IDENTITY, CULTURE AND SHARED EXPERIENCES:

THE POWER OF COGENERATIVE DIALOGUES IN

URBAN SCIENCE CLASSROOMS

by

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ABSTRACT

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Advisor: Professor Kenneth Tobin

The research presented in this dissertation details four major examples of work that took place during a three-year longitudinal study in a small urban New York City public high school for high achieving youth. It aims to play a role in contributing to the understanding of the breakdown between and amongst those parties involved in urban science education. The work outlined herein responds to the calls for improvement within urban education, utilizing the experiences, knowledge and practices of its students, in order to help inform and improve science teaching and learning. Theoretical lenses upon which this critical ethnographic research is grounded primarily involve those that are socio-cultural in nature and examine the sociology of emotions.

In this research, I address how urban students, who have been historically alienated by science, develop forms of culture, enact them in science classes and then make transitions from participating marginally toward participating more centrally, demonstrating increasing science and science-like practices with higher levels of expertise. This work involves investigating human agency and its expansion as it becomes increasingly incorporated and internalized into individual and collective habitus.

The protocol utilized in this critical ethnography (videotapes of cogenerative dialogues, classroom practices and interviews; journal entries, field notes, student and teacher generated artifacts) facilitates the exploration and understanding of the ways by which aligning culture and expanding student roles, both inside and outside of the classroom can occur. The results of this study include concrete examples and interpretations of these expansions and, provide suggestions by which more adaptable forms of teaching and learning can be enacted. These practices ultimately benefit a wider variety of students who as result will become better at creating their own structures to succeed.

Dedication

To my loving husband, Max, son Ethan, mother Barbara, Aunt Jacquie, siblings and extended family. You have been my foundation, my source of strength and love.

ACKNOWLEDGEMENTS

As my journey with the many aspects of this dissertation comes to a close, I am filled with emotion. I thank those who have stood by my side, supported and nurtured me in innumerable ways.

I feel honored to have worked with such talented students and the community of The Collaborative School. I am especially thankful to Theo and Jazz who took on the initial challenge of working with me and others to help create novel, equitable resources that continue to be used and make for richer quality learning environments.

Dr. Kenneth Tobin has been an exceptional mentor, advisor and friend. I am truly appreciative of all of your guidance, Ken, your support and belief in me. I thank Dr. Sue Kirch and Dr. Sonya Martin for serving as members on my committee and for helping me to grow as a scholar.

I am fortunate to have built strong bonds with those in the "Tobin Research Squad." Wesley Pitts, Chris Emdin, Ashraf Shady and Ed Lehner have all played very important and active roles in sharing insight into theory and research. Thank you also to the Urban Education community for your sense of communalism and support.

Finally, I am indebted to my selfless husband, Max and darling son, Ethan. There were many times when I wondered if and when I would finally come to writing this page in the dissertation. I saved writing it until the very end. With your constant support, together we have reached this moment. I love you both and thank you so much for taking this difficult journey with me.

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Six hundred minutes
How do you measure – measure a year?

In daylights – in sunsets
In midnights – in cups of coffee
In inches – in miles
In laughter – in strife

In – five hundred twenty-five thousand
Six hundred minutes
How do you measure
A year in the life?

How about love?
How about love?
How about love?
Measure in love

(*Seasons of Love* by Jonathan Larson)

I came to the science teaching profession serendipitously, having been invited to coteach in a high school enrichment program while conducting biological research at a local university. Although somewhat hesitant about working with high school students, only because I never had, I thought that it would be wonderful to share my love for the sciences with others. Throughout the years, I have had innumerable rewarding science teaching experiences in different types of educational settings, including high schools, both public and private, working with a wide range of students, including for example, those living in abject poverty to those living a life of privilege; as well as adults in high

school equivalency programs and those pursuing science and education degree at the university level. Challenges have prevailed and it is because of them and my love for teaching that I began to delve deeply into understanding and contributing to theories, ideas and practices which promote and foster educational change, particularly within the domain of the urban science classroom.

Given the multifaceted nature of teaching and learning within an urban setting and the diversity of students it encompasses, the need to teach toward a critical pedagogy – pedagogy grounded in a social and educational vision of love, justice and equality – may never have been more urgent. By studying a variety of philosophies, methods and educational practices, and by building upon and utilizing theoretical lenses which are sociocultural, historical and psychological in nature, I am able to consider and to more appropriately address the effects of the rapidly increasing complexities that arise and I have experienced within urban science education. These complexities oftentimes stem from, for example, racial, ethnic, socioeconomic, religious and language differences. This dissertation has created an opportunity for me to share some of the ways by which I have been able to use these lenses and other meaningful avenues to uncover strategies by which classroom changes and ultimately transformation can take place.

Urban School Concerns and the Need for Research

Safety in and around urban schools has become an increasingly serious concern for students, families and society at large. In their writings on predicting school violence, Edward Mulvey and Elizabeth Cauffman (2001) state that schools which lack the promotion of healthy relationships, have students who have a sense of being treated unjustly and/or feel alienated from the general population, may have a higher likelihood

of exhibiting violent behavior and/or committing acts of violence. According to the 2000 U.S. Census, over 79 percent of the U.S. population lives in urban areas. As such, in addition to safety concerns, contemporary educational challenges include overcrowding, limited space and resources to adequately address the needs of increasingly diverse student populations. A push toward standardized science curriculum and mandated high-stakes exams like the Regents exams in New York, pose a myriad of challenges and stresses upon students, teachers and parents alike. Teacher preparedness and qualification are other areas that tend to greatly affect the dynamics of classroom interactions, as do disparities around educational quality, equity and access to human and structural resources.

Although there is increasing literature which has its focus on current research taking place in science education, there remains a strong need to address specific concerns of the education of children in urban science classrooms. This is especially salient because of the continued disconnect and sense of estrangement from science content that generally prevails. I echo the sentiments of Elmesky (2001) who declares, "...there is a need to understand the individual lifeworlds of the students on a micro-level so that teachers may begin to intimately understand, on the macro level, how cultural capital from the home and neighborhood crosses the boundaries of school walls and classroom doors and can help or hinder the science learning process" (Elmesky, 2001, p. 11).

Challenges in Science Education

The creation and implementation of novel research practices that value the lifeworlds, voices, beliefs, talents and languages of urban students and what they bring to science

education are crucial elements in catalyzing change. While reform initiative like those proposed in the National Research Council's National Science Education Standards (1996) are well intended, they do not address the challenges that the complexities of race, ethnicity, gender, socioeconomics and political concerns play in the teaching and learning of science in our schools (Rodriguez, 1997). I have felt this need and as a result, the utilization of critical qualitative research, specifically *cogenerative dialogues*, began to take place within my own urban science classroom about three years ago. This initiative took place in an effort to examine how these facets of social life become integrated into the culture – schema and practices – of the classroom. Specifically, elements of urban culture were explored in an effort to learn how they can be utilized to mediate learning. Cogenerative dialogues, discussions amongst stakeholders (e.g., teachers, students and administrators), afford the examination of shared experiences within a field – a physical and temporal place where individuals interact with each other – in order to co-create new culture and/or amend that culture which already exists, as a means to improve the quality and efficacy of teaching and learning. In collaboration with student researchers and coteachers who regularly participate in cogenerative dialogues, this dissertation presents some of what has been learned about participant interactions. That which has transpired between participants has been analyzed primarily at the *meso* and *micro* levels using video analysis. This research has affirmed that urban students are able to access and appropriate human and material resources needed to enact individual and collective agency. Additionally, emerging from this research includes learning about and applying more adaptable forms of culture that support a variety of students in creating and utilizing appropriate structures to augment their own academic success, especially in the sciences.

It is because of the variation in understandings of the sciences as well as the diversity that prevails within urban settings that the spirit and practices salient to collaboration, coteaching and cogenerative dialogues have been created and maintained in my science classroom. One goal of this dissertation is to introduce and build upon varied, innovative educational strategies needed in order to improve the quality of both teacher and student experiences. By being better epistemologically informed, the objective of enriching the lives and science experiences of all involved in the educative process becomes a reality.

Cogenerative Dialogues

Cogenerative dialogues (Roth, Tobin & Zimmermann, 2002) are conversations between participants in which the enactment of culture in a particular field takes place. While often viewed in a negative light, urban youth culture is a valuable resource, which can greatly mediate the learning of mainstream discourse, such as science in a positive manner. The materialization of cogenerative dialogues is such that it emerged in urban science education from longitudinal studies. These studies took place in urban high schools, like City High in Philadelphia, where students were involved in research as researchers and practitioners in the teaching and learning of science in their own classrooms (Tobin, Elmesky, & Seiler, 2005). The studies have provided considerable insights into the quality of the roles of teachers and students, and have generated opportunities for stakeholders to make and act upon suggestions related to the generation of new (science) culture that is enacted within multiple fields. Consequently, cogenerative dialogues have generative potential for the production of new culture, encouraging successful interactions across sociocultural boundaries. As expressed by Tobin, Roth and Zimmermann (2002), cogenerative dialogues, “can be understood as a

new learning environment that takes the classroom learning environments as its object of inquiry" (Tobin, Roth & Zimmermann, 2002, p. 6). In this dissertation, examples from a longitudinal study – involving my ninth grade biochemistry classes and cogenerative dialogues – are presented. Rippling effects (Tobin, in press) within the learning community and the lasting effects that cogenerative dialogues have had on a variety of participants, individually and collectively are presented as well.

Research Site and Student Population

This study is situated in Chelsea, New York City in a small high school, The Collaborative School[1], for high achieving youth that screens its applicants. The school was created with the intention that students would work in a learning environment that fosters collaboration. The school began as a middle school and within a few short years took in one class grade at a time, until a full middle and high school was formed. Most students who make up the student body have attended *Collaborative's* middle school. Requirements for admission include that students live within the district, have taken and performed well on a school required entrance exam, have passed the interview process and have performed well on the Citywide math and English standardized tests. Collaborative has prided itself on being an alternative to other schools with high caliber academic programs. Inherent in the school's culture is the desire to develop students who are compassionate, respect diversity, work diligently, and are grounded in moral thought and ethical behavior. Collaborative has been lauded as an academically rigorous school that, despite its small size, is on par academically with Stuyvesant, Bronx Science, LaGuardia and Townsend Harris.

[1] The Collaborative School is a pseudonym. From here on, *Collaborative* will be used to denote the name of the school.

According to the 2004-05 district report card (New York City Department of Education, 2006) 14 percent of the students at *Collaborative* qualify for free lunch, as compared to 51percent of students in other city schools. *Collaborative*'s student population is made up of 59 percent White, 6 percent Black, 11 percent Latino, and 25 percent Asian students. These statistics are significant because of the great variation in the distribution of racial and ethnic identities of most other schools: 14 percent White, 35 percent Black, 37 percent Latino and 14 percent Asian. Additionally, at *Collaborative*, 40 percent of students are male as compared to 61 percent who are female. Other city schools typically have a ratio of 51 percent males to 49 percent female. Those students who are eligible for free lunch at *Collaborative* are 14 percent versus 51 percent of those in other city schools. More importantly, this information also becomes very significant when we consider how the interpretation of these statistics becomes incorporated into the culture and the unfolding of social life in the classroom. Issues involving race, ethnicity, and socioeconomic status become enmeshed within the culture of my science classroom in yet another way – I am one of three out teachers (of a teaching staff of about forty) who are Black and, the only female. Clearly, the implications of being a Black female science teacher in a school of predominantly White students are many.

Working with Student Researchers

During each of the three years of this research, all students (32- 36) in my three ninth grade biochemistry classes were invited to participate as student researchers in cogenerative dialogues. Student researchers who were very different from each other were either self-selected or invited by peers or their teachers to participate in

cogenerative dialogues regularly during the school term. The cogenerative dialogues took place during our lunch period, usually once a week. Two to three lessons and/or laboratory activities were taped per week. Student roles involved videotaping classroom lessons, activities, and laboratory experiences and helping to select specific vignettes for whole class and small group discussions. They have also commonly led discussions around specifically selected vignettes. Cogenerative dialogues and classroom lessons involved these student researchers as well as the class general education teacher researcher (me) and oftentimes inclusion teachers, guidance counselors and principals. On occasion, students as well as staff were interviewed both video and audiotapes were used to create a record.

An understanding of the culture that gets enacted in varied fields, including the learning environment becomes possible by involving different stakeholders and their recollections of shared experiences. During the first year of research, primarily two student researchers, Theo and Jazz[2], became involved in cogenerative dialogues. The number of participants increased during the second year to about 8. Finally, during the third year of research, there was a range of 8 to 16 students who became increasingly committed to transforming their classroom experiences. Feedback, regarding individual and/or collective practices, mutual focus, entrainment, solidarity and positive emotional energy (Collins, 2004) became salient factors used to evaluate the nature of the laboratory and classroom environments.

Conceptualizing the Research

This research utilizes the experiences, knowledge and practices of urban students with

[2] pseudonyms

the intention of helping to inform and improve science teaching. The varying complexities of urban science classrooms have required all to question, reflect upon and take action toward understanding and improving the power dynamics that exist within the classroom and throughout educational systems at large. Pedagogues with a keen understanding of the importance of criticality concur that change in the contemporary urban classroom must begin with educators taking an active role in creating critical consciousness and utilizing critical pedagogy, in order to transform the nature of teaching and learning. The efforts required for change take on a multitude of forms. They require careful, thorough, reflection of a teacher's personal, educational and professional histories, as well as a reflective praxis. In this research I dialectically conceptualize culture as the dynamic interaction between schema and practices – a system of symbols and its associated meanings and practices (Sewell, 1999), which are enacted in various fields. Culture influences action by shaping a collection of symbols, stories, rituals and worldviews. Fields have resources that promote structure; agency within a field involves being able to access and appropriate structures/resources. In her recent research of urban youth and their encounters with physics, Rowhea Elmesky (2001) demonstrates how fields – the urban street and a college university physics lab – are dynamic, with weak and porous boundaries. This weakness and porosity allow for cultures that are enacted in one field to be enacted in others. Within a field, social life is mediated by the agency|structure relationship. It is through using theory to help understand the dynamics of my own classroom that I have been forced to evaluate, question and reconsider the role that my own personal cultural experiences have played in this field. With an understanding and insight into my own lived experiences, I have begun to share with my

students a means by which collectively we can examine who we are and work toward transcending social and educational injustices. This is afforded through the understandings and exertion of agency and the ability to access and appropriate various forms of capital. In so doing, students are able to transcend the oftentimes stigmatizing and paralyzing effects of being viewed through deficit lenses and stereotyping.

The broad research questions explored in this dissertation are:

1. *How does studying and utilizing the experiences, knowledges and culture of urban students help to inform and improve science teaching and learning?*
2. *How can examining the cultural and emotional dynamics of the science classroom, laboratory, and cogenerative dialogues help to bring about understanding and mediate disparities between students and teachers?*

Ethics and Authenticity Criteria for Conducting Research

The research presented in this dissertation adheres to the principles embedded within the Belmont Report (1979). These principles involve an overarching respect for those involved in research. Additionally, potential harms to participants are minimized while participant beneficence is maximized. Striving for the equity of benefits as experienced by participants is a constant throughout this research. A series of authenticity criteria have been employed. These criteria, delineated by Guba and Lincoln (1989), are of ontological, educative, catalytic and tactical natures. Qualitative guidelines, including those involved in critical ethnography (specifically cogenerative dialogues and related sessions), support differing stakeholder views and have been sought out for the purpose of introducing and addressing concerns raised by these stakeholders in an effort to reach agreed upon strategies of action. Authenticity requirements include that stakeholders have an equal opportunity to contribute to discussions and negotiate recommendations

that have been put forth. Ontological authenticity encompasses the extent to which an individual's emic (organization and interpretation of data) constructions are improved, matured, expanded and elaborated as a result of participating in the research. Educative authenticity involves the extent to which individual participants' understanding of and appreciation for the constructions of others are enhanced. Catalytic authenticity is the extent to which action is stimulated and facilitated as a result of the research. Finally, tactical authenticity is evidenced when, as a result of the research, help is provided to those who cannot access the resources to help themselves.

