

Self-Organizing Collaborations as Blueprints for CSCL Design

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Abstract: We propose that ethnographic studies that precede, but inform, design, can be a productive addition to CSCL design practices. We anchor our claims in a case example of an ethnography of an undergraduate history course. We describe how the ways in which learners self-organized and created practices for producing, sharing and reproducing knowledge in the course can serve as a blueprint for CSCL design. Such learners' counterculture practices may not readily emerge in participatory design discussions. This approach identifies points of contact between pre-existing collaborative practices and pedagogical considerations. Designers can then infuse pedagogical innovations into the activities that participants already value and perform, achieving benefits akin to participatory design.

Introduction

Considerable research in CSCL analyzes the ways in which designed technological supports enable groups of learners to develop knowledge and skills through joint activity (Dillenbourg, Järvelä, & Fischer, 2009). Increasingly, it also includes designing ways in which the tools can be integrated within the structures of local settings (Cress, Stahl, Ludvigsen, & Law, 2015; Roschelle, Dimitriadis, & Hoppe, 2013). In this paper, we take the local setting as our starting point, and investigate how naturalistically occurring collaborations can serve as a blueprint for CSCL design. Specifically, we report on a cognitive ethnography of an introductory undergraduate history course. We describe how the ways in which learners self-organized and created practices for producing, sharing and reproducing knowledge in the course inform our design. We propose that basing designs on findings from ethnographic studies can, just like participatory design (Könings, Seidel, Jeroen, & van Merriënboer, 2014), mitigate some of the challenges associated with the introduction of externally designed tools.

The need to incorporate local voices into CSCL design

Research in the learning sciences, and in CSCL specifically, often envisions new forms of learning that can cultivate more robust knowledge and skills (Barab, 2014; Design Based Research Collective, 2003; Dillenbourg et al., 2009). Turning these visions into a reality has to do with embodying the vision in a design (Sandoval, 2013), but even more so, it is dependent on whether and how the design is taken up by local participants (Dillenbourg et al., 2011; Radinsky, Loh, & Lukasik, 2008; Suchman, Blomberg, Orr, & Trigg, 1999).

CSCL tools may support learners in the sense-making process, but learners may not have social structures in place that enable them to make effective use of these features (Fischer et al., 2013). Determining what medium can best support a process may be a function of the interplay between the qualities of the medium and of the setting. For example, some information may be adequately represented in either digital or paper form, but paper might work better in some settings (Dillenbourg et al., 2011; Smith & Reiser, 1998). A large sheet of paper laid out on the floor can enable a group of children to cluster around the sheet, mark it up; pick it up and lay it next to another group's sheet; argue about similarities and differences while motioning or covering parts of the drawing with their hands or body; then, pin-up their drawing and proceed to create a new version that will be pinned up next to the first drawing. In this example, the collective interaction with and around the drawing was better supported by the paper, aligning with routinized practices in the classroom, and enabling learners to pin-up a series of drawings as a "thinking trail" (Johnson, 1997). As in this example, local participants may have pre-existing practices that fulfill some of the same learning goals as the proposed designs, or may have pre-existing practices that can augment and strengthen the designed supports (Tabak, 2004).

These examples point to the need to understand how participants might perceive particular tools, how local settings are configured, what needs are particular to the setting, and what are the existing material and social practices that sustain intellectual work. These insights should inform the design. As a result, there are increasing efforts to incorporate local voices in various design processes, including CSCL design. Incorporating local voices in the design process takes on different forms, such as, design-based research (e.g., Barab, 2014; Roschelle et al., 2013), teachers as designers (e.g., Kali, McKenney, & Sagy, 2015), participatory design (e.g., Könings et al., 2014), change laboratory (Engeström, 2007), and ethnographic study (e.g., Suchman et al., 1999).

