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University–school collaboration based on complementary needs

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Abstract This paper discusses school development as collaboration between local schools and universities based on complementary needs. I examine a 10 year case study of a long-term relationship between an elementary school and a university in a town in Sweden. The relationship is jointly constructed and mediated by local, national, and international projects. Such jointly constructed and shared projects represent innovations of both the school's and the university's pedagogical practices. The significant actors in the collaborative relationship have been teachers, undergraduate and graduate students, school pupils, and researchers. The collaboration, which still exists, started in 1996 and has experienced stages of varying intensity and scope conceived metaphorically as a thin string. Analysis of the case and collaborative process suggests an answer to the question: Why does this collaboration exist and what makes it sustainable? This case suggests that the collaborative projects provide solutions to problems intrinsic to the respective educational institutions.

Keywords Activity theory · Complementary needs · School collaboration · School development · The Fifth Dimension

Introduction

School change and development is difficult to achieve, and reform is not always the solution (Hargreaves and Fink 2006; Sarason 2002; Tyack and Cuban 1995). In this paper I introduce an approach to school development that entails collaboration between local schools and universities based on complementary needs. When researchers take part in local collaborative efforts, such as action-research projects, the university's role is often seen as facilitator of change in the local school, i.e., the relationship is unidirectional. In this analysis, I also consider the role that the local school can play in the work and

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able to deal with this situation; they have access to and construct 'tools' to work with it. However, most teachers do not have these tools and instead dread changing and adjusting their teaching to novel needs. In fear of chaos, they keep to their old methods which they believe will help them remain in control.

Similar tensions can be found in the university activity. The director of the Learning Lab described a tension in the university world between those who emphasize teaching and those who emphasize learning. Proponents of re-establishing the former quality of university education and teaching complain that today's students are ill prepared for university studies. They take, as the director put it, "an elitist approach" and oppose a diversified student population. Their solution is to grant access to the very best students only. Those who stress the learning approach accept the fact that information is widely distributed and accessible in today's society. The university can no longer claim a monopoly over knowledge. The instructors' expertise, according to the director, rather than focusing solely on subject matter must shift so that it focuses on expertise in facilitating learning. According to the director, university teachers who realize this use the modern techniques to enhance their students' learning instead of fighting a war that cannot be won.

The changing conditions for teaching and the contradictions this implies might be an indication of a changing object. Students do not behave as they used to, which causes tension. I interpret the statements as expressions of emerging needs requiring new resolutions to the problems schools and teachers face today. There is a need for novel tools, but there is also an emerging need for a reconceptualization of the object of schooling, which would imply radical changes on an activity level. This is true both for the school and the university. The two institutions struggle with their legitimacy and identity. It is in this context that we should understand our relationship and collaboration mediated by diverse projects framed by the 5D.

The 5D as a bridging artifact (Nilsson 2003) or a boundary zone (Konkola et al. 2007) for collaboration indicates that joint use of the 5D does facilitate the development of new responses to emerging needs. Through the collaboration, both institutions' needs are, at least partly, satisfied. As the BTH professor puts it "through the collaboration we obtain access to a known research environment where students and instructors can do new things [...] it is obvious that the school gains from this, they get new blood and they get help to think about their activity."

Recent signs of the need for resolutions are the joint effort to create a pedagogical specialization focused on media, and Carina's new appointment. The collaboration is undergoing a transformation from being voluntary and based on particular individuals to being institutionalized. The superintendent said that "in order for school development to happen, it can not only depend on external resources but has to be prioritized and financed by the school institution." And further, "this kind of collaboration, I believe, would fertilize your activity and our activity." These statements can be interpreted as reflective responses to needs inherent in the respective institutions.

Even though changes on an activity level at the school and the university are incidental rather than substantial, changes on an action level have been obvious. Change and development seem to happen due to the joint production of novel mediating artifacts. From the start the university–school collaboration implied the construction of new tools, which were understood to be tangible and intellectual artifacts as well as methods and activities. As educational researchers we aspire to understand processes of learning and change and how they are mediated, as well as how they contribute to development. Thus, a way to look at educational research is as a 'tool building' process.

Theory and key concepts

In CHAT, an activity or activity system (Engeström 1987) is the unit of analysis. Every activity has an object which motivates actions. The object of an activity is collectively constructed when a need becomes 'objectified', that is, when it becomes materialized in a collective motive (Leont'ev 1978, 1981). The object then takes on the role of motivating actions and creating new needs.

