

# Coteaching: Some Theoretical Considerations

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**Abstract:** In this article, I present some theoretical considerations that go with coteaching and cogenerative dialoguing. These considerations are rooted in my reading of cultural historical activity theory and critical psychology. Both are particularly suited for analyzing and theorizing complex practices such as teaching and learning in schools for several reasons. First, it requires us to take a first-person perspective on the actions of individuals and groups. Second, it theorizes actions available to an individual as concrete cases of a generalized action available at the collective level. Third, all actions are mediated by the tools (language, curriculum theory), rules, community, and division of labor characteristic of the situation. Fourth, because this approach explicitly theorizes context, it is an excellent tool for articulating and removing structural contradictions. Fifth, the approach assist us in understanding the contradictions within a system in a positive way as opportunities for change and growth. Finally, activity theory explicitly focuses on the cultural historical changes that individuals, their community, division of labor, tools, and rules undergo.

Christine, a veteran teacher with twelve years of experience and Brigitte, a curriculum developer who had taught for four years, decided to take collective responsibility for teaching science in a split fourth- and fifth-grade classroom. The particular unit focused on learning concepts of science and engineering related to material strength, stability, and forces while building bridges, towers, and houses from simple, everyday materials such as paper, straws, glue, pins, and so on. Taking collective responsibility meant that they not only planned the curriculum together but also that they taught together, at each other's elbow so to speak, rather than dividing up the task so that each would do only what she feels

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best at. In this way, for example, they conducted whole-class sessions together, each contributing when it appeared opportune and to the benefit of the children. Or, they might follow one another for a while, experiencing one other interact with children over the issues at hand, and then go off on their own engaging in small-group interactions while the children were working on their constructions.

The following transcript shows them at work in a whole-class session that followed a series of tasks in which the children developed techniques for strengthening materials. The intent of the session was both to get the children talk science and engineering design so that they could, on a collective level, evolve a classroom discourse in and about the topic.

- Brigitte: OK, I really liked that technique and Shannon, you used this technique as well especially on your Christmas light strengthening technique, where Shannon hung paper clips along spaghetti and put plasticene at the ends. I am interested in Shannon how you came up with that idea?
- Shannon: I don't know.
- Christine: I really want you to think about that . . . Shannon?
- Shannon: I thought about my house. I got it from my house-
- Brigitte: Sorry, Shannon, I couldn't quite hear that?
- Shannon: I just said where my dad had to climb up the roof to put it on it.
- Brigitte: Um and did you try to do something else besides plasticene at the end, or was that the first thing you used?
- Shannon: The first thing I used.
- Christine: Can I say something? (*Pause. Christine nods.*) What I think Brigitte is really getting at is for you to think about what makes you think of things and use it. Actually, go into your brain and think, "What do I think of?" "What am I thinking about?" Because part of this science is not just doing your thing and doing it, but also is becoming aware of what kind of things help you think and what you are thinking about when you are learning and when you are experimenting.

Both teachers had been very keen from the beginning of the unit to encourage the girls in the design of artifacts and in talking science and engineering. Although both were somewhat hesitant to put girls on the spot when they did not volunteer to speak, Brigitte addressed Shannon while talking about a particular technique that she had used. Shannon, as many other girls, attempted to dodge Brigitte's question about how she came up with the idea by saying, "I don't know?" Here, Christine in whose class the unit was taught took the next speaking turn. She insisted that Shannon think about how she came up with the idea for the "Christmas-light-strengthening" technique. Because Shannon responded, Brigitte could come back into the conversation and pursue her line of questioning. However, Shannon provided short, hesitant answers. Christine therefore stepped in to take another speaking turn, here to explain to the children the ap-

proach that they, the teachers, wanted to take to the unit—allow the children to become reflexively aware of their own learning.

When we analyze this small excerpt in terms of the heuristics for productive coteaching developed as part of a project on learning how to teach science in inner-city schools (Roth & Tobin, 2002), we note that many of our indicators are present. For example, they created space for one another to contribute to the unfolding conversation, which included the willingness to step back, actually stepping back, willingness to step forward, and actually stepping forward. Their interaction and contribution to the lesson was seamless, the lesson seemed orchestrated without a conductor and actions were compensatory and coordinated. Their coparticipation was reciprocal, which we had described in terms of playing off one another and passing the baton.

The most striking aspect of the unit was how the two teachers became so much in tune that they picked up one another's ways of being in the classroom without actually becoming aware of this until our analyses of videotaped lessons turned this up. For example, Brigitte was very good at asking productive questions, which allowed children to talk through important and difficult scientific and engineering-design issues. "Which are the features of your tower that you can sell me on?" or "Can you find another way of strengthening this part of your bridge?" were some typical questions that Brigitte asked throughout the lesson. In contrast, Christine asked questions that allowed students to answer with "Yes", "No," or with simple fact-like statements and therefore to avoid dealing with science and engineering concepts. Although Christine made students aware of the "great questions" Brigitte asked, she could not initially ask such questions herself. In the course of the three-month unit, however, Christine's questions become increasingly similar to those that Brigitte asked. The learning was not one-sided but reciprocal. For example, Brigitte initially asked questions that Christine thought as being too challenging and risking children to avoid answering. In the course of the unit, the questions Brigitte asked and her timing of difficult questions become increasingly similar to Christine. Furthermore, even their mannerisms became more and more alike and in tune: little gestures or ways of moving about the room became common features of both. This, we found in our work in Philadelphia, is yet another indicator of productive coteaching.

