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SHARED OBJECT AND STAKEHOLDERSHIP IN TEACHER-RESEARCHER EXPANSIVE LEARNING ACTIVITY

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Cultural historical activity theory (CHAT) perspectives are used to shed light on an extended teacher-researcher collaboration, at a Grade 4-6 school in Sweden. Beginning with participant observation and emerging forms of engagement like co-authorship of research reports, the collaboration is understood as expansive learning activity. Treating the practices of teaching and research as distinct yet collaborating activity systems within this, provides an opportunity to analyse the manner in which joint conduct of project related instructional interventions became shared object. This also enabled teacher and researcher to become active stakeholders in each other's practice. Dialectical realisation of stakeholdership and shared object led to reconceptualisation and transformation of the very horizons of our work.

INTRODUCTION

In his plenary address at the 35th annual PME conference, Konrad Krainer (2011) sought for teachers to become stakeholders in mathematics education research and researchers to become stakeholders in classroom practices, not only to allow for mutual trust but for respective knowledge bases to overlap in reflective rationality. As teacher and researcher, in this paper we shed light on one such instance of stakeholdership, elaborated elsewhere as a case of expansive learning activity (Gade, 2015). Such activity elaborated upon in following sections, exemplifies our collaboration, first with a six month pilot at a Grade Six classroom, followed by year-long project related work to promote communication in mathematics at Grade Four. During this time, our initial engagement as teacher and researcher observer gave way to analysis of intervention related data as well as co-authorship in scientific reporting, such as this research report. Enabling us to build trust and share knowledge over time (Krainer, 2011), such engagement exemplifies the motive, purpose or object of what Engeström (2001) identifies as expansive learning activity:

The object of expansive learning activity is the entire activity system in which the learners are engaged. Expansive learning activity produces culturally new patterns of activity. Expansive learning at work produces new forms of work activity. (p. 139)

While project related interventions formed the central backbone of our collaboration, in this paper we step back and reflect on the evolving nature of the object we shared in our extended collaboration. Such an eventuality enabled us to work across school and university confines, our respective practices of teaching and research and become stakeholders. In what manner did the shared object in teacher-researcher expansive learning activity, allow for stakeholdership in teacher-researcher collaboration?
Prior research points to poorly understood relationships between practices of teaching and research. Writing to the theory-practice issue which remains problematic to this day, Elliott (1991) speaks from action research traditions and points out that teachers feel threatened by theory, produced by outsiders who claim to be experts. Such theory, couched in generalised terms, denies teachers their everyday experiences. From teacher education research, Cochran-Smith (2005) has more recently argued in favour of building a theory for social change by university-based researchers drawing on educational scholarship, while collaborating with school-based teachers who are activists. Within mathematics education research, Schoenfeld (2013) has spoken to the paucity of studies which detail classroom ecologies, while also addressing major problems of practice. Laying down principles of action that could ensure success in mathematics for all, Leinwand, Brahier and Huinker (2014) articulate professionalism of teachers in terms of their ability to enter into partnerships with knowledgeable others, so as to question the existing status quo. Speaking from lesson study research Corcoran (2011) shows how lesson plans say, could be viewed as boundary objects in communities of practice in which teachers needed to constantly "become". Engaging with these issues, in this paper we treat our individual practices of teaching and research as two separate yet collaborating activity systems, with the shared object of each being our joint conduct of project related instructional interventions.

