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{Coteaching | Cogenerative Dialoguing} as Praxis of Dialectic Method

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Abstract: We present our {coteaching | cogenerative dialoguing} model in which historically existing boundaries between academic research and everyday teaching are considered. In coteaching, all individuals (teachers, teachers in training, supervisors, and researchers) participate in assisting students to learn; sitting on the sidelines and watching (objectifying) others is not permitted. In cogenerative dialoguing, these individuals and student representatives talk about their experience of teaching and learning in order to develop generalizations that open new possibilities for future action. On the basis of these generalizations and new action possibilities, changes are brought about in the environment to further enhance students' learning. Thus, {coteaching | cogenerative dialoguing} serves multiple purposes: besides the obvious context for teaching in a collective manner, it provides a context to research teaching, induct new teachers, supervise new and practicing teachers, assist teachers in development (that is, learning to teach). The structure of the {coteaching | cogenerative dialoguing} model is parallel to two dialectical pairs of concepts, {praxis | praxeology} and {understanding | explanation}, central to our epistemology and methodology, respectively.

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> Activity theory is interventionist in its methodological approach.
>
> Seeing humans as creators of their activity contexts, it aims at reconstructing contexts in practice so that people are not just objects or subordinate parts but regain their roles as creators.
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> KUUTI, 1999, p.373
>
> The term "emancipatory relevance" is intended to account for the double determination of human existence in psychological concepts and methodological arrangements, that is, objective determinacy and subjective determination. It will serve as a precondition for developing a psychology that practically intervenes in problematic (because they limit subjective determination) societal conditions.
>
> MARKARD, 2000, [4], our translation

1. Introduction

In this article, we present aspects of a research methodology that we evolved while attempting to deal with two major problems that plague learning and teaching in inner-city schools. The first problem arises from the distance between teachers' middle-class dispositions (e.g., language, patterns of interactions, interpersonal relations, or worldviews) and those of many students in inner-city schools. This distance, which is already large for students from the working class (ECKERT, 1989), is especially large for students from impoverished neighborhoods whose inhabitants are often unemployed and subsist on welfare (TOBIN, 2000). Moreover, we know that the larger this distance the larger the symbolic violence experienced by the students and the more resistance can be expected to the imposition of culture and cultural values through teachers and the schools they represent (BOURDIEU & PASSERON, 1979; WILLIS, 1977). [1]

The second problem arises from the distance between teacher education as it occurs in universities and the classrooms where teachers are practicing. New teachers are asked to acquire theories of teaching and learning and to apply them subsequently in the classroom. There are often brief field experiences toward the end of teacher training followed by the real work as a teacher. Our research among prospective and practicing teachers shows that they experience a significant gap between what they were taught in university classrooms about how to teach and their experiences of the demands in real classrooms (ROTH, 1998a; ROTH, MASCIOTRA, & BOYD, 1999; TOBIN, SEILER, & SMITH, 1999).

This problem is particularly salient in inner city high schools, where students resist the inculcation of middle class culture—and thereby contribute to the reproduction of class society (TOBIN, 1999; WILLIS, 1977).[1] [2]

To address these problems at an appropriate level of complexity[2] and to work on changing the situation, we introduced a pair of research practices which we conceptualize as a dialectic unit: {coteaching | cogeneratively dialoguing}. In coteaching, all individuals other than students who come to a classroom participate in assisting students to learn; just looking from the sidelines for the purpose of researching what others do is not permitted.[3] In cogenerative dialoguing, all teachers and student representatives talk about the shared experience with the intent of expanding the range of actions available to each stakeholder and thereby bringing about change in the teaching-learning environment. We refer to knowledge created in such sessions as praxeology (Gr. *praxis*, action & *logos,* talk). Praxis and praxeology form a dialectical unit ({praxis | praxeology}), which, as all dialectical units, harbors contradictions that give rise to continuous development (e.g., IL'ENKOV, 1982) and "expansive learning" (e.g., ENGESTRÖM, 1999a).[4] [3]

The purpose of our research is expansive learning, that is, an increase in the range of possible (i.e., concrete) actions available to participants in classrooms (schools). Such increases come about when we understand individual problems in terms of societal contradictions that have been internalized (HOLZKAMP, 1984). How can we change this situation given the existing conservative political climate to make schooling more appropriate for students in inner-city schools? How can we train teachers to teach in existing inner-city schools all the while participating in the transformation of these schools toward more equitable participation of students and teachers in the design of the learning environment? [4]

1 The work we present here has evolved from our engagement in practice. Consequently, only some aspects are well developed. To date, the second one of these problems has received more attention in our research in order to provide a platform for engaging in the much more demanding problems of dealing with the societal structural problems that have become apparent in the course of our work.

2 In this article, it will become clear what we mean by an appropriate level of complexity. Suffice it to indicate that we do not think of classrooms as systems that can be decomposed into individual factors so that predictable changes can be brought about by tweaking one or the other variable. Rather, we think of schools and classrooms more in terms of complex ecological systems, in which any one change can bring about unpredictable changes elsewhere. Systems are not to be comprehended as a complex of ready-made things but as complex processes, in which apparently stable entities and concepts go through uninterrupted change of coming into being and passing away (MARX & ENGELS, 1970).

3 Watching activities from the sidelines gives a distorted view of the meaning relations (Begründungszusammenhänge [MARKARD, 2000]) that are the grounds for practitioners' actions (e.g., BAKHTIN, 1993). It is a well-known phenomenon that many fans, though they are far from proficient in a sport, seem to know better what a player or the team in the game they are watching should have done.