Coteaching provided learning opportunities for Christine, which arose because she could experience good questioning, for example, which she could not have prepared for and enacted because she was preoccupied with organizing other aspects of the learning environment.

I could have done this unit without Brigitte and I would never be where I'm right now with those kids. And the kids would have never made the bridges they made today, because I just wasn't able to think enough you know . . . To me the whole process of or-

ganizing them, and getting them what I was expecting them to do, took so much of my thinking that I wouldn't have had the time to think about the questioning. And that was so much more important than that would bring out so much more . . .

That is, collectively Brigitte and Christine were able to organize the classroom and to ask the kind of productive questions that provided increased learning opportunities to the children. At the same time, being there with the other, provided Brigitte and Christine opportunities for experiencing actions that were, at the time, not part of their own range of possibilities.

Central to the unit were the regular meetings in which Brigitte and Christine talked with me and sometimes other teachers and professors who had been present in the classroom for one or more lessons. I have come to think about these sessions as cogenerative dialoguing, because their purpose was to collectively generate a discourse about the classroom events and to design changes that the teachers could immediately enact begin with the next lesson.

Brigitte: I am familiar with the content a lot, and I think that the kids come to me about the content.

Christine: You know what I say sometimes, I realize that and I say, "Ask Brigitte."

Brigitte: Yeah, I am the same.

Christine: Because, I have never done it before. It's not common, I am not as good in it. And usually I have an answer, I just go fine, and sometimes I wonder what she would say about that, I am interested to know and I say, "Go ask her."

Brigitte: It's part how we set that up, we've been often, you have asked me in front of the kids about some concepts. So there is an atmosphere in and around the content, but I do think that they have adopted us both in different ways.

Christine: That is true.

Brigitte: You know that a lot of the cooperative skills that they need in order to make a structure work they come to you for, you know, I can't work this out, like Brittany and Melissa, they know . . .

Christine: Oh yeah, probably they don't go to you for that.

Brigitte: No, nothing related to what do you call that . . .

Michael: Group skills?

Brigitte: Yeah group skills, collaborative skills. Or like something is wrong and [they] need empathy and sympathy and that sort of thing.

Christine: Yeah, I wouldn't see that.

Brigitte: So we have taken different roles with it, which in some ways is a bit artificial. Michael and I were talking about this how you know if I wasn't for our collaboration, you would answer those questions, and you would do it in your own ways.

In this conversation, which occurred after about one month of coteaching, Brigitte and Christine articulate the different, complementary roles that they have come to play in relation to the children's needs. Brigitte had become the

subject matter expert: the children came to her when they had design problems and Christine, rather than providing a quick answer or saying “Just fine,” sent students who had questions to her. At the same time, when something went wrong and children needed empathy and sympathy or needed to work through trouble with a peer, they came to Christine or where to referred to Christine by Brigitte. What is important to me in the present situation is the fact that the two teachers articulated the different roles as an aspect of classroom life at that moment in their coteaching. As it turned out, coteaching allowed both teachers to increasingly take on the roles previously played only by one of them.

As these episodes show, coteaching is not just a way of going about the everyday work of accomplishing a teacher’s task but equally important, it is a way of changing the way one teaches. Coteaching is not about two teachers being in the classroom together to make their job easier but about developing as a teacher while teaching, that is, continuously in a process of becoming (a better teacher) in the classroom. This becoming in the classroom is associated with and defined by an increasing range of actions available to any individual teacher, an increased room to maneuver for dealing with the myriad of situations that a teacher faces on a daily basis.

In this article, I articulate a theoretical framework that acknowledges the primacy of teaching praxis and places equal value on the structural and agentic aspects of teaching. In this approach, individual human actions are the result of the dialectic of agency and structure (Pickering, 1995; Sewell, 1992).

### **Structure of Activity: Cultural-Historical Activity Theory**

Cultural historical activity theory makes hierarchical distinctions between activity, actions, and operations. Activities, oriented towards motives or objects<sup>1</sup>, are carried out by the community; actions, oriented towards goals, are carried out by individuals or groups; and operations, oriented towards conditions, are carried out routinely and automatically (Leont’ev, 1978). In the course of individual and collective development, activities can become actions and actions can turn into operations. For example, for beginning teachers, creating an appropriate learning environment is a specific conscious goal, which they attempt to achieve by engaging in specific (explicit) actions. Experienced teacher often do no longer have to have the creation as a goal; creating and maintaining an appropriate learning environment is implicit in their everyday (routine) way of going about teaching.

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<sup>1</sup> In the German philosophical tradition from which cultural historical activity theory emerged (e.g., Hegel, Marx, and Engels), a distinction is being made between Gegenstand (especially material object) and Objekt (thought, idea, vision), both of which are contained in the English term “object.”

