

Situating relational ontology and transformative activist stance within the ‘everyday’ practice of coteaching and cogenerative dialogue

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Abstract This paper attempts to advance the thinking in Stetsenko’s paper by situating the concepts of relational ontology and transformative activist stance in the context of coteaching and cogenerative dialogue. In so doing, we hope to make Stetsenko’s ideas more operational in terms of access and application by researchers, teachers, policy makers and other stakeholders in education. Stetsenko argues that moving from relational ontology to a transformative activist stance can be considered as moving from participation to contribution. When this model was applied to coteaching and cogenerative dialogue, it was apparent that the coteaching and cogenerative dialogue moved further, from contribution to shared contribution, adding even greater potential for transformation. The paper also discusses the use of cultural historical activity theory in articulating the relationships, dynamics and interpretations of coteaching and cogenerative dialogue in relation to the wider context of their application.

Keywords Coteaching · Cogenerative dialogue · Sociocultural theory · Relational ontology · Transformative activist stance

Introduction

Stesenko’s paper argues for more integration and connectedness of ideas among socio-cultural theorists researching education and psychology. Her position is that positivist, mechanistic approaches to such research are favoured by policy makers, despite their relatively reductionist stance on human nature and development to “processes in the brain rigidly constrained by genetic blueprints passes on to contemporary humans from the dawn of evolution”. Essentially, Stetsenko is arguing against a Cartesian, dualist approach towards a more relational and ultimately a transformational activist stance in conceptualising what it is to be human in terms of development, learning and human nature. Such a

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stance is required on a global scale, she asserts, for the transformation of social institutions, politics and ways of life in the pursuit of social justice.

In elaborating her position, Stetsenko argues that the lack of integration between sociocultural theories may be attributed to the:

general suspicion of grand theories that are thought to represent totalizing discourses that dangerously flatten differences in points of view and positions, impose rigid standards of truth and undermine the politics of diversity

As a result there is a greater interest among sociocultural theorists in the complex and changing identity and subjectivity rather than their focusing on the broader issue of conceptualising human development (learning) and nature. Stetsenko identifies relational ontology (that social and psychological phenomena exist in the interaction, or realm, *between* individuals and their world, as opposed to separate and self-contained within individuals and their world) as the unifying position across a number of sociocultural theories. She reasons, however, that relational ontology is limited in its ability to conceptualise what it is to be human as it does not eliminate a ‘spectator stance’ and that it could reduce the potential for individual agency. Instead she advocates a transformative activist stance with activity of organisms (between each other and the world) as the supreme ontology to unite many frameworks “attuned to the effects of culture, social interaction, embodiment and context already *de facto* converge and can be brought into an even closer rapport”.

In terms of educational research, Stetsenko offers many examples of how relational ontology unites sociocultural theorists and discusses examples of how the work of Dewey, Piaget and Vygotsky support this stance. In terms of a transformational activist stance, however, she differentiates on the one hand between Dewey and Piaget, whose position regarding humans is Darwinian in that humans are responsive to nature and adapt to it; and Vygotsky on the other hand, who held the more Marxist stance, that people collaboratively and continuously *change nature* and develop cultural tools (including language) which are passed on from generation to generation. The importance of learning/teaching for Vygotsky is that this is *how* such cultural tools are acquired.

Stetsenko then introduces the framework of cultural-historical activity theory (CHAT) which merged cultural-historical theory with ideas of activity and is considered to be a unified Vygotsky-Leontiev-Luria school of thought, arising from the ideas of Vygotsky and further expanded by his followers, principally Leontiev and Luria. The profound implications of CHAT in terms of human activity are not, according to Stetsenko, sufficiently discussed due to its underpinning of Marxist ideas which propound a largely economic interpretation of human history and development, and CHAT’s association with “the perils of instrumental control over nature that can only result in destruction”.

