

Epistemic Mediation, Chronotope, and Expansive Knowledge Practices

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Abstract: In this poster we examine the role of epistemic mediation in technology-mediated collaborative learning. We argue that participants in technology-mediated learning deal with amplified, temporally integrated and spatially merged semiotic resources, constituting specific chronotopes. The cultivation of such chronotopes, characterized by the creation of epistemic artifacts that crystallize cognitive processes and re-mediate activity, requires expansive learning efforts that transform the entire activity system. Investigation of such chronotopes seems a promising line of inquiry in CSCL.

In the investigation of technology-mediated learning, it is essential to acknowledge that human beings use various External Memory Fields (EXMF, Donald, 1991), such as paper and pencil, for extensive elaboration of ideas. EXMF provides material agency (Pickering, 1995) for pursuing complex inquiries and participates in the process of externalization and collectivization of cognitive processes (Donald, 1991). One basic aspect of the use of EXMF in learning is epistemic mediation, i.e., a process of deliberate re-mediation of personal and collective activity by the creation of epistemic artifacts, a growing network of which remediate subsequent inquiry. Artifacts, in fact, bear knowledge (Baird, 2004) so that their design may crystallize a whole expert network's knowledge, which can afterwards be taken as a black box (Tuomi, 2002). Artifacts, then, become instruments that mediate subsequent inquiry (Beguín & Rabardel, 2000), becoming part of the invisible background of activities (Engeström, 1987). EXMF and knowledge practices, through epistemic mediation, generate specific spaces of interaction and specific temporal organizations of learning activities analyzable through the concept of chronotope (Bakhtin, 1981). In this poster we will briefly discuss the relations between epistemic mediation in CSCL, knowledge practices and emergent space-time relations.

Pioneering research on epistemic mediation in CSCL has been carried out by Scardamalia and Bereiter (2006). The authors, in their design based experiments, guided students in developing knowledge through the embodiment of their ideas in conceptual artifacts (Bereiter, 2002), having both ideal and thing-like characteristics. The concept of mediation is central also within cultural-historical activity theory (Engeström, 1987), as an aspect of mediated activity: ideas and conceptualizations are seen as psychological tools in materially embodied activities (Vygotsky, 1978). By building on those theories, the first author and his colleagues developed the "knowledge-creation learning" (Paavola et al., 2004), characterized as a object-centered approach to CSCL in which the nature of the material objects worked on mediates and significantly shapes the nature of inquiry.

In our vision, EXMF is part of a dynamic semiotic field that intersect boundaries of mental, virtual, and social spaces of activity (Nonaka & Konno, 1998), which can be considered part of the chronotope of technology-mediated learning (Ligorio & Ritella, 2010). Chronotope is Bakhtin's (1981) concept originally devised for understanding how literate genres of novels define specific ways of interconnecting spatial and temporal relations (Tuomi, 2002). In educational context, Brown and Renshaw (2006, p. 249) used chronotope in order to show how pupils participation in classroom activities is linked to the way they discursively shape "the space-time context of the classroom". For our purposes, we define the chronotope in ICT-mediated learning as the emergent configuration of temporal and spatial relations in learning practices as they are impacted by ICT. In fact, the entire flow of activity, in terms of temporally organized sequence of actions, is impacted by the use of different EXMF. Moreover, interacting with EXMF provide semiotic spaces organized in multiple ways. Suffice it to think of the difference between the organization of books in a library and in Google books. Following Bakhtin, we consider spatial and temporal processes as fused: chronotope invoke a whole, so that 'reciprocal impact' of space and time is an approximation in the understanding of the process.

Chronotope is useful in technology-mediated learning because ICT break many traditional spatial and temporal boundaries of human activity. Indeed, educational settings are to be considered what Foucault (1967) called a "heterotopia", i. e. a place in which multiple types of physical and symbolic space coexist and alternate. Digital epistemic artifacts even transform and enrich the heterotopia of learning, while ICT permit to create easily shareable and workable epistemic artifacts which transform distributed problem space and provide

anticipatory guidance for future inquiry. So, such learning is a multimodal and laminated (i.e., spatiotemporally layered) activity (Prior, 1998) in which social practices related to epistemic mediation are crucial.