Chapters in Dissertation

This dissertation is organized into 5 main bodies of work. Chapters 2, 3, 4 and 5 present different research opportunities that emerged over a 3-year longitudinal study in *Collaborative*. Each chapter is meant to be one that stands alone from the others, yet coheres under the unifying themes of improving urban science teaching and learning, and expanded participant agency. As such, the reader may experience some redundancies in the presentation of methodology. Chapter 6 presents a culmination of what was learned as a result of being involved in this research and the implications for policy and practice.

Chapter 2

The research described in this chapter is situated in a small urban New York City high school for high achieving youth, *Collaborative*. The study plays a role in contributing to an understanding of the breakdown between and amongst those parties involved in urban science education. The work utilized the experiences, knowledge and practices of students, in order to help inform and improve science teaching and learning in my biochemistry class. Theoretical lenses upon which this research is grounded

primarily involve those that are sociocultural in nature (Sewell, 1992), explore social life through the agency|structure relationship (Roth & Tobin, 2005) and, through the work of Collins (2004) and Turner (2002), examine the sociology of emotions and emotional dynamic in encounters that involve face-to-face interactions and transactions.

The practices salient to *cogenerative dialogues* (Roth, Tobin & Zimmermann, 2002) are employed in this research. Cogenerative dialogues, as described earlier, are conversations between participants that in my research involve organizing and implementing agreed upon ways by which improved teaching and learning can take place. Cogenerative dialogues are fields, places where culture gets enacted, and consequently, have physical and temporal dimensions inherent to them. Within the cogenerative dialogue field, making meaning of shared experiences through polysemic and polyphonic opportunities occur. Urban students, who have been historically alienated by science, embrace opportunities to share and develop forms of new culture. This new culture is then reproduced, enacted in the science class, laboratory or other fields and is concurrently transformed from that which it once was. This chapter provides concrete examples that show how the students involved in the transformation of culture utilize their agency and understanding of theory to make transitions from participating minimally to accessing structures that enable them to contribute to their own learning, and the learning of others, in substantive ways. I argue that it is because of engaging in cogenerative dialogues that the range of possibilities for the development of new roles for students becomes possible. What is substantiated in this work is that the new culture created during cogenerative dialogues can and does become integrated into participants' habitus (Bourdieu, 1996), greatly affecting the *core self*, *sub* and *role* identities (Turner,

2002).

Theo, a student researcher of more than three years at The *Collaborative* School, provides insights into the understanding and expansion of his own agency, both at conscious and subconscious levels. He attributes this phenomenon to his consistent participation in cogenerative dialogues.

The protocol utilized in this study incorporates a variety of ethnographic data resources (videotapes and transcripts of cogenerative dialogues, high school classroom and science laboratory practices, interviews, and spontaneously occurring meetings; journal entries, field notes, student and teacher generated artifacts) with foundational conversational analysis. The evaluation of these data resources have facilitated the exploration and understanding of the ways by which aligning culture and expanding student roles, both inside and outside of the science classroom occurs.

Chapter 3

New York City's school district and is now divided into 10 regions. Each region contains approximately 120 schools and has 2, 3 or 4 Community school districts and high schools organized within its designated geographic limits. The Collaborative School is part of Region 9 and has recently become one of the New York City Department of Education's (D.O.E) Empowerment schools. Considered by many to be a school designed to meet the needs of high achieving youth, this chapter highlights the school's history, policies and decision-making processes. Subsequent to interviewing the co-directors of the school, both formally and informally, other members of the school community were invited to contribute to the discussion in a metalogue. These members included Theo, a student researcher, along with a veteran history teacher and me, a

general education science teacher. Theo has been an active member for three years in cogenerative dialogues and his role has expanded tremendously because of his participation in them. A goal of employing this methodology was to invite varying voices and perspectives to be heard and considered around the general theme of school governance. Foci for discussion were around six major themes: the school community; high states testing; curriculum innovation, integration and choice; teacher accountability and hiring; and the acquisition, distribution and utilization of resources. Results also shed light on inconsistencies, contradictions and challenges in both the governance and culture of the school as articulated by metalogue participants. These polyphonic and polysemic perspectives are important in making meaning of participants' experiences. Areas of controversy and contradiction help to bring to our awareness work that needs to continue in order to bring about change and meet the needs of those intimately involved in the learning environment. Additionally, the ways in which specific concerns have been addressed, may serve as a model from which other schools can benefit.

Chapter 4

It is because of the tangible effects that cogenerative dialogues have had on the life of the science classroom, those who directly participated in them, and my biochemistry class at large, that I decided to continue to use them as a method of good practice as well as to learn from additional studies that I would lead in subsequent ninth grade biochemistry classes. My reflective teaching identity has grown and I have become more comfortable with being open to change that is suggested by both students and coteachers within the cogenerative dialogue field and within other fields as well.

The research presented in chapter 4 emerged as a welcome surprise. While I have

learned of student role expansion being mediated through participation in cogenerative dialogues, i.e., Elmesky and Tobin (2005), I had no specific ideas as to what kinds of lasting effects they might have on Jazz, Theo or any other student directly or indirectly involved with them. Presented in this chapter are a series of seven vignettes, which emerged over the course of two years. These vignettes, most of which emerged serendipitously, address answering the essential question, what are the lasting effects of having participated in cogenerative dialogues at the individual (Theo) and at the collective (classmates, classes, school and educational community at large) levels? The illuminations, as made manifest in change in culture, and their associated contradictions and interpretations are presented in this chapter. The vignettes highlight the expansion of Theo's role identity and the fusion of his cultural identity into who he is and how he maneuvers in variety of fields.

Chapter 5

This chapter details research that incorporates mixed methods, including the use of qualitative and quantitative data. The study draws from my second year of using cogenerative dialogues with a group of 32 ninth grade biochemistry students, 6 of whom over a 10-month period were regularly involved as student researchers. One goal of the research was to provide insights into the ways students experienced their science learning environments. An integration of quantitative work – which afforded insights into students' actual science classroom experiences and perceptions of their learning environments, utilizing the Constructivist Learning Environment Survey, CLES, (Taylor, Fraser & Fisher, 1997) – elucidates important and meaningful ways for stakeholders to explore and understand the intricacies of the qualities of life lived in urban science

classrooms. The CLES assesses perceptions held by students and their teachers, related to the particulars of their science learning environments. It investigates concerns that are organized into 5 different categories. Cogenerative dialogues and interviews qualified details of students' experiences in ways that the CLES could not.

Chapter 6

In this concluding chapter, I re-examine the questions posed throughout this research. An examination of the salience of cogenerative dialogues, functioning both as a methodology and method, and their influence upon individual and collective agency is discussed. The value of having opportunities for polysemia and polyphonia in an effort to better understand students' experiences and better serve students is further discussed. Implications for the use of cogenerative dialogues in a variety of forums, including teaching, research, educational policy, teacher education and school leadership, are explored.

CHAPTER 2

Making Meaning of Shared Experiences Using Cogenerative Dialogues

Introduction

The research described in this chapter is situated in a small urban New York City high school for high achieving youth, *Collaborative.* The study plays a role in contributing to an understanding of the breakdown between and amongst those parties involved in urban science education. The work outlined herein utilized the experiences, knowledge and practices of students, in order to help inform and improve science teaching and learning. Theoretical lenses upon which this research is grounded primarily involve those that are socio-cultural in nature (Sewell, 1992), explore social life through the agency|structure relationship (Roth & Tobin, 2005) and, through the work of Collins (2004) and Turner (2002), examine the sociology of emotions and emotional dynamic in encounters that involve face-to face interactions and transactions.

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transformed from that which it once was. Students involved in this process utilize their agency and understanding of theory to make transitions from participating marginally to accessing structures that enable them to contribute to their own learning, and the learning of others, in substantive ways. I argue that it is because of engaging in cogenerative dialogues that the range of possibilities for the development of new roles for students becomes possible. What is substantiated in this work is that the new culture created during cogenerative dialogues can and does become integrated into participants' habitus (Bourdieu, 1996), greatly affecting the *core self*, *sub* and *role* identities (Turner, 2002).

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The protocol utilized in this study incorporates a variety of ethnographic data resources (videotapes and transcripts of cogenerative dialogues, high school classroom and science laboratory practices, interviews, and spontaneously occurring meetings; journal entries, field notes, student and teacher generated artifacts) with foundational conversational analysis. Evaluation of these data resources facilitate the exploration and understanding of the ways by which aligning culture and expanding student roles, both inside and outside of the science classroom occurs.

A Call for Criticality

> [We] must realize that the creation of 'new' and alternative practices result from the heroic efforts of collective intellectual work and communal resistance which shape and are shaped by present structural constraints, workings of power, and modes of cultural fusion (hooks & West, 1991, p. 145)

The longstanding disparity in educational opportunities provided to individuals of

distinct social classes has been a pervasive societal challenge on many levels. Even so, such an obstacle pales in comparison to the cumulative effects created by discriminatory considerations in the urban environment as to an individual's race, ethnicity, gender and socioeconomic status in impeding meaningful, involved educational experiences. Many of these obstacles still remain, most having evolved from the mid to late 19th century into today's sometimes more subtle forms. Although change can be slow, especially in the field of education, at times one is forced to wonder whether contemporary thought is moving forward or backward – as in the case of Lawrence Summers, former president of Harvard University, who attributed innate differences between the sexes to why, in his estimation, women are lagging in progress in math and science (Angier & Chang, 2005). More recently, I was left stunned when I read about how New York City has developed, 'an innovative anti-poverty program' which 'rewards' poor students and their parents, "from $25 for good school attendance to $200 for visiting the doctor to $3000 for passing five Regents exams" (Haberman, 2007). In order to appropriately address the needs of inner city students, there have to be measures taken that will thoughtfully and creatively address the complexity of who they are and what resources they bring to a classroom. It is foolhardy to believe that poverty, and its effects on educating our youth, could be remedied by per item compensation.

This sentiment reverberates with the above quote by hooks and West, who essentially call for a focus to critically examine social reality and its effects on the education of urban youth. By looking more closely at these factors, we become more aware of how to appropriately address the needs of a variety of urban science classrooms. Given the diversity in race, class, ethnicity, learning styles and the like, there is an urgency,

especially in today's urban classroom, to examine oppressive and hegemonic forces more closely. Educational morals have to be reconstructed from a new vantage point, using a different lens, including those that incorporate all aspects of the student's life, one that ensures the power of all students, and thus, one that entitles all to an equitable and just educational experience. In hooks' *Teaching to Transgress* (1994) educators are encouraged to remember the importance and sacredness of the classroom, its limitations and unlimited possibilities, both for the individual student as well as for society. hooks speaks to our moral obligation as educators to create a paradigm shift toward ways that will allow education to become what it was honestly meant to be – all inclusive, unbiased, and multicultural, irrespective of the student body "color." A true and just education must be one that allows for open-mindedness and, being aware of the need to operate in a manner which transcends boundaries related to cultural, racial, economic and social differences in order to educate as the "practice of freedom."

Positive change in science education is progressing in part because of those involved in critical, substantive work. Calls continue to be made and are being heard. They beckon us to wrestle with concerns around justice (Calabrese Barton, 2003), democracy (Shady, 2007) and ethics, requiring a staunch adherence to the criterion of credibility (Guba & Lincoln, 1989). This criterion has been utilized throughout the entirety of my research. It encompasses six dimensions that include: (a) prolonged engagement, (b) persistent observation, (c) peer debriefing, (d) negative case analysis, (e) progressive subjectivity, and (f) member checks. In urban science classrooms we are challenged to become sensitive to the richness that diversity offers. With this challenge comes an emergent desire to think about and implement novel approaches to understanding varied

ways of knowing and understanding (Ladson-Billings, 2000). As a science teacher who has had a wide range of teaching experiences with very diverse student populations, I am committed to discovering ways by which change in many of the dynamics of the classroom can take place. Change, especially as it relates to change through the production of capital – that is the reproduction and transformation of cultural, social, and symbolic capital (Bourdieu, 1986) – its reproduction and transformation is at the heart of the work presented in this dissertation.

Social Reality in Science Education

Sociologists commonly identify social reality as unfolding along three major levels– institutional systems and domains (macro-level reality), corporate and categorical units (meso-level reality) and face-to-face interactions (micro-level reality) (Turner, 2002). Each of these realities operates in a manner that is in a dialectical3 relationship to the other. In other words, the three levels, macro|meso|micro, neither can presuppose the other, even though each, in and of itself, is different. Within each level, there are traces of influences of another. Research in science education is becoming increasingly attuned to the ways by which social life of a classroom or laboratory setting is enmeshed within these levels of social life. For example, Roth, Tobin and Ritchie (in press) investigate how time and temporality mediate the organizational structure, and the unfolding of meso and micro level realities in various aspects of the teaching and learning of science in an urban school. Prosody, the particulars of sound production, including pitch, speech rate, and speech intensity is proving to be invaluable in exploring how, at the micro level,

[3] Roth (2005) indicates a dialectical relationship by the using of the Sheffer stroke ("|"), as do I.

students and teachers can use structures and their agency to facilitate (or truncate) learning. Pitts (in press), for example, examines how students and teachers used a combination of prosody markers to appropriate resources and to create structures that help decrease the breaches of encounter across social markers, such as age, ethnicity, gender, and role, during a chemistry laboratory activity. Tobin, with the example provided through interactions between Mirabelle (student) and Victoria (teacher), in *Teaching to Learn* (Tobin & Roth, 2006) provides a very valuable example of how research at the meso and micro levels can help to understand and predict the emotional content and the power dynamics that transpire as social reality in the science classroom gets enacted. In order to understand and gain a greater appreciation for the challenges faced by urban inner city students today, especially those who are Black and Latino, it is crucial to consider new pedagogical and theoretical lenses through which these contemporary educational challenges can be interpreted and acted upon. It is equally important to remember the historical climates that have shaped the challenges that these racial and ethnic groups have faced in their pursuits of education and educational equity.

Setting the Stage for Change

In the fall of 2004, Theo, an incoming ninth grade student of Dominican descent, excitedly approached my teaching bench on the first day of school. Looking to his left, and then to his right, in an effort to be discreet and maintain a sense of privacy, he said:

> *Hi, Ms. Bayne, my name is [Theo]. I just wanted to ask you a quick question. Do you allow hats to be worn in your science class? I'm new to the school and wouldn't want to do the wrong thing by wearing one, especially on the very first day.*

A sense of relief came over his face and seemingly his entire body when I assured

him that as long as his hat posed no safety hazards in the class or science lab, the culture of *Collaborative* and each of the classrooms within which he studied would welcome him with or without a hat of any type. Even though this is what I hoped would be Theo's experience, I learned in subsequent conversations with him that being respected and welcomed by all were far from givens in this, his new learning environment. Being different in so many ways from the majority of the high school student body at *Collaborative* was certain to have its challenges, both with Theo and with those of whom he interacted, at conscious and subconscious levels. It is precisely because of his difference that I believed that Theo was an excellent choice of students to become involved in cogenerative dialogues. While there were several participants in cogenerative dialogues during the course of this research, Theo is the focus of this chapter.

Developing Collaborative High School

In 1988, three administrators who were eager to develop a school that would address specific concerns around the intellectual, emotional and social development of children created *Collaborative*. The school is grounded in a philosophy that upholds compassion, diversity, pluralism, academic rigor and collaboration. During the first four years of the school's operation, it functioned solely as a middle school. Most students who attend the high school are students who also attended the middle school. New York City's Department of Education is organized around districts and regions. Preference for attending *Collaborative* is given to students who meet a series of requirements. First, they must live in close proximity to the school – in the district. The school is located in Chelsea, New York City. Also, students who would like to attend the middle school must take an entrance exam, which includes a writing and math component. Recently, a

collaborative project requirement has been added to the entrance prerequisite, which provides some insight into how students might work collaboratively in a classroom. Upon completion of their middle school experience, a large number of students (approximately 85 percent) elect to attend *Collaborative's* high school, thereby severely limiting the number of new students who will complete the student body. Theo is one of the few students accepted into the high school that lives outside of the district.