4 In a comment of an earlier draft of this article, Morus MARKARD pointed out that theory and praxis have to be separated to allow a critique of praxis. As described below, we enact such separation in our data analyses through radical doubt and suspicion of ideology. However, here we are concerned with gap that exists between hearing prescriptions for teaching (theory courses in university) and the practice of teaching. This gap is certainly neither necessary nor required for the type of theory-praxis separation in the service of a critique of praxis that MARKARD and others (e.g., Jürgen HABERMAS) advocate.

2. Fundamental Assumptions

Current conceptions of schooling and teacher training are dominated by traditional ("Variablen") psychology. This psychology seeks to make people comply with existing conditions and thereby always supports the status quo and existing power relations, and is a science in the service of the powerful ("Herrschaftswissenschaft"). MARKARD (1996) and HOLZKAMP (1992) noted that school psychology truncates research by focusing on such things as a student's "learning disabilities" that need fixing rather than attempting to create appropriate psychological concepts to understand students in their (societally mediated) school contexts. It is our belief that critical and emancipatory forms of research in schools cannot be based on a psychology that potentially serves to reproduce social inequalities. Our research is, therefore, based on the following assumptions:

1. Human beings live in (and under) certain conditions that determine their actions but they also have the power-to-act ("Handlungsfähigkeit") to change these conditions. (The latter is not normally part of educational and psychological theories.)
2. The object of inquiry is the world as perceived and experienced by the subject. (This contrasts with those forms of [quantitative and qualitative] inquiry in which human beings are the objects of research and analysis.)
3. Participation in praxis is a prerequisite to understanding praxis. The purpose of inquiry is to change the world rather than to understand it. The consequence of this perspective is the radical partiality ("Parteilichkeit") of the researcher who participates in the day-to-day accomplishment of the activity, for the purpose of understanding *and* changing it. [5]

We view and relate to students differently than official school practices. We view students as the true subjects of learning (LAVE, 1997). The motivation for learning is an increase in the power-to-act in the real world, characterized by an increase in the actions available to the individual. Learning thus motivated has been referred to as "expansive learning" (ENGESTRÖM, 1999b; HOLZKAMP, 1992).[5] In our work, this view pertains to high school students learning science, university students learning to teach science, and teachers and university professors developing their teaching practice. [6]

5 Morus MARKARD pointed out to us that Klaus HOLZKAMP's concept of "expansive learning" has to be understood solely in its relation to defensive learning. There is no expansive learning that one could see and describe. Rather, "expansive learning" is a means to unpack the contradictory nature of real learning processes. Influenced by ENGESTRÖM (1999a), we understand the notion as descriptive of activity systems under development, which can certainly be described.

3. Practice of Method

The two dialectically related practices of coteaching and cogenerative dialoguing emerged from our work in schools; that is, they are themselves the result of a continuing process of expansive learning. We did not design coteaching and the associated cogenerative dialoguing as ideal forms of practice to be implemented in response to some problem. Once we noticed the tremendous amount of learning that accrued to all participants, we began theorizing this practice a posteriori. We always considered {coteaching | cogenerative dialoguing} as a practice of method rather than as a method of practice. Rather than telling teachers and research participants what *they should* be doing, *we coparticipate* in their everyday work and practice what we think and believe. Rather than forming theory that we hand to teachers, we construct theory with them and in a collective fashion. [7]

3.1 Coteaching

In coteaching, two or more teachers collectively do what under current circumstances has to be done by a single individual. In so doing, the collective accomplishes much more than any individual. First, at the level of teaching there is a division of labor so that there are more resources available to students in their efforts to learn. Second, from the perspective of teacher training, it is a form of learning by participating in the practice, which allows newcomers to learn by working in authentic activity at the elbows of an experienced individual (e.g., BOURDIEU & WACQUANT, 1992). Accordingly, new teachers engage in legitimate peripheral participation (LAVE & WENGER, 1991). Third, coteaching is a form of supervision: university supervisors and "pedagogical methods" teachers coparticipate in the classroom (with the regular classroom teacher and the new teacher) and in subsequent cogenerative dialogue sessions. Fourth, and most important in the context of this journal, coteaching is a form of research in which the university-based researchers participate in the daily praxis of teaching at the high school. In this way, coteaching is different from action research, often practiced without the participation of university researchers (e.g., NEWMAN, 2000). It also differs from those uses of participatory action research (e.g., ELDON & LEVIN, 1991) and critical psychological counseling (e.g., DREIER, 1993), in which university-based researchers participate in making sense and therefore are consultants rather than participants on the job. In some ways, coteaching as method is similar to apprenticeship as method (e.g., COY, 1989) but it differs in that the researcher participates (the participation is research qua teacher qua supervisor qua colleague) in the collective transformation of participating individuals and situations. Our approach is perhaps most akin to "practice research" (NISSEN, 1998) as a specific form of action research in which the actual empirical projects are understood as joint ventures between research projects and various forms of quality development in practice. Our approach also shares its fundamental values with participatory action research as it has been practiced mostly by and with the people of non-industrialized nations (e.g., FALS-BORDA & RAHMAN, 1991; FREIRE, 1972) and which has led to the international Participatory Research Network (e.g., HALL, 1997). With this movement, we

share a "version of 'commitment' which combined praxis and phronesis, that is, horizontal participation with peoples and wise judgment and prudence for a good life" (FALS-BORDA, 1996).[6] [8]