THEORETICAL UNDERPINNINGS

In his version of cultural-historical activity theory, also known as CHAT, Engeström (2001) extends the Vygotskian premise that the human mind develops with meaning mediated by cultural artifacts acting as tools or instruments. To overcome the divide between the Cartesian individual and prevalent societal structures, Engeström forwards a triangular activity system as analytical unit, which incorporates a selection of societal elements. While other scholars have sought for explicit inclusion of emotion while studying human development (Roth & Lee, 2007), and dwelt insightfully on its transformative aspects (Stetsenko, 2008), in this paper we take Engeström’s activity system as point of departure. We analyse teacher-researcher collaboration in terms of two separate yet collaborating practices of teaching and research, which we consider as activity systems, whose realisation over time led to expansive learning activity (Gade, 2015). In understanding the shared object of such expansive activity, one which led to stakeholdership in our collaboration, we draw upon five principles laid down by Engeström (2001) which underpin his analytical framework: (1) that an activity system in its network of relations with other activity systems, be treated as unit of analysis; (2) that activity systems be conceived as multi-voiced, incorporating views, traditions and interests of the wider community; (3) that development of activity systems be studied historically, over lengthy periods of time; (4) that the role of contradictions and structural tensions between activity systems, be studied as the source of change and transformation and (5) that the object and motive of expansive learning, with their qualitative transformations, be understood in terms of how radically new horizons and modes of activity are reconceptualised.
In line with Engeström we represent the practice of teaching and research as two triangular activity systems, as in Figure 1. This schematic also depicts collaborative activity between Lotta (as Charlotta is known) and Sharada with respect to our joint conduct of instructional interventions to meet with Lotta's project related aims. The evolving nature of either activity system over time, led us to share project related aims, reconceptualise the very horizons of teacher-researcher collaboration and allowed us to become stakeholders in each other's practice.

Following non-dualist perspectives of CHAT, we conceive the practices of teaching and research as a network of relations, in both independent and collaborative ways. In line with this view, Lotta was subject in her own activity system for which she utilised various physical and intellectual artifacts to mediate teaching within her classroom (e.g. the textbook, her pedagogy). Directed primarily at students her activity system drew on her practical action or praxis and her practical wisdom or phronesis (Gade, 2014). Sharada likewise was subject in her own activity system, for which she deployed artifacts in educational research (e.g. academic literature, analytical perspectives). Directed at both Lotta and her students, her activity drew on conducting disciplined inquiry within research. In Table 1 below we outline both independent and commonly shared aspects of each activity system.

<table>
<thead>
<tr>
<th>Activity system</th>
<th>Practice of teaching</th>
<th>Practice of research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruments</td>
<td>Of classroom</td>
<td>Of research</td>
</tr>
<tr>
<td>Subject</td>
<td>Teacher</td>
<td>Researcher</td>
</tr>
<tr>
<td>Object</td>
<td>Conduct of project related instructional interventions</td>
<td></td>
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<tr>
<td>Outcome</td>
<td>Sharing of object and stakeholdership</td>
<td></td>
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<tr>
<td>Rules</td>
<td>Of praxis, phronesis</td>
<td>Of disciplined inquiry</td>
</tr>
<tr>
<td>Community</td>
<td>School students</td>
<td>Students and their teacher</td>
</tr>
<tr>
<td>Division of labour</td>
<td>Primarily of teaching</td>
<td>Primarily of research</td>
</tr>
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Table 1: Comparison of the practices of teaching and research, conceived as activity systems, in the study of teacher-researcher collaboration
CHAT perspectives conceive the purpose or object of any activity system to be their motive as well (Leont'ev, 1978). Our conduct of instructional interventions was both object and motive for each of our activity systems, guided by Engeström's (2001) five principles of expansive learning activity. In deploying two activity systems in our analysis, we investigated the nature of relations which constituted our ongoing functioning, besides the wider network of relations that we were able to enter into (principle 1). These activity systems were far from water-tight and responded to inputs received by way of opinions and interests of both Lotta and her students (principle 2). With both activity systems being multivoiced, we were able to take on each other's role while ensuring democratic participation for all. Achieving multi-voicedness in our study enables this paper to shed light on how our activity systems evolved gradually over time (principle 3) and became expansive learning activity (Gade, 2015). Such conduct provides our study detailed understanding of classroom ecologies (Schoenfeld, 2013) and knowledgeable partnerships which have potential to question the existing status quo (Leinwand et al., 2014).