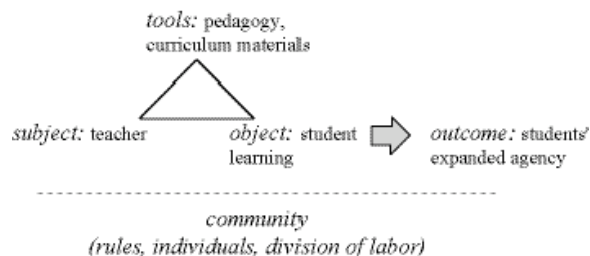


Figure 1. Structure of human activity using teaching as an example.

### *Basic Elements*

Human activity is fundamentally oriented towards objects and mediated by tools (Vygotsky, 1978) and results in a tangible outcome (Figure 1). The object typically exists as (a) vision of the outcome and its significance, (b) materials or material conditions, and (c) understanding of the reigning social and material conditions (Saari & Miettinen, 2001). Teaching is a typical activity. Thus, teachers draw on pedagogy and curriculum materials (tools, means of production) to assist students in learning, the result of which is an expansion of the range of actions these have for dealing with the world. Most importantly, though, human activity is always mediated by the community that carries out the activity and within which individual subjects (individuals or groups) are situated (Figure 1). The community is characterized by its members, the rules that govern the way in which these interact, and the forms in which labor is divided up among them (Engeström, 1987). Saying that human activity is mediated amounts to the fact that the relation between any two basic structural elements of an activity system (i.e., subject, object, tools, rules, members, and division of labor) is mediated by a third. How a teacher relates to other members in the community, the principal, colleagues, parents, or students is mediated by the rules of conduct to which they subscribe. Likewise, the roles teachers take within the community and the hierarchical and collegial relations with principal and fellow teachers are aspects of the division of labor in society. To provide a final example, Brigitte and Christine do not employ pedagogy and curriculum in a willy-nilly fashion but in the way that these have evolved within the community.

An interesting aspect of the analysis of productive human activity is the fact that the subjects in the activity do not just produce tangible outcomes that are subsequently reintegrated into the activity system (Marx & Engels, 1970). Rather, in the course of realizing the object/motive of the activity system, the individual subject produces him- or herself as a member of the community. Thus, Brigitte and Christine do not just contribute to expanding students' agency

(as part of preparing them for participation in the adult world) but they produce themselves as teachers. Because students liked the science unit and because the students showed high achievement at the end, Brigitte and Christine also produced themselves as successful teachers, recognized as such by their peers, principal, and parents, and as teachers that are liked by students.

### *Historical Perspective*

These basic elements and the mediated relations that they bring about are constitutive of a culture. At the same time, because all relations are mediated, each element is necessarily cultural so that it makes little sense to theorize it independent of the culture, that is, the activity system as a whole. An important advance of activity theory was that it emphasized the historical nature of culture and the elements and mediated relations that constitute it. That is, an activity system is never thought and understood something fixed but as undergoing continuous change. A system in activity theory is never a fixed structure that could be captured in a photographic snapshot; rather, what the system is can only be understood when it is considered in the context of the historical processes that brought it to its current state, itself in transition to future states. An activity system such as teaching can therefore never be understood in terms of fixed structural relations, as these are produced in quantitative and structuralist approaches, but as dynamic, historically and culturally situated systems in a continuous process of becoming.

An interesting example that particularly requires a historical approach for understanding the events were the difficulties to implement a more gender-balanced distribution of who questions are directed to. Because of their intent to make the unit equally attractive and full of learning opportunities for boys and girls, Brigitte and Christine wanted to have equal numbers of them contribute to whole-class conversations. However, from the beginning it was clear that the ratio was tilted in favor of the boys, leading in some discussions to as many as 19 questions directed to boys and only one question directed to a girl.

- Brigitte: So this is the question I have, I have felt uncomfortable in a whole class setting when there are five boys with their hands up, consciously asking girls. And you know that I do that “Right, Cara what do you think about that?”
- Christine: She is the girl that never gets her hand up.
- Brigitte: I know. But you know my struggle is there is something going on with me about relating to that girl. I feel uncomfortable; I have a real hard time with my wait time. I have to consciously count to five.
- Christine: Sure, I consciously do my three circles around the classroom. One visual circle, two visual circles- That’s what I do, three visual circles.
- Brigitte: But I guess my question is, is it right to put girls on the spot in front of the class like that, or are there other ways to draw them out that they are more

comfortable being drawn out in, like, part of it is what we are talking about is what we value in our teaching, we value kids that have their hands up . . .

In this episode, Brigitte talked about her discomfort to ask girls when they did not raise their hands and when, simultaneously, many boys eagerly wanted to contribute. Although Christine suggested that she was waiting to encourage more signals from the girls, she did not actually ask more girls to respond to her questions. Despite repeated feedback about the frequency of participation, which throughout the unit never became better than two to one in favor of boys, and despite continued willingness to improve the situation, little changed, at least in the whole-class situations. (The two actually did more work with small groups of five to seven students that were separated by gender.) When prodded to talk about the reasons for not involving more girls, both teachers brought up experiences that they had as children, when they had been embarrassed when a teacher had called them up although they had not raised their hands to indicate willingness to contribute.