Having summarised Stetsenko’s position, this paper seeks to advance her thinking in terms of its accessibility by researchers, teachers, policy makers and other stakeholders in education. Firstly, we identify the *language* of much sociocultural theory as a potential barrier to its uptake by policy makers. Sociocultural language is inherently abstract, whereas that describing the research findings from work using more reductionist, positivist approaches is operational. In an attempt to ‘operationalise’ some of the tenets of relational ontology and the transformative activist stance put forward by Stetsenko we illustrate their use in the everyday context of coteaching and cogenerative dialogue in pre-service teacher education.

Table 1 outlines some aspects of coteaching and cogenerative dialogue which illustrate concepts arising from Stetsenko’s explication of relational ontology, transformative

Table 1 Illustration of sociocultural concepts using coteaching and cogenerative dialogue

Concept	Coteaching	Cogenerative dialogue
Relational ontology	Shared expertise; expanded learning opportunities arise from the interactions between coteachers, between coteachers and students, coteachers and the classroom and between coteachers, the classroom and the students	Discussion of shared experience in which no voice is privileged provides a hitherto unknown 'space' for interactions to occur, which generate suggestions for actions to improve the learning environment
Transformative activist stance	Coteachers act together in the classroom in new ways to transform the learning opportunities for themselves and the students by creating new cultural tools	Suggested strategies are enacted in the classroom to transform the actions of learners and teachers in the classroom
CHAT	Articulates the meaningful and purposeful transformation of learning opportunities through students and teachers working collaboratively via coteaching	Articulation of addressing contradictions and moving towards the development of new actions for learning

activist stance and CHAT. In subsequent sections we expand on this outline and offer possible ways forward from this work.

Relational ontology

When discussing relational ontology in terms of a broad, meta-level approach, Stetsenko claims that:

... development and learning are not seen as products of solitary, self-contained individuals endowed with internal machinery of cognitive skills that only await the right conditions to unfold. Instead, they are seen as existing in the flux of individuals relating to their world, driven by these relations and their unfolding logic, and therefore as not being constrained by rigidly imposed pre-programmed scripts or rules.

This is borne out by coteaching, in which the assumption is that individual teachers share their expertise and thus provide expanded learning opportunities for both themselves and the students in class. The 'expansion' does not come from either coteacher but from the effects of their interactions both with each other and with the students. When we started our research, both teachers and pre-service teachers asked questions about 'how' to co-teach. We had no answers for them but to find ways of working together which might benefit the learning of all—we had no script or rules. We subsequently observed (video recordings and participant observation) ways that coteaching was enacted in the classroom—observations which were used as coteaching 'tools' for subsequent 'generations' of coteachers (Murphy and Beggs 2006a). Coteaching explicitly brings two or more teachers together to increase what they can offer to the children they teach, while providing opportunities to learn more about their own teaching. The coteachers plan, teach and evaluate lessons together and share responsibility for the lesson (Murphy et al. 2004). Roth and Tobin (2005) state that when two (or more) teachers begin working together, and share the full responsibility for planning, teaching, and reflecting on lessons, there is "automatically a greater range of action possibilities" (p. 207) and collective activity enables each individual to develop since "any individual can now enact teaching practices not

available in individual teaching” (Roth and Tobin 2005, p. 207). Our primary (elementary) pre-service teachers, who were science specialists, evidenced greater confidence to teach not only science, but all other subjects on the curriculum (Murphy et al. 2004) as a result of coteaching. In addition, when assessed on solo teaching by non-coteaching supervisors, the group of pre-service teachers who had been involved in coteaching showed greater improvement in their teaching practice scores than those who had not cotaught (Murphy and Beggs 2006b). The class teachers also evidenced significant confidence gains in science teaching as a result of coteaching (Murphy and Beggs 2006b). The children who were cotaught were surveyed and interviewed about school science 6 months after coteaching. They reported significantly higher interest and enjoyment of school science, which could be attributed, in part, to the higher confidence and enjoyment of science teaching by the class teachers as a result of coteaching with a science expert.