> A need of some sort is a prerequisite of any activity. In itself a need cannot, however, determine the concrete direction of activity. A need gets its definiteness only in the object of the activity; it has as it were to find itself in it. In so far as a need finds its definiteness in an object (becomes 'objectified' in it), the object becomes the motive of the activity, and that which stimulates it. (1981, p. 239)

Thus, needs are transformed in object oriented collective activity and activities are no longer created and transformed based on entirely individual and biological needs. The implication is that, in an activity system, participants' actions are framed and constrained by the collective object, which responds to needs inherent to the activity.

Actions, in turn, are mediated by tools (Vygotsky 1978), which are simultaneously conceptual and material. As human beings we act on and make sense of the world through mediating artifacts or tools. At the same time that activity systems are durable and long-lasting they are dynamic and changeable due to systemic contradictions. Thus, in activity theory, change and development are understood as resolutions of dialectical tensions and movements in activity systems, which in turn are connected to needs requiring responses (Engeström 1987).

The case narrative

The key feature of the 10-year, school and university collaboration in Ronneby has been joint endeavors with mutual gain for the participants. As university researchers, we have benefited from access to the school for study and collection of empirical data. Our university students have been able to do field work as a complement to their coursework. The teachers and the pupils in the school have benefited from interactions with researchers and university students both in terms of temporary additional labor and intellectual stimulation.

The collaboration started in 1996 and continues. It has gone through stages that vary in intensity and scope. This relationship may be described metaphorically as a thin string—occasionally almost invisible—yet strong enough to sustain long-lasting collaboration aimed at educational innovation.

Figure 1 depicts the trajectory of the collaboration. The upper portion of the figure focuses on events from the university's perspective. The lower portion is from the elementary school's perspective. The missing years in the figure represent times when 'the string is thin', whereas the years included represent periods when 'the string is thick'.

The school under study is a public school in a small town in Sweden. It was founded in 1981 and has six classes, one each from first to sixth grade. BTH is a small public university specializing in information technology. My collaboration with the school started in 1996, but BTH's involvement started a year earlier with New Forms, a project aimed at school development through implementation of ICT. Through New Forms, teachers were offered IT-courses focusing on such subjects as how to use digital cameras and scanners, or what to learn from computer games. New Forms was co-directed by BTH and the town of

Ronneby and financed by the KK-foundation, (a national research institute). Support from the New Forms project resulted in the school becoming computerized: an intranet was implemented with a relatively large number of computers. Thus, the school became a pioneer in Sweden's 1990s attempt to increase the role of information and communication technologies in education.

As an undergraduate in 1996, I initiated contact with the elementary school's principal. I wanted to conduct a study of their innovative use of ICT. The study resulted in a bachelor's thesis in 1996 and a master's thesis in 1998. In 1997, I discussed with the principal the possibility of starting an activity called the Fifth Dimension (5D). The 5D is a research and learning model based on cultural historical theories of learning (Cole and Distributed Literacy Consortium 2006). Characteristic features of the 5D are a rich variety of diverse artifacts, particularly ICT-based artifacts, and the participation of undergraduate students as guiding peers with participating children and youths. The 5D was introduced in the school and started up in 1998 as an after-school program. The first attempt with the 5D was successful and resulted in moving the activity into school hours. This took place as part of a school reform which began in the fall of 1998. The reform was nationwide and provided for variations in implementation. I studied the local reform effort in the school as a participant-observer. The effort lasted two years. The study was the basis for my PhD thesis (Nilsson 2003).

The 5D ran twice a week for eighteen months under the auspices of the reform effort. It was offered to pupils in kindergarten and first and second grade. Students from a nearby high school took part, an approach that differs from the traditional 5D model, where undergraduates interact with the pupils.

In 2000, the 5D research team at BTH, in collaboration with a Danish team and a Spanish team, received a 3-year grant from the European Commission, supporting further development of the 5D work. The grant made possible collaborative activities in which the school became a significant player. For example, the school took part in a collaboration with a Danish school based on Active Worlds, a 3D virtual meeting space for construction of virtual worlds and a Weblog (Jensen et al. 2005). Other activities included newspaper production on the Internet, a Lego Mindstorms (Papert 1994) activity run by undergraduates, and an experiment with intergenerational peer-guidance, where fifth graders facilitated second graders while being mentored by undergraduates. Finally, digital storytelling (Lambert 2002) was introduced as a major activity within the 5D. Over the years, a significant participant has been Carina, a second language teacher and the ICT-pedagogue at the school. The grant permitted Carina to be hired by BTH at 50% time.

