Collaborative Design (CODE) As a Teacher Professional Development Model in Francophone and Anglophone Quebec

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Abstract: Teacher professional development as collaborative design (TPD-CODE) is fostered in network-enabled university-school partnerships. We reflect on two initiatives sponsored by the Quebec Ministry of Education, and coordinated by a knowledge transfer organization (CEFRIO). Their activity systems are based in two different cultures: The Francophone and the Anglophone Quebec cultures, Canada. Both initiatives afford school teams an opportunity to enhance their practices and broaden the horizons of both classes and schools. In the Remote Networked Schools (RNS) initiative, teachers, students and researchers use the same online tools (iVisit, VIA and Knowledge Forum). In the BCT (Building Community through Telecollaboration) initiative tools vary to a greater extent. We illustrate what TPD-CODE can be as we describe the interactions that are taking place in these activity systems in which teachers engaged K-12 learners into networked learning through the use of collaborative technologies.

The purpose of this paper is to offer new thoughts on teacher professional development in complex ecologies. Professional development is enacted as collaborative design (TPD-CODE), and is illustrated here through an analysis of the interactions that occur within two activity systems, the *Remote Networked Schools (RNS)* francophone initiative and the *Building Community through Collaboration (BCT)* Anglophone initiative. The *RNS* initiative began in 2002 and is in its fifth phase of development (2010-2011). Its goal is to enrich the learning environment of small rural schools. The BCT project is a province-wide initiative with teachers and administrators from English school boards across Quebec. Its main goal is to encourage, facilitate and support collaboration among students, teachers and educational leaders to enhance learning across the community.

Conceptual Background

Teacher professional development, collaboration, design and technology have been associated in a number of ways in the past fifteen years: Loucks-Horsley, Hewson, Love, and Stiles (1997) published an influential book, *Designing professional development for teachers of science and mathematics*; Dufour and Eaker (1998) launched an increasingly popular movement, professional learning communities; Wenger (1998) published *Communities of practice* and inspired the design of a growing number of onsite/online teacher professional communities; Lieberman (1996, 2000) documented teacher networks for educational reform; Marx, Blumenfeld, Krajcik, and Soloway (1998) wrote a powerful article on New technologies for teacher professional development; and Glazer and Hannafin (2006) provided an understanding of how reciprocal interactions influence professional learning. Our own reflective practice as teacher educators in participatory modes (Silva & Breuleux, 1994; Breuleux, Erickson, Laferrière, & Lamon, 2002; Laferrière & Breuleux, 2006) led to the understanding of teacher professional development as collaborative design (TPD-CODE).

When approached from recent social and cultural theories of learning and cognition and their applications (Barab, Kling, & Gray, 2004; Bransford, Brown, & Cocking, 1999; Engeström, 1987; Hollan, Hutchins & Kirsh, 2000; Lave & Wenger, 1991; Lave & Chaiklin, 1993; Salomon, 1993; Stahl, 2006; Scardamalia & Bereiter, 1994, 2004, 2006) the focus of teacher professional development is not the individual performance or the development of an individual's generic competence (applicable to all situations) but rather the collective performance and the development of "colocated competencies" shared among a group of individuals. *Learning in a distributed way through a historically developing activity in a concrete setting or context* became the cornerstone of our two initiatives. It involved a particular activity, the use and mastery of multifaceted cultural tools (ICTs) by K-12 teachers wanting to engage learners in cooperative and collaborative inquiry within and across schools. Our analysis focuses on the interactions that took place within and between constituents (or sub-systems: the university-school partnership, the classroom community, and the online collaborative space) for teacher professional development to transform into collaborative design.