At the same time, there were other circumstances of cultural historical nature that mediated the teachers' effort to bring about a greater gender balance. For example, on one day, both made a tremendous effort to involve girls calling on girls to respond to thirty-three percent of the questions. In a debriefing session, several girls asked "Why do you always call on us when we don't want to answer the questions?" In the groups where there were only boys, the symmetrically opposite questions were asked, "Why do you call on girls when they don't want to respond and when there are so many of us who have an answer?" That is, there was a culture in which boys and girls were accustomed to the asymmetry in participation to answering questions. When a conscious effort was made to change, even these children noticed it and indicated their discomfort with the change in practice. Clearly, their experiences to this point enculturated them to a particular practice; changes therefore are more difficult than just asking an increased number of girls. Getting more girls to respond requires some fundamental changes of several basic elements of the activity system and the ways in which they mediate the relations between pairs of entities. What happened here can be analyzed in terms of contradictions, the removal of which corresponds to the sought-for change.

### *Contradictions*

Activity systems embody contradictions that interfere with and impede the motives of the activity. These contradictions come in four different kinds (Engeström, 1987). They exist as primary contradictions within any one of the basic entities. Secondary contradictions are found in the relation of any pair of entities. Tertiary contradictions are located between the object of the dominant form of the activity and the object of a culturally more advanced form. Quater-

nary contradictions are those that exist between two neighboring activity systems. In the present example, Brigitte and Christine identified a particular goal for achieving a gender-balanced approach to participation in and therefore learning of science. But they did not achieve this goal because of contradictions within themselves and rooted in their biographical experiences as learners and teachers of science. Thus, Brigitte did not want to ask girls to respond because she still remembered an incidence where she had been embarrassed as a second-grade student. She also identified other contradictions such as wanting to wait five seconds before requesting a particular student to answer, but finding it inappropriate to wait that long when several boys eagerly requested a turn at talk. We can think of the situation also in terms of a secondary contradiction in the relation between teachers and students, mediated by the rules of interaction. Whereas the teachers wanted gender-balanced participation as a rule, the boys and girls actually “conspired” in enacting a different rule, which heavily required boys to respond and girls to hold back. (Elsewhere I provided an extensive analysis of the different rules that actually mediated whole-class interactions versus those that the teachers had as goals [Roth 1998].)

Contradictions are not inherently bad. In activity theory, which embodies a dialectical method, contradictions (including dilemmas, disturbances, paradoxes, breakdowns, and antinomies) are the driving forces of change and development (Il'enkov, 1977). These contradictions become central to my approach, because, once understood—not only in terms of lived experience but also in terms of their structural origin—they lead to the articulation of actions and change.

Contradictions do not always originate where they are apparently found. Thus, for example, individuals (the subjects in the activity system) may internalize contradictions that may have their origin elsewhere in the activity system. For example, a current craze in education is the notion of accountability—if students have low scores, teachers are held accountable and may be required to engage in special professional development courses or may be fired from a school system. However, the teacher may not be the root cause for student performance. Rather, the lack of or inappropriate existing curriculum materials may have mediated low performance. Tracking and social factors heavily select students from the underclass and working class into the same schools, which then, for a variety of reasons and on the whole, show lower student performance. However, teachers internalize the contradictions, blame themselves, burn out, and ultimately leave education altogether. The subject-centered methodology of critical psychology presented below has the identification of such internalized contradictions as one of its main goal.

### **Subject-Centered Perspective on Agency**

Cultural historical activity theory emerged from an interest in describing and explaining human praxis and the various ways in which it is mediated by the different elements of the activity system. In my view, despite the focus on praxis, cultural historical activity-theoretic analyses focus on the structural aspects of praxis. This focus on the structural aspects of human activity is inherent in the way cultural historical activity theory cuts up reality, in particular in the third person perspective it takes on the activity system, of which the experiencing subject is but one part. However, human beings act not because of structural aspect in an abstract world (revealed by third-person analysis); rather, they act because of structures that they perceive, that is, the structures of their lifeworld. The subject-centered approach of (Marxist) critical psychology (Holzkamp, 1983) and phenomenology are resources for thinking through praxis from the perspective of the individual. Central to this approach is not the subject but the world as experienced by it in terms of feeling, thinking, sensing, and acting. The results of such a subject-centered human science are therefore not propositions about or classifications of humans but always propositions about experienced and sometimes generalized possibilities and constraints for acting (Markard, 2000).

#### *Agency and Subjectivity*

In critical psychological approach, human agency is the fundamental starting point of theorizing. This means that humans are not considered to be cultural or psychological dopes that react to situations in ways *determined* by and reacting to the existing conditions, whether environmental or internal. Rather, human agency allows more than acting in response to given conditions: it allows changing the conditions. Agency is conceptualized in terms of the potential to act or, in other words, the range of possibilities for acting in particular situations. This range of possibilities constitutes the room to maneuver at a particular point. But these possibilities are mediated (rather than determined) by the reigning conditions so that praxis is the outcome of the dialectic between agency and structure (conditions). An expansion of the potential to act or the range of possibilities is tantamount to learning. As far as teaching is concerned, the expansion of the room to maneuver or *spielraum* is central aspect of teacher development (Roth, Masciotra, & Boyd, 1999; Roth, Lawless, & Masciotra, 2001).