In cogenerative dialogue, ‘space’ is created for participants to achieve a greater understanding of events through dialogue about an experience. All groups involved in the experience (for example, a lesson) are represented and ‘rules’ are set (Stith and Roth 2006) to facilitate equal participation. This interaction between coteachers, university tutors and students collectively cogenerates *action strategies* which would not be possible by any individual or separate group, nor if any voice was privileged.

Generally the aim is that there be open negotiations in cogenerative dialogue, participants come to understand themselves and others better, are empowered to act, and to question how this action is stimulated and facilitated (Stith 2007). Ultimately, from a long-term practice, students will understand and embody their collective responsibility of knowledge and action in their way of living in this world. This suggests cogenerative dialogue as not only a tool for classroom setting but as a way of developing democratic citizenship for students as well as teachers to get involved in dialogues with the society per se (Kim 2006).

It is clear, therefore, that interactions in coteaching (between coteachers; coteachers and classroom; coteachers and students; coteachers, classroom and students) and in cogenerative dialogue greatly expand the opportunities for learning and teaching. Such interactions could be described in Vygotskian terms as *zones of proximal development* for class teachers, pre-service teachers and the children.

The theoretical framework for coteaching and cogenerative dialogue is embedded mainly within sociocultural approaches which underpin how coteaching is enacted in the classroom, how practices might be altered as a result of coteaching and how learning might come about through coteaching. According to Roth and Tobin (2001) the benefits of coteaching fundamentally arise from the experience of *being-together-with* where new teachers learn and develop their practices with more experienced practitioners. It has often been suggested that particular skills such as teaching are difficult to teach by more traditional didactic methods because they involve a number of complex activities which draw on the context of the situation rather than an overarching theory which is consistent across contexts (Grimmett and MacKinnon 1992). Thus by co-participating in teaching with another person, particularly with an experienced teacher, new teachers come to enact appropriate teaching, i.e., teaching habitus, as a way of being in the world (Roth and Tobin 2001). The pre-service teachers in our projects also acknowledged what many researchers refer to as the ‘gap’ between what they are taught in university based courses and what they experience when they are teaching in the classroom. Interviews with pre-service teachers who had participated in coteaching indicated that coteaching was a way of addressing this gap. For example:

The coteaching programme has added to my confidence and has made me more aware of how I could use methods such as questioning to add to the lesson. I really gained a lot of awareness from this experience and I believe that coteaching has made me more aware of what techniques I could use to create more effective and interesting science lessons as well as other subjects.

(Female student 3rd year)

Stetsenko, in her advancement of relational ontology, states that “all behaviour including most advanced knowing should be treated as activities not of a person alone but as processes of the full situation of organism-environment”. It is this core concept of learning which is illustrated through student teachers’ experiences of coteaching. Through coteaching student teachers can develop room to manoeuvre in the *praxis* of teaching in ways which cannot be achieved through university-based courses alone. Bourdieu (1992) stated that there is no way to acquire this other than to make people see them in practice, to experience collectively each precept applied directly to the particular case at hand. As a consequence student teachers can develop a “feel” for what to do in a particular situation and what causes more experienced teachers to do what they do at the “right moment”. This too supports Stetsenko’s search for common ground within sociocultural approaches in which she argues that Piaget, Dewey and Vygotsky all unite on ‘understanding development and human nature as being dynamic and fluid process taking place not inside the organisms and not in the outside world but at the intersection of the two, undergoing constant change and never following one pre programmed path’.

The following transcript illustrates the “fluid and changing” processes described by Stetsenko within the context of coteaching. The teacher and pre-service teacher in a question and answer session with young children (5 and 6 years old) about plant life cycles. The teacher’s interventions reveal her greater knowledge of the children and concern with the learning of individuals. The teacher uses names more frequently than the pre-service teacher, who seems to subconsciously pick up on this and tries to use the children’s names more. The teacher uses prompts and cues to help the children with their vocabulary development, whereas the pre-service teacher’s approach assumes greater familiarity of the children with the scientific terminology (Table 2).