Methodology

One of the comprehensive approaches is cultural-historical activity theory (Lim, 2002; Bernhard, 2007). We adopted Engeström's (1987) framework, but limited our analysis to the interactions within and between three constituents of the activity systems (the university-school partnership, the classroom community, and the online

collaborative space). Moreover, we focused on the third phase of the RNS activity system (2006-2008), one carried out in over 80 schools operated by 22 different school boards. Its aim was the improvement of small rural schools' learning environment. Top-down and bottom-up processes had been deployed for conditions of innovation (Ely, 1990) to exist (Turcotte & Hamel, 2008). As for the BCT project, it was initiated in 2007 along with a design research approach (Bereiter, 2005; Brown, 1992; Collins, Joseph, & Bielaczyc, 2004; Schoenfeld, 2006), highlighting iterative processes of research (i.e., design – evaluation – revision) and mutual close collaboration between teachers, administrators, a University-based research team, and a support team. Through the iterative processes, the design research approach has evolved since 2009 toward participatory design research (Silva & Breuleux, 1994), which emphasizes the engagement of users / participants in the design process.

Participants

Participants were volunteer teachers working in network-enabled classrooms. They were also school and school district administrators. They were from numerous sites, and mostly elementary schools. The RNS research-intervention team was composed of a CEFRIO representative, teacher educators and researchers from four different universities. In the BCT initiative they were from the same university.

Collaborative Technologies

Collaborative tools were used to support the design of new forms of learning. The collaborative platform chosen for the RNS initiative is the result of more than two decades of analysis of the process of expertise and innovation, involving cognitive and computer scientists and practitioners, with social innovation (Knowledge Building, Scardamalia and Bereiter, 2004) and technology innovation (Knowledge Forum, Scardamalia and Bereiter, 1994) reciprocally linked and both central to the classroom agenda. This suite of tools includes a web-based collaborative platform for extending and deepening classroom discourse, which affords scaffolds to support written discourse, and a set of analytical measures that participants and classroom-based communities can apply to monitor their own knowledge building activity.

SAKAI was the learning management system (LMS) adopted by the BCT community to help instructors, researchers, and students create websites for collaboration. Since September 2009, a space for the BCT community was created and we have used it (a) to cultivate the community of practice (Wenger, 1998) for BCT teachers and educational leaders (i.e., shared vision and shared repertoire); (b) to provide an online space where BCT teachers and educational leaders can share experiences, thoughts, knowledge, and resources in relation to their professional practice; (c) to allow BCT teachers and educational leaders to engage in open and sustainable communication and collaboration; and hence (d) to foster a culture of sharing and create shared repertoire within the BCT community. Each Cycle group organized various collaborative classroom activities with ICT tools (e.g., WIKI, Blog, VoiceThread, Google Docs, Audacity, and Live Classroom) depending on the needs and the levels of skills of the participating teachers.

Activity Systems

The two initiatives were themselves nested in the context of an ongoing reform initiated ten years ago, spanning the entire K-12 curriculum, and influenced by social-constructivist conceptual and pedagogical approaches. They were conceived as ways of implementing the reform through onsite/online collaborative design. The partnership structure, including the Ministry's involvement, created a change context: all actors, from teacher to superintendent, as well as parents and community organizations, were informed and involved in the initiative. At the intervention level, the following design principles guided actors within the activity systems:

- **Ease of access.** Networked computers and online resources and tools need to be accessible without loosing much time once basic technical skills are mastered.
- **Multi-modal social interactions.** Educators and learners meet face-to-face. Teacher educators and teachers also meet online, pursuing locally grounded activities or geographically extended activities.
- **Active collaborative learning.** Teachers' networked classrooms foster peer interaction in the pursuit of projects and inquiries, rather than individual learning where students/pupils work on computers learning rote knowledge and specific skills.
- **Collaborative knowledge building.** Meaning is negotiated and collective ways of understanding complex problems emerge and evolve.

The reflective practitioner approach (Schön, 1983) was endemic to the way professional development.was conceived by the research-intervention team. For example, baseline data was provided to teachers regarding their students' use of Knowledge Forum (notes written and read, length of threads, scaffolds used, etc.), and specific qualitative analyses were conducted (e.g., questions asked by students, levels of explanation reached). At the end of each cycle of activity, new intervention-oriented questions were identified with participating teachers and a new iteration was launched.