The concrete possibilities for acting are highly contingent; they are not available to the theoretician but only to the practitioner (Bourdieu, 1990). What can be done at any one moment of praxis is highly individual, subjective space of possibilities. By its very nature, theory eliminates the contingencies that provide opportunities and constraints in the actual situation. This is why there is such a gap between the lived praxis of teaching and traditional theory of it. To

understand the concrete actions of a teacher we therefore need to understand the world through his or her eyes rather than how it looks to the theoretician. In the concreteness of praxis, the individual teacher acts upon and changes the world as it appears to him or her then and there. In coteaching, however, two teachers who are in tune with one another and the situation tend to see what is going on in very similar ways but also recognize when another person acts differently than what the individual would do for him or herself. That is, working together opens up the possibility to experience new and different forms of actions possible in particular situations that were previously not apparent to the Self. Central to theorizing human agency is therefore the relation between individual and collective, especially society as a whole.<sup>2</sup>

#### *Individual and Collective*

In a series of qualitative leaps, the dominant form of (pre-) human life changed from adaptation of the organism to the environment to the adaptation of the environment to individuals in the context of more generalized, collective provisions. “The objective world formed by human beings, together with the social relations that were simultaneously established, became an independent carrier of development” (Holzkamp, 1991, p. 55). Crucially, individuals no longer had to get food for themselves but by contributing to the production of goods in and as part of society—with the concomitant processes of exchange, distribution, and consumption—could survive by participating in the survival of the society in a variety of ways. In this way, individual and society become irreducibly interdependent. Individual life conditions are always individually relevant societal life conditions. Securing and developing of individual conditions tend to be identical with individual participation in the control over collective processes, namely those that are relevant to the individual. Learning and development are therefore equivalent to an expansion in the range of actions available to the individual and therefore the control over life conditions.

The individual can control his or her own conditions, which are always individually relevant collective conditions, only when he or she participates in the collective control over collective conditions through concrete change. Participating in collective control always provides greater control for the individual and the collective. This is because for any group, the possibilities for acting available to any individual are always only a subset of the possibilities for acting available within the group as a whole. Individual possibilities are therefore con-

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<sup>2</sup> Consistent with a cultural historical approach, Klaus Holzkamp (e.g., 1983, 1991) developed a psychology from a historical reconstruction of human subjectivity. Thus, Holzkamp and his associates only accept categories (e.g., emotion, motivation, genesis of subjectivity in early childhood) when it can be shown how they have arisen in the course of human evolution.

crete realizations of a set of generalized possibilities. When groups of individuals work under the same conditions, they can witness what others do and therefore emulate such actions in situations that are experienced as similar. Let us take Brigitte and Christine as an example. The year before they taught the science and engineering unit together, Christine had taught a similar unit. When she compared the achievements of the children in this classroom with those of the children during the previous year, she noticed tremendous differences. She attributed the more advanced learning during the ongoing year to the productive questions that Brigitte introduced to their practice.

There is no question, I was really becoming aware of the kinds of questions [I asked]. And I was trying to use her words because I needed to put it into my being. I needed to practice what I had seen and heard before it was part of me. You know, now it has become much more part of me. . . . After watching Brigitte, I just improved dramatically. I realized that I was going nowhere fast, and I wasn't helping these kids at all with the kinds of questions.

Teaching together with Brigitte allowed Christine to experience productive questioning in specific contexts. Here, the common experience is the foundation of individual experience, which is always "just mine." That is, individual subjectivity has an interpersonal nature because it always implies a transition from mere individuality in the direction of participation in collective subjectivity. By working together, the two exceeded the limits of their individual subjectivity through cooperation directed towards common, general goals and interests (Holzkamp, 1983).

In activity theoretic terms, working together, that is, changing from individual to collective subject (Figure 1), brings about a change in the activity system, and therefore, because the change affects the entire system, in the outcomes. That is, coteaching constitutes a historically new form of societal activity that is collectively created. The distance between normal everyday actions (of teaching) and those generated by collective (teaching) activity can be understood as a zone of proximal development (Engeström, 1987). The changes in the (e.g., questioning) practices that were observed in both Brigitte and Christine as part of their coteaching was a direct result of such a zone of proximal development arising from participating in collective activity. That is, there are new possibilities for acting and learning whenever people work together, which arise from the relationship between generalized action potential (collective room to maneuver) and my specific, concrete, and more limited way of realizing it.<sup>3</sup>

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<sup>3</sup> In dialectic logic, the notion of "generalized" does not have the same meaning that it has in traditional logic, that is, valid in different contexts or universal (Il'enkov, 1977). The general in dialectical logic is always a concrete universal. Thus, the realm of gener-

This perspective on collective activity suggests that we would also expect learning opportunities to arise for all coteachers even when they are all new (beginning) teachers or when the collective includes new and long-time teachers. This is just what we could show in series of studies that involved different groupings. Thus, a thirty-year veteran biology teacher learned more about genetics and teaching genetics while coteaching a unit with an intern (Roth, Tobin, Zimmermann, Bryant, & Davis, 2002) and two interns tremendously learned while coteaching as compared to teaching on their own (Roth & Tobin, 2002).