Rather than personally experienced conflicts, CHAT perspectives treat contradictions as tensions between activity systems and the drivers of societal change and human development (principle 4). For example, in the first of three instructional interventions, Sharada's presence as researcher in Lotta's classroom led us to rectify the faulty use of the mathematical '=' sign by Lotta's students (Gade, 2012). Towards the end of our collaborative work, Lotta likened her experience to a professional development course conducted in her classroom, in contrast to her earlier experience with researchers visiting her classroom as spectators, providing her teaching with little insightful feedback. Through promoting students' development in line with CHAT, our interventions were able to overcome the realisation of a generalised manner of theory which denied teachers their everyday experiences (Elliott, 1991). Our interventions drew on educational scholarship and contributed to wider social change (Cochran-Smith, 2005). Our conduct of project related interventions can also be seen as responding to tensions faced in Swedish society in relation to falling educational standards as reported in International tests, since Lotta's project was one of many funded nationwide by The Swedish National Agency for Education. These societal events provided fillip to the teacher-researcher collaboration and enabled us to respond to local needs in Lotta's classroom, wherein we reconceptualised prevalent pre-existing norms and relations (principle 5). Our need to report on our project related work then led us to enter into and utilise new forms of engagement and work, which characterised our expansive learning activity (Engeström, 2001). Born from our motives within teaching and research, such activity resulted in our crossing the institutional confines of school and university. The newer modes of engagement which we realised were neither clear to us prior to entering into collaboration, nor predetermined in any manner. Our realisation of expansive learning activity was an open ended exercise which drew on our joint conduct of project related instructional interventions, which became the object, purpose and motive of our extended teacher-researcher collaboration (Leont'ev, 1978).
METHODOLOGY AND METHODS

Our collaboration extended across a pilot conducted by Sharada in the first half of 2009 in Lotta's classroom and a year-long project during 2009-2010 for which Lotta received funding (Dnr 2009:406). We consider the CHAT methodology that underpinned our study to be tool-and-result (Newman & Holzman, 1997). Unlike designated tools used for obtaining specific outcomes, in this approach a researcher accompanies any subject's use of tools in activity to draw inferences on the human development possible. Recognised as developmental education (van Oers, 2009), classroom interventions in line with this methodology, include teachers and also peg instruction to lead, advance and proceed ahead of students' development within instruction. Conducting our instructional interventions in line with this approach, we drew also on the CHAT theory of explicit mediation wherein students' participation in activity was not invisible, internal and implicit; but spoken, audible, visible and made explicit within instructional activity (Wertsch, 2007). Detailed at length elsewhere, these included Lotta's students overcoming their faulty use of the mathematical '=' sign (Gade, 2012), their posing of mathematical problems by making use of textbook vocabulary (Gade & Blomqvist, 2015a), and their use of talk to explore their current understanding of everyday measures, leading also to articulating their nascent and emerging theories of measure (Gade & Blomqvist, 2015b).

Each of our interventions, aimed at promoting students' communication as they learnt mathematics, was conducted at timely breaks within Lotta's teaching to limit their strain on her curricular routines. They were also conducted with students grouped in pairs or dyads. We collected empirical data in the form of students' inscriptions, Sharada's field notes of classroom proceedings and audio recordings of Lotta's whole classroom instruction. It was thus possible for us to carry out multiples levels of triangulation between our three data sources, as well as draw on our experiences of conducting the three interventions as teacher and researcher. This approach informed our analysis and prepared the ground for our scientific reporting of each intervention. The historical progression of such manner of collaboration provided the ground for instructional interventions to become the shared object of both of our activity systems, as further outlined below. In doing so and in line with CHAT, rather than limiting ourselves to methodological individualism, we understood the human mind as actively taking part in ongoing events and practices, geared towards realising specific end products, within instruction, in a non-dualistic manner.

SHARED OBJECT IN EXPANSIVE LEARNING ACTIVITY

To outline the manner in which our conduct of instructional interventions became the shared object of teaching and research as activity systems, we trace our teacher-researcher collaboration from inception beginning with Sharada's pilot study in Lotta's Grade Six. In this study Sharada invested in one-to-one relationships with Lotta's students, in order to examine students' narratives as they went about learning mathematics. Upon observing satisfactory realisation of these within her classroom,
Lotta began sending students who had completed their assigned classroom tasks, to work at puzzles which Sharada had at hand. Soon after, Lotta requested Sharada to work with a student who was weak, with the consent of the student's mother. The history of these events exemplifies the manner in which we built trust, the first step in the expansive learning activity. The manner in which Lotta acted on this trust leads us to the second step, exemplified by her beginning to take Sharada's presence and input for granted while applying for project funding whose aims were those she thought appropriate as a teacher. We argue these actions mark the nascent beginnings of what became our shared object of collaboration with Lotta's Grade Four students in the year ahead. This sharing took root in yet another pilot in which Lotta conducted an intervention based on the CHAT theory of explicit mediation (Wertsch, 2007). Such conduct had two benefits. First, Sharada was able to study the implementation of CHAT theory within Lotta's instruction. Second, Lotta sought and read the research literature on which the pilot was designed and implemented. Such a theory/practice CHAT approach became our bedrock for conducting further interventions.