In 2002, the funds for New Forms terminated. Consequently, the educational activities that aided teachers with ICT-tools ended, which in turn ended technology development, or as the superintendent explained it, "Everything fell like a stone" (interview 06/19/07).

The ongoing EU-project, however, was productive from the perspective of the university; when the EU grant ended in 2003, the outcome of the project was a large number of progress reports, student reports, conference papers, books and theses. The ending of the EU grant resulted in a break in the joint activities between BTH and the school. During this period we sustained our collaboration through joint seminars and renewed efforts to find ways to continue our collaboration. Eventually, digital storytelling mediated new paths.

In the spring of 2006, BTH and two other universities in the region, together with their local towns' school authorities, applied for a regional grant (Kronan association) that proposed the 'Southeast collaboration between towns and universities on digital learning environments.' The grant was awarded and lasted for a year. One goal of the grant was to run a university course for teachers in digital storytelling. The course was popular and most of the participating teachers worked with digital storytelling in their schools and classrooms during and after taking the class.

Sonja, a fourth-to-sixth grade teacher taking the class designed a curriculum unit aimed at enhancing students' narrative forms of knowledge (Bruner 1985) and multimodal language (Kress and van Leeuwen 2001). Her idea has become the basis for a (pending) research grant, "Creative Learning Trough Digital Storytelling" from the Swedish Research Council. Sonja, Carina and a teacher from a nearby town (who also was a student in the class) with my support, have formed a digital storytelling tour group. School authorities in towns and Schools of Education in the region have invited this group to inform teachers and student teachers about digital storytelling. I have collaborated in this activity.

When the Kronan grant ended in the spring of 2007, the superintendent of schools made Carina a full time ICT-pedagogue with the goal of facilitating digital storytelling in the schools of Ronneby and, more generally, to facilitate major developmental efforts in the schools. One of her main duties, according to the superintendent was to "stay in close contact with BTH." He wanted her to be a 'bridge' between BTH and the Ronneby schools. Another outcome of the grant is a joint media pedagogical program for teachers. The aim of the program is to help teachers learn to work with, and consider, youth culture and media as resources rather than as obstacles.

Analysis

The case narrative reveals many peoples' joint, yet not always coordinated, efforts to create innovative and sound educational practices. A great deal of time and effort is volunteered and times of discouragement are overcome by a strong wish to sustain the relationship. Why?

Interviews with different key collaborators demonstrate a wish to change present school practices (university and public school), though focused on slightly different aspects. The former principal of the school (who now is school superintendent in a nearby city) said that her interest was to promote ICT in schools (interview 07/30/07). Carina said she became part of the 5D because of curiosity and because she found it challenging and interesting enough to continue (interview 07/06/07). The director of Learning Lab believed in ICT as a tool for teachers and students to communicate with the 'world' or as he put it "get the school to get out from the classroom" (interview 08/13/08). A professor at BTH explained his wish to create a learning practice at the university, which he called 'learning by research' which would "challenge the students and take them seriously" (interview 08/24/07).

In spite of all these efforts, the objects and the institutional structures in the respective educational institutions have only been altered in limited ways. I want to stress, however, that there are connections between the diverse motives of the collaborators as well as contradictions in the respective educational institutions. The school superintendent of Ronneby discussed his rationale for supporting the collaboration in terms of a tension, which is present in the lives of students and teachers. "Children do not behave anymore as they used to 15, 20, and 30 years ago." The school, he claimed, is exposed to an enormous alternative supply of information from television, video, music and the Internet. Though he believed that the media and pop culture can definitely be perceived as tools for learning, he also had concerns. The children, as he said, live in the mass media world and the teachers still live in an atomistic world of mathematics, geography, history, etc., and these two worlds do not communicate very well. Good teachers, according to the superintendent, are

development of the university. This case shows that it is possible to build a relationship of mutual exchange of services that impels change in the respective institutional activities in a school and a university. Rather than unidirectionality, the point of departure in this paper is reciprocity.