#### *Collective Responsibility*

In the work on coteaching, “collective responsibility” for the events in the classroom has become an important aspect of talking about praxis. That is, all teachers contribute to the collective responsibility for assisting students to learn. Sometimes when people work together, one can find them say and think things like, “I do not have to address this issue because someone else is going to take care of it” and “I do not have to act because I can always blame others or the group.” But, in line with the description of the relation between individual agency and collective agency, the attitude expressed in these statements would not be consistent with taking individual responsibility. This is so because individual responsibility is thought as a concrete realization of a more generalized collective responsibility, where “generalized” is used in the sense of a concrete universal, that is, the collective responsibility is also and always concrete. If a teacher acted consistent with the attitudes expressed in the above statements, he or she would not participate in and contribute to collective responsibility, because their concrete actions are not concrete realizations of responsibility. Furthermore, such restricted notions of collective responsibility come with costs both to the collective as well as to the individual, because of their mutual interdependence, even if the costs are not apparent upon first or superficial inspection.

In teaching the unit together, Brigitte and Christine each contributed to their collective responsibility for student learning, that is, expanding their agency with respect to talking and enacting engineering design. The two always complemented one another—when one saw that the other did not seem to provide maximum support to student learning, the other would come in and do something about it then and there. That is, she acted consistent with an individual responsibility that is a concrete realization of the collective responsibility. In the following episode, Christine provided a recollection of one situation in which

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alized actions includes all actions that can be concretely realized by the members of a collective as a whole.

she had believed that Brigitte's questioning was potentially interfering with the learning of a student labeled as learning disabled within the school system.

So bridges were being built, a tooth pick bridge was built, a straight bar of tooth picks, popsicle sticks, straight across about this (*Gestures about 20 cm*) wide with a couple of braces taped around it, more than one layer of popsicle sticks, it spanned a gap about this (*Gestures about 20 cm*) big. One made it in about five minutes. He is somewhat low achieving, well really low achieving—on Monday he is going to another center with five kids for one teacher, for about three months. He made this thing, and what Brigitte and I have been working together on is to try to ask questions to pull out more, from the kids; you always wind up pull out more. Brigitte had asked him some questions and he had changed something underneath to make it stronger and I sort of came in and didn't know what she had talked about, and she was trying to get him to think about building a top on the bridge, and, because I knew the kid better than Brigitte did, I wanted to stop, because I thought this was enough for that kid. I thought he had done this magnificent thing, I didn't think he should do another thing to it, he is really proud of it. It carried weight, that's what we asked them to make it to do. It just needed to stop then. I probably could judge that way quicker because I know the kid so much better than you do.

Coteachers who see that something in the situation could or should be improved immediately goes about making required changes. Rather than sitting back and subsequent to the lesson talking about or blaming the other, coteachers who enact their part of the collective responsibility do what can be done to improve the situation.

Making the changes necessary to enact one's part of collective responsibility does not necessarily come easy. For example, in one of my projects, we taught a lesson in biology. We had planned two investigative tasks for this 90-minute period, but because we had allowed students more time to complete the first task, made a quick decision to use the time remaining for reviewing and extending some core concepts of the ongoing unit. As it happened, the only transparency sheet available was full of writing and needed to be cleaned.<sup>4</sup> There was therefore some time while the teachers and class waited until the student who was cleaning the transparency had come back. During the subsequent cogenerative-dialoguing session, one of the coteachers asked the lead teacher at the time why she had let the time go unused. At that moment, she immediately defended her actions and therefore accepted blame. However, when we subsequently talked about the situation again, we realized that the coteacher who noted that there was something "wrong," that time was "wasted," he should have

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<sup>4</sup> This is one of the contradictions found in urban schools: the tools for teaching exist in limited amounts or not at all. Teachers often internalize this contradiction and feel personally responsible for the lack of means and purchase materials out of their own pockets.

**Prescribed Learning Outcome**

*It is expected that the students will:* Calculate hours worked and gross pay.

**Illustrative Examples**

Find Al Passey's net pay for the week. His claim code is 7, his weekly salary is \$385.00, he has union dues of \$3.80, dental plan of \$1.85, and the usual CPP, EI, and Income Tax deductions.

Figure 2. An excerpt from the illustrative examples provided for a specific "prescribed learning outcome" in the *Integrated Resource Package* in the province of British Columbia.

done something about it. It would have been more consistent with collective responsibility and individual responsibility being a concrete realization of it to immediately address the situation and thereby make use of the time to further assist students in learning biology.

*Agency and Change*

Teachers often do not recognize or realize agency by understanding their actions as determined by the situation. They resign themselves to reacting to the conditions imposed from the outside, the constraints that they see as imposed by the principal, school board, or ministry of education. Such resignation, whatever its source, necessarily means that an individual looks at the situation in terms too general and global to see its own possibilities for action and determination of the situation (Holzkamp, 1984). The room to maneuver of the individual teacher is very limited and restricted. For example, the teachers at the school where Brigitte and Christine taught their lessons and elsewhere in the British Columbia feel constraint in their actions by the "prescribed learning outcomes" outlined by the provincial government in the *Integrated Resources Packages* or IRPs. The examples provided by the ministry, such as that in Figure 2, constrain teachers such that doing well on these and on similarly constructed exercises become the only goals that teachers seek to achieve. Many teachers feel they cannot follow the recommendations of recent research with constructivist orientation because the fear that they would not be able to reach the prescribed outcomes. Their room to maneuver, the subjectively experienced space of action possibilities is reduced. Here, learning is equivalent to an expansion of the room to maneuver. Coteaching is an ideal situation for the expansion of the room to maneuver, because collective activity inherently allows individuals to experience in concrete situations other and new ways of acting. Each person has, at least in principle, the fundamental capacity to extend his or her possibilities by engaging in cooperative actions. In fact, it is in the interest of every person to extend his or her possibilities by participating in cooperative actions because "it contributes to the

continued improvement and safeguarding of his or her own quality of life” (Tolman, 1994, p. 114).