Research Squad Beginnings

I was invited by Kenneth Tobin to participate in a New York City urban education research project, which involved utilizing cogenerative dialogues in public high school science classes during the fall of 2004. I was eager to be involved, as I had already had a general understanding and appreciation of cogenerative dialogues due to some reading and classroom discussion around them in a research methods class I had taken with Ken the previous year at the City University of New York's Graduate Center. I envisioned being able to use cogenerative dialogues in a multitude of ways. One of these ways included being able to reach out to ethnic minorities who, for varying reasons, were not performing as well academically as some of their classmates. In total, four teacher researchers who taught in very different schools began utilizing cogenerative dialogues at the same time in their individual science classrooms. A research squad was formed and simultaneously weekly research meetings began. During these research meetings, each was able to share videotaped vignettes, written and oral experiences and receive valuable feedback from colleagues related to ongoing work in our classrooms. We endeavored to make sense of what was taking place in our classrooms and laboratory activities from varying experiential and theoretical perspectives, much in the same vein that bench

scientists come together to organize their thoughts and viewpoints related to the results garnered from, for example, a novel experimental protocol. Evelyn Fox Keller (1984) speaks to the value of having a polysemic (diverse array of interpretations) in bench science that is readily transferable into what is experienced in our research squad meetings.

> One of the characteristics of scientific development that most plagues historians is the enormous diversity of viewpoints that can continue to persist long after it appears that a consensus has been reached. The difficulty arises not only because consensus is never total, but also because of the fact that consensus always means the consensus of a particular community. Scientists make up many communities, and these communities vary by subject, by methodology, by place, and by degree of influence. Science itself is a polyphonic chorus. The voices in that chorus are never equal, but what one hears as a dominant motif depends very much on where one stands (Keller, 1984, p. 174).

For similar reasons to those enumerated by Keller, the criterion of credibility, as described by Egon Guba and Yvonne Lincoln (1989), including peer debriefing, sense making and member checking have been embedded in the culture of the research squad.

Schools House and Produce Culture

From a sociocultural perspective, schools are fields –places and spaces that are physically and temporally defined, within which the participants in them enact culture. The nature of their boundaries, being weak and porous, allows the school's culture and the culture from other fields, to traverse freely between and within them. The notion that the culture which takes place in schools is mirrored by that which take place in arenas directly or indirectly related to schools at both the meso and macro levels (Turner, 2002), is not unusual; rather, it is likely to be the norm. It is not surprising to find, therefore, that culture - associated practices and schemas - within a field shares many commonalities,

including, for example, views and perceptions related to factors such as race, class, gender and age, with those of society at large. Often times urban schools designated as gifted, specialized or geared toward high performing students are thought of in a different light than most. These schools are not devoid of many of the challenges that are dealt with in others, including student interest, motivation, standardized test performances classroom behavior and truancy. Additionally, injustices prevail in high performing schools that, as in others, implicate race, ethnicity, socioeconomic standing, language differences and ability. The utilization of cogenerative dialogues as a means to address the shaping and creating of new culture that ultimately leads to successful interactions across sociocultural boundaries is the focus of this work. It is important to note as well that cogenerative dialogues address unsuccessful, disruptive interactions and other contradictions as well. The use of cogenerative dialogues with my ninth grade classes at *Collaborative* began with Theo, Jazz, another student researcher, and members of their science class over two and a half years ago. The effects of this research continue to resonate within the participants, especially Theo as he moves through his high school experience.

The Implementation of Cogenerative Dialogues at Collaborative

The varied uses of cogenerative dialogues emerged from longitudinal studies undertaken in urban science classrooms in Philadelphia more than five years ago. Historically, cogenerative dialogues have taken on many forms. Differences amongst Theo and Jazz included those along race and gender lines and along the levels of participation and success they demonstrated within the class.

Theo was selected to participate in cogenerative dialogues for a number of reasons,

including the fact that he was new to the school and was different from many of his peers racially, culturally, and socioeconomically. Theo's exposures to science were radically different to those of students who had a history in *Collaborative*– they had attended the junior high school and he did not. Theo demonstrated a keen desire to understand the given science content and to master it. Finally, Theo took pride in maintaining his inner city dress and style, not wavering in the face of peer pressure to change the way he presented himself aesthetically.

Theo's roles in and out of the school have expanded in many ways. For example, he has become a student advocate, coteacher, peer-teacher, and a school wide curriculum developer. Over the years, he has organized a Hispanic Culture Club, participated in a lobbying visit to Albany, NY to address politicians on issues related to second language learners and has provided valuable insight into the hiring of science faculty. Within this chapter, salient examples of Theo's emerging ontology of *being with the other* and *for the other* (Tobin & Roth, 2006) become evident.

Jazz, an African-American student, transferred into *Collaborative* at the start of eighth grade from a poorly performing middle school in her uptown neighborhood by way of The No Child Left Behind Act.[4] She lives with both of her parents. It was Jazz's mother who heard about *Collaborative* and encouraged her to think about transferring.

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[4] The NCLB, signed into law on Jan. 8, 2002, is the latest revision of the Elementary and Secondary Education Act (ESEA), the federal government's flagship aid program for disadvantaged students. At the core of the No Child Left Behind Act is a number of measures designed to hold states and schools accountable for the academic achievement of all students; ensure that the teaching and paraprofessional staff is highly qualified; and provide parents with access to information and choice. In Jazz's case, her middle school fell into the category of being a low performing school. Savvy and informed parents know that under the NCLB Act their children can choose to attend a school that is in good standing. While this is great for those who can and do transfer, children are still left behind in schools that are not serving them properly.

Jazz was very interested in attending the school. She realized early into her eighth grade experience that both her elementary and previous middle school experience might place her at an academic disadvantage. Nevertheless, Jazz has always approached her work in a mature and endearing manner. Jazz's demeanor has always been very pleasant, yet reserved. She mentioned in the cogenerative dialogues that she felt a bit stigmatized at *Collaborative* because of being affiliated with NCLB. Jazz has been met with challenges, both with her classmates and some teachers based on disparities around race and her academic exposures and background. She has struggled academically in many of her classes, including science.

Traditionally, in addition to student researchers participating in cogenerative dialogues, one or more teachers from the class, one or more school administrators, and one to two teacher educators and/or researchers have participated. The cogenerative dialogues that took place at *Collaborative* during the first year of this study involved Theo and Jazz, an inclusion teacher, on occasion, a student teacher, and myself, a general education science teacher. The focus for dialogues involved a shared experience of participating together in a field, typically, a classroom or laboratory. There were often opportunities for students to talk about events and or conversations which took place in other commonly traversed school fields as well, including math classes, visits to guidance counselors and meetings with the directors of the school. Usually the discussion involved careful evaluation, interpretation and commentaries on events considered to be worthy of discussion, including contradictions. Shared experiences within the classroom, that needed to be resolved, practices and roles of participants, and suggested changes associated with improving the quality of teaching and learning within these fields also

were investigated.

Toward a New Paradigm: Change in Individual and Educational Identities

While both Theo and Jazz were very active in cogenerative dialogues during their ninth grade, the focus of this chapter is on Theo. The reasons for this are many. Over the years I have maintained a friendly and collegial relationship with Theo. During very short periods of time, and with regularity, I noticed that Theo's growth as a student had changed markedly. His roles in and out of school expanded, a result that he credits to the value and workings of cogenerative dialogues. Periodically and informally, I would ask Theo to reflect upon various aspects of his school experiences, his family, dreams and goals. I was very much I was especially interested in how his identity as a student may or may not have been changing. Below, Theo reflects upon his middle school identity. He admits that his focus from middle school to high school was changing, along the lines of academics and the regard that he has for his teachers.

> *The person I was at Wagnall was completely different than the person I am now. At Wagnall I didn't really care about my grades, I preferred to focus on self-image; that was my area of expertise. As long as everyone liked me, mainly the girls, I was happy. I didn't really care about my teachers and how they viewed me because my mentality was that, I knew I was smart but just felt that I didn't need to prove to anyone that I was capable of getting good grades, and besides, being popular beat having to study and work hard any day.*

Based on this description and observations of Theo that I was making on a daily basis very early in the year, I could sense that he would be challenging some of his own identity constructions. I was eager to start the cogenerative dialogues and learn more about both him and Jazz.

Insights into Student Identities

Students who do not return to *Collaborative* for their high school experience, usually

elect to attend specialty public high schools, such as Bronx Science, Stuyvesant, Brooklyn Tech or private schools. The science program in *Collaborative's* middle and high schools is rigorous. Middle school students' exposures to science are in-depth and the curriculum challenges them to probe into the content in ways that many urban middle school students do not. In the cogenerative dialogues (see Figure 2.1), Theo described his science exposures as extremely limited, where investigations were carried out in a disjointed and superficial manner. In middle school, a feeling of being disconnected to the content was seemingly the rule rather than the exception in his experience. Not only were Theo's science exposures different from those of the returning *Collaborative* students, on several occasions he mentioned that the relationships he had with his peers during his first year at this school were, disappointedly, not as meaningful as they had been at Wagnall. As such, he mentioned that he felt very much like an outsider for must of this time. While it was disappointing to hear this, it was not very surprising to me. In one cogenerative dialogue, Theo, Jazz and I were talking about math and science identities and what it was like to be a student of color in the school. Theo shared with us the following:

Figure 2.1. Gillian, Theo and Jazz (from left to right around the table) participate in cogenerative dialogue discussing science and math identity

Theo: At first everyone was thinking that my good grades were no big deal, like it was luck or something. And then everybody kinda started figuring out that math was actually my strong point and that it was something that I enjoyed doing. So then, I found out that people started relying on me in math, kind of asking me like, "Yo, what's the math homework? Can you help me?"…So the fact that I wasn't getting that at the beginning of the year, made me feel like they obviously assumed that I wasn't going to be smart. And then later I was going into Mr. Star's (the student counselor's) office and he complemented me and said, "Oh, I saw your grades, you got really good grades…" and then at the end he added, "but, you know, you kind of threw me off with that backward hat." Not that that made me feel bad or anything, I just kinda laughed at it but, it made me feel that this appearance has a great deal to do with how people feel about what I am capable of…

Gillian: You kind of threw me off with the backward hat…

Theo: Yeah.

Gillian: What do you think about that comment Jazz?

Jazz: That's wack but, it doesn't surprise me.

I could identify with many of the concerns that Theo expressed around how he had been inscribed by others, likely because of his gender and ethnicity. There is a lot of contention around race and ethnicity. As such, popular notions that urban students are lacking in both interest and competence, particularly in math and science because of cultural poverty, deprivation and social reproduction have proven to be neither transformative in either student or teacher attitudes nor in practices (Seiler, 2002). Nancy Lopez (2002) in her research on second generation Dominican males found that both formal and informal institutional practices within schools "race" and "gender" students in ways that greatly affect their outlook on education. The above example speaks directly to the potential of this happening. While it is likely that the guidance counselor probably did not give much thought to what he said, it was laden with deficit views of urban youth,

especially Latino males, and it obviously bothered Theo. There was great value in having an opportunity to talk with both Theo and Jazz about this encounter and the role that hegemony and the viewing of urban youth through deficit lenses can and does influence students in classes like math and science.

When Ken Tobin and I were invited by a colleague, Amy, to speak with her graduate urban education class about 'practical purposes' of utilizing cogenerative dialogues, we were very much taken aback by deficit perspectives of urban youth which were brazenly articulated by one White middle aged female student in the group. The class was composed of about twenty-eight students, two of whom were Black females and one who was a young White male. The rest of the class was composed of White females, most of whom were at the beginning of their education career. By talking with our colleague prior to the class, we discovered that many of the students were changing careers, and a small number of them were at the time immersed in teaching – primarily in elementary schools outside of the borough where the racial and ethnic demographics were radically different than the graduate class itself. I mention the composition of the class because it speaks to the saliency of being able to bridge disparities that arise from differences along gender, ethnic and racial lines through the use of cogenerative dialogues.

We were introduced to the class and began by defining cogenerative dialogues and describing the general manner by which I have been using them during the last few years. After entertaining some questions related to participant selection and some preliminary findings, I shared some of the aforementioned cogenerative dialogue vignette. In the vignette, Theo was describing how both his peers and teachers perceived him in his math and science classes and proceeded to talk about how he was surprised at

his guidance counselor's response to his recent report card.

While reflecting upon cogenerative dialogues being an excellent field which affords better understandings across racial, ethnic, gender and age differences between teachers and students and a means by which these and other factors shape one's cultural identity, a discussion arose regarding teachers' experiences dealing with multiple student issues, including a few related to the wearing of hats in school. Suddenly one student blurted out, "He's a punk! If I had this kid in my class, I would definitely say that he's a punk and tell him that in the *real* world; he would never get a job looking like that! He's bad news!"

I was stunned. Several aspects of this comment disturbed me. First, the volume of the student's voice was several notches above the earlier discussion. Second, the pitch and tone of the statements were noticeably antagonistic. While pointing to Theo's image and declaring him a punk, the woman appeared to have risen out of her seat, a gesture used to emphasize the emotional content of her statement.

I decided not to follow my first inclinations – to declare the woman's perception of Theo to be absolutely inaccurate and insensitive and to defend him as emotionally as she had attacked him. Instead, I maintained silence. As I had experienced an audible demonstration of collective effervescence as a result of positive emotional energy in my own teaching history, for example, by spontaneous clapping, or a collective, "yay," so too was this moment. A good eight to ten seconds elapsed before anything else was said – turning the silence into a structural resource – time for the individual and the collective to really begin to dissect and think about the loaded nature of the woman's declaration.

The first thing that I thought about was that this may be a good example of the

very need for cogenerative dialogues to add to and become integral parts of teacher education programs and of the practices educators study and use within the varied aspects of their professions. Our colleage had shared with me some of the particulars of her class, including student dispositions as well as specific content being studied in her urban education class. It is not enough for teacher education programs to organize around mandating academic rigor. That which is taught must also enable teachers to seek out means by which they do not consciously or subconsciously endorse hegemony, prejudice, discrimination and deficit thinking. The aforementioned vignette speaks for a continued need to engage in critical pedagogy in an effort to improve the ways by which urban students are understood. We must use such opportunities to address issues around power and social justice in our science classrooms and elsewhere. An ideal field to do so is within the structure of cogenerative dialogues.

Agency|Structure Mediates the Ability to Create and Enact Culture

> *I feel that I have two niches in school, one is to enlighten the environment and make school fun and the other is to make school diverse and allow people to see Hispanics can be intelligent and well rounded as well. (Theo, Grade 10, reflection on how he envisions his role in the* Collaborative *community)*

This emergent research study is founded upon the primacy of human agency – the power to act. When agency is exerted, the capacity to create and participate in our lived work, i.e., teaching and learning (Varela, 1999) as opposed to being determined by it becomes possible. This work utilizes the experiences, knowledge and practices of urban students in order to help inform and improve science teaching. The varying complexities of the urban science classroom have required all to question, reflect upon and take action toward understanding and improving the power dynamics that exist within the classroom

and throughout educational systems at large. The writings of Paolo Freire (1970) emphasize the dialectical relationships between society's political, social, and economic conditions and personal freedom. Freire's foundation for change begins with an individual's lived, private experiences. Change in an individual and one's environment become possible through the awareness of the dialectic, not just by sheer luck. Pedagogues grounded in practices of criticality agree that change in the contemporary urban classroom must begin with educators taking an active role in creating critical consciousness and utilizing critical pedagogy (emancipatory pedagogy, guided by the values of solidarity, love, respect, justice and equality), in order to effectuate meaningful results (Kincheloe, 2005). This change is multifaceted and involves a careful, thorough, reflective evaluation of the teacher's own personal, educational and professional histories within a bricolage context (encompassing all aspects of a teacher's own experiences as a student). Additionally, it requires us to dialectically conceptualize culture as the dynamic interaction between schema and practices – a system of symbols and its associated meanings and practices (Sewell, 1999) which are enacted in various fields (Swartz, 1997) – places and sites that are separated both temporally and spatially, and within which culture gets enacted. Fields have resources that promote structure that may be characterized as being of material, social or schematic in nature. Agency within a field involves being able to access and appropriate the structure/resources. Furthermore, fields have boundaries that are porous and weak, indicating that culture can influence and can, in turn, be changed by agency (Sewell, 1992). As evidenced by Elmesky (2001) in her study of urban youth and their encounters with physics, fields (the urban street and a college university physics lab) are dynamic, with weak/porous boundaries. Within fields,

as an action is taken, it provides for a new or altered resource for participants to make use of, or not. This characteristic allows for cultures, both with practices that are dominant and typical of other fields, to be enacted in a specific field, as well as to be found in others. The "social life" within fields has an agency|structure dialectic nature. Culture influences action by shaping a collection or "tool kit" of symbols, stories, rituals and worldviews, from which individuals create "strategies of action" (Swidler, 1986). The pursuit of self-actualization via auto|biography and auto|ethnography (Roth, 2004) summons us to consider, evaluate, question and reconsider our own personal and cultural experiences, and their intersections with "academic" and constructed knowledge. With an understanding and insight into our own lived experiences, we can begin to share with our students (a) a means by which they too can examine who they are and (b) work to transcend social and educational injustices through the understandings and exertion of their own agency and abilities to access and appropriate various forms of capital. In so doing, students are able to free themselves from stigmas, and are able move from a place of commonly internalized untruths to a place where freedom to choose, validate and incorporate one's own reality can be made.