Finally, coteaching is grounded in our reading of (neo-) Marxist psychology (e.g., BAKHURST, 1991; HOLZKAMP, 1983; LEONT'EV, 1978) and hermeneutic phenomenology (HEIDEGGER, 1977; RICCEUR, 1990). Our understanding of praxis is that it is characterized by a particular experience of temporality, the constraint that there is no time out from the activity, and that action not taken is also a form of action (BOURDIEU, 1980). As such, the modes of time characteristic of praxis—the temporality of a practice—cannot be experienced from the outside (e.g., by a theoretician). Consequently, praxis, per se, is necessarily absent from any theory of practice. To understand a practice one has to participate in praxis (MAO, 1967). Moreover, to understand a social practice one has to share being-with (Mitsein). A second constraint on theory arises from this situation: the purpose of theory is not simply to understand (as produced by idealists and academic theorists) but to change the world (MARX & ENGELS, 1970). Its purpose is to provide more room to maneuver by making available new forms of action (HOLZKAMP, 1984). Coteaching and the associated cogenerative dialoguing evolved[7] because we found that they led to understandings that allowed us to generate new possibilities for action and thereby engage in expansive learning and transformation of praxis. [9]

3.2 Cogenerative dialoguing

Cogenerative dialoguing developed out of our practice of debriefing lessons with coteachers followed by the practice of debriefing between teachers and coteaching researchers, to our present practice of including students. Generally, some or all coteachers meet after a lesson to debrief. Periodically, coteachers and student representatives (anyone willing to participate) gather more formally to talk about the lesson that had just occurred. For reasons that will become more obvious in this section, we refer to this aspect of our practice as *cogenerative dialoguing*. Cogenerative dialoguing is intended to improve teaching and learning and therefore provide participants with opportunities to talk about specific lessons, teaching strategies, and subject matter pedagogy as well as about

6 In 1996, two issues of *Sociological Imagination*, 32(1) and 32(2), were devoted to the active engagement of academic sociologists in the daily struggle of people who cannot easily fend for themselves (http://comm-org.utoledo.edu/si/sihome.htm). In the same year, *Social Studies of Science*, 26(2), devoted a special issue to a debate between those advocating neutrality and those advocating personal commitment and open partisanship as fundamental stances academic researchers should take.

7 Coteaching and cogenerative dialoguing were not designed, at the drawing board of theory, to be implemented subsequently, but evolved out of our situated practice. For one of us (ROTH), the practice arose as we attempted to assist elementary teachers in teaching science where they often did not know the subject matter very well (e.g., ROTH, 1998a). In the other case (TOBIN), the evolution had a different origin. The principal at City High School placed together two new teachers to learn to teach science from one another rather than what is more conventionally done—assigning one new teacher to a more experienced teacher. On the basis of this successful experience we extended the amount of coteaching and at that time created a theoretical and empirical rationale for what we were doing. Hence coteaching for us grew out of praxis and our studies of it.

teaching and learning in general. Having experienced a particular class from a similar point of view (as teacher), and having had to make decisions in the same mode of temporality, participants now have opportunities to develop explanatory accounts of these shared events. That is, their shared lived experiences provide them with a common resource for constructing shared formal explanations (re-presentations) of their praxis. Every attempt is made to allow all participants to contribute to the conversation in equitable ways. To achieve this we created a heuristic, a sort of checklist with items such as "all participants have the opportunity to voice their opinion" or "all participants have the opportunity to ask questions or raise new topics." Our research shows that the contributions of all participants are valuable and valued and lead to ongoing change in teaching practices of newcomers and old-timers alike (e.g., TOBIN, ROTH & ZIMMERMANN, in press). Our cogenerative dialogue sessions provide a forum in which successes, failures, and (failed) opportunities are raised and analyzed. [10]

Cogenerative dialoguing is intended as a practice for generating new action potential for the different coteaching stakeholders, including students, (cooperating) teachers, new teachers, supervisors, and researchers. That is, by bringing together all stakeholders we expect differences in lived experience to arise from what might be held as the same classroom events. These differences provide us with in-roads to critically interrogate immediate experience and to come to understand differences as the result of biography and social and societal location. [11]

3.3 Dialectics

We understand {coteaching | cogenerative dialoguing} as a dialectical pair of situations associated with and corresponding to a {praxis | praxeology} dialectical pair. The latter pair forms a dialectical unit because praxeology, although generated by practitioners, can never be identical with praxis (BOURDIEU, 1980). More so, because there are differently located teachers (with different biographical trajectories) *and* students who participate in cogenerative dialoguing, there is always the potential of different understandings and therefore the potential for contradiction. We do not view the contradictions as negative nor do we attempt to negotiate away different viewpoints and different accounts of experience of the same lessons. Rather, we view differences and contradictions as resources for developmental change. From phenomenological and Marxist psychological perspectives, it does not make sense to negotiate away differences in experiences and viewpoints (and therefore distinct interpretive horizons), all of which are the result of differences in social location and biographical experiences. Because we are interested in individuals and their learning, we enact a subject-centered approach to research ("Subjektwissenschaft" [e.g., MARKARD, 1993]). [12]

Dilemmas, disturbances, antinomies and paradoxes arise from contradictions within a system and lead to resistance in ongoing activity. At the same time, this resistance is developmentally significant because it also has the potential to lead to expansive learning (ENGESTRÖM, 1999c). Any concrete system includes contradictions, which are the motors of change that work to bring about

development of the system (IL'ENKOV, 1977). The critical analysis of concrete conditions of existence allows for the identification of contradictions between understanding (theory) and praxis. This analysis of concrete conditions leads to the creation of (real) concrete possibilities for action and change. [13]

4. Data Sources and Data Interpretation

Research such as we present it here necessarily has multiple motivations (i.e., multiple users and audiences, each with their own community-specific requirements of credibility). On one level, the intent of {coteaching | cogenerative dialoguing} is the transformation of the concrete conditions in which inner-city students learn, teachers teach, new inner-city teachers learn to teach, and university-based teacher educators supervise new teachers. We provide examples of coteaching and cogenerative dialoguing in Section 5. On another level, we participate in academic communities, which have their own interests and are characterized by different practices. At this level, we analyze and report on our work at a meta-level by describing how we go about our research rather than what specific results we achieve in praxis. In the following, we describe this aspect of our research methodology. [14]