At the research level, ethnographic data regarding university-school partnership was gathered through participant observation. Questionnaire and interview data was analyzed along with online verbal and written discourse to study onsite/online interactions that characterized professional development within each activity system. Applying Engeström's (1987) framework, sociocultural accounts were developed to identify the characteristics of the interactions taking place within and between constituents (or sub-systems): the university-school partnership, the classroom community, and the online collaborative space.

Results

Interactions within the University-school Partnership

Sustained Interaction

Interaction is sustained as steering committees, coordinating body (CEFRIO) and research teams interact with school district and school leaders and personnel on a regular basis (new role and routine).

Inclusion

Participants are prompted to develop images of their networked collaborative learning environment – as the object-outcome of the design activity. Depending on the dynamics at each site (school school district, local community), there are classroom students, school and school district personnel, local community members, parents and social leaders who submit ideas.

Negotiated Goals

The research-intervention team values the use of online collaborative tools for deepening understanding of authentic problems. Participating teachers are primarily engaged in making sense of new technology use in the classroom. Through onsite/online interaction with members of their local school district and of the research-intervention team, object-outcomes emerge.

Learning by Design

Participating teachers cooperate and collaborate with one another onsite/online to plan and conduct specific learning activities and projects for and with their students (new roles and routines). Design does not depend only on technology as some teachers with lesser connectivity engage school learners in collaborative inquiry projects of a greater complexity than some with better connectivity. Teachers' online classroom activities (new artifacts) serve as exemplars to incoming teachers seeking ways to use online tools in their own classroom.

Interaction within and beyond the Networked Classroom Community

Rotation

Learners from one grade may be involved in individual tasks while others work at the computer searching for information or interacting with peers at distance.

Cooperation

Cooperative learning practices in place are extended online: one student helping another with math problems, students making short presentations, small groups presenting the outcomes of their projects to a remote classroom (new artifacts, roles and routines).

Collaborative Inquiry

The learning community model is new to almost all teachers. It means engaging students in collaborative inquiry (new roles and routines). The online component tends to involve students from two different classrooms working together in teams. The underlying knowledge building principles did not get fully understood by a majority of teachers but a few of them are largely applied: real ideas/authentic problems, diversity of ideas, constructive use of authoritative sources, and rise above.

Interaction within the Online Collaborative Space

Joint Design Space

Online conversations unfold. For instance, there is always someone from the research-intervention team available on the videoconferencing system (iVisit), for providing technical and pedagogical support and guidance (new role, new routine).

Accumulation of Artifacts

As the repertoire of activities develops, communities' artifacts also develop. Experienced teachers have evidence to show when incoming teachers express doubts about the students' overall capacity to engage in inquiry with others at a distance.

Boundary Spanning

Incoming participants (substitute teachers, beginning teachers, experienced teachers) are enculturated into the emerging networked school cultures: teachers teaching other teachers about engaging students in authentic questioning and collaborative inquiry across classrooms; school learners describing to substitute teachers what they had just done online with their regular teacher (new roles and routines). Teacher educators and teachers also push the boundaries of their own individual teaching and that of their collaborators (new roles and routines) as they encounter real and authentic new problems (technological, pedagogical) in their practices of use.

Discussion

Collaborative design (CODE) takes shape as interaction intensifies and endures between research and intervention in real contexts. Putnam and Borko (2000) called on teacher educators for approaching teacher professional development from the teachings of the new learning sciences. CODE has been in the making for years. The two initiatives just described contributed to its articulation: a university-school partnership, a networked classroom communities, and an online collaborative space. Within each sub-system, characteristics of interaction emerged: 1) the university-school partnership's interactions demonstrate sustainability, inclusion, and shared goals; 2) the networked classroom community's interactions occur on a rotating basis and manifest cooperation and/or collaborative inquiry/knowledge building; 3) the online collaborative space is a space for joint design, accumulation of artifacts, and boundary spanning. We suggest that teacher participation in the design of an online collaborative space is critical to the design of the networked classroom community. Strong university-school partnerships provide the necessary anchorage.

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