Identifying and thoughtfully conceptualizing how to most appropriately alter power structures helps all, especially students, to understand their workings and dynamics within their respective schools. In this manner, we will help to positively impact individual schools and educational departments so that they can ultimately empower all stakeholders. Freire's contributions to the education and liberation of those who are and have been oppressed continue to reverberate within the domain of urban science education. When we envision the urban high school, whether low performing, high

performing, charter or magnet type, the notion of students becoming empowered to know, understand and challenge ineffective power structures helps to set the stage for transformation. Freire's emphasis on dialogue founded upon respect, involving people working with each other, instead of one person acting on another is a theme that is woven tightly throughout the heuristics of the work detailed in this study's cogenerative dialogues.

Cogenerative dialogues are conversations between participants in which actors within a particular field create and enable the enactment of culture. Urban youth culture is a valuable resource, which readily affords the learning of mainstream discourse, such as science. A novel and valuable interpretation of, "the studying of science as culture and the learning of science as cultural production, reproduction and transformation…" (Elmesky & Tobin, 2005, p. 4) is critical in this research project and is utilized throughout it. The materialization of cogenerative dialogues is such that it emerged in science education from longitudinal studies in which students were involved as researchers and practitioners in the teaching and learning of science in their own classrooms (LaVan & Beers, 2005). They have provided considerable insights into the quality of the roles of teachers and students, and have generated opportunities for stakeholders to make and act upon suggestions related to the generation of new (science) culture which is enacted within multiple fields, both within and outside of the school environment. Consequently, cogenerative dialogues have generative potential for the production of new culture, which encourages successful interactions across sociocultural boundaries, including issues related to race, class, gender and age. In the process of new culture production, culture is reproduced continuously, and is at the same time

transformed.

Restructuring Power Dynamics

During our initial cogenerative dialogues, Jazz, Theo and I began to generate a set of heuristics, which would lead us to attaining our overarching goal. This goal was to improve the learning environment of our biochemistry class. One of the first contributions to the heuristics offered by Jazz was for us to use a "one mike" format. This would require that we agree upon only one person talking at a time. It followed then that participants were expected to listen attentively, to contribute to the dialogue and that no voice would be privileged over another. Initially we thought that we would spend some time evaluating ways by which the prescribed curriculum could better serve our specific class and the possibility for students to coteach with teachers and with each other. We decided to meet every Monday during our lunch period for about 40 minutes. Theo, Jazz, Rosemary and I all took regular turns at videotaping the class and the laboratory experiences. If others wanted to videotape, they were welcomed to do so. Student researchers helped to select and interpret many of the vignettes discussed in the cogenerative dialogues. Additionally, they contributed to both formal and informal interviews.

Shortly after we began meeting as a trio, we agreed that involving our inclusion teacher, Rosemary, would be essential to improving all that we wanted to improve. While I was not new to teaching students who were identified as either learning disabled or as special education students, this was the first time that I cotaught with an inclusion teacher. Rosemary had come to *Collaborative* as a relatively new teacher after working for one year in a very challenging school in the South Bronx. At *Collaborative* her

assignment was to be in science and math classes along with her eight inclusion students. Additionally, she was to serve them individually in a separate class. Rosemary felt very confident in her ability to teach math but, admittedly was very intimidated by much of the science content that we taught in our biochemistry class. There was very good rapport between Rosemary and all of our students. She and I had a very collegial working relationship and tried to share teaching responsibilities equally. Even though Rosemary worked in the high school division at *Collaborative*, her primary interest and license for special education was in the middle school division.

Opportunities arose for me to incorporate much of the theoretical framework that I began to learn about through my research squad participation in cogenerative dialogues. Soon we all began to talk about experiences related to, for example, agency, culture, transformation, emotional energy and communalism. What was very interesting to note in particular was the growing ease at which both Jazz and Theo spoke of their concerns, goals, struggles and identities. During this first year of using cogenerative dialogues, Theo became increasingly agentic in a variety of ways. For example, he would take risks by contributing to lessons, such as asking clarifying questions and volunteering to demonstrate specific aspects of a lab that may have been especially challenging. This was meant for his benefit, as well as for the benefit of his classmates. Jazz's development through her participation in cogenerative dialogues included her increased fluidity in expressing herself and in many cases, there was an increased attention to detail, especially in projects that required the representation of concepts and ideas in authentic model making. Reviewing videotape recordings of classes, laboratory activities and conversations with cogenerative dialogue participants and the research squad at the

Graduate Center, became ways by which interpretations and understandings of what was occurring in the learning environment deepened. After speaking with a science education consultant who had been working as a staff developer with the *Collaborative* School for a number of years, the co-directors decided that instead of offering students biology and chemistry courses as two separate courses, as most New York City high schools do, the school would offer a two year biochemistry course. This new course, identified as a biochemistry course, would encompass all required standards for learning and the laboratory experiences that individual chemistry and biology classes include. The content would be spiraled over a two-year period and students would take the Living Environment Regents Exam in January of their sophomore year and the Chemistry Regents in June of the same year. A rationale for the organization of the content and format of this course, and hence the utilization of the curriculum, was to help allay many of the fears and anxieties that students have around chemistry. Hence, the curriculum was presented to students, teachers and parents in a way that was likely to make more sense than the traditional curriculum had. Even though this was the intention, there were many instances when students were challenged not only in understanding the content but, were also often confused about the necessary requirements for assignments processing and completion. Cogenerative dialogues became an important vehicle through which such concerns could be discussed.

Within cogenerative dialogues, as in any field, social life unfolds and culture gets enacted. Over time, my impression is that those who have participated in cogenerative dialogues feel increasingly comfortable with each other. Consistent, meaningful contributions have been made, with the expectation that any agreed upon changes

proposed within the cogenerative dialogues would be enacted in the appropriate field. In this particular cogenerative dialogue, Theo, Jazz, Rosemary and I had a conversation about lab quizzes and lab reports, specifically *lab rubric items*[5]. During the course of their ninth grade biochemistry experience, students typically complete eighteen to twenty-one labs. It became apparent that after the first few labs, students were not completing the required reading and consequently were not amply prepared to carry out many of the laboratory experiments. Typically, students were required to complete a set of pre-lab activities. A common pre-lab activity involved reading an introductory section that was formatted into a lab packet. In the first few labs, the introduction was detailed in 2-3 pages. As the course progressed, the introduction became increasingly detailed and could easily extend into 6-8 pages. Rosemary and I decided that in order to help prepare students for the lab, we would review all of the key ideas and concepts in class and require students to thoroughly read through the entire introduction for homework. To our disappointment, we found that over time, students were coming to class and to lab ill prepared. As such, we maintained that in an effort to hold students more accountable for their homework assignment (the reading of the introduction), we would give them a quiz *after* reviewing the laboratory material but *prior* to carrying out the lab. Usually one of the questions on a lab quiz would require students to identify the lab's purpose. This became a concern for students in the class and was broached in the following transcript of one of our cogenerative dialogues. Additionally, an attempt to better understand the challenges that students faced in preparing for labs became apparent. By talking with

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[5] *Lab rubric items* are written requirements for ninth and tenth grade students at *Collaborative* that collectively make up the content of a well-organized lab report. Students must meet designated standards to demonstrate their competencies in lab work. The lab rubric items detail requirements for meeting these standards.

Theo and Jazz, both Rosemary and I were made privy to students' rationales for their points of views and feelings about their preparedness for lab quizzes. This cogenerative dialogue, as well as most others, was held during our common lunch periods. We are seen, therefore, in the photo below (Figure 2.2) sharing our perspectives over lunch.

Figure 2.2. Participating in the cogenerative dialogue are (from left to right) Gillian, Theo, Jazz and Rosemary.

What can be discerned from the vignette that generated this photo is that within the cogenerative dialogue field, although differing points of views are presented, there is evidence of participation by each of the stakeholders and a mutual focus that, in this case, is organized around quizzes and lab rubric items. Ethnographically, I describe participants as leaning in toward each other, making consistent eye contact and as speaking in a respectful tone, with fairly consistent and equal turns at talk – all important indications of the presence of mutual respect and rapport, principle tenets of cogenerative dialogues.[6] I have found that the first four episodes are especially interesting and helped me to understand the role that gestures, eye gazes and head nods play in building

[6] See Chapter 5 for details related to the heuristics of cogenerative dialogues established at *Collaborative*.

solidarity and mutual respect in a science classroom. As such, I have included the transcripts as empirical evidence and have provided some theoretical interpretation and discussion around salient points.

Despite Theo's articulated concern about his previous academic exposures in science, he became increasingly agentic within the cogenerative dialogue field. He was especially interested in issues around understanding the content and around student involvement in the lessons and student expectations.[7]

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Episode 1
01  Gillian:     So, what is it that you'd like to talk about today?
02  Theo:        =Let's focus around quizzes and lab reports.
03  Gillian:     O.K., so, can we talk a little bit about performances
                 on quizzes, specifically about identifying the
                 purposes of labs and the::n the procedure?  ((Gillian
                 gets up to adjust the video camera))Anybody want to
                 talk about that?
04  Theo:        Umm:: (6.2) The lab rubric and quiz
05  Gillian:     =What?
06  Theo:        (0.8) Umm…I don't know how to put this into words, but
                 we never really had a quiz on the purpose of the lab
                 before.  We usually write down the purpose of the lab
                 in our lab notebooks.
07  Gillian:     =Right.
08  Theo:        =So::, I felt we were kind of put on the spot.
09  Gillian:     [You felt that you were put on the spot.  O.K.  So how
                 do you think that may affect your attitude toward the
                 quiz?  How do you think being put on the spot affects
                 you on a ↑pop quiz and as it relates to material that
                 you ↑should have been familiar wi::th, right?  And I
                 am, I was a little disappointed with the grades that I
                 saw but, not necessarily from you guys.(0.6)Some
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[7] All episodes have been transcribed following the conventions of conversation analysis employed by Roth (2005).

[beginning of overlapping talk or gesture;
= equal sign at the beginning of turn indicates no gap between two speakers;
(2.3) elapsed time in tenths of a second;
:: colons indicate lengthening of the preceding phoneme, approximately one tenth of a second for each colon used;
– a dash indicates sudden stop in talk;
↑↓ arrows indicate shifts to higher or lower pitch in the immediately following utterance part;
°no° utterances surrounded by degree signs are less loud than the surrounding talk;
(()) double parentheses (italicized) are used to enclose comments and descriptions

people for example gave the purpose and the protocol for a completely different lab.
So::, do you remember the first((Rosemary nods head, yes)) question on the quiz? It was what is the purpose ((Theo nods his head, yes)) of the lab and the second question asked for you to describe the procedure ((Theo again nods head, yes)).

In episode 1, turn 4, after I ask for suggestions as to what our discussion focus should entail. Theo takes initiative in focusing the topic of discussion around quizzes and lab rubric items. In turns 6 and 8, Theo moves the conversation forward by suggesting that there are equity issues related to the quiz that need to be addressed (turn 6). He expresses his concern about the class being, 'put on the spot' (turn 8) because the taking of a lab quiz in this manner had not taken place before. I interpret his concern to one that is beginning to illuminate Theo's evolving sense of criticality. I am challenged to truly consider his and others' feelings of not being as prepared for a quiz, as they would have liked to be prepared. Additionally, I am challenged to think deeper about my own practice – in this case the temporality of the quiz. Having an opportunity to hear from students how they experienced this quiz reinforces the notion that not matter how organized or thought out a lesson may be, there are consequences for actions; sometimes they are not what was intended. I am made aware of the need to be more ethical with these types of quizzes. Opportunities for polysemia and polyphonia helped me to better understand students' experiences and to more appropriately adjust plans as a means to serve students better.

At the beginning of the school year Rosemary and I stated clearly that there would be pop quizzes throughout the year. Even though we reserved this "right", it was now being presented as a salient issue to be discussed. In turn 9, I acknowledge Theo's feelings of being "put on the spot." I continue by asking several questions, one of which involved an

attempt to find out how having a pop quiz might have affected students' attitudes toward the quiz (and perhaps their performance). I was concerned about the consequences of our actions and that they may affect students' enthusiasm for learning the content and their future attitudes toward preparing for future tests and quizzes. I was able to express my disappointed with some grades, something that I don't ordinarily share with students. I believe that in taking risks, like sharing my feelings around grades with students is one way to begin to bridge some of the barriers that exist between students and teachers. Later in turn 9, I ask if Theo and Jazz remember the first and second questions on the quiz. All participants continue to lean forward, showing interest in the conversation. Theo and Rosemary nod their heads affirmatively and Jazz maintains eye contact with me as I ask the questions. All of these gestures acknowledge continued focus on the conversation.

In episode 2, I interpret Theo's tone and the content of what is being said as a means to create an opportunity for him to present his rationale for proposing that questions related to the purpose of the lab should be asked of students after the completion of a lab.

Episode 2

10	Theo:	[↓Hold up, We took this test, though, ↑before or after ((Theo shakes his head, no)) the lab? Before,↑right? ((Theo looks for response first from Gillian, then from Rosemary))
11	Gillian:	(0.6) Before ((Theo glances over to Jazz, and then to Rosemary. He glances again at Jazz and then to Gillian)).
12	Rosemary:	(1.37) Ummhmm: ((Rosemary shakes her head, yes; Jazz is looking straight ahead at Gillian)).
13	Theo:	(3.19) Was that the whole point of this ((Theo is nodding, yes)) to take it before? Or was it oh, I think it's time that I should give them a ((Theo shakes his head as he speaks as in saying no, and then follows this gesture up with a smile))
14	Gillian:	[Well, the reason why I gave
15	Rosemary:	[before ((Theo looks now at Rosemary and then looks directly down at the white lunch paper that held his sandwich)
16	Gillian:	[it before was because I wanted to

On several occasions, it appears as though Theo is monitoring the comfort level of the participants as they begin to discuss the temporality of the quiz. Theo does so, for example, by first, quickly glancing to me and then to Rosemary in turn 10. In turn 11, as I am speaking, Theo glances over to Jazz and Rosemary, then again back to Jazz and finally to me. I interpret his activity as a means by which he is demonstrating attentiveness and concern for what is being said and perhaps, anticipation over what may be said. During turn 13 Theo asks me to clarify (in the cogenerative dialogue) what the "whole point" of addressing the lab question in the manner that it was addressed. At first, he is nodding his head as in saying 'yes' – indicating that he has a good idea of why the question was asked before the lab. Then, he quickly asks another question, as if trying to make sure that we weren't giving a quiz for the sake of 'giving a quiz', i.e., "Or was it oh, I think it's time that I should give them a [quiz]." He clarifies that he did not think that this was our rationale for the quiz. He does so by using expressive gestures and by ending his turn at talk with a smile. I interpret his smile to be a means by which he introduces positive emotional energy to offset any negative emotional energy inherent in a confrontation. I believe that in part we are able to continue the conversation and create a safe place within which we can talk about our concerns because of Theo does not mean overtly or in an confrontational manner show his disagreement with the quiz protocol.