In our work on coteaching in inner-city schools in Philadelphia, we extended the idea of collaboration to students—participating in the collective determination of what goes on in the classroom allows students greater control over their individual conditions rather than reacting, they actively change conditions. Collaborating on creating functional learning environments would expand the action possibilities of teachers *and* students and thereby give them greater individual control over their life conditions by contributing to the collective control over life conditions of the group.

The dialectic approach inherent in our coteaching method does not advocate change efforts where researchers infuse abstract recommendations for change that are subsequently implemented by teachers. Our very purpose for coteaching, particularly for the associated cogenerative dialoguing, lies in its potential for enlarging the subjective possibilities and therefore the range of concrete actions available to the teacher to make a change in the situation as they see it. Cogenerative dialoguing produces recommendations for concrete actions and change that teachers experience as opening of their possibilities rather than recommendations that they know to be “possible only in theory but not in praxis.” A dialectical approach understands the current state of the activity system as a possibility space for its own transformations. Change is usually not a radical and revolutionary process but a slow historical evolution. This is why research that recommends teachers to act very differently than they currently do has only limited prospect.

Change is often difficult because it is associated with anxieties, because the extension of ones possibilities always involve giving up an existing state of relative agency together with the proven means for coping with the demands of life (Holzkamp, 1983). Any attempt to improve one’s quality of life is always linked to existential insecurities, such as whether the envisioned new level of agency and new possibilities can actually be attained. In this situation, support can experienced when change is envisioned in and as a cooperative effort. The success of our coteaching experience has likely come from the support that one experiences from collaboration. Coteaching and cogenerative dialoguing constitute a practice and mechanism that mediate the existential insecurity that comes with change and prospects of change. Other possibilities arise because the move from individual teaching to coteaching constitutes a radical change in the conditions of teaching, which opens up a space for continuous teacher development to occur in a context that they experience as safe because the responsibilities are both collective and shared.

*Contradictions, Change, and Expansive Learning*

In the perspective advocated here, learning is synonymous with changing participation in activity that arises from increasing control over one's life conditions through an expansion of the possibilities for acting. Learning, therefore, is in some sense inherently expansive. Because of the relation of individual and society, each new possibility of acting at the individual level is also an expansion of action possibilities at a collective level. Engeström (1987) reserves the notion "expansive learning" for the outcome of changes at the collective level, that is, learning as change of the activity system.

An important driver for learning and change are the contradictions that exist in an activity system. From the perspective of the individual subject, the expansion of action possibilities and agency is mediated by the ability to find the proper location of a contradiction. This is an important step in working towards change because higher order contradictions can become internalized by and understood as contradictions at a lower level. Addressing the contradictions at the lower level, while sometimes being able to deal with the symptoms does not address the root of existing problems. For example, teacher burnout is usually dealt with at the individual level—a teacher takes time off, receives counseling or other (chemical) treatment, or quits. Thus, rather than seeking to identify the contradictions at a systemic level, which could yield a lowering of teacher burnout across the board, the costs have to be born by the individual. Rather than yielding an expansion in the range of actions available to the individual, the traditional approach to burnout are various means to mitigate the effect of contradictions rather than the removal of them.

At Mountain Elementary School where Brigitte and Christine taught, science teaching at the school improved not because individuals took more university courses or workshops but as a result of identifying and removing some central contradictions that interfered with student learning. Although the teachers had tried in the past to bring about change in science teaching in the school as a whole, all attempts had failed. Some of the problems identified included limited access to resources for science teaching; lack of science content knowledge and pedagogical content knowledge for teaching particular units; lack of equipment for teaching science; limited budget to purchase new equipment or supplies; lack of understanding of and approaches to gender-related issues; and lack of time to prepare a class which, because of its short duration, does not warrant the amount of preparation time needed. Above all, budgetary constraints were constructed as a major impediment to reform. The engineering design curriculum responded to these budgetary constraints because it made use of everyday materials and scraps that were procured from a variety of sources; it also provided teachers with release time for observing other science classes and planning curriculum. Coteaching (involving Brigitte or myself) not only was a temporary response to

the lack of content and pedagogical content knowledge but also provided learning opportunities that brought about changes in the level of science teaching across the entire school. Christine did not just improve in her own teaching but also fostered the learning of other teachers in the school by becoming the science coordinator and facilitator of others. Other teachers in this school came to her class to coteach and in the process expand their own possibilities for teaching science.