Ethnographic study that precedes any design or intervention, is less common in the CSCL community. In this paper, we want to make a call for increased attention to this approach. We suggest that it holds particular value for educational contexts in its potential to strengthen learners' voices in the design, and in facilitating designs

for third space (Gutiérrez, Baquedano-López, & Tejada, 1999). Suchman, Blomberg, Orr and Trigg (1999), in their retrospective of 20 years of research, note that in the absence of ethnographic study some aspects of practice may remain outside the purview of the design process, because participants may not raise in discussion aspects of practice that are so ingrained that they seem “unremarkable.” Based on our own ethnographic findings, which we discuss further below, we proffer that power relationships and the social construction of various practices as “worthy,” “unworthy,” “script,” or “counterscript” (Gutiérrez et al., 1999) might further stand in the way of participants voicing certain practices in design discussions. Consequently, practices that could contribute to the design and to its productive take up by participants might remain outside of the design process.

An example of an ethnography informing CSCL design

We conducted a cognitive ethnography (Hutchins, 2014) of an introductory undergraduate history course in an Israeli university. The study included weekly observations of class and recitation sessions, as well as in-depth interviews with the course instructor, teaching assistant, and a sample of students. The ethnographic study (Brami, 2015) revealed qualities of the formal and of the unofficial social spaces of the course. Following Gutierrez and colleagues (e.g., 1999), these are referred to, respectively, as the *script* and the *counterscript*. The counterscript enabled many of the students, even those who were mostly disengaged from the formal script, to pass the course. More significant from our perspective was that some of these counterscript practices could potentially be leveraged for the purposeful design of a third space (Gutiérrez et al., 1999) in which the script—infused with supports for disciplinary epistemic socialization (Tabak & Reiser, 2008; Tabak & Weinstock, 2011)—could productively coalesce with the counterscript.

Self-organizing collaborations

The script in this course was similar to many large undergraduate introductory courses, where the central conduits for knowledge are the course lectures and course readings. There were students who did not attend the lectures, did not read the required readings, or attended lecture but were not necessarily attentive. On the surface, it might seem that these students were disconnected from the intellectual life of the course, destined, perhaps to fail. Yet, uncovering the counterscript, revealed that the students in this course had established a parallel intellectual life that engaged in conversation with ideas from the script. In this counterscript, the main conduits for knowledge were shared course notes, and an archive of past exam questions and model answers. It is through this counterscript that the majority of students engaged with the intellectual content of the script, and this enabled them to contend with the final exam. We focus here on the note taking practices.

Students organized and sustained a collaborative system for shared notes. The shared note taking enterprise took on various forms with different students fulfilling different roles. One form of collaborative note taking was a more insular collaboration among a group of students. The notes produced by this group were shared within the group but not with the entire course. In this group, some students were note takers, tasked with summarizing the main points from class, while others in the group were responsible for reading and summarizing the assigned reading. The more prevalent collaboration was the voluntary posting of class notes that were made available to any student in the course. A few students in the class took notes at their own initiative, and chose to post their notes to the course Facebook group or Dropbox folder. The majority of students in the course were consumers rather than producers of these notes.

This “consumption” of notes was strategic: some note takers had a reputation for consistently producing accurate extensive notes, and their notes were more highly consumed. These reputations sometimes transcended courses, because the voluntary posting of class notes to a shared cloud was a common practice in many courses. Students held the shared notes in high regard, considering them essential to their learning and their ability to succeed in the course (which essentially meant to perform well on the final exam). In fact, the “master note taker” in the class we observed was highly valued, and one student said that her friend recommended his notes, stating that he was “her angel, her savior,” and that he had already “saved” her on two exams (courses).

Blueprints for CSCL design

Our research program focuses on designing material, technological and social supports to cultivate disciplinary practices. We had a number of design features in mind based on published literature and our prior research. However, the cognitive ethnography of our target setting, undergraduate history education, pointed us in additional directions that we had not considered previously. We saw students’ pre-existing practices as an opportunity to infuse disciplinary considerations into a set of practices that students valued, and in which they were already immersed. Thus, one main facet of our (in progress) design is a collaborative note taking tool, that includes prompts and other structuring features derived from a task model of expert historical reasoning. In what follows we discuss two main points of contact between our pedagogical aims and students’ counterscript practices.