Episode 3

17	Theo:	[Auh nuh ((Theo concurrently folds his lunch paper in half))
18	Gillian:	[Sorry, go ahead ((Gillian is looking at Theo directly, now))
19	Theo:	Oh (0.6) Oh, no, I know. I know. The reason, well, I know why you could give it before but, I'm just saying, was that like pur::posely ((Theo glances over to Rosemary. Rosemary looks on at Gillian)) that you gave it to us before ↓lab, or ↓not

20	Rosemary:	=Umhmm↑ ((Gillian glances over to Rosemary who shakes her head, yes))
21	Theo:	=Awright ((Theo folds the lunch paper over again, this time gingerly))
22	Gillian:	=Well, the reason w↑h↓y (0.4) Why do you think I would give you a quiz asking what the purpose ((Theo folds paper again))of the lab is before you carried it out?
23	Theo:	=Well, because maybe ((Theo continues to fold over paper two more times as he is speaking. The focus of what he is saying now, is changing a bit))So that, well, the only thing that you have before ((Theo folds paper)) you to do the lab is your lab sheet so, you ((Theo smooths fold out on sandwich paper))don't really have the experience yet of doing the lab and, guess you'd want to, you want to make sure that we know what we are going to do prior to doing it.

At the end of episode 2 and during the entirety of episode 3, I interpret Theo's use of his sandwich paper as a resource to reinforce the temporality of his turn at talk, especially as it relates to what he says, will say and has said. For example, in turn 17, Theo interrupts my turn at talk (16) by breaching the turn saying, "Auh nuh." At the same time of his utterance, Theo folds his sandwich paper in half. This motion gets synchronized with his length of talk, starting at the commencement of the utterance and is completed at the end of turn 17. I propose that this motion brackets his turn at talk while at the same time reinforces his stance regarding the timing of the quiz. I view this coordination of motion and utterance as one of which he is unaware. In turn 21, Theo folds his paper again once, this time very gingerly. Although he is not speaking in turn 22, another fold is placed in his paper when the word *purpose* is uttered. Interestingly, in turn 19, Theo emphasizes the word *purpose* by lengthening the phoneme (theoretical representation of the length of talk). In turn 23, he continues to fold over the paper two more times as he is speaking. This time he folds the paper as a shift in what is being said takes place. In this episode it is interesting to note as well Rosemary's participation. Although her verbal participation was minimal because she was engaged in eating her lunch, her head nods

and eye gazes at me along with her response, "Umhmm↑" (turn 20) provided me with a sense of solidarity.

It is because of the porous nature of field boundaries, that the enactment of rituals (patterned actions over time) in other parts of Theo's lifeworld was enacted in cogenerative dialogues. His ability, for example to create and then to mend breaches, his use of semantics (speech content) and utterances, and the manner by which he makes eye contact, all play a role in shaping his identity as an agentic student. Additionally, the vignette is divided into ten episodes, of which six feature Theo using his agency to equalize the power dynamics within the group. He does so, for example, by creating frequent breaches in the conversation and becoming involved in their repair (Roth, 2005). My interpretation of his interactions is that through eye gazing, and enacting repairs frequently using his voice in a non-confrontational manner and by using physical resources (the folding of his sandwich paper), Theo is creating opportunities to structure the field by framing and reframing the ways by which he communicates.

Temporality becomes an essential factor in this vignette. In Theo's appropriation of capital, motion becomes an empirical representation of the length of talk. This representation is substantiated through the embodiment of his schema and provides a physical means by which it (disagreement with the timing of questioning students about the purpose of a lab) can be supported. The empirical representation and significance that motion has in this example can be likened to the motioning of an umpire when a runner has safely reached a base. The umpire gestures that the runner is safe by crossing his hands, one over the other, and then quickly and forcefully, extending them opened. This all happens as the umpire bellows, "safe." In turn 10 Theo provides another example

of how Theo uses his agency ("↓ Hold up") to manipulate resources, namely time and space. It is likely that Theo has not consciously chosen this utterance, but was more likely a part of the repertoire of the resources that have served him well in garnering control, i.e. increasing social capital in other fields.

Accruing Symbolic Capital and Becoming a Resource for Teachers and Students

Toward the end of Theo's ninth grade biochemistry experience, it became clear that he had become more engaged in class and laboratory work. The following photo sequence and transcript provide an idea of Theo's involvement in a lab where both CO_2 and O_2 gases were being collected. Throughout the lab, Theo has clearly demonstrated the incorporation of an ontology that is *for the other* and *with the other*, strengthening solidarity with both his peers and teachers. I argue that it is because of our involvement in cogenerative dialogues throughout the year that disparities, which traditionally exist between teachers and students along the lines of power dynamics, age and gender have changed – affording mutual respect, understanding and equity.

Both Zack and Theo work diligently to understand the protocol as written. Neither has used many of the pieces of equipment before this lab.

Figure 2.3. Zack and Theo working together to set up gas collection apparatus

While students struggle with how the protocol has been written, Theo proposes an alternate series of steps. His proposal vastly improves the entire class' ability to move through the activity with relative ease.

Figure 2.4. Theo seeks out help and clarification from Gillian around how to best conduct the lab.

Both students report their findings and verify the subsequent steps. Theo is epecially excited about being able to troubleshoot his difficulty and expresses a desire to help others do the same.

Figure 2.5. Zack and Theo verify their collection of gas.

In Figure 2.3, Theo and his lab partner Zack were struggling with understanding and the laboratory directions and with carrying out the prescribed protocol. After approaching several of their classmates and getting conflicting information, Theo approached me. He was able to identify the wording in the protocol that was problematic, and suggested rewriting a section of it for the benefit of all students (Figure 2.4). Together, we quickly reworded the script and presented it to the class. Theo and I in this moment were together working to create a seamless interpretation of this section of the lab. We were in effect, "work[ing] at each other's elbows to enhance the learning experiences of students

[and teachers] (Roth, Tobin & Zimmermann, 2002, p. 6). In Figure 2.5, Theo and Zack are confirming that they have appropriately collected the desired gas. They are both pleased to have accomplish what they were expected to accomplish.

Vignette: Collecting and Testing for Oxygen Gas

Theo was especially excited that they were successful because adjustments to the protocol had been made. He expressed a desire to demonstrate to not only his class but also another of my biochemistry classes the appropriate way to carry out the lab in order to obtain the desired results. He requested a classmate, Amy, to help with the demonstration (Figure 2.6). Mr. Gold, the school's laboratory specialist looks on. A transcript of the demonstration follows:

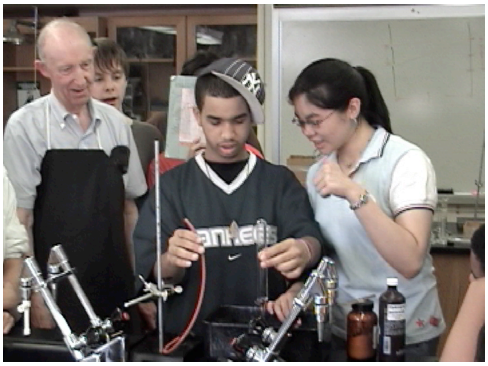

Figure 2.6. Theo and Amy coteach lab protocol as Mr. Gold looks on.

Theo: It's actually pretty simple and similar to the carbon dioxide experiment. Just in the lab (referring to the written document) they say place your thumb over the end of the inverted tube. So you have to place the tube here and you have to pour whatever it is that you have to pour in here and you have the test tube in here and then you place this thingy (the tubing) in here (To Amy) here, hold this.

(putting the tubing in the test tube and then inverting the test tube under the water)

You place it exactly the way he did it (referring to Mr. Gold) and put in there so that you have it like that (showing the inverted tube) and you place how ever many grams (sodium iodide) they ask of you in the test tube and then you add the hydrogen

peroxide and stop it with this (the tubing) as soon as possible or else the gas will take the water out of the test tube.

Amy: But before you start, you have to wait 10 seconds

Theo: Right. It says it. It says it in there. You have to wait 10 seconds for the iodide and peroxide to mix and for the gases to move out.

Mr. Gold: But that is to clear it out – to clear some of the air out (motioning with his hand in an upward direction).

Theo: Right.

Amy: And after you finish with the carbon dioxide

Theo: Yeah, make sure you wash everything

Amy: Clean out the test tube…

Theo: Then…Oh, do you have a question?..(attention is directed to a question being asked by a classmate. Question is inaudible).

Theo: No. It says in here add the 10 mL of peroxide in the 8 inch test tube and then add the 1 gram of sodium iodide and then you put the stopper on it, right? You wait 10 seconds and then you continue on with the lab. OK, and then after that you also have to ignite the splint and put it here and make sure that when you put the stopper in this one after the gas has taken all of the water out, you try work with your partner on this one to try to not have any water go into the test tube. OK, you just try not to have any water remain in the test tube that will prevent the gas from taking the water out. And then you just light the splint and your partner will either hold the test tube and you hold the splint or the other way around and you just do the same thing. You put the splint in quickly and take it out and put the top on it and you'll see the oxygen gases remaining in the tube (Clapping from the student body spontaneously emerged).

In this vignette, Theo's role became one that took on the characteristics of a coteacher. Through his own praxis of being reflective in the moment, an opportunity for all to learn was created. Cogenerative dialogues have influenced the ways that capital is created, reproduced and exchanged. The extent to which capital produced in one field can be used to attain goals of both the individual and collective in other fields very important, as demonstrated in this vignette. Additionally, Theo was able to restructure this field and

others because of the culture that was mediated through his participation in cogenerative dialogues. In this regard, teachers and students alike are able to harness the culture that urban students bring with them from various fields to into the science classroom, changing how social life unfolds there.

Educating Students and Teachers

Students can become alienated from science for a variety of reasons. The urban context, including complexities involving ethnicity, race, socio-economic status, language differences, and immigration create challenges around diversity and equity in schools. Also issues that challenge equity include school size and resource availability. These sources of complexity are salient to my research using cogenerative dialogues. In this chapter, evidence of how cogenerative dialogues have been used to engage students at risk of being alienated from science has been provided. For example, this chapter is focused around Theo, a new (second generation Dominican male) student to *Collaborative.* Theo's identity as a math and science student changed during the course of his year's participation in cogenerative dialogues. His ontologies –constructions of what was taking place in the science classroom and how his interpretations were changing, were also becoming evident. Theo became positively inscribed because he learned how to access and appropriate the capital that is used to increase production, through the capital exchange cycle. By being involved in cogenerative dialogues, Theo's science identity had begun to change into one that included leadership in the discipline. Additionally, students and teachers became increasingly dependent on Theo as a coteacher. A salient feature of coteaching is that a sense of reliability emerged between

students and teachers, creating the possibility for successful interactions in the cogenerative dialogue, the classroom, and the lab. For example, when both Theo and I engaged in a type of interactive coteaching, Theo's sense of *being with* and concern *for the other* became evident through his volunteering to amend the lab protocol and to demonstrate how to correctly execute the protocol. Captured in the vignette at the end of his demonstration was a spontaneous emergence of clapping – what Collins (2004) refers to as collective effervescence. The response of his concern for his fellow classmates was acknowledged and appreciated. These interactions afforded a good feeling about the science content and execution of the lab. The success of this experience was dependent on Theo's actions of being timely, anticipatory and appropriate. While Theo is the focus of this chapter, Jazz also played a very important role in the research and has benefited from being involved as well. For example, from my perspective Jazz has demonstrated an increased sense of self, voice and agency. We created a culture that produced understandings, which allowed for adaptations in the ways by which we planned and enacted teaching and learning. Engaging in understanding contradictions and polysemic perspectives (which value and take seriously the voices of urban students) create opportunities to produce new practices and schema in numerous professional fields.

CHAPTER 3

Accessing the Powers That Be: Intricacies of Decision Making in a Small Urban Public School

Introduction

An Emerging Challenge

> *All year, we've felt completely ignored as a grade by the administration. Everything we've asked for has been denied and everything we suggest has been pushed aside. When we voiced that particular concern and requested twice to be given at lease some kind of meeting or hearing, we were refused both times.*
>
> *So we organized a grade-wide protest. On the day we chose, almost the entire grade and a few juniors showed up at 7:50 a.m. in front of the administrators' office. We sat out there for fifteen or twenty minutes, at which point we started chanting, "2007!" They came out and tried to placate us by saying how proud they were that we able to organize a protest to this scale. We ignored that and voiced our concerns, requesting a formal meeting.*
>
> *At the meeting, several of us showed up – maybe 40 or 50 people altogether. I was impressed – the meeting was very mature and very productive. Our main concern was student voice, and the fact that we had been forced to resort to a public disturbance in order to be heard. We also had a lot of problems with the way students were treated by teachers and the options that would be available to future students – things we wanted to have access to that we felt we'd been denied. Another request we made was for the ability to work out our own problems instead of leaving our futures and school lives in the hands of the administration. We want a say in what happens to us.*
>
> (Student account of senior protest, May, 2007)

How did we arrive at this state of affairs?

> *It seemed as though stink bombs were going off every fifteen minutes or so subsequent to the protest for about a week. Even though the protest took place about a month ago, kids are still very upset. It seems as though more students are getting suspended and almost every day there are incidents of fighting, theft and bullying. My classroom is on the third floor and the administration offices are now on the fourth.*

> *In my six years of teaching at the Collaborative School, students' dissatisfaction related to how their affairs have been handled (or not) by the administration had never been manifested, to the extent and fashion that they are now.*
>
> (Gillian: June 11, 2007)

The above accounts serve as only a couple of many examples that relate to how change in a school can bring about a plethora of challenges chocked full of physical, temporal and emotional concerns. This research took place in a small urban public secondary school in New York City. The Collaborative School[8] has recently changed its administration; its founders have retired and moved on to new work. The Collaborative School has a strong foundation and, the work presented in this paper is organized around its almost two decades of governance, led by the school's creators, Sandy and Robin[9].

New York City's school district and is now divided into 10 regions. Each region contains approximately 120 schools and has 2, 3 or 4 Community school districts and high schools organized within its designated geographic limits. The Collaborative School is part of Region 9 and has recently become one of the New York City Department of Education's (D.O.E) Empowerment schools [10]. Considered by many to be a school designed to meet the needs of high achieving youth, its co-directors/principals and founders provided some insights into the school's history, policies and decision-making processes. Subsequent to interviewing the directors, both formally and informally, other members of the school community were invited to contribute to the discussion in a

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[8] The Collaborative School is a pseudonym.

[9] Sandy and Robin are pseudonyms given to the two directors of The Collaborative School.

[10] Empowerment Schools allow principals along with their school communities to choose their own reading, math, and sex education curriculum. An additional $250,000 is controlled by the principal and can be used for teacher training, art programs, or the hiring of additional teachers.

metalogue[11]. These members included Theo, a student researcher, along with a veteran history teacher and me, a general education science teacher. Theo has been an active member for three years in cogenerative dialogues[12] and his role has expanded tremendously because of his participation in them. A goal of employing this methodology was to invite varying voices and perspectives to be heard and considered. These polyphonic and polysemic perspectives are important in making meaning of participants' experiences. The notion that, "who we are at any moment cannot be divorced from what other things are and who other people are to us," (Varela, 1999, p.38) becomes very important when we try to understand deeply what is being said in the metalogue that follows.

A major objective of the school has been to build a pedagogically strong community of teachers and learners who are capable of meeting rigorous educational requirements while maintaining compassion and sensitivity toward others – both within the classroom as well as outside of it. Some of the intricacies involved in the formation and evolution of The Collaborative School are elucidated in this research. Foci for discussion were around six major themes: the school community; high states testing; curriculum innovation, integration and choice; teacher accountability and hiring; and the acquisition, distribution and utilization of resources. Results also shed light on inconsistencies, contradictions and challenges in both the governance and culture of the school as

---

[11] Metalogue- a conversation about some shared subject of interest or experience. The conversation often is such that not only do participants discuss the problem but also, the structure of the conversation as a whole is relevant to the same subject. It is a means by which the voices of individual authors are served. Metalogues provide a "ratcheting up" of conversation, moving from a shared experience into theory about the shared experience and are increasingly being used in science education research (Tobin & Roth, 2005). Additionally, metalogues can be used to explore the feasibility of conversations within a classroom (Emdin, 2007).