4.1 Context

The teacher education program at the University of Pennsylvania (Penn) constitutes the context of the work reported here. (Proper names are pseudonyms unless already identified as co-authors of this and other cited papers.) In 1997, TOBIN was appointed Director of Teacher Education. It was under his tenure that the context for teacher education, particularly that for science teacher education, was changed. We are now in our third year of conducting ethnographic research in accompanying the changes in the teacher education program at Penn and associated public schools. [15]

Most of our research was conducted at City High School (CHS) in urban Philadelphia. This high school is attended by more than 2,000 students mainly from African American, poverty-stricken or working class families. The curriculum is often enacted at a minimal attainment level, students rarely engage appropriately in activities, equipment, supplies and textbooks are in short supply, and there appears to be a lack of motivation on the part of either teachers or students to pursue deep learning goals (TOBIN, SEILER & WALLS, 1999). Conversations with teachers reveal that they place the blame for this state of affairs with the students and the situations in which they live. Teachers also note a lack of commitment from the school district and a system that permitted urban schools to be funded at a level far below that of suburban schools. In striking contrast, the students place the blame for the inadequate curriculum squarely with teachers and administrators who maintain a curriculum perceived by many students to be a complete waste of their time. (From the perspectives of activity theory and Critical Psychology, both forms of analysis [student, teacher] of the situation are "restrictive" because they are conducted in terms of lived experience and therefore do not recognize the societal mediation of the existing situation.)

Since January, 1999, TOBIN has cotaught in the school on a regular (nearly daily) basis. ROTH cotaught with TOBIN, resident teachers, and new teachers at CHS as part of this research. [16]

4.2 Data collection and interpretation

As part of our research, we draw on a variety of qualitative research methods appropriate in school contexts, including ethnography, discourse analysis, and micro-analytic approaches to studying situated cognition. In addition to the usual observational, methodological, and theoretical field notes, we videotape lessons, interview students and (student) teachers, audio-tape interviews conducted by high school student research assistants among their peers, and collect the teaching-related discussions preservice teachers held using an online Internet forum. We also videotape "cogenerative dialogue sessions" (described below) in which those who participated in a lesson talk about teaching and learning in order to generate understanding by critically examining their praxis. [17]

We begin our initial analyses in the sessions with teachers and students who shared our experience in the classroom. We use the techniques of peer debriefing (relationship with independent colleagues without interest in the local situation), monitoring progressive subjectivity (emergent collective descriptions), and member checking (validation of situation descriptions by research participants) for ascertaining the credibility of our research findings (GUBA & LINCOLN, 1989). We make sense of our data by analyzing data independently followed by subsequent discussions or by analyzing data collectively such as when we conduct interaction analysis (JORDAN & HENDERSON, 1995). [18]

We analyze data at multiple levels and engage in ongoing efforts to understand; we both generalize (ascending from particulars) and remain concrete. Thus, the results of our theorizing efforts have to lead to concrete changes in the classroom. [19]

For example, in a genetics lesson, one of our cooperating teachers presented a way of figuring out all possible genetic make ups in the filial generation given the make up of both parents. In his own words, the teacher "messed up," becoming entangled in a flurry of letters and boxes (Punnett Squares). Already during the lesson, the other teachers and one student proposed different ways to solve the problem. They subsequently elaborated and compared their different approaches in an ensuing cogenerative dialogue session. These different approaches, in other words, correspond to different subject matter pedagogies, which, according to some (e.g., SHULMAN, 1987) constitute important forms of teacher knowledge. However, our process of investigation did not stop there. For several weeks we continued a conversation, which led to a better understanding of genetics and associated pedagogies. Ultimately, the results of this continued inquiry into science teaching and scientific contents were published by an author team involving all the primary participants in the coteaching experience and subsequent cogenerative dialogue (ROTH, TOBIN, ZIMMERMANN, DAVIS, & BRYANT, 2000). Each new piece of conversation, email, personal note, or

comment became a new piece in our artifact collection. New results became tools or objects for subsequent analysis.[8] Our ultimate solution was not to come up with one way of teaching or learning Mendelian genetics, but with a better understanding of the structural relationships of the multiple methods of getting to the same result and with better understanding concerning multiple pedagogies appropriate for Mendelian genetics. [20]

4.3 Dialectic of immediate and generalized understanding

Our intent is to employ critical analysis to move from the immediate understanding of teaching, associated with teaching praxis, to understanding our lived experience as mediated by a societal context. The intent of a critical analysis is to increase the range of actions available to participating individuals. This is achieved when we transcend the immediate world of lived experience and come to understand it as the result of societal mediation (HOLZKAMP, 1991). Yet how is it possible to move from immediate understanding to generalized understanding, that is, to bring about "expansive learning" (ENGESTRÖM, 1999a) and the associated increase in concrete[9] action possibilities? Here again, we conceptualize a dialectical unit that arises from the contradictions between immediate and generalized understanding. [21]