Capitalizing on pre-existing collaborative structures

One of the challenges in reaping the pedagogical benefits of CSCL innovations is that students are not always attuned to productive collaborative processes, creating a need to support the process of collaboration as well as the domain processes that the tools were designed to support (Fischer et al., 2013). In this case, the cognitive ethnography revealed pre-existing collaborative processes. Rather than introduce an innovation that calls for a new social organization that will require its own set of supports, we are infusing supports into these existing collaborative structures. Similarly, the pedagogical supports will be embedded in artifacts and practices that are already valued by the students, and that are part of their conception of productive course participation.

Bolstering nascent spontaneous disciplinary practices

The students' note taking enterprise offers a promising opportunity to cultivate core disciplinary practices, because the "master notes" already, spontaneously, reflect such practices. In our analysis of the content of the "master notes" we found that the master note taker would annotate the notes with comments that pointed out connections between prior notes and current notes, between the course readings and the notes, or pointed out how particular elements in the notes explicate a key idea in the lecture/historical work.

In many ways, the master note taker's annotations express reflective processes and historical reasoning (e.g., Wineburg, Martin, & Monte-Sano, 2014), as well as a recognition of the, sometimes subtle, messages that the instructor conveys about history and historical work. One example comes from a set of notes related to a lecture on a critique of the decline thesis approach to Ottoman historiography. The lecturer raises a rhetorical question asking learners to consider what underlies the moniker "Suleiman the Magnificent" noting that the Ottomans referred to Suleiman as "the legislator." The master note taker rewrites this rhetorical question as a statement in an annotation to the notes, writing that "Suleiman the Magnificent" is a *moniker* that was *given* with the decline thesis, the Ottomans *called* him "the Legislator" (translated from Hebrew, emphasis added, sic). We take this annotation to reflect the note taker's recognition that the use of the term "magnificent" is a form of positional writing, it is part of a particular way of portraying events as a rise and fall. It further connotes that historical accounts can be evaluated against evidence, such as the existence of the moniker "the Legislator."

These notes are more than a testament to one learner's prowess, they are indicative of broader understanding. Many students held these notes in high regard due to their added layer of annotations beyond the lecture summary. This means that a larger group of students have enough insight into what counts as history, or what is important in historical work, to recognize the value of these annotations, even if they do not have the ability or inclination to generate them themselves. From a design perspective, this suggests that students are likely to gravitate to notes that include a more elaborate and refined version of such annotations.

Conclusion

There are a number of approaches for shaping designs according to participants' knowledge and practices (Engeström, 2007; Könings et al., 2014; Suchman et al., 1999). Preceding the design process with an ethnographic study can reveal practices that might not arise through design discussions. Particularly in instructional settings, it can reveal practices that reside in the social space occupied by learners. Learners participate in this space willingly and centrally. This space, the counterspace, may include practices that align with formal educational aims. Infusing these existing counterscript practices with pedagogical innovations can create a third space in which learners engage in practices that they value and are accustomed to, while being better supported in achieving formal educational aims. Thus, this approach can strengthen the students' perspective in the design. These ethnographies complement rather than obviate participatory design processes, especially those that include learners in the process (e.g., Könings et al., 2014; Luckin et al., 2006), by extending opportunities for counterscript practices to be part of the participatory design process. Despite its productive potential, infusing pedagogical innovations into counterscript practices also carries a measure of risk. It is highly relevant that the notion of third space originates in scholarship on the tensions that arise from having a new culture *imposed* on one's own (Bhabha, 1994). This tension can lead to alienation and dissent or to the formation and adoption of new hybrid practices. The efficacy of the design, and its ability to make stronger strides in fostering disciplinary practices than in unproductively disrupting student life will need to be put to empirical test.

References

- Barab, S. (2014). Design-based research: A methodological toolkit for engineering change. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences: Second edition* (pp. 151-170). New York, NY: Cambridge University Press.
- Bhabha, H. K. (1994). *The location of culture*. London: Routledge.