The transcript highlights how one teacher can pick up cues from another teacher and adapt her behaviour or response. In this case it was the pre-service teacher picking up on the cooperating teacher’s use of the child’s name and incorporating them into her own questioning.

Stetsenko advocates moving from relational ontology to transformative active stance on the basis that “the only access people have to reality is through active engagement with and participation in it, rather than through merely ‘being’ in the world”. She argues that “relationality is not eliminated but instead, entailed in activity that now becomes the supreme ontological principle, bringing organisms into relations with the world and with each other”. The next section illustrates how coteaching and cogenerative dialogue can be conceptualised within a transformative active stance and indeed moves Stetsenko’s articulation of *participation to contribution* to that of *sharing*, which expands the potential for transformation.

Transformative active stance

One of the most useful concepts Stetsenko illustrates in moving from relational ontology to a transformative activist stance is the idea of moving from participation to contribution. It

Table 2 Transcript and commentary of lesson episode

Person	Utterance	Comment
Pre-service teacher	I'm going to test you all today. Who can remember the parts of the flower? I'm going to take these all down ((labels on a picture of a sun flower)) and jumble them up. I'm going to start with Paul, what are these things called, the things that go down into the soil? They are the first things that grow	Teacher prompt
Teacher	Listen to the sound of the start of the word...r, roo...	
Child 1	Roots	No name used
Pre-service teacher	Very good, roots	Teacher uses child's name
Teacher	Afric, what's this big long part here?	
Child 2	The stem	
Pre-service teacher	Ryan, these two things here	Pre-service teacher uses name
Child 3	Leaves	
Teacher	What were you going to say Brian?	
Child 4	Holding it down	
Pre-service teacher	What does the stem do?	Pre-service teacher uses scientific terminology/directed question
Child 5	When you pour water in it goes up into the root...	
Pre-service teacher	So what is the stem for?	No name/directed question
Teacher	Seamus, what do you think?	Teacher uses child's name
Child 6	The stem holds the flower and the leaves...	
<i>Later in same lesson</i>		
Pre-service teacher	shows the children a diagram of the lifecycle of the plant	
Pre-service teacher	Do you remember what we called this?	
Teacher	This is a hard one, remember how the word starts off...l, l.life...	Teacher prompt
Child	Life-cycle.	
Pre-service teacher	What does it show us?	
Child	It shows you what happens to the flower	
Pre-service teacher	Yes, will we let Maria do it? So what comes first?	Pre-service teacher uses child's name

Table 2 continued

Person	Utterance	Comment
Child	Seed.	
Pre-service teacher	And then what comes out of the seed?	
Child	Roots.	
Pre-service teacher	And what comes out of the top?	
Child	Bud?	
Teacher	Sh... Sh...	Teacher prompt
Child	Shoot!	

is this idea which underpins coteaching and cogenerative dialogue as research methods as well as processes by which the learning opportunities for coteachers and their students are expanded. Researchers involved in classroom research *act as coteachers* in the classroom when they visit—they are never spectators (Murphy and Beggs 2006a). Cogenerative dialogue, by definition, is a discussion of action based on a shared experience (for example, a lesson) and thus can only include individuals who have partaken in the activity (Roth and Tobin 2002). It is this idea of *shared contribution*, as opposed to participation, that coteachers sign up to when they agree to join in coteaching/cogenerative dialogue research (Murphy and Beggs 2006a).

Stetsenko presents implications of the transformative activist stance for the theory and practice of education by comparing the ‘contribution’ model with the participation and acquisition models. Coteaching develops the notion of contribution to *shared contribution*. Adding coteaching as a further element in Stetsenko’s table of the implications of the different models for the notion of learning (Table 3) shows that coteaching presents a further model in which shared contribution promoted even greater potential for transformation.