The relationship between (immediate) understanding of lived experience and understanding experience in generalized terms (explanation) has been conceptualized in hermeneutic phenomenology (e.g., RICCEUR, 1991) and political philosophy (GRAMSCI, 1971). From this perspective, immediate understanding and explanation (generalized understanding) stand in a dialectical relationship. Explanation always requires immediate understanding—praxis always precedes the comprehension of praxis (MARX & ENGELS, 1970). But explanation develops immediate understanding in an analytic way. That is, explanation is enveloped (preceded, accompanied, and concluded) by immediate understanding which arises from our practical engagement in the world of teaching. However, immediate understanding also requires explanation to be further developed lest we become trapped in understandings that take the form of ideology, an outcome we should avoid by the expression of doubt and suspicion about what we are learning or claiming to learn from our research (BOURDIEU, 1992; MARKARD, 1984). The search for explanations is simply based on common sense or folk knowledge but draws on everything that the history of thought on the subject has produced. [22]

Structurally, the dialectical unit {understanding | explanation} parallels that between the other two pairs of concepts, {coteaching | cogenerative dialoguing} and {praxis | praxeology} presented here. Coteaching as praxis is the source for our

8 In activity theory, tools are conceptualized as entities that mediate the subject-object relation (LEONT'EV, 1978). However, there are no clear distinctions between objects and tools: The object of present inquiry can become tool during a subsequent activity and a tool (particularly during breakdown) can become an activity-determining object.

9 We are not interested in action possibilities that participants characterize as "idealistic," that is, actions that they characterize as "possible only in theory" but as "impossible in practice."

immediate understanding of teaching. Cogenerative dialoguing constitutes an explanation-seeking practice that leads to praxeology. [23]

5. Example from our Practice

5.1 The praxis of coteaching

Andrea and Sonny, two new teachers, are the two lead teachers in this example. Chuck, the cooperating teacher, is a resident teacher at City High School. Ken is the supervising professor and Michael a researcher of coteaching. Andrea and Sonny decided to teach the grade 10 class separately, having the class physically divided into two parts. Although Chuck, Ken, and Michael move back and forth between the two smaller groups, most of their time is spent in Andrea's section. [24]

Andrea opens the class by reviewing how to state and test a hypothesis. To help students relate science to their everyday life outside school, she had prepared bread and jelly. During the previous lesson, students had suggested that jelly sandwiches always seem to land on the jelly side when they were dropped. Andrea had used this as a way of helping students learn how to conduct experiments and particularly how to state and test hypotheses about the factors that cause particular outcomes (landing on either the jelly side or backside of a sandwich). [25]

Students then begin stating hypotheses, preparing data tables, and experimenting. Andrea, Chuck, Ken, and Michael circle around the classroom and begin to interact with pairs of students. The questions asked by the teachers engage students in a conversation that allows them to articulate what they were doing, and thereby engage in talking science. (Opportunities for *talking* science may be the most important aspect of science pedagogy [LEMKE, 1990].) [26]

Later, once all students have completed their activity, Andrea brings them back together in a circle. The lesson has taken more time than was allotted in the original plan so Andrea and Chuck quickly decide to leave the rest of what they have planned until the next full lesson. Instead they agree to introduce students to a new topic in Mendelian genetics. At first, Andrea reviews with the students crossing single genes and subsequently, Chuck takes over to work with students through the laws of inheritance for linked genes. Chuck, Andrea, Michael, and Ken all contribute to this part of the lesson by participating in conversations begun by one of them. [27]

For example, at one point in the lesson, Michael posed a riddle, which he thought might make genetics more tangible and therefore concrete to students. From this developed a series of genetics riddles, solved in conversations involving teachers and students alike.

> Michael: I wonder if anyone can figure out a little bit about my family? So, I have blue eyes and my wife has blue eyes. I was wondering whether you could figure out what color my son Niels' eyes are?
>
> Andrea: This is a good question.
>
> Natasia: Blue eyes.
>
> Michael: Why would they be blue?
>
> Natasia: You have blue eyes, she has blue eyes ...
>
> Natasia: She has blue eyes and you have blue eyes, you all must have recessive genes.
>
> Andrea: OK, let's think about that [begins to write] let's list the possible ...
>
> Natasia: Make them have all the different combinations
>
> Andrea: Excellent, excellent. A good point. [to Michael] I am glad you brought that up. Natasia has a good point. Let's list all the possible genotypes. OK. He has blue eyes, so his phenotype is blue. So what are the possible genotypes he may have? All right. What condition he may have?
>
> Natasia: He would have to be recessive, because if, if, if all people ... [to Michael] You all have blue eyes?
>
> Andrea: This is the question.
>
> Michael: My wife and I both have blue eyes.
>
> Natasia: It has to be both recessive genes, because, a dark color is dominant like brown eyes would dominate over blue eyes. [28]

In this excerpt, both Andrea and Michael participated in the conversation that followed the original puzzle. Natasia's contribution can be thought of as a think-aloud session by an expert, who thereby modeled exemplary reasoning patterns in the domain (e.g., SCHOENFELD, 1985) for the benefit of her peers; encouraged, they contributed in increasing ways to finding a solution to a subsequent genetics puzzle that involved real people. The conversation was spontaneous, not planned. In the subsequent riddle more students got involved. Eventually, Andrea also provided an example from her family. [29]

Toward the end of the lesson, Chuck attempted to show students how to figure out the genes of the offspring given a particular gene set of the parents. However, he committed a series of errors that, because of the impending end of the lesson, could not be resolved by the participants. Natasia and Ken proposed different ways of helping Chuck out of his trouble. Michael also contributed, and Ken and Andrea began to negotiate their different approaches. As students walked out of the classroom, the conversation continued between the different teachers right into the beginning of their cogenerative dialogue session, where the conversation was subsequently extended in a cogenerative discussion in a group that included Natasia. [30]