Singled out as a contradiction earlier on, Lotta's seeking Sharada's expertise to rectify her students faulty use of the '=' sign, made our collaboration gain agency. In line with action research perspectives, we drew upon our reflexivity to design, conduct and sustain a four-stage action cycle in which Lotta's students offered mathematically appropriate statements (Gade, 2012). Aiming for students to pose mathematical problems as well as reflect on written language, we next had them use vocabulary we chose at random from their textbook. Lotta participated in pair work, standing in for a student who had swimming lessons, and also conducted blackboard work for students to discuss vocabulary which they thought was utilised within mathematics (Gade & Blomqvist, 2015a). Our final intervention was in Lotta's teaching of the topic of measurement. In line with the project aims, we had students use talk to explore their understanding of everyday measures, articulating their nascent and emerging theories of measure. Even as Lotta conducted this intervention by choosing a pedagogical category she thought was appropriate, it was our joint transcription of Sharada's audio-recording and its subsequent analysis which lent itself to our reporting of the landscape study (Gade & Blomqvist, 2015b). In recognising the greater role Lotta began to take on in the trajectory of research being conducted, we point out that while Lotta was anonymised in the first reporting, by the second and third Lotta having contributed to analysis and interpretation of data, was co-author of its content.

From initial steps of our building mutual trust, the process we outline here sheds light on how our teacher-researcher collaboration became expansive learning activity. In line with Engeström (2001), the project-wide activity of teacher-researcher collaboration was motivated by our conduct of project-related instructional interventions. Towards the same we utilised new patterns and forms of work, from building trust, interpreting data, to co-authorship. The conduct of project related instructional interventions was also the object to which teaching and research as activity systems were subordinated (Leont'ev, 1978).
TEACHER-RESEARCHER STAKEHOLDERSHIP

We conclude by juxtaposing two aspects which inform the notion of stakeholdership which Krainer (2011) sought, so that our knowledge base as teacher and researcher could engage in reflective rationality. The first is, wider research in education which seeks it's realisation in instructional practices. The second is, CHAT research which allows for its realisation by attending to human development. The need for teachers and researchers to realise stakeholdership is informed from many fronts - to meet demands that teachers have in their everyday (Elliott, 1991), to build theory for social change (Cochran-Smith, 2005), to grasp classroom ecologies (Schoenfeld, 2013), and to question prevailing status quo (Leinwand et al., 2014). In realising stakeholdership in our study and speaking to how these objectives have potential to be met via CHAT perspectives, we point to it's non-dualistic approach which seeks the study of the human mind as culturally and historically situated, distributed or networked in wider society. This premise led to our treating the practices of teaching and research as interacting activity systems (Engeström, 2001), whose motive and purpose lay in the kind of object that was being immediately pursued (Leont'ev, 1978). This involved adopting a tool-and-result approach in our extended conduct of collaborative research (Newman & Holzman, 1997), wherein we conceived teachers as partners and pegged instruction to advance students' development (van Oers, 2009). Such a stance leads us to our next point, that a focus on human development entails that researchers work with various stakeholders in concrete instructional realities and guide the progression of outcomes which may not be envisaged by anyone beforehand. In such conduct the growth of the shared object of the activity systems which collaborate, has potential to overcome contradictions and bring about instructional change.

Finally, we consider our collaboration to exemplify how instructional interventions became the shared object of teaching and research. We found that our pursuance of this shared object evolved dynamically and resulted in our becoming stakeholders in each other's professional practice. Dialectical realisation of both these aspects enabled us to reconceptualise our existing relationships and radically transform the status quo, besides the historical reality and very horizons of our work.

References