[12] Cogenerative dialogues (Roth & Tobin, 2002) are conversations between participants within a field, which involve agreed upon ways by which improved teaching and learning can take place, ultimately affording the co-construction of new culture.

articulated by metalogue participants. It is hoped that this work will foster an understanding of some of the challenges involved in the decision-making processes within other public schools. Especially salient along these lines include that which is garnered relative to understanding small schools and schools that do not quite fit into a specific category, like being a charter or magnet school. Areas of controversy and contradiction help to bring to our awareness work that needs to continue in order to bring about change and meet the needs of those intimately involved in the learning environment. Additionally, the ways in which specific concerns have been addressed, including the aforementioned, may serve as a model from which other schools can benefit.

What Makes for an "Equitable" Urban Small School Model?

> Young people cannot learn democratic values in a setting that does not value individual achievement, that cannot notice triumphs and defeats, has no time to celebrate or mourn, or respond with indignation or recognition as the situation requires (Meier, 1989).

Large urban public schools are increasingly, being replaced by both smaller and charter schools. In addition to small schools providing students with more individualized academic attention they also help to foster awareness toward the emotional needs of its students. Studies of small schools in Chicago, Philadelphia and New York found there to be lower dropout rates and higher grade point averages (GPAs) amongst its students (Wasley, et al., 2000). Educators, policymakers and foundations, such as the Bill and Melinda Gates Foundation and parents, support research that underscores the benefits and weaknesses of small schools. Although there is a growing body of literature dealing with the nature of small schools in general, there remains a need to study and learn more about how these schools are managed. There has been a tendency to adopt an ideology

that small schools are good schools and a failure to connect policy to well designed studies of the nuances associated with education in small schools.

Ted Sizer and Deborah Meier are two prolific and highly respected contemporary scholars with an expertise in the area of small school development. Both have been instrumental in providing, not only inspiration and rationales for small schools, but in laying the foundations upon which these schools are built for years. Ted Sizer's work has provided a framework for developing alternative schools in large urban cities. He has served as chairman of the Coalition of Essential Schools and has taught at Brown University as a professor and chair of the education department. In 1993, he became the founding Director of the Annenberg Institute for School Reform. Central Park East Secondary School (CPESS) in New York City has followed the small school model and the "Common Principles" inspired by Sizer's five-year research project as detailed in his book, *Horace's Compromise* (1984). These principles greatly influenced The Collaborative School's philosophy and encompass the following ideas and practices:

1. Learning to use one's mind well
2. Less is more – depth over coverage
3. Goals apply to all students
4. Personalization
5. Student-as-worker, teacher-as-coach
6. Demonstration of mastery of material (from both teacher and student)
7. A tone of decency and trust
8. Commitment to the entire school
9. Resources dedicated to teaching and learning

10. Democracy and equity (this principle was added later, in the mid 1990s)

This list of tenets along with suggested practices were intended to clarify the positions on equality and democratic governance of schools to which stakeholders should aspire. Sizer underscores the need to scrutinize nonfunctional existing governance models that so often proliferate in urban school environments.

Deborah Meier has spent many years emphasizing the need for constant reexamination of the public education system, expounding upon concerns and longstanding biases related to complex issues involving race, ethnicity, socioeconomic status, gender, and their subsequent impacts on urban students and the ways in which their schools are led (Meier, 1995). She inspired the founders of The Collaborative School, as they had direct and regular contact and conversations about the creation of the school. Additionally, she often speaks about the many hats that urban teachers wear and their collective responsibilities that must occur in order for students' needs to be met.

Foundational Springboards for Small Schools

Many pedagogues and administrators of large and small schools continue to turn to John Dewey's writings (1938) for inspiration and theoretical groundings related to examining the critical nature of teaching and learning and the roles and responsibilities of those who lead schools. The notion that true education is one that allows for the growth and development of a learner as well as the opportunity for "experiences to take place along a continuum" is one concept that Dewey proposes, and is likely to be fostered in a small school's community where students, teachers and administrators are able to expand their repertoire of practices. Additionally, Dewey emphasizes the need for guidance

around educators cultivating a "sympathetic understanding of [an] individual as [an] individual," allowing for a truer sense of "what is going on in the minds of those who are learning" –examples of practices commonly nurtured in an intimate school setting. An important idea in his work points to the notion that educators must "know how to utilize the surroundings…[in order to build] up experiences that are worthwhile" for their learners.

While Dewey's ideas have shaped education for many years, contemporary issues in urban education necessitate a variety of perspectives in order to be properly addressed and understood. Popular notions that urban students are lacking in both interest and competence because of cultural poverty, deprivation and social reproduction (Seiler, 2002) have proven to be neither transformative in student or teacher attitudes and practices, nor in urban school governance. Rather, they tend to be hegemonic, laden with deficit views of marginalized youth – perspectives that create and reinforce oppressive tendencies. Deficit thinking in the context of urban schooling is rampant and is identified as having six characteristics (Valencia, 1997), one of which is

> …a person-centered explanation of school failure among individuals as linked to group membership (typically, the combination of racial/ethnic minority status and economic disadvantagement). The deficit thinking framework holds that poor schooling performance is rooted in students' alleged cognitive and motivational deficits, while institutional structures and inequitable schooling arrangements that exclude students from learning are held exculpatory. Finally, the model is largely based on imputation and little documentation (Valencia, 1997, p. 9).

Hegemony, oppression and deficit thinking, and the unjust consequences and inequities that result from them, involve active intervention in order to be properly addressed. Innovative strategizing around school reform, changing how most urban students are perceived, and thoughtful decision-making processes are requisites for such a

change.

Although the details of who makes decisions in urban schools and why they are made typically are evolving processes, characterized primarily by the New York City Department of Education and to a lesser extent by a school's individual needs and culture, salient considerations related to the creation and implementation of decision making have at their core challenges which stem from (a) the type of curriculum utilized and its implementation; (b) socio-economic status of students and their families; (c) quality of instruction and instructors; and (d) student accessibility to instructors, staff and administrators (Armstrong & Thompson, 2003). It is because the workings of power in schools and society are politically orchestrated that calls for the enactment of critical pedagogy have been made (Kincheloe, 2005). Critical pedagogy involving a rigorous pursuit to understand the workings of power in these spaces is needed to reconstruct schools so that they empower all. It is emancipatory, guided by the values of solidarity, love, respect, justice and equality and is of a dialectical, recursive nature involving academic rigor and an impassioned spirit.

Despite these and other challenges, urban classrooms offer a wealth of opportunities to begin to understand and remedy the breakdown between and amongst those parties involved in the education of our urban youth and the leadership of the urban schools they attend. Emphasis in these schools has often been placed on problems, primarily focused around 'standards' and high stakes testing, especially their ramifications. Those involved in the educative process are often directed to 'mind the gap' between those students who flourish and those who flounder. This type of focus has resulted in a variety of consequences, including a need to call upon and utilize human and material resources

creatively and intelligently. Practices, which provide for windows of opportunities to create new learning environments, aligned with a sensitivity and awareness toward urban youth culture – through fostering an understanding of the power of culture, its creation and enactment – are examples of foundational essentials, requisite for positive changes toward creating and managing successful small urban schools.

The following research questions have helped to guide this study:

1. What is the history of *Collaborative*? What was the impetus for developing the school, its management, and the protocol utilized to execute decision-making practices?
2. What are administrators', teachers', and students' experiences like in this school? Who is responsible for decision-making? What types of challenges have been encountered during this process?

Utilizing Multiple Data Sources for Deeper Insight

This research employed a descriptive qualitative methodology that utilized both formal and informal interviews. It took place over a four-week period and involved discussions with the co-directors and founders of The Collaborative School in addition to the use of field notes written as a teacher researcher in the school, student reflections and electronic mail. One objective of this work has been to provide descriptive accounts and understandings of the complexities involved in the management and decision-making practices employed within a small urban public school. Sandy and Robin had been leading the middle and high schools, respectively, for eighteen years. The goals of the research include studying how the co-directors individually and collaboratively enacted

their leadership roles and the scope of the school wide decision-making in which they were either directly or indirectly involved.

Overview of School Structure and Operation

> The [Collaborative School] aims to give students an academic program that's on a par with that of Stuyvesant or Bronx Science in a more relaxed, less competitive atmosphere. Students work hard here -- to be sure, some are as sleep-deprived as the kids at the specialized high schools — but [Collaborative] is less intense and more intimate (Larsen, 2001, p.32).

Situated in the heart of Chelsea and housed in an old, gray four story building that shares its space with that of another small school, The Collaborative School, was established in 1987 by Sandy and Robin, two administrators who were seeking to create a child-centered school, where the classroom would be the ultimate experience in a collaborative setting. Upon entrance, one is greeted by two of the three security guards who serve the two schools. Unlike many of New York City Public High Schools, there are no metal detectors in the school. Generally, one will not find policemen or policewomen in the school unless there is a dire situation e.g., someone may be taken to the hospital because of a gym injury or asthma attack. There are three non-teaching male staff members who keep the traffic moving during the two minutes that students have to change classes. Their roles have involved more than patrolling the hallways; they have organized clubs, participated in assemblies, provided a variety of assistance to the principals and teachers, and are a vital part of the school community. Both the middle and high schools have very attentive parent coordinators who are involved in helping to facilitate communication among parents, the guidance department and staff.

Daily Maneuvers

There is a scurrying of teachers and students between 7:30 am and 7:50 am, all determined to be in their classroom ready to begin the day by 8:00am. It is the responsibility of each teacher to ensure that his or her class does not extend beyond the designated 42 minutes, as the school functions on a non-bell schedule. The most common way by which teachers and students learn about daily and upcoming events is by logging on to the school's official web site or by referring to one of several school publications. A monthly report, written by members of the Parent Association (P.A.), is sent to each child's home to apprise parents of pressing concerns and fund raising statistics.

Information involving what is taught and to whom is gathered and organized around two broad categories at Collaborative – departments and grade teams. Academic point people are elected each year to oversee a variety of information around content matter, including, curriculum articulation, incorporation of state standards, academic planning, and the incorporation of the school's philosophy in planning, teaching and assessment. The grade team point people facilitate work that interfaces with student support services, address the needs of teachers, coordinate grade-wide events and encourage interdisciplinary planning.

This school prides itself on being an alternative to other schools with high caliber academic programs, and in endeavoring to develop questioning, reasoning citizens within society by encouraging practices which revolve around compassion, diversity and pluralism, academic rigor and collaboration as central themes. These central themes make up the core of the school's philosophy and mission. One component of the school's

mission is to interweave academically challenging course offerings for a screened population with students and teachers who are intimately involved with the Collaborative Team Teaching (CTT) inclusion program. There is an active School Leadership Team (SLT) and a P.A. The SLT serves to advise the principals and convenes a diverse body of elected officials. It deliberately extends itself to the community of the school and beyond by providing a variety of services, communications and resources from community experts, local businesses, non-profit organizations and the like. Traditionally, parental figures have been actively and consistently involved with all aspects of the school. A curriculum night for parents in October of every academic year familiarizes them with the school's teachers and curricula.

This school is highly regarded within circles of educators and parents, having gone to great lengths to have students feel comfortable and get what they can from The Collaborative School's partnerships with a variety of colleges, universities, educational and financial programs. This school is considered to be one where parents have a higher than average income level, as compared to other urban public New York City schools. Schools like Collaborative, and likely Collaborative itself, have come under the scrutiny of many who have taken note of the radical socio-economic differences and inequities that exist in school districts. Jonathan Kozol (2005) speaks to many of the inequities, specifically addressing those that deal with access to money or lack thereof.

> This relatively new phenomenon of private money being used selectively to benefit the children only of specific public schools had not been noted widely in New York until about ten years ago when parents of the students at a public school in Greenwich Village in Manhattan raised the funds to pay a fourth grade teacher, outside of the normal budget of the school, when class size in the fourth grade otherwise was likely to increase from 26 to 32, which was the average class size in the district at the time but which, one of the parents said, "would have a devastating impact" on her son.

> The parents, therefore, collected $46,000 – two thirds of it, remarkably, in just one night in order to retain the extra teacher (Kozol, 2005, pp.46-47).

Collaborative's racial and ethnic makeup of students is radically different from most urban schools. The weekly average attendance rate has consistently hovered around 96 percent. In the 2003-2004 academic year, out of 431 students, 59 percent were female. Student ethnicity distribution shows the student population during that time as being comprised of 26 percent Asian/Pacific Islanders; 10 percent Hispanic; 7 percent Black; 56 percent White and 1 percent not reporting their race. Two percent of students were identified as English Language Learners, 94 percent as general education students and 6 percent as inclusion (special education) students. This information becomes very important when we consider that most New York City Public Schools serve large populations of Black and Latino students whose parents, while actively involved in their children's education and raising money for their children's schools, have not been able to do so at the tune of around $100,000 per year[13].

Inviting Polysemic Interpretations and Polyphonic Opportunities: Metalogue

What follows is the metalogue that addresses the six themes spoken of earlier. The participants are:

Sandy – codirector

Robin – codirector

Gillian – general education science teacher

Marvin – veteran history and sociology teacher

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[13] Collaborative's P.A. has an annual goal to raise around $90,000 annually to help supplement the principal's budget. It has met and exceeded this goal with regularity.

Theo – student researcher involved in many aspects of cogenerative dialogues

Evolution of Collaborative's Decision Making Practices

Gillian: Let's begin by talking a bit about Collaborative's evolving decision-making model.

Sandy: Originally decision-making was only in our hands. Now the staff influences it. Staff input is vital to the survival and operation of the school because we value people and the way they work, unlike the former school from which this one took its cue. This school was built as a reaction to 17 years of abuse by other schools in which we were involved. There was a tremendous amount of neglect of the emotional and intellectual needs of students. The Collaborative School is a reactionary experience to what staff members were used to in other urban schools. In most cases, people are happy about realizing that their destiny within the classroom and the school is not fixed. We screen potential staff because they become part of the hiring and decision making process within the school.

Theo: I completely agree with what Sandy says. I haven't really been a student at Collaborative for that long but I've been here long enough to have realized that teachers play as equal of a role as the directors play. It really seems like Sandy and Robin care about the well being of the faculty and students. I don't think they see themselves as "principals," or "directors," of the school but as facilitators, facilitating the prosperity and success Collaborative has had.

Gillian: Over the years, my experiences as they relate to how decisions are made and as being a respected contributor to the ways by which classrooms, science

departments and a school operate have varied. I have taught where I felt as though what I have contributed to the design of courses and the cultures of schools have been valued. In this school, I do feel as though my suggestions related to decision making have been heard to a large degree. Can you talk a little about from where you took inspiration when you were beginning the school.

Robin: We took inspiration for our school from Hampshire College. Academic models came from Bank Street as well as its interdisciplinary teaching model, and example of diversification. For commentaries on teachers as models to students as well as intellectual concerns, we looked toward Deborah Meier. West Point gave us good insight in studying how a group can flourish when it supports all members, regardless of their backgrounds. We originally envisioned the school as a community that would not fail if it were properly supported. We also wanted teacher collaboration to be emphasized.

Sandy: Kids are first and foremost on our agenda. We always consider what is best for their emotional and intellectual development. Parties that influence our decision-making include the district, parents and teachers but, not necessarily in this order. It depends on the issue at hand.

Robin: Our decision-making process is a work in progress. The goal is to modify/adapt our processes according to students' needs and their best wishes. We try to involve all and hear everyone's perspective. Several meetings will be held and attempts will be made until all feel comfortable with the outcome. The students' well being is always at the forefront of every decision.

Teachers feel as though the school environment is a community. Teachers (hopefully) feel empowered and are free to be creative and happy with the work that they are doing. This feeling is most often contagious and students do not feel overly stressed out. They can, as a result, approach their work in a serious, happy manner.

Gillian: Often in large organizational systems like the D.O.E., it is not uncommon for individuals to feel isolated and disconnected in many ways from their students and colleagues. I have experienced a sense of community at The Collaborative School. There is a genuine concern for others by many colleagues and a willingness by all to go above and beyond the call of duty. Children and adults have done so selflessly.

Sandy: Students feel free to confide in their teachers and look to them as supportive adults. The goal is to have an environment where students feel safe, are comfortable, and have good relationships with their peers and teachers. Students generally love, are fond of, and respect the adults in the school community and many opportunities are available for the students to have role models and supportive adults during a sometimes difficult time in their lives.