- Brami, U. (2015). *A case study of personal epistemology in the context of an introductory course in history for first year b.A students*. (M.A.), Ben-Gurion University of the Negev, Beer-Sheva, Israel.
- Cress, U., Stahl, G., Ludvigsen, S., & Law, N. (2015). The core features of cscl: Social situation, collaborative knowledge processes and their design. *International Journal of Computer-Supported Collaborative Learning*, 10(2), 109-116.
- Design Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 32(1), 5-9.
- Dillenbourg, P., Järvelä, S., & Fischer, F. (2009). The evolution of research on computer-supported collaborative learning. In S. L. N. Balacheff, T. de Jong, A. Lazonder, S. Barnes (Ed.), *Technology-enhanced learning: Principles and products* (pp. 3-19): Springer.
- Dillenbourg, P., Zufferey, G., Alavi, H., Jermann, P., Do-Lenh, S., Bonnard, Q., . . . Kaplan, F. (2011). Classroom orchestration: The third circle of usability In H. Spada, G. Stahl, N. Miyake, & N. Law (Eds.), *Proceedings of cscl2011* (pp. 510-517). Hong Kong: International Society of the Learning Sciences.
- Engeström, Y. (2007). Enriching the theory of expansive learning: Lessons from journeys toward coconfiguration. *Mind, Culture, and Activity*, 14(1-2), 23-39.
- Fischer, F., Kollar, I., Weinberger, A., Stegmann, K., Wecker, C., & Zottmann, J. (2013). Collaboration scripts in computer-supported collaborative learning. *The international handbook of collaborative learning*, 403-419.
- Gutiérrez, K. D., Baquedano-López, P., & Tejeda, C. (1999). Rethinking diversity: Hybridity and hybrid language practices in the third space. *Mind, Culture, and Activity*, 6(4), 286-303.
- Hutchins, E. (2014). The cultural ecosystem of human cognition. *Philosophical Psychology*, 27(1), 34-49.
- Johnson, S. (1997). *Interface culture: How new technology transforms the way we create and communicate*: Basic Books New York.
- Kali, Y., McKenney, S., & Sagy, O. (2015). Teachers as designers of technology enhanced learning. *Instructional Science*, 43(2), 173-179.
- Könings, K. D., Seidel, T., Jeroen, J., & van Merriënboer, G. (2014). Participatory design of learning environments: Integrating perspectives of students, teachers, and designers. *Instructional Science*, 42(1), 1-9.
- Luckin, R., Underwood, J., Du Boulay, B., Holmberg, J., Kerawalla, L., O'Connor, J., . . . Tunley, H. (2006). Designing educational systems fit for use: A case study in the application of human centred design for AIED. *International Journal of Artificial Intelligence in Education*, 16(4), 353-380.
- Radinsky, J., Loh, B., & Lukasik, J. (2008). GIS tools for historical inquiry: Issues for classroom-centered design. *Journal of the Association for History and Computing*, 11(2).
- Roschelle, J., Dimitriadis, Y., & Hoppe, U. (2013). Classroom orchestration: Synthesis. *Computers & Education*, 69, 523-526.
- Sandoval, W. (2013). Conjecture mapping: An approach to systematic educational design research. *Journal of the Learning Sciences*, 23(1), 18-36.
- Smith, B. K., & Reiser, B. J. (1998). *National geographic unplugged: Classroom-centered design of interactive nature films*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Los Angeles, California, USA.
- Suchman, L., Blomberg, J., Orr, J. E., & Trigg, R. (1999). Reconstructing technologies as social practice. *American Behavioral Scientist*, 43(3), 392-408.
- Tabak, I. (2004). Reconstructing context: Negotiating the tension between exogenous and endogenous educational design. *Educational Psychologist*, 39(4), 225-233.
- Tabak, I., & Reiser, B. J. (2008). Software-realized inquiry support for cultivating a disciplinary stance. *Pragmatics & Cognition*, 16(2), 307-355.
- Tabak, I., & Weinstock, M. (2011). If there is no one right answer? The epistemological implications of classroom interactions. In J. Brownlee, G. Schraw, & D. Berthelsen (Eds.), *Personal epistemology and teacher education* (pp. 180-194). New York: Routledge.
- Wineburg, S., Martin, D., & Monte-Sano, C. (2014). *Reading like a historian*: Teachers College Press.

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