In Ligorio & Ritella (2010), chronotope has been characterized by the use of the musical metaphor for the analysis of the tempo of the activity. Three chronotopes, related to different rhythms emergent in collaborative interaction, have been identified (Ligorio & Ritella, 2010): 1) adagio, characterized by a slow flow of action 2) andante, characterized by an acceleration of the flow and 3) allegretto, in which the configuration of participation allow a fluid and dynamic course of actions. Some features such as “the depth and the size of the space of interaction” and “how participants move around the computer and within the digital space” play an important role in the emergence of specific chronotopes. Building on this work, we characterize the chronotopes of technology-mediated learning as follow: 1) they are marked by changes in the tempo of the activity and occasional intensification of collaboration, and they permit to explain variations in the pace and in the emerging organization of collaborative processes (Ligorio & Ritella, 2010); 2) they involve the use of collaborative technology; 3) epistemic mediation plays a crucial role; 4) they are characterized by multimodality, heterogeneity and multi-modality; 5) they are locally improvised, but also mediated by socio-historically developed genres, technology-based instruments, and educational practices.

Technology enhances learning through transformed social practices (Hakkarainen, 2009), as successful cultures of CSCL appear to be also expansive-learning communities (Engeström, 1987) which problematize practices, envision changes and consolidate novel practices. Accordingly, the emergence of a new chronotope implies both the transformation of the arrangement of the space and of the practices that occur within that space. That new pattern generates also a new time perspective and impacts the tempo of the activity, making the new chronotope emerge. The development of chronotopes of knowledge creation is, then, a collaboratively emergent process (Sawyer, 2005), seldom analyzed by investigators who either pursue one-shot experiments or describe mature inquiry cultures. Detailed multi-level data on transformative activities are needed to account for such dynamic emergent processes. In fact, evolution of practices is elicited by selectively consolidating ephemeral as well as stable aspects of CSCL. Through sustained collaborative improvisation, ideas, artifacts, methods and practices that do not belong to individuals, emerge from self-organized collaborative processes (Fleck, 1979).

Concluding, epistemic mediation, chronotope and knowledge practices appear to have three interconnected aspects: 1) In order to transform technological artifacts to instruments of inquiry, expansive development of knowledge practices is needed. 2) When adequate, practices guide participants’ activities toward epistemic mediation. 3) The emergence of a new chronotope elicits collaborative creation of knowledge. The notion of chronotope appears useful because it assists in understanding how dynamic semiotic spaces are associated with social practices; the challenge is to create methods that allow investigating such processes.

References

- Baird, D. (2004). *Thing knowledge*. Berkeley, CA: University of California Press.
- Bakhtin, M. (1981). *The dialogic Imagination. Four essays by M. M. Bakhtin*. Austin: University of Texas Press
- Bazerman, C. (1988). *Shaping written knowledge*. Madison: University of Wisconsin Press.
- Béguin, P., & Rabardel, P. (2000) Designing for instrument-mediated activity. *SJIS*, 12, 173–190.
- Bereiter, C. (2002). *Education and mind in the knowledge age*. Hillsdale, NJ: Erlbaum.
- Brown, R. & Renshaw, P. (2006). Positioning Students as Actors and Authors: A Chronotopic Analysis of Collaborative Learning Activities. *Mind, Culture, and Activity*, 13(3), 244-256.
- Donald, M. (1991). *Origins of the modern mind*. Cambridge, MA: Harvard University Press.
- Engeström, Y. (1987). *Learning by expanding*. Helsinki: Orienta-Konsultit.
- Fleck, L. (1979). *Genesis and Development of a Scientific Fact*. University of Chicago Press.
- Foucault, M. (1967). Of other spaces, heterotopias. <http://foucault.info/documents/heteroTopia/foucault.heteroTopia.en.html>
- Hakkarainen, K. (2009). A knowledge-practice perspective on technology-mediated learning. *ijCSCL*, 4, 213-231.
- Ligorio M. B., Ritella G., (2010). Chronotopes and heterotopias as conceptual tools to understand the development of a computer supported collaborative professional task. *ijCSCL*, 5, 433-452
- Nonaka, I., Konno, N. (1998) The concept of BA. *California Management Review*, 40, 40-54.
- Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Modeling innovative knowledge communities: A knowledge-creation approach to learning. *Review of Educational Research*, 74, 557-576.
- Pickering, A. (1995) *The mangle of practice*. Chicago: The University of Chicago Press.
- Prior, P. A. (1998). *Writing/disciplinarity*. Mahwah, NJ: LEA.
- Sawyer, R. K. (2005). *Emergence: Societies as complex systems*. Cambridge, MA: Cambridge University Press.
- Scardamalia, M., & Bereiter, C. (2006). Knowledge building. In K. Sawyer (Ed.) *The Cambridge handbook of the learning sciences* (pp. 97–115). Cambridge, MA: Cambridge University Press.
- Tuomi, I. (2002). *Networks of innovation*. Oxford: Oxford University Press.
- Vygotski, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.