Over more than 10 years, my colleagues and I at Blekinge Institute of Technology (BTH) have collaborated with a local school and school authorities in the town of Ronneby with mutual gain for the participants. The aim of the analysis is to understand why this collaboration exists and what makes it sustainable. I first describe the methodological approach and methods used, leaning on the concepts of ethnographical case narrative (Zeller 1995) and archeological ethnography (Engeström et al. 2007). Second, I describe activity theory and the concept of need (Leont'ev 1978, 1981). Third, I describe the case and how it has unfolded during the ten year long collaboration. Fourth, I analyze the case using cultural historical activity theory (CHAT).

Methods and data

This study is an ethnographical case narrative (Zeller 1995). In order to produce and present the case narrative I have conducted "archeological ethnography" (Engeström et al. 2007), that is, I have collected, examined and reread documents such as papers, reports and theses produced during the 10 years as well as e-mail, minutes, field notes, project plans, project reports, syllabi, interviews, and student reports. The exercise resulted in the case narrative and the Fig. 1, which shows the richness and intensity of the collaboration. I have also interviewed key collaborators, among them a teacher, a former principal at the school (now the school superintendent in a nearby city), the superintendent of Ronneby's schools, the director of Learning Lab (an IT training and development unit at BTH) and a fellow professor. Each interview lasted between 1 and 2.5 hours and focused on the following questions: What is school development? What are the main issues in schools today—what are schools and teachers struggling with? Why promote collaboration between the university and local schools? The interviews are key to the analysis.

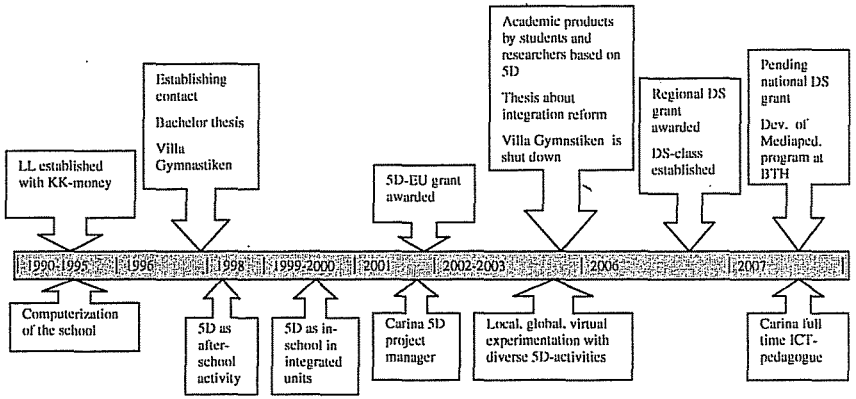

Fig. 1 Long-term university–school collaboration

Designed to be rich in communication and with its mix of play and learning, the 5D implied and suggested novel pedagogical approaches. So does the present work with digital storytelling. Carina, one of the interviewed teachers, who has been involved in the 5D since 1999, describes how she changed her attitude toward teaching and her pupils from 'playing school' to 'for real' in the process of becoming a legitimate participant (Lave and Wenger 1991) of the 5D community. To her as a teacher, 'playing school' means showing or informing the pupil about something, which the pupil later is able to repeat. 'For real' occurs when her interactions with her students become much more natural and closer, "more equal somehow, supportive", as she said. Nowadays, teaching for Carina is to "do things together with my students." The 5D community offered novel "interpretations of contexts and actions within them" as Edwards (2000, p. 200) puts it.

The school–university collaboration, which has created access to one another's practices, resources and competencies, has generated and continues to generate opportunities for innovative educational practices in both institutions as a productive approach to resolving the needs of both institutions. Therefore, I suggest the concept of *complementary needs* to conceptualize school development in the 21st Century. I locate the concept in what is called the third generation of activity theory (c.f. Kerosuo and Engeström 2003) which deals with networks of interacting activity systems.

Conclusion

In this analysis, I have discussed reciprocal development as collaboration between a local school and a university based on complementary needs. I have metaphorically described the relationship as a thin string that is strong enough to survive changes in intensity in the relationship. I have argued that the reason the relationship is sustained can be found in the needs of the respective educational institutions, which are expressed as dilemmas and problems that both schools and universities face today. The needs are expressed through the collaborators' innovative interactions. Schools and universities need to develop innovative pedagogical practices in order to be legitimate educators in post-modern society (c.f Barnett 2005; Lemke 2002). This case study has shown that collaboration between educational institutions constitutes a potential response to this need. Thus, a way to approach school development is as a reciprocal relationship between universities and local schools where collaborative activities and access to each others' practices enable reciprocal change.

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