Stetsenko refers to human nature and development from the Vygotskian transformative activist stance which “has to do with people collaboratively transforming their world in view of their goals and purposes”.

In many solo practice teaching settings student teachers are either non-participant observers in the classroom or teaching while classroom teachers observe. This provides a situation whereby student teachers might find it difficult to fully understand the context of the decisions the classroom teachers make as the lesson unfolds; and how to apply this classroom knowledge to their own particular teaching situation (Roth 2001). However when coteaching, pre-service teachers reported that participation improved their knowledge and confidence in teaching science and made them think more about how they could deal practically with certain aspects of science and technology and come up with new ideas which were not inhibited by the constraints of solo teaching practice. For Stetsenko this represents the emphasis on human action on development “the only access people have to reality is through active engagement with and participation in it rather than merely being in the world”. The comment below illustrates the different experience of coteaching compared to solo teaching.

When you are out on teaching practice you are relying very much on schemes that were there and you didn’t really have the confidence to just go and try practical things. There (coteaching placement) you were able to experiment with different things that you maybe wouldn’t have tried in teaching practice on your own in case it didn’t go right.

(Female student 4th year)

The comment from the student teacher also relates directly to the premise of development through active engagement in that it was not just through being in the social context of the classroom but through actively engaging in the lesson *with another teacher* the pre-service teacher was able to most effectively learn about the praxis of teaching. The following quotes from fourth year pre-service teachers articulate ways in which coteaching expanded their agency, and thus their teaching capacity as more legitimate classroom participants, in the classroom as compared with solo teaching:

I think it [coteaching] forces the teacher and the student teacher together and then they *see each other as an equal*. You weren’t sitting talking to her as a teacher you

Table 3 Coteaching as further transformative potential, based on Stetsenko’s implications of different models for the notion of learning

	Acquisition	Participation	Contribution	Coteaching
Key definition of learning	Information processing; obtaining knowledge; individual process ‘in the head’	Participation, i.e., becoming a member of community; the permanence of having gives way to the constant flux of doing	Contributing to collaborative practices of humanity: continuing, while simultaneously transforming them	Shared contribution of coteachers and students towards mutual learning
Key words	Knowledge, concepts, meaning, fact, contents; acquisition, internalisation, transmission, attainment, accumulation	Apprenticeship, situatedness, contextuality, cultural embeddedness, discourse, communication, social constructivism, cooperation	Contribution, transformation, history as collaborative practices, cultural tools; vision and directionality; activism and commitment	Sharing, collaborative teaching, cogenerative dialogue, transformative classroom practice
Stress on	The individual mind and what goes into it; test and control of acquisition outcomes	The evolving bonds between the individual and others; the dialectical nature of learning interaction: The whole and the parts affect and inform each other	Dialectics of continuity and transformation, tradition and innovation; Knowledge for and as action; learning-for-change	Dialectics of individual and collective, learning and teaching, sharing learning, collective responsibility
Ideal	Individualised learning	Mutuality and community building	Contribution through self-development <i>and</i> community development	Expanded agency for all contributors, democratic classrooms
Role of teacher	Delivering, conveying, inculcating, clarifying	Facilitator, mentor; Expert participant, preserver of practice/discourse	Activist open to collaboration and dialogue; agent of a collaborative change	Active collaborator; promoter of shared lesson ‘ownership’
Nature of knowing	Having, possessing facts and skills	Belonging, participating, communicating	Collaboratively transforming the past in view of present conditions and future goals	Collaboratively transforming the nature of learning and teaching
Time line	Carrying out past experiences into the present; future is irrelevant	Focus on the presently evolving patterns of participation; the past is irrelevant and no future	Interface of the past, the present, and the future; the past and present are known through positioning vis-à-vis the future	Focus on current contribution at the interface of the past, present and future

