, and thus it is not obvious that CSCL has completed its emergence as a paradigm, we can at least say that whilst the set of questions dealt with in CSCL research is expanding, together with the accumulation of a set of results, the field is also being revitalised by important developments in the way in which the some of the key phenomena it studies are being *conceptualised*. The four papers assembled in this issue of the journal are cases in point, in that they deepen and extend our understanding of a number of foundational concepts or questions in CSCL. These include the nature of group understanding, the role of the artefact within it, the creativity of dialogue, socially shared regulation and game-changing technologies in CSCL. Discussing these concepts and questions in relation to the four papers published in this issue of the journal seems to us a fitting end to this year 2024, the first of our co-editorship.

Group-understanding and the role of the artefact

A key concept of the CSCL paradigm — and possibly its definitional object of study — has been termed (*shared*) *meaning making* (see Stahl & Hakkarainen, 2021), *intersubjective meaning making* (Suthers, 2006) or, within conversation analytic approaches (Koschmann, 2013), the *collaborative production of sense within talk-in-interaction*. However, the notion of what is ‘shared’ in collaborative activity, and how it becomes so, has been conceptualised differently in alternative frameworks that contribute to CSCL. There exists a cluster of cognate concepts here, between which there are subtle differences, including at least the “joint problem space” (Roschelle & Teasley, 1995), “grounding” (Clark & Shaefer, 1989; Baker et al., 1999; Barron,

2003), “intersubjectivity” (Rommetveit, 1976) and even such basic psychological phenomena as perspective-taking and empathy (Järvelä & Häkkinen, 1999).

Profound work on conceptual clarification is required in this case, and we shall only scratch the surface of it here. One basic difference between these concepts concerns *what* is claimed to be shared. In conversation analysis, meaning making does not only concern language, but also non- and para-verbal dimensions, whereas Clark’s theory of grounding, at least in its early formulations, is firmly based on language exchanges, with the “common ground” comprising a set of propositions that are agreed to be mutually understood to a sufficient degree. More recent work by Cherubini et al. (2005) refines the grounding model by distinguishing the utterance and knowledge levels, proposing the alternative concept of a “mutual cognitive environment”. The “joint problem space” (Roschelle & Teasley, *ibid.*), a product of collaboration, would seem to concern primarily the knowledge level, even though their study involved use of a computer simulation. Rommetveit (1976) proposes that “states of intersubjectivity” need to be understood taking into account the time and space of utterance, and potentials of meaning in relation to expansions and/or modifications of a pre-established shared *lifeworld*.

What about the role of the artefact, the technology in shared understanding? The research described in the paper by Mørch, Andersen, Eie and Mifsud, intitled “Emergent group understanding: Investigating intersubjectivity in sociotechnical interdependencies” (2024, this issue), takes up the concept of intersubjectivity in the context of the use of a Minecraft virtual world. “Emergent group understanding” is proposed as a new concept, to add to those mentioned above. A number of fine-grained processes of intersubjectivity that contribute to collaborative learning are described. Some of these integrate the role of the virtual world technology, not as a mere ‘vessel’ for the collaborative activity, but rather as a medium of expression and achievement of shared understanding. Indeed, the research question here concerns characterising the interplay of social and technical objects, the emergence of intersubjectivity, in Minecraft. Thus vague, technical, fragmented, connected, entangled and enmeshed forms of intersubjectivity are identified, most of which integrate perception and modification of the Minecraft technology. In enmeshed intersubjectivity in particular, technology and social objects are tightly interwoven as students are immersed in the virtual world.

The paper by Borge, Smith and Aldemir, “Using Generative AI as a Simulation to Support Higher-Order Thinking” (2024, this issue), also contributes to advancing our understanding of intersubjective meaning making with technology. The authors present a case study examining how chat-based GenAI (chatGPT 3.5, specifically) can facilitate metacognition and socio-metacognition—awareness and regulation of individual and collective cognitive processes. The stance on generative AI taken in this study is that Large Language Models’ (LLMs) conversational and reasoning capabilities could be used to provide a simulation environment for practicing conversational and metacognitive skills. This is an opportunity in particular for students who have little opportunity for such practice in their home setting and in the classroom, provided there are no financial or technical barriers. The observations with chatGPT 3.5—which must by now be considered an early LLM—are encouraging. With expert prompting, it adheres to most principles of productive dialogue or can be further guided to do so in the course of the dialogue. ChatGPT 3.5 not only performs well on the level of simulating a ‘partner’ in a one-to-one conversation with the focus on discussing ideas and generating new ideas, but also does a good job on the metacognitive task: in taking the record of the conversation as data and ‘reflecting’ on it, in this case through the lens of categories for the characteristics of dialogue provided by the authors as prompts. We shall return to metacognition and self-regulation below.

Activity, artefact and instrument

A second foundational question mentioned in introduction to these editorial notes concerned the nature of the relations between learners’ collaborative activities and the technologies that they

use. The paper published in this issue by Elizondo & Brown (2024), intitled “Students’ use of technological tools to engage in collective mathematical proof activity”, describes these relations drawing on the theory of *instrumental genesis* (Rabardel, 2002). In Elizondo and Brown’s study, students used the widely available technological tools GoogleDocs and Zoom. This exemplifies the tendency of moving from developing and studying the use of bespoke CSCL environments, to that of studying tools readily available on the Internet, as mentioned in our previous editorial (Baker & Reimann, 2024). What is at stake, therefore, in this research is how these *tools* are appropriated, to become veritable *instruments*, in the context of a mathematical proof activity.