The fundamental point here is that students and teachers engage in what might be considered one lesson. During this lesson, however, individual participants do not know what the experience is like for others, what and how they learn from

coparticipating, and how aspects of the lesson might have interfered with teaching and learning. In order to deal with these issues, the four coteachers (Andrea, Chuck, Ken, and Michael) met with two students (Natasia and Shawan) during the subsequent lunch period in order to talk about teaching and learning specific to this lesson and to coteaching more generally. The purpose of such cogenerative dialogue is to understand what has happened and to allow all participants to create new possibilities for enacting science lessons in this classroom. We periodically returned to the issues of the "mess up" by continuing the dialogue involving subsets of our initial group. Here, then, we drew on transcripts of the lessons and the follow-up meeting, our journal entries, and initial draft manuscripts as data. Each time we wrote or talked about the lesson, we added any created artifacts to the existing data. (Exemplifying this process would exceed the space we have here, but reports are available elsewhere [ROTH & TOBIN, in press; ROTH, TOBIN, ZIMMERMANN, DAVIS, & BRYANT, 2000]). [31]

5.2 The praxis of cogenerative dialoguing

In the subsequent cogenerative dialogue session, we talked not only about the "mess-up" but also about the particular way of grouping students that Andrea and Sonny had chosen and the (teacher) resources available to students in such situations. In most situations, the "data" are lived experiences as the various participants articulate these during the session. In our work, we are interested in establishing practices of learning that work in this context rather than broad statements about this or that form of organizing a classroom. That is, we are not interested in how an (ideal) average student responds, as measured by some context-independent test, to different ways of grouping students in the classroom. Rather, we are interested in finding ways that *these* students are supported in their learning in *this* classroom in *this* school. Our focus here is on understanding the content and process of learning from a student-centered perspective, which requires us to engage in a dialogue with these students. Together with students and teachers, we need to make sense of how this classroom fosters the learning of City High students and the learning of individuals, in the process of becoming certified as science teachers. [32]

In this lesson, the large class was split into two smaller groups each led by one of two new teachers. A common lore among teachers states that it is easier to teach smaller rather than larger classes. There exists research that shows higher test scores for students in smaller classes. Also, as part of the class, students worked in pairs to conduct their experiment, a form of collaborative learning, which has been hailed as the answer to many problems in teaching-learning contexts (e.g., ROSCHELLE, 1992). However this existing research appears to be inappropriate in the present context. Here, the students make a number of arguments against a separation of the class into two groups taught separately and by different teachers. They stated that their preferred arrangement would be a combined class in which all teachers and student experts were available to all students and attempted to articulate an explanation (theory) why a larger class will better facilitate learning.

> Shawan: I think the combined class [is better], because the whole class would just be together ... because people ...
>
> Natasia: All do the same ... experiment, because people from Miss Sonny's class go, 'Oh, we don't get to do stuff like that.' 'Yeah, they get to do that stuff but we don't'
>
> Shawan: Like they get to throw sandwiches but we don't, because their teacher don't give them as many activities. So I think if the combined class was, you never know, like it might be that more people like the thing and they catch on. [33]

The students also proposed that peers who are experts on some topic could provide additional teaching resources in the classroom, and thereby increase the teacher-student ratio available at any one point in time. Multiple teachers also provide opportunities to receive multiple explanations, allowing students to learn simply by participating in conversations where different teachers speak about a topic. [34]

At one point, the senior science teacher (Chuck) suggested that he still preferred splitting the class into two, three or more smaller groups, each taught by one individual. One of the researcher-teachers asked him to elaborate.

> Chuck: I am just afraid that in a large group of 30 that you know, that they don't get the needed attention (gestures 'separation', 'segregation'). I mean, that is what my fear is. It may not materialize but when I have a group of 15 and one, you know, the one teacher is going to know what is going on with everyone of those 15 kids.
>
> Natasia: It's just like having a big class with three teachers!
>
> Chuck: That's true
>
> Natasia: It's basically the same thing.
>
> Shawan: It has the kids divided in the whole group, like [Andrea] says, like me I like the reports, that's easy to me, she [Natasia] likes the DNA and thing. And I think that if everybody likes something, sit together in a group. And the people who catch on fast to what she likes, sits with her, and she can help them and not only y'all [gesture pointing to teachers].
>
> Chuck: Yeah, if you had the one large class and with three teachers, then we would basically break down into groups. Like that's what you are asking? So you want to get more groups there?
>
> Natasia: Yeah.
>
> Ken: And if two or three groups are working ok, then the teachers can put their resources over into the groups that are not. And I suppose there is a chance to have 'wandering experts', who catch on quickly, and you (to Shawan) might be the wandering expert on the report writing, and so ... [35]

Without hesitation or fear of reprisals, both students critiqued Chuck's position. Natasia pointed out that both splitting the class among teachers or teaching all students with all teachers present, results in the same teacher-student ratio ("It's basically the same thing"). Shawan's comment, subsequently picked up in Ken's notion of "wandering experts", underscores the additional resources to learning at the classroom level. In a larger class, there is a greater likelihood for a variety of

student experts (those who "catch on fast"). The two students also emphasized that there are fewer inequalities arising from different teacher preferences in topics and ways of teaching the topic. Thus, what made sense to Chuck and is supported in research (in middle-class schools) did not make sense to the students in *this* context. These students and their peers generally preferred larger classes where all students have equal access to all resources. Thus, whereas existing research-based knowledge told these teachers that breaking the class into smaller units should increase the learning potential for each student, the outcome of our collective analysis revealed the opposite. At this point in time, we do not know whether this form of classroom organization is a preferred mode of inner city students more generally. More important to us in this situation is the fact that subsequent classroom practices could be adapted to the needs of *these* students in *this* class. [36]

Our cogenerative dialogue sessions are conceptualized as forums in which all participants contribute in equitable ways, irrespective of their current institutional role (teacher, new teacher, or student). Our cogenerative dialogue therefore has to be necessarily reflexive and focus, in part, on its own dynamic. This reflexive component, and particularly any contradictions articulated in it, become forces of change. For example, as part of our analysis we developed a heuristic to describe our cogenerative dialogue sessions as forums of equitable participation. One of the items was "all participants engage in asking questions." When we brought the heuristic to subsequent meetings, students noted that whereas they engaged in other activities specified in the heuristic, they did not participate in asking questions. [37]

5.3 "Applying" theory

In our coteaching work, the often-reported gaps between theory and practice of teaching do not arise. Explanations of phenomena and events developed during our cogenerative dialoguing lead to developmental changes in the classroom learning environment that are themselves subject to further research. As the following comment from Andrea suggests, there is great potential for learning by participating in {coteaching | cogenerative dialoguing}.