A Tight Rope to Walk: Keeping the Focus on Depth versus Breadth

Hi Ms. Bayne,

With all the talks about the 10th grade BioChem curriculum and the fact that some parents already got tutoring groups for their kids for next year, I wanted to find out where Andy is with the materials. I did not realize there is an issue until I spoke with the outgoing HS Parent's Association president…

So, the advice I got was to have Andy take the Princeton Review for the BioChem Regents in the 10th grade and see how he's doing.

What is your advice? And if you think this is a good/productive idea – then what is the correct book name and test he should be taking? Will you then be able to check it at the end of summer and advise us if you recommend tutoring?

So before I get crazed, just let me know.

(Parent email, June 13th 2007)

Gillian: One can gather from the above email that there is a very high level of concern and anxiety around high stakes testing at Collaborative, especially by parents. While I can understand the concern around these tests and what they may and may not mean for a student's graduation requirements and her entrance into college, I try not to have these tests overshadow the real *value learning the science content – that is, trying to understand our world, its dynamic interactions between living and non-living things housed within it. Even though we are preparing students for the Regents, my experience has been that by overemphasizing the 'value' of a test such as the Regents can and oftentimes does damage student interest and participation in science. Solely teaching to a test can devalue efforts to create a constructivist learning environment.*

Sandy: Originally, Robin and I felt that we would teach in the classroom also, but did not.

Limiting areas within the curriculum are standardized exams (for example Advanced Placement exams in AP classes and Regents). We really have faith that teachers will run with a curriculum so as to include a multidimensional approach without just teaching to a test. At Collaborative, the parents and district have political impact.

There are many concerns around the overall AP tests. Many parents and teachers (and us too) are concerned about the implications of the AP experience. We must consider what is best for kids in the long run. Because of this we make decisions based on how students feel (inquiry course vs. book/exam focus). Kids are 'captive' so their emotional and intellectual integrity must be protected. Richness and depth must be provided in the curriculum. We are less concerned about breadth.

Marvin: I think the way the school got started involved teachers having autonomy to create the type of classroom that we individually dreamed about. [We were] free to do the kinds of things that we would want to do with our curriculum, [with] hiring, with developing "innovative ways in teaching" and also, the bottom line was also trying to help our students. So, we are looking at a group of students and seeing how they have fared over the years. For example, how did they fare when they first came in, let's say as ninth graders, or in middle school as eighth graders and, where are they now in tenth or eleventh grade? And so we are trying to look at or examine their progress academically. Now obviously, the social concern is there – how they feel about themselves, how they perceive themselves within the classroom, their comfort level with material – and this whole notion of how their identity is being shaped as a Collaborative student. And what I mean by that, I think for many, particularly when they come in as ninth graders and they're not part of the school culture. That's a challenge. What I mean by culture is that there are certain expectations that students already have when they are in our middle school and transit into the high school, both at an academic and social level. But when ninth graders come here, and they are coming from all walks of life from the city, then that can be a challenge.

Gillian: When I joined the teaching staff at Collaborative I was very excited to learn that even though I would be utilizing a prescribed curriculum for my ninth grade science classes, there was a desire from a small number of twelfth grade students to have additional exposures to biological science. Kids wanted to take more rigorous science courses but not necessarily a course that would be test-driven. They made a request and the administration was happy to have a means by which kids could get what they requested. I think that recently students did not feel that this was happening. I was even more thrilled to learn that I would be able to teach anything that I wanted to teach. It did not take much brainstorming to make a decision about what would constitute the course. Of course, I was drawn to teach about those things I loved to learn about through my own science experiences. There would be opportunities in each of the four marking periods for students to be engaged both intellectually and experientially in select arenas of science. This translated into in-depth histological studies and laboratory work; dissections; a literacy piece with a central focus which not only involves retrieving primary research journal articles, but reading and talking about them as well; computer based work and research; and discussions and presentations involving aspects of science that I find especially intriguing – bioethics and controversial science issues involving intelligence and its implications around race and stereotyping. Not only was I able to draw from my own interests but from the interests, energy and experiences that over the years I have shared with my students and their love for science.

Sandy: One of our jobs is to explain the value of curriculum integration (e.g.: biology and chemistry curriculum) not only to parents, but to the students as well. This helps students see the value in each discipline as it relates to others. We try to shield teachers from parents, who are hyper vigilant when it comes to their children's grades, and various pedagogical decisions. For those (teachers) who can deliver a good program by engaging their students will have less contact with us, or other outside help. Those who need more help, we will try to monitor and support them more. We will work with and get help from others for curriculum integration.

Gillian: By utilizing a curriculum that integrates both biology and chemistry, I have found that students are exposed to a more realistic understanding of how life 'works'. A part of the challenge of teaching science, especially chemistry, is that students cannot often readily see applications to their every day lives. Although the prescribed biochemistry curriculum is sensible, in that there are many opportunities for students to directly apply that which takes place in the lab there are instances when students are disconnected. As is oftentimes the case, students feel very much estranged from scientific content. Providing a means to have relevant connections to the science content is one of many ways to begin to bridge the divide that oftentimes leaves many marginalized students at a disadvantage (Elmesky & Tobin, 2005). While many at our school can 'buy' test prep courses or participate in a paid for DNA extraction and decoding experience at a facility like Watson's own DNA Learning Center, there are those who cannot. Through careful and thoughtful curriculum planning and, by incorporating ideas and practices, as articulated and proposed by students who have

participated in cogenerative dialogues, for example, a greater feeling of connectedness to the content becomes more of a possibility.

Theo: Taking biochemistry as a course that integrates biology and chemistry content has had its positives and negatives. A negative is that since the curriculum is biology and chemistry intertwined, at times it becomes really difficult to individually tell the two apart and distinguish them. A positive is the overall understanding of chemistry becomes easier to process when applied to the real world examples. Chemistry is a very dense and complex subject, and relating it to our everyday is probably the best way to grasp chemistry.

I think that combining English and history classes to create a humanities class is a horrible idea, however, only because you have to really be able to distinguish the subjects. English is English. You can't combine English and math. Even though history has some overlapping points with English, I don't necessarily think that they should be combined as one class. I think things work like that within the subject, in and of itself, so that maybe an AP composition class combined with an AP literature class, I guess could be combined because they are both English. I don't think a whole subject should be combined with another whole subject even though there may overlapping material. Physics and math have a lot of overlapping material. There are certain equations that hold true in math and physics but you can't combine the two because they each have unique qualities that the students themselves have to be able to distinguish apart. So, Collaborative is a Regents based high school, so if there is to be taken an English Regents, I think that taking humanities would make it more of a hassle or more difficult for students to do well on an English Regents. The

reasons being that they've [students] taken a humanities course since it is a combination of history and *English. The same goes for a history Regents - taking a combination of English and history. This kind of scenario would not better their grade for a history or social studies based Regents.*

To Teach or Not To Teach: Consistencies and Inconsistencies in Hiring

Robin: School based transfer options exist for teachers with seniority or viable applicants. We do, however, have the final say and reserve the right to 'overrule' staff and student opinions and suggestions, though their arguments are heard. The overruling happened once, but was later rescinded.

Marvin: I think in many instances we serve as a feeder school because many of our staff members are very connected to Columbia and Bank Street and N.Y.U. So it seems to me that potential staff members come from that same pool – from Teachers College and Bank Street. I think that when someone does not come from out of that environment, they are more scrutinized. Let's look, for example, at my former student, who has subbed for me for a while now and happens to be African American. He applied for a social studies teaching job here at Collaborative. His teaching would not only include this discipline but would require him or any applicant to teach a sociology class as well. This applicant has a master's degree and has experience teaching. As a matter of fact, he has taught at the Baldwin school, which is right across the street. I think he would have much invested here because he knows the culture of the school, being that he is a graduate of the school. It is because we have at least two other colleagues who have attended the school, that I think having

graduates of The Collaborative School teach here only strengthens the culture of the school. It strengthens teacher morale also. But when I reflect upon the results of his application last year, and his demo lesson – which was great – I was really disappointed. He was not hired. I think the reason for this had a lot to do with another person who had applied for the job. The applicant, a white young lady who was a graduate from a feeder school was selected for the position. Her resume was very, very good and may have been a couple of grades higher than my former student's. She had more experience than him and could speak Spanish. She had experience with Model UN and gave a very good demo lesson, from various perspectives. So clearly she had a certain level of expertise and on paper, she could have functioned in many positions. She was hired. However, all of her background and expertise didn't necessarily mean all that it could have when it came to teaching. What is happening in the sociology class right now, where contention is not embraced or accepted, challenges exist because she doesn't have the tools or the experience to create strategies for the class.

Gillian: Even though my experiences at this school have for the most part been very personally and professionally rewarding, there have been a couple of instances when decisions have been made and seemingly my input has either not been valued when I though it should have been. A couple of years ago, for example, I recommended one of my student teachers, a young woman of East Indian descent, for a job at the school. She was very qualified and worked directly with the curriculum. Students really enjoyed her lessons and their shared interactions. Although I recommended her highly, to my disappointment, she was not hired. At the time, I felt that one of the

reasons that the person who was hired was brought on board, was due to a recommendation that came from someone affiliated with the school tangentially. The selected candidate had not worked with our prescribed curriculum, nor had she had any experience with Collaborative School students. I remember feeling that perhaps she got the job because of the symbolic capital she brought to the table – because of her phenotype – she is a tall, good looking white, young woman – not very different racially or phenotypically from the majority of our student body population, whereas my student teacher was. The selected candidate's formal education was earned from an institution that the administration has drawn many of its potential applicants. Of course, this may not at all be the case but, I think that if you are going to involve others than the powers that be in the decision making process, people should really feel as though what they have to say is not only heard, but is also respected and seriously considered. There was never a discussion with me around my student teacher, her demonstration lesson or teaching history in my class. It was because of the lack of communication and interaction around her candidacy that I ended up feeling as though my recommendation was not taken seriously at all[14]*. Recently I have come across the work of Collins (2004) who proposes a theory of interaction rituals and explores their connections to emotions and interpersonal encounters. I have been able to use his theoretical lens to understand much that takes place as I interact with others in my daily life, including my life as a teacher and staff member at Collaborative. The senior student in her account of the protest saying, "*At the meeting, several of us showed up – maybe 40 or 50 people altogether. I was

[14] My student teacher applied two years subsequent to this initial interview for another teaching position at Collaborative as a seventh grade life science teacher. Under the new administration, she was hired directly after her demonstration lesson.

impressed – the meeting was very mature and very productive. Our main concern was student voice…" *is a good example of how this can happen. Collins' notion of successful interactions resulting in positive emotional energy is vital not only within the student population, but with teachers and other staff members as well. Interpersonal encounters are said to demonstrate characteristics, which lead to a sustained activity or activities. Ultimately, shared experiences and positive emotional energy promote a sense being valued and solidarity. It is important for the powers that be in a school to become involved in creating new culture that is likely to serve all in a manner that is suitable for true collaboration and change. As Sandy stated, it is because of the history of abuse that both she and Robin were able to develop schema and practices from which an environment with a fresh, new culture which has put children, their needs and rights, front and center could take hold.*

Theo: I think teachers at Collaborative particularly need to come to the realization that Collaborative is not like many other schools. Teachers at Collaborative need to understand that this is a very comfortable environment. So that if they feel uncomfortable or shy before they get into the classroom here, they really need to throw that out the window because at Collaborative we are not really quick to judge people, and the student really take in any new staff members here at the school. I think that the way they think of themselves, I mean, if they are insecure and shy, it will change, in maybe the first two weeks of being in the school. And I think that many new teachers seem to get the gist really quickly. The most impressive example would have to be an assistant teacher who is new to the school. One Spanish teacher was able to very quickly adapt to the culture of Collaborative. Yes, the Spanish

department is part of the school but it has its own culture that comes with being part of the Spanish department. And only teachers who are part of the Spanish department can really understand what that culture is. The new teacher fits right in. I happen to have a really close relationship with the Spanish department and it seems as though she's been here for ages. She's able to fit right in. I feel just as comfortable with her as I do with the Spanish teachers that I've had for three or four years. That's due to the teachers taking her in, and it's also due to the students taking her in. Administration and students here at Collaborative do a very good job at doing that. And along the lines of teachers showing compassion towards their students, I think that students should have some kind of input when a teacher first arrives permanently at Collaborative. So that after they are hired, maybe at the new teacher meetings or the new teacher assembly, or whatever is in place to welcome the new teachers, I feel like there should be a couple of students, maybe a representative from each grade or, two or three representatives from each grade, including the middle school, just to get middle school input as well, even if the teacher is a high school teacher. The reason for this is because they never know if they might find themselves in a middle school classroom within Collaborative. If there were kids at the new teacher staff meetings, students can easily say to the new teacher, not tell them what to do, but they could get a sense of what it means to be compassionate and what it means to be humble. This would enable, a friendship, if you will, with the students, because it is true that a lot of teachers do go above and beyond what is expected of them at Collaborative as teachers. So many teachers do have friendships outside of school. I think that if students would be able to express this to the teachers, this would kind of provide a

kind of training, if you will, for the teachers.

To Whom Are Teachers Accountable?

Robin: Originally we thought of staff accountability as taking place through a conversational teacher collaborative. Sometimes there are confrontations with us, and then memos are sent out, letters are placed in teachers' files, and one-on-one conversations are used. The ultimate responsibility rests with us as it relates to rectifying teacher incompetence.

Theo: I'd like to talk about staff accountability, specifically as it relates to the importance of having teachers in more than one classroom setting. Also, I want to talk a little bit about some contradictions around teachers. I think that having teachers in more than one classroom setting is great. Inclusion teachers are there for the inclusion students but they are there also for everyone else, just like the principal teacher is there for the general education students and the inclusion students. It goes both ways. So the way that I see it is not having an inclusion teacher in the classroom, it's just having another teacher in the classroom. One teacher for thirty students is kind of ridiculous. The ratio obviously gets cut down with two so that you have one teacher for every fifteen kids. And so, that's great. To have one teacher for every fifteen kids is not only beneficial to the student but, to the school itself. It is actually invaluable how much more can be done within a classroom with just one more helping hand – with one more teacher. Unfortunately we have some teachers who after they've been here for a while or, they are already welcomed at Collaborative, come with teacher experience, or, are very confident, they tend to

some what put up a front for the first year, and then sort of take on their own principles, their own philosophies, if you will. We know that this was definitely a concern during the senior protest. I think that Collaborative's administration, when recruiting, really needs to look out for this. I think that this is something that needs to be brought up with the teacher when students feel that they do that 'cause I've had a teacher for a certain class for the first year and the second year that I've had them, they are completely different. This is really a contradiction in that Collaborative teachers are supposed to be compassionate toward their students, and certain teachers, basically, by their second or third year, they kind of institute their own principles, their own philosophies, their own rules, and they kind of defeat the purpose of the Collaborative School's philosophy and they kind of make the students feel uncomfortable and not happy to be in their class. And if a student is not happy to be in this class then they are not going to want to do their work to the best of their abilities and it just goes to say that it hurts everyone. It hurts the teacher, it hurts the students, it really worsens the reputation of the school.

Formal and Informal Observations: Help by Many Means

Sandy: We both (Robin and I) do staff observations. Our goal is to head toward peer review so as to improve the practice because teachers are active and closer, more in touch with each other, and have a clearer vision about what actually goes on in the classroom. Many staff members, however, are still very uncomfortable with these ideas.

Theo: I think that students should have some kind of input when a teacher first arrives permanently at Collaborative. So that after they are hired, maybe at the new teacher meetings or the new teacher assembly, or whatever is in place to welcome the new teachers, I feel like there should be a couple of students, maybe a representative from each grade or, two or three representatives from each grade, including the middle school, just to get middle school input as well, even if the teacher is a high school teacher. The reason for this is because they never know if they might find themselves in a middle school classroom within Collaborative. If there were kids at the new teacher staff meetings, students can easily say to the new teacher, not tell them what to do, but they could get a sense of what it means to be compassionate and what it means to be humble. This would enable, a friendship, if you will, with the students, because it is true that a lot of teachers do go above and beyond what is expected of them at Collaborative as teachers. So many teachers do have friendships outside of school. I think that if students would be able to express this to the teachers, this would kind of provide a kind of training, if you will, for the teachers.