To bring about change, the subject of the activity system (individual or group) therefore needs to better understand the structure of the activity system in order to appropriately locate the contradictions that are limiting productivity, that is, for teachers, the learning of students. However, structural understanding in a structuralist sociological manner (deterministic explanations of human actions in terms of variables such as social class or SES) is insufficient because it does not address the concrete situation experienced by the individual. Although the individual subject needs general insights to understand his or her situation and problems, these insights have to be concretized in direction of his or her own conditions and action possibilities, which only he or she is in the position to articulate (Holzkamp, 1984). What is important in this approach is to understand how individual subjectivity is mediated by other aspects of the activity system, itself an integral and constitutive part of society. Coteaching, like the change labs initiated and sustained by Yrjö Engeström and his colleagues (e.g., Engeström, Engeström, & Suntio, 2002) to assist middle school teachers in changing their conditions of work, provides the conditions in which expansive, collective learning can occur. At the core of both approaches is the fundamental assumption that expansive learning and institutional change occur more easily when the subjects constitutive of the activity system begin to articulate and remove existing contradictions collectively. Together with cogenerative dialoguing, coteaching provides teachers (and students if teachers involve them) with opportunities to create new possibilities for concrete action and change.

### **Coda**

Coteaching has tremendous potential for bringing about change of praxis. Rather than spending great amounts of money on workshops, which bring about little change as the research on science teaching over the past four decades has shown, much less resources are needed to hire a few competent science teachers to coteach with regular classroom teachers. In our experience, three months of coteaching can lead to tremendous changes in individual classrooms and across the school. The theoretical perspective articulated in this paper has the advantage over others that exist in the literature in that it starts with the premise of agency as the fundamental characteristic, which allows teachers (as all humans) to change their life conditions rather than merely react to them. This perspective

is more positive than the somewhat pessimistic perspective often associated with viewing schools as agents in the reproduction of an inequitable society (e.g., Bourdieu & Passeron, 1979). Coteaching and cogenerative dialoguing are appropriate vehicles and practices to change the often deplorable conditions under which learning and teaching currently occur—such as in the inner-city schools where part of our coteaching work is situated.

### References

- Bourdieu, P. (1990). *The logic of practice*. Cambridge, UK: Polity Press.
- Bourdieu, P., & Passeron, J.-C. (1979). *Reproduction in education, society and culture* (Transl. by Richard Nice). Thousand Oaks, CA: Sage.
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.
- Engeström, Y., Engeström, R., & Suntuo, A. (2002). *From paralyzing myths to expansive action: Building computer-supported knowledge work into the curriculum from below*. Paper presented at CSCL 2002, Boulder, CO, January 7–11.
- Holzkamp, K. (1983). *Grundlegung der Psychologie* [Foundations of psychology]. Frankfurt: Campus.
- Holzkamp, K. (1984, November). Die Menschen sitzen nicht im Kapitalismus wie in einem Käfig [People are not caught in capitalism as in a cage]. *Psychologie Heute*, pp. 29–37.
- Holzkamp, K. (1991). Societal and individual life processes. In C. W. Tolman & W. Maiers (Eds.), *Critical psychology: Contributions to an historical science of the subject* (pp. 50–64). Cambridge: Cambridge University Press.
- Il'enkov, E. (1977). *Dialectical logic: Essays in its history and theory* (Transl. by H. Campbell Creighton). Moscow: Progress.
- Leont'ev, A. N. (1978). *Activity, consciousness and personality*. Englewood Cliffs, NJ: Prentice Hall.
- Markard, M. (2000). Kritische Psychologie: Methodik vom Standpunkt des Subjekts [Critical psychology: A methodology from the subject's perspective]. *Forum Qualitative Sozialforschung / Forum Qualitative Social Research, 1*. Available online at URL <http://qualitative-research.net/fqs/fqs-d/2-00inhalt-d.htm> [Accessed February 15, 2002]
- Marx, K., & Engels, F. (1970). *The German ideology* (C. J. Arthur, Ed.; W. Lough, C. Dutt, & C. P. Magill, Trans.). New York: International.
- Pickering, A. (1995). *The mangle of practice: Time, agency, & science*. Chicago: The University of Chicago Press.
- Roth, W.-M. (1998). Science teaching as knowledgeability: a case study of knowing and learning during coteaching. *Science Education*, 82, 357–377.

- Roth, W.-M., Lawless, D., & Masciotra, D. (2001). Spielraum and teaching. *Curriculum Inquiry, 31*, 183–207.
- Roth, W.-M., Masciotra, D., & Boyd, N. (1999). Becoming-in-the-classroom: A case study of teacher development through coteaching. *Teaching and Teacher Education, 17*, 771–784.
- Roth, W.-M., & Tobin, K. G. (2002). *At the elbow of another: Learning to teach by coteaching*. New York: Peter Lang.
- Roth, W.-M., Tobin, K., Zimmermann, A., Bryant, N., & Davis, C. (2002). Lessons on/from the dihybrid cross: An activity theoretical study of learning in coteaching. *Journal of Research in Science Teaching, 39*.
- Saari, E., & Miettinen, R. (2001). Dynamics of change in research work.: Constructing a new research area in a research group. *Science, Technology, & Human Values, 26*, 300–321.
- Sewell, W. H. (1992). A theory of structure: duality, agency and transformation. *American Journal of Sociology, 98*, 1–29.
- Tolman, C. W. (1994). *Psychology, society, and subjectivity: An introduction to German critical psychology*. New York: Routledge.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.