> The initiation of round table discussions (by Ken), in which Chuck, two or three students and myself, reflected on a lesson, were so inspirational that I plan on continuing them at my new school. Most importantly, the conversations gave students a voice in the manner in which they were taught. Whether it involved a minor detail like their difficulty in discerning my "r" from my "n" or a major strategy such as pairing students as study partners, their feedback was a precious resource that aided me in designing lessons that best met their needs. Chuck also seemed to heed their advice. When a student informed him that his multiple stories were boring, he smiled and responded, "I'll try to cut back." While Chuck was affable and turned the criticism into a light-hearted moment, it was a major breakthrough in terms of his pedagogy. It was a practice that I knew needed improvement but was too shy to mention. I am convinced that students always serve as the best consultants. [38]

Notable in the context of our earlier example is the fact that the students' (here Shawan and Natasia) contributions to the conversation about grouping led to a change that had a very positive impact on subsequent learning. That is, our understanding of learning in groups and organizing collective learning experience was not abstract and inconsequential to a particular context. Rather, it was concrete in the sense that it led to immediate changes in pedagogy with consequences for student learning. [39]

6. Discussion

As a methodology, {coteaching | cogenerative dialoguing} is squarely based in the educational context because of our commitment to the supposition that to understand praxis, one has to participate in it. We do not argue that the methodology generalizes to other professional contexts. Whether the methodology is applicable elsewhere needs to be the topic of research. Certainly, workplace-based research where workers collectively reflect on their practice and where participants are remunerated for their competence in facilitating learning (e.g., ONSTENK, 1999) bear strong resemblance with our approach. Participatory action research (e.g., ELDON & LEVIN, 1991; FALS-BORDA & RAHMAN, 1991), if the researcher also participates in praxis, is structurally equivalent to our approach. In all of these situations research-activity cannot be meaningfully isolated from work-activity. We therefore discuss our work both in terms of its potential in the practical school context and in terms of more general research issues. [40]

6.1 Resolving school-related contradictions

In his address *Die Fiktion admistrativer Planbarkeit schulischer Lernprozesse* ("Planning school learning processes—A fiction") HOLZKAMP (1992) noted that the organization of schools and school life actively interferes with students' learning, which is structured for administrative reasons rather than emerging from students' needs. Furthermore, current practices in teacher training, because they conflate decontextualized theory and practical knowledge interfere with the process of development, i.e., *becoming-in-the-classroom* (e.g., GRIMMETT, 1996; ROTH, MASCIOTRA, & BOYD, 1999). {Coteaching | cogenerative dialoguing} in praxis provides a different context for the learning of students and new teachers, provides a forum for practice-relevant theory that changes and is tested in praxis, and provides a different form for doing research targeted for academic audiences. For example, time and again teachers in our research pointed to the gap between the talk about teaching (at the university) and teaching practice. It does not come as a surprise that teachers often consider getting a degree as a pro forma activity, a rite of passage, which has little to do with the real world of teaching. Formal teacher development comes to a halt once teachers have their degrees. Our approach to teacher education has the potential to change this. Teachers who learn "on the job" and practice cogenerative dialogue automatically engage in an effort that engages the dialectic of {praxis | praxeology}. That is, the dilemmas (contradictions) that arise from the sense-making efforts of teachers and learners are the driving force for further development. {Coteaching |

cogenerative dialoguing} builds into the teaching profession an engine of development, an engine that derives from the dialectical nature of its basic component practices. [41]

Our research methodology has already provided solutions to antinomies and paradoxes identified by others in the pages of this journal (PROKOPP, 2000). In PROKOPP's context, these antinomies and paradoxes were not used as resources to drive development. It is true that his teachers met to make sense collectively, but they failed to include in their meetings ("Teamkonferenzen") students and, from our perspective, other stakeholders that contribute to expansive learning in our context. [42]

The first antinomy is related to differences in the actions of teachers who decide on doing "the same thing" but despite this intention enact different practices. The second antinomy is related to the differences between the worldviews of teachers and students, which lead to the production and reproduction of power relationships. Our research approach deals with both antinomies in the sense that coteaching provides a forum for teachers to learn from each other and to develop highly congruent forms of actions (e.g., ROTH, 1998b). Cogenerative dialoguing provides a forum for students and differently located teachers to engage in an equitable conversation where differences in worldview are allowed to emerge and, in fact, are ways for interrogating them in a reflexive way. [43]