Table 3 continued

	Acquisition	Participation	Contribution	Coteaching
Agency	No agency for social change	Collaborative agency	Co-evolving individual and collaborative agency	Active promotion of each other's agency
Who develops?	Individual learner	Community	Learners-through-humanity and humanity-through-learners	Coteachers and students co-develop
Where is mind	In the head	In patterns of participation	In continuous flow of transformative action	In the actions of learning and teaching
Key goals of learning	Knowledge of facts and skills	Ability to communicate in the language of community and act according to its norms	Knowing the past in order to be able to transform it; emphasis on the vision for the future from which the past can be known	Sharing learning and teaching for the benefit of all

were talking to her as a *partner* somebody who you need to work with and you need to be able to work with. Teaching practice is normally: “is it ok if I do this” but it [coteaching] was: “what do you think we should do, should we do this and then we will do that” and then tweak everybody’s ideas.

Coteaching is good because you *feel that you are allowed to interrupt*, you are not in a position to patronise your teacher by adding something extra. If I wasn’t coteaching and I was just doing an average lesson in English or something and my teacher interrupted and said something and you would feel like “oh she has just said something because I’m useless” whereas when you are coteaching and somebody interrupts you and you just think “*right she is just contributing to what I said as opposed to correcting me or making me feel like a student there.*” it is that kind of you’re allowed to do it...

This paper has thus far considered transformational activity as a goal for achieving sustainable improvement via coteaching and cogenerative dialogue. In order to include the dimension of directional transformation, Stetsenko offers the framework of CHAT. CHAT articulates activity as “entailing an authentic subject position—the directionality of one’s pursuits, the way one strives to be and envisions one’s world to be—is put forward [by the CHAT founders] as the ultimate anchoring for development and learning”. Our use of CHAT to articulate opportunities and contradictions arising from coteaching and cogenerative dialogue is considered in the next section.

Application of CHAT within the sociocultural framework of coteaching

Stensenko argues that many sociocultural theorists often overlook the aspect of individual subjectivity. In her view other approaches which attempt to deal with this “notion of mind, cognition knowledge, self and agency” tend to either utilise reductionist views or adopt this approach to explanation themselves. However Stensenko points out that by adopting the transformative activist stance does not necessarily remove the contribution of “human subjectivity”. She suggests CHAT as an alternative approach which views:

human subjectivity [is] understood to emerge out of, within and through collaborative transformative practices, representing just one form (or mode), though highly specialized, in which these practices exist.

CHAT supports the concept that a subject’s relationship with the objective world is always mediated by activity and most behaviour should be viewed as “purposive and culturally meaningful actions” (p. 103) rather than reactive to environmental stimuli (Kozulin 1996). Leontiev (1981) who differentiated between the collective and the individual (subject) argued that it was only through a relation with others that an individual relates to “nature itself”. Therefore the actions of the individual are considered within their cultural and the historical context.

Examining coteaching using CHAT make a valuable contribution to expanding a theoretical framework for coteaching and cogenerative dialogue. Within each field of activity you have the subject linked to the object through a range of tools. For example in teaching, teachers rely on pedagogy and curriculum materials (tools) to assist student learning (Roth and Tobin 2004). Furthermore each field of activity is characterised by its community, the rules which govern the way they interact and how the labour is divided up between them (Engestrom 1987). In the example of teaching, the curriculum and pedagogy