Rabardel’s theory is both Vygotskian and Piagetian. It is Vygotskian in considering that the appropriation of tools transforms the structure of activities, by a process that Rabardel calls *instrumentalisation*; and Piagetian given that appropriation of tools goes together with the development of cognitive schemes relating to their specific affordances. A case in point is what Rabardel terms “catachresis” (literally, “misuse”: the use of a word in a way that significantly departs from its conventional usage), the way in which users ‘get around’ the technology to use it in new, creative ways that were not necessarily anticipated by its designers. For example a brush can be used to brush the floor (what it was designed for), or it can be used to knock something off a high shelf (catachresis).

The paper of Elizondo and Brown focusses on episodes of students’ activities at university level, using Zoom and GoogleDocs concurrently or alternatively, where a sub-task was completed. Their analysis turns on relating such goals (for example, “propose idea”, “check over work”) to utilisation schemes (e.g. “talk verbally on zoom”, “read over work on googledoc”). This gives rise to the identification of more complex or higher-level collective action schemes, transforming the tools into instruments, closely tied to mathematical activity. “Visual mediators”, such as diagrams and examples, play an important role in these processes.

The creativity of dialogue

The paper by Mørch and colleagues (*ibid.*, this issue) deals with a further topic that has far-reaching consequences, that of articulating teachers’/researchers’ (top-down) educational goals with the (bottom-up) goals that learners are actually pursuing. Since learners’ goals are emergent from the dialogue, they may very well not correspond to those that were part of the pedagogical design. In other terms, seeing and evaluating learners’ dialogues exclusively through a normative lens may miss important learning that falls outside this. Several issues arise here. To what extent is dialogue in fact predictable? If it becomes almost completely formatted, is it still a dialogue? Dialogue may be partially predictable on a general level — we can broadly predict how a debate would proceed between people with completely opposed entrenched views — but not on more specific levels. A related issue is that of what might be termed the *creativity* of dialogue, that may be stifled by (over-)scripting (Fischer et al., 2007; Dillenbourg, 2002). The design of CSCL situations thus requires a certain degree of humility: we may aim to promote a certain type of dialogue, but it should hopefully produce creative surprises; we may design tools with certain affordances in mind, but the students may use them in different creative ways (see the above discussion of instrumental genesis); and although we aim for the achievement of particular educational goals, we still need to pay attention to what the students are in fact aiming for and learning, beyond such normative goals, by localised analyses of their interactions.

Collaboration Scripting and Socially Shared Regulation

The paper “Comparing the Effectiveness of CSCL Scripts for Shared Task Perceptions in Socially Shared Regulation of Collaborative Learning” (Miller & Hadwin, 2024, this issue) touches not on one but on two foundational concepts: collaboration scripts and group regulation. This is interesting because scripts have been typically deployed to guide or constrain group activities (when to contribute with what) not to provide guidance explicitly on the metacognitive level: to

regulate the regulation. A second innovation is the study's focus on scripts in enhancing shared task perceptions. Shared task perception is important pedagogically because bypassing it can lead to problems with learning further on in groupwork; but is also of high theoretical importance: Information processing models of (individual and group) self-regulation such as COPES (Winne & Hadwin, 1998), also relied on in this study, require a representation of the starting point of the task and its goal or end state; otherwise, the regulation operations—conceptually conceived as a planning process—would not work.

The research focuses on how different levels of scripting (high vs. low) impact the accuracy of shared task perceptions, negotiation processes, and overall group performance. Findings indicate that groups using high-support scripts constructed more accurate shared task perceptions and engaged in more transactive discussions. However, neither the level of individual support nor group support affected groupwork outcomes. Miller and Hadwin mention as a possible reason that negotiation of shared task perceptions could have dynamically evolved as learners collaborated rather than being conducted at the beginning of the group work. This explanation, along with observations in other studies that individuals and groups sometimes (often?) skip the task analysis, might indicate that theories that build on the idea of self-regulation as planning need to consider alternatives, such as self-regulation as situated action (Suchman, 1987). Or perhaps students assume that learning tasks given to them in formal learning contexts always have a more or less straightforward solution, hence any serious planning effort would be otiose. This amounts to a meta-cognitive decision — to plan or not to plan — that falls outside the COPES model.

Concluding remarks

The set of papers published in the four issues of this journal published during 2024 have stimulated us to make a number of reflections on the current state of play in CSCL research and how this might point to future research directions. We conclude this editorial by recapitulating some of these reflections.

In the first issue of this year, we emphasised how CSCL has changed since its beginnings in the 1990s, in terms of the learning tasks studied, the technologies involved (from bespoke environments to platforms) and the need to extend our vision of what collaboration is, embedded in broader collective activities. We argued for three closer connections: between theory and design, between theory, data and models and between research and educational practice. In the second issue; we focussed on dialogues on dialogues, as reflective practices, and the specific topic of sequential data analysis. The third issue inspired us to situate CSCL within other disciplines that study collaboration (such as CSCW, co-design) and to express a provocative conjecture: could there be a domain, a superclass of CSCL, called the *Collaboration Sciences*? For such a proposal to be feasible, we proposed that a unified language for describing collaboration would be required to avoid a theoretical-methodological Tower of Babel. Finally, in this present Issue 4, the last of the year 2024, we described how the papers assembled herein revitalise foundational issues, as new socio-technological configurations lead to, for example, new visions of intersubjective meaning making, one of our core, or even foundational concepts.

This seems to point to CSCL being at least on the cusp of becoming an autonomous research paradigm. Consolidating this process requires deepening its conceptual core and positioning of CSCL as the discipline that provides the 'glue' between the many frameworks and theories involved in researching technology-mediated and technology-supported collaborative learning, that help to inform design by research knowledge. We have every reason to hope that the papers to be published in the year to come will be just as innovative as those that were published this year.

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