PROKOPP (2000) also noted three paradoxes in teacher action ("Paradoxien des Lehrer(innen)handelns"). The first paradox relates to the contradictions arising from an imposed temporal development of lessons by teachers and different learning rates by students ("Lernorganisationsparadoxie"). The second paradox arises from the fact that in traditional schools, the abstractness of subject matter interferes with the emergence of complex dialogues between teachers and students ("Lerngegenstandsparadoxie"). The third paradox ("Lehrtätig-keitsparadoxie") arises from the contradiction between the routines teachers have to create to suffice administrative purposes and the activities required in support of individual student learning. Our {coteaching | cogenerative dialoguing} paradigm addresses the first two paradoxes because content and pedagogy are, within certain constraints, open for discussion between teachers and students. We do not have sufficient experience with the third paradox, which requires that school and school district administrators also participate in {coteaching | cogenerative dialoguing}. Consequently, we have had to solve certain problems in limited (restrictive) ways. For example, curriculum content and tests of competence are imposed at the school district level. Teachers therefore teach to the curriculum and teach to the tests rather than involving students as subjects of their own learning (HOLZKAMP, 1992) in the design of curriculum and tests of competence. As a temporary solution, one of our doctoral students created a lunch science club in which students design their own curriculum. However, the solution is limited because it does not deal with the core of the problem. There are other problems that we still face in working at City High School that require the inclusion of administrators. For example, students come late to classes (e.g., because of weapons checks) or do not come at all (e.g., being refused entry to

the school because they are a few minutes late), thereby further limiting learning and reproducing inequities. In this case cogenerative dialogue would have to bring those administrators to the table who are responsible for the policies that keep students from attending classes. [44]

6.2 Partiality

In traditional approaches to ethnography and qualitative inquiry, researchers were external to the lives of those researched. Qualitative researchers thought of themselves in terms of the fly-on-the-wall metaphor and thereby disregarded the influence their presence had on events and on the research. The research participants became the objects of inquiry, and were depicted by researchers rather than participants in the depiction. That is, participants did not have a voice (e.g., RODRIGUEZ, 1998). Critical and emancipatory approaches to research have changed their intent. Rather than thinking of themselves as flies on the wall, critical ethnographers and Critical Psychologists openly become partial and ideological (BARTON, in press; LATHER, 1988). For example, Critical Psychologists use and theorize subject-centered research ("Subjektwissenschaft", "Forschung from Standpunkt des Subjekts") that makes the standpoint of the individual subject the privileged position from which to view his/her life. For us, this position—and the resulting partiality ("Parteilichkeit")—constitutes a fundamental commitment to the people we are working with. It is a praxis that is consistent with the notions of catalytic and tactical authenticity (GUBA & LINCOLN, 1989), which pertain to the extents that our research assists in creating new opportunities for acting (catalytic authenticity), particularly for those who may, initially, not be able to assist themselves (tactical authenticity). For example, some readers may think that teachers could engage in {coteaching | cogenerative dialogue} on their own. However, working within an educational system that primarily serves to reproduce rather than change society, teachers—as psychologists (MARKARD, 1997)—will find it (increasingly) difficult to do their job in critical emancipatory ways *and* earn a decent living. Here, tactical authenticity becomes relevant to our work. Not being caught up in the same existing institutional relations (power/knowledge divides) often allows us to recommend changes that teachers find almost impossible to bring about. [45]

Although our work shares a lot in common with Critical Psychology in its methodology and theoretical framing, it also distinguishes itself from subject-centered research. MARKARD (2000) noted that the object in subject-centered research is not the subject but the world that is experienced by it. In the existing literature on the methodology, the researchers (counselors) are always external to the actual life of the individuals whose reflection they encourage and support and who are coparticipants in the research. Practice theorists noted that one could not fully know praxis unless one participated in it (BOURDIEU, 1980; MAO, 1967). In our work, the relationship between research participants is changed in the sense that the university-based researcher supports the people in praxis, the ongoing everyday activity of teaching, before they all become researchers with respect to a *common* experience. The object is not just the world experienced by some of the subjects, but the university-based researchers are part and parcel of

the experience and the analysis. We therefore do not engage in therapist-client relationships, but the changes brought about by our research concerns our own praxis of teaching. Rather than being reported back during sessions with the therapists (e.g., MARKARD, 2000), successes and failures arising from a change are directly experienced by all coteachers. [46]

HODGSON (2000) suggests that ethnographic researchers assist in the process of understanding how people view the world and thereby contribute to the efforts of convincing, changing, or consoling others. This makes researchers partial (and compassionate) with respect to research participants. That is, teaching is one of those specialized activities that, as GRAMSCI pointed out, contribute in a significant way to cultural production (e.g., MARKARD, 1997). Being partial and compassionate is fundamental to our research; elsewhere we wrote about the need of a sense of solidarity in teaching / researching practices (ROTH, 2000). In this sense, we understand ourselves as "organic" or "democratic" intellectuals in the way GRAMSCI conceived them—people who, in their work, stand in a practical relation to a cultural context that they participate in changing (e.g., COLUCCI, 1999). Indeed our approach reflects an axiological stance, because we believe that research should be transformative. But we also believe in a plurality of voices[10] and that no one of them can be privileged. In this sense, our work is consistent with open theory, the collective generation of theory unhampered by existing forms of power and knowledge (e.g., http://www.opentheory.org/). Going further we believe that we can learn from any and all participants through our praxis in their communities—by coparticipating with them in the school / classroom and in cogenerative dialogue. We show here that in contexts such as teaching, university-based researchers have opportunities to coparticipate in praxis. Furthermore, in the associated cogenerative dialoguing, they participate in evolving generalizations that can be tested for the effectiveness of bringing about change in subsequent praxis. [47]

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10 Voice is also a critical issue in our form of qualitative research. However, we must not forget that there are different types of audiences, too, and that participants in our research want to speak in different places and to different audiences. We have been using conversations for quite a number of years as a way of writing research such that it does not curtail individual differences. Writing in one voice, often in an authorized form and tone, flattened and eliminated viewpoints and voices of individual research participants.

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