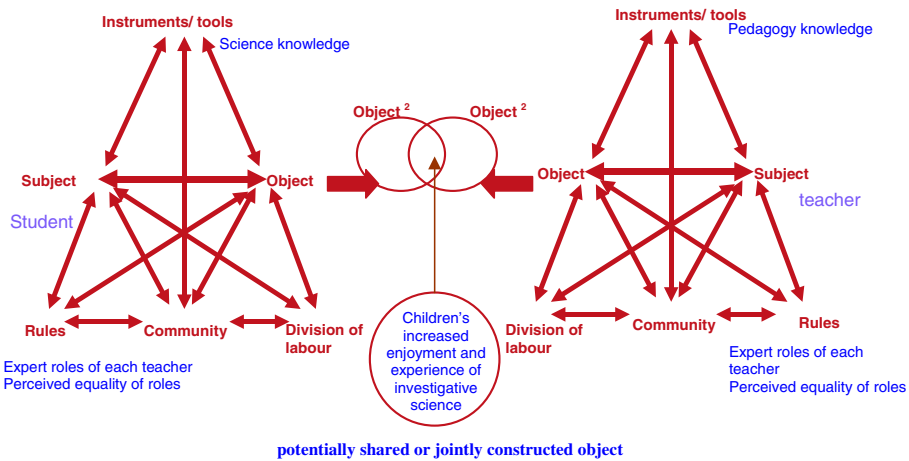


Fig. 1 CHAT model for student teachers and class teachers engaged in coteaching

employed by a teacher are shaped by being in a particular context and working with others. Thus the lower part of the triangle highlights these contextual, cultural and historical factors shown as rules, community and division of labour. (Roth and Tobin 2004) (see Fig. 1).

CHAT also supports the idea of networks of activity within which contradictions and struggles take place. Roth and Tobin (2004) argue that contradictions should not be viewed negatively. They should be considered as a driving force for change and development because, in the context of their research, they are “central to strategies for change” (p. 169). The minimal representation, which Fig. 1 provides within the context of coteaching, shows two of what may be a number of systems which are interacting and with the potential for developing new tools and new ways of working. The activity systems illustrate that the tools of expertise and the rules based on the understanding of equal roles in the classroom are crucial elements of the activity of coteaching and contradictions may arise within the rules supporting coteaching if the class teacher also has scientific expertise.

Stetsenko views CHAT as a “vision for a unified human science that... brings together the questions of what is, how it came to be, how it ought to be, and how all of this can be known”. We would also support the idea that within the context of our research CHAT can provide a structure for conceptualising the complexities of coteaching/cogenerative dialogue in its entire context. For example, it can incorporate the interacting systems of all potential actors involved in coteaching (i.e., student teachers, class teachers, children, university tutors and school staff). It makes explicit each of the elements of the activity and allows for questions to be asked of each element and highlights tensions between each element and interacting activity system. Crucially activity theory takes consideration of the social and historical context in which each element of the activity system is seen to have developed over time, developed its own dynamics and interpretations for the actors involved with an emphasis on the larger context.

Conclusion

In this paper we have illustrated and, to some extent, advanced the theory explicated by Stetsenko. In doing so we argue that coteaching and cogenerative dialogue provide

expanded opportunities for transformative action in learning and development through *shared* contribution, collective responsibility, expanded agency and the active promotion of each other's agency and co-development. Coteaching and cogenerative dialogue also create hitherto unknown 'spaces' for such interactions to occur. The paper has not, however, explored in detail the ethical and moral dimensions of the theory, described by Stetsenko as "central both ontologically and epistemologically". Ethics of coteaching and cogenerative dialogue have been discussed extensively elsewhere (for example, in the *Qualitative Research and Ethics* debate in the *Forum for Qualitative Research* (available online at: <http://www.qualitative-research.net/fqs/fqs-e/debate-3-e.htm>).

Finally, we would posit that there is a place in educational research for collecting and reporting both qualitative and quantitative data in an attempt to reinforce and scale-up findings for the purposes of dissemination and policy making. The nature of our research is collaborative and chiefly constructivist, yet we saw fit to collect quantitative data to add to the "story" of the work. Hence we present coteaching as both a context for illustrating some of Stetsenko's ideas and we refer to findings derived from non-sociocultural approaches derived from different aspects of the study which we feel are valid in explicating the work on a larger scale and perhaps helping to 'translate' some of our ideas into language which is more accessible to policy-makers.

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