Gillian: When I first began teaching at Collaborative, teachers were encouraged and even expected to carve out time to observe each other's classes. This is a great opportunity to learn – both by the visiting and residing teacher. My experience has been that most times, visiting teachers would remain on the sidelines having little to no interaction with the students or teacher(s) in the class. Nowadays I find this intolerable. If someone is visiting my classroom for a significant amount of time – one class period or more – I would expect that the person be ready to become involved in the lesson through one or many aspects of coteaching.

Coteaching involves an equitable inquiry into teaching and learning processes in which all members [or representatives thereof] of a classroom community participate – including students, teachers, student teachers, researchers, and supervisors (Roth, Tobin & Zimmermann, 2002, p.1).

Not only can learning take place by visually and audibly following along, but physically and actively being involved in a lesson, whether to a small or large degree. Learning at the elbow of another through coteaching provides opportunities for visiting and resident teachers to learn and teach in a way that they may not ordinarily.

Marvin: Sometimes it can really help to have another person's point of view. For example, when thinking about the teacher of whom I spoke earlier, I was getting feedback around how the sociology class was going from the teacher's students, some of whom I taught last year. The administration had a meeting with her and they called me in on the meeting to see if I could help. Since there was a lot of concern around racial and homophobia issues, one of the things that I thought would be important for this teacher was for her is to focus in on historical pieces, like supreme court cases. The reason for using these would be so that the content wouldn't necessarily be very close to the kids' experiences and, so that they could look as issues historically, and not necessarily socially or politically. Another suggestion that I gave to her was to have her class view a film on anti-homophobia to help lessen stereotypes and fears that get generated around that subject. But I don't think that viewing the film actually minimized the homophobia that was coming out of the classroom discussion. My opinion is that when that when you are dealing with a group of sixteen, seventeen and eighteen year olds, obviously a lot of contentions are coming from the dinner table with students' parents. And so kids might not

necessarily understand or believe what is being said, but they get involved in what I call 'intellectual conversation'. And sometimes those conversations, which get translated into the classroom, are offensive and racist. It is imperative that the educator has to be able to manage these kinds of challenges. I am not saying that you should shut these types of conversations down, I am saying that you want to have an honest and sincere dialogues. These types of discussions are contentious. That is why you need an experienced, strong presence in such a classroom.

From Collaborative Middle School to Collaborative High School?

Robin: Student school choice and screening processes are initially set up in middle school. Students are selected by common characteristics, i.e., residence, etc. Originally we thought we would screen by IQ but we decided to screen by performance (academic record and city-wide testing scores) and made up our own questionnaires and essay questions. Our student population reflects the population of the district, although it traditionally has not been as diverse as we hoped it would be. Fortunately, this incoming class is more reflective of NYC's population and is more diverse. The district is expanding to include parts of the Bronx and East Harlem. We always want the school to reflect the city's population. Currently, 73 percent of Collaborative's Middle School will proceed to the high school. We want to take in a greater proportion of students from elsewhere to increase diversity.

Theo: The application process from Wagnall to get into Collaborative was a smooth one. It was pretty much the only school I wanted to go to because my guidance counselor had strongly recommended it to me; so I made up my mind that Lab is

where I wanted to be. My grades and records were submitted and I was accepted. Every year the school becomes more and more racially diverse. I think that's great because it gives us a chance to experience and explore other cultures and ways of life. Minorities are truly misrepresented within the educational system and Lab allows for us to justly make a name for ourselves.

Gillian: Opportunities for rich learning, irrespective of the concentration or discipline, take place in environments that are not only diverse ethnically, racially and socio-economically, but differ in the learning styles of students as well. Students and teachers are forced to confront stereotypes, perceptions and contradictions related to what is articulated through the school's philosophy and that which actually gets enacted. The Collaborative School's (as well as other public schools that are properly equipped) high expectations, rigorous academic exposures and access to structural and human resources (for its students and teachers) are some of the basic elements to which every child in New York City should have be privy. It is extremely important that the school is striving toward creating a more realistic representation of its urban student population, paying particular attention to the need to be more inclusive and tolerant of difference.

Theo: Collaborative takes pride in how its students collaboratively work together on group projects. But why stop the collaboration there? Why not have collaboration throughout the grades, especially middle school with the high school. The inter-grade collaboration projects that my classmate, Max and I created were meant to fill in this gap. By creating these inter-grade collaboration projects we wish to achieve more unity and a friendlier place within the school. The essential part of these projects

isn't really the quality of the projects themselves, but how the high school and middle school interact in a working environment with one another. Basically, the ultimate goal that we were trying to achieve was not only to have the ninth graders getting to know the seventh graders and vice versa but, to foster a long term relationship that those ninth graders and those seventh graders will continue to have throughout their Collaborative School experience. So when the seventh graders eventually became ninth graders in high school, those ninth graders this year would be juniors at that time. So, they would already have a type of 'chemistry' as ninth and eleventh graders, which started when each was in the seventh and ninth grade two years prior. So I guess that the goal is to make the Collaborative School more collaborative as a school and not just having the high school being very unified and the middle school being very unified. Instead of making these into two separate entities the goal was to make it into one entity.

Restriction and Access through Budgetary and Research Opportunities

Sandy: Distribution of resources is a group decision. We try to put as much back into classes as possible. Money is tight and is therefore earmarked because there is not a surplus. We usually have a little money left over. Those who are most diligent in pursuing utilization of leftover money for their own classes are likely to get it.

Theo: In terms of the school not being up to snuff academically in comparison to some other schools in the city, in the eyes of some students, I think for the most part that Collaborative is *very academically rigorous and that the only fault in that is that it is a small school. There is only so much funding for classes that we can get*

through the Department of Education. I know that the current seniors felt as though they were cut off from the partaking of many classes. I know that the current seniors were able to partake; for example in architecture and other classes that the juniors and others will not be able to partake in. And I think that it's mostly due to funding and not having enough money to really hold those classes. I doubt that this has much to do with a shortage of teachers who can teach these courses, I think that it has to do with having money and making use of that money and being able to use that money in order to best fit the students in the school and I think that the administration is doing the best that they can with the money that we have.

Gillian: At Collaborative a good amount of resources are put into trying to improve the various aspects of schooling through professional development for teachers and the principals.

Sandy: We invest in the knowledge and experience of others to help us along the lines of professional development. Consultants are *hired. Our development comes primarily from staff and kids. Our 11th and 12th graders give us input on what is needed regarding course work, pedagogy, and choice of texts. We are proud of our ability to bring in top-notch consultants. We have a collaborative administration and are learning to let go of our egos. We have complete faith, trust, and love in each other and always rehash things together. We reflect on the dynamics of our old school and are encouraged by Tony Alvarado, now of the San Diego schools system. Originally, we went to the superintendent to look into creating an alternative elementary school modeled on Central Park East. We started the school, which was in the Bill Gates' program but was lost (closed down) due to political tensions. We*

did not choose to lead The Collaborative School ourselves but rather were placed in it through the D.O.E. We are now battling to diversify this high achieving, homogenous population.

Robin: People have found Collaborative to be a very interesting school environment, and when opportunities for research present themselves, interested parties will approach the school, staff and co-directors.

Theo: I really enjoyed taking part in the cogenerative dialogues because they allowed me to know that the teachers really cared. I enjoyed being able to talk about things I liked and didn't like about the curriculum and syllabus. It also helped me see things from a teacher's perspective, which made the relationship between the teachers and me essentially a stronger one.

Gillian: Both Sandy and Robin have been very welcoming of my own research, which utilizes cogenerative dialogues and their potential to transform both individual and collective learning experiences. They have made it clear that the ultimate concern and focus must always concern keeping in mind what is best for the students – academically, socially and emotionally. The intention of my research is first and foremost to improve the quality of the learning environment by trying to understand the interactions that people have with both human and material resources. Each year, as part of good practice, my desire is to create a physical and temporal field, where culture is enacted and within which this objective will be facilitated. In one regard, cogenerative dialogues are conversations that stakeholders have around a shared experience, that culminates with an agreed upon plan of action, affording a

desired change which is made manifest in the production of new culture. Through the valuing and respect of others within this forum, this new (science) culture and the (science) identities of individuals can be formed and reproduced and ultimately transformed. These notions are especially important, as oftentimes cogenerative dialogues can address shared experiences, which implicate race, gender, ethnicity and an individual's science exposures. Essentially cogenerative dialogues have the potential for serving as powerful domains for social justice (Freire, 1970), and are authenticated by four criteria; they are constituted by ontological, educative, catalytic and tactical soundness (Guba & Lincoln, 1989).

Objectives, Mission and Direction of School

Robin: Social justice is a theme that is woven tightly throughout the mission of our school. The philosophy and mission of the school were generated at its inception. They are modified each year by the whole staff at meetings at the beginning of the school year.

Theo: The Collaborative school philosophy is great; it combines all the great qualities a school should have into a philosophy. The philosophy is made up of: diversity, collaboration, compassion and academic rigor – each contributing to the essence of the school, which makes Collaborative so unique. As far as diversity is concerned, I feel like the administration is doing the best that it can as far as diversifying the school. Honestly I see a really big difference as far as the demographics are concerned when I think back to how the school was when I first came to Collaborative as a freshman. I think that it is a lot more diversified. I think

when I came to Collaborative, there were I think around eight to ten Hispanics in the whole school and now in my grade alone there are like six or seven. In the senior class there are like three and with the sophomores there is a bunch, actually. So, I think that there is a huge change in the Latino demographics but in the African American and Asian demographics as well. So I think that the administration is doing its best at diversifying the school.

Gillian: I consider The Collaborative School's philosophy as being one that should reside actively in every member of the school community. Often, people take the philosophy for granted and may not feel the need to be certain that when appropriate, opportunities to talk about or take action towards ensuring the materialization and display of compassion, diversity, pluralism, academic rigor and collaboration occur. Over the years I have spoken to students regularly about what concerns them about their experiences in the school. Invariably, irrespective of race or ethnicity, students have voiced concerns about the lack of sensitivity around race and ethnicity. I believe that part of this concern has existed because of the complexities of the mentalities and sentiments around entitlement that stems from this population of students. One of the challenges that small schools have faced revolves around the 'types' of students that are recruited into them. Often times these small specialized schools are referred to a niche academies Kozol (2005).

There is also the problem posed by what are basically elitist "niche academies" that tend to attract the children of more privileged white families, while a totally different set of niche academies has been developed with career affiliations that are clearly targeted at poor children of color. A number of the small schools, for example, that have been set up for children of minorities in recent years are explicitly indoctrinational academies established to recruit young people to the military services and funded partially with money from the Pentagon (Kozol, 2005, p.296).

Tensions and Resolutions

Robin: Areas of tension in our school have revolved around academic rigor, grades, clubs/seminars, extended day; AP classes; integrated curriculum, scheduling of classes, emergency evacuation protocols. Parties with concerns will bring them to us. We will present the pertinent information to staff and/or needed parties, who will collectively decide how to resolve the issues.

Gillian: The biochemistry curriculum that is used at Collaborative was officially introduced during my second year. I believe there had been (and continues to be) concern around the curriculum being one that is integrated and, that the Regents exams strictly tests for a student's understanding of content in either the biology or the chemistry domain, not in an integrated manner. Parents and students alike tend to put a tremendous amount of value into these high stakes tests, as a student's performance on them can play a role in college acceptance and scholarship worthiness. While the intention was to assure parents that students would in no way be hindered but, would be likely to have a richer science experience than a prescribed Regents curriculum, I do remember having a very long and involved meeting with them, another colleague who taught the second year of the two year curriculum, the educational consultant who created the curriculum and both Sandy and Robin. The goal was to discuss the rationale of the curriculum and entertain questions related to its details. The meeting provided for a very good opportunity to engage in a meaningful and clarifying conversation at the time but was never repeated in subsequent years. Students have valid concerns around the curriculum

and being heard.

Robin: Other challenges include decisions, which have to be made during a particular time frame. Not everyone may be in agreement. Issues that are unresolved will be revisited and discussed later.

Theo: Another concern that was focused on in the protest involved free periods. One flaw within the school is that during the free periods students aren't allowed to sit and intermingle in the hallways. I know that the idea sounds absurd in comparison to what other schools do but, Collaborative is really supposed to represent this home away from home and the teachers are really supposed to confide in the students and the administration is supposed to confide in the students, I don't see why students can't sit in the hallway and just casually talk about work, what you're going to do that evening or that weekend. I think that the excuses that the students have been getting are really ridiculous, like it's a safety hazard. How is it a safety hazard if we have a fire drill? The students in the hallway are going to want to exit the building too, and will probably be able to exit the building before the students who are in the classroom will. The fact that it is a safety hazard is just beyond me. The security guards say that it is a standard rule in New York City but the security guards are not Collaborative students and they don't know how contradictory it is for the principals or during orientations to hear that Collaborative is supposed to be a home away from home and there is no dress code and everything is so nonchalant but we can't sit in the hall and mingle. We haven't gotten the right answers and no answers thus far have been significant or they haven't made any sense. And I think that's one of the things that we should really look into. Because, it bothers students when they're in

the hallway and they are not disturbing other classes and we're talking and we have a security guard tell us that we have to leave the hallway and go outside of the school where it might be cold or it might be raining, or we have to be in a classroom. I think that's unfair to the students because it is a misrepresentation of what the school claims to be and it's also hypocritical on the part of the school.

Conclusion

Good small schools share a common set of characteristics, including strong leadership. Sandy and Robin have both demonstrated these qualities during their tenure as co-directors at The Collaborative School. Their strength emerged and was sustained first, because of their passion and dedication toward students and secondly, because of their own negative experiences within other schools as both teachers and administrators. These leaders maintained a clear vision, as well as appropriate organization and use of the facilities and resources. They were instructional leaders and teacher coaches, providing job-related learning experiences and time for teachers to work together. While they initially took responsibility for the majority of decision-making at The Collaborative School, they quickly immersed themselves in the collaborative process, in which teachers, staff and students shared ideas and learned from each other about the best ways to approach managing the particulars of the school. Through this study, data related to the school community; high states testing; curriculum innovation, integration and choice; teacher accountability and hiring; and the acquisition, distribution and utilization of resources were explored and discussed with the co-directors. Clearly, they have employed means by which those who are affiliated with the school truly participate in it with a sense of community. Roles are shared as is the handling of challenges that

emerge, such as (a) wrestling with whether or not to have AP classes versus advanced classes, (b) how to integrate disciplines, (c) how make decisions in thoughtful ways when there are time constraints, and (d) how to work with the various components of the Department of Education to get what is needed for students and staff. While Sandy and Robin are proud of the work they have done and the strides they have made in many aspects of the school, they have shared in much of the decision-making process with The Collaborative School community, conceding that it continues to be, "a work in progress" – work that now falls upon the school's new co-directors. Discussing contradictions are equally as important as the positive aspects of the school, for this is where we can find much to learn. It is hoped that this research project aids in creating new inroads into becoming aware of and understanding how decisions in a small urban public school are made. While the metalogue in this chapter has shed light on how decisions are made and who makes them at Collaborative, they have proven to be invaluable in shaping science curriculum. Insights from this work can support a variety of small schools and, as a result help, them to become more capable of creating their own structures to succeed and manage the wide range of decision-making processes and practices that occur daily.

CHAPTER 4

Cogenerative Dialogues: Expanding Student Roles Inside and Outside of the Urban Science Classroom

Introduction

> The extent to which capital produced in a field can be used to attain goals in other fields is a crucial issue, as is the capacity of individuals to restructure all fields in which they participate (Tobin, 2006).

It is because of the tangible effects that cogenerative dialogues have had on the life of the science classroom, those who directly participated in them, and my biochemistry class at large, that I decided to continue to use them as a method of good practice as well as to learn from additional studies that I would lead in subsequent ninth grade biochemistry classes. My reflective teaching identity has grown and I have become more comfortable with being open to change that is suggested by both students and coteachers within the cogenerative dialogue field and within other fields as well.

I have used cogenerative dialogues for a total of three years in my classroom at *Collaborative.* The research presented in this chapter emerged as a welcomed surprise. While I have learned of student role expansion being mediated through participation in cogenerative dialogues, i.e., Elmesky and Tobin (2005), I had no specific ideas as to what kinds of lasting effects they might have on Jazz, Theo or any other student directly or indirectly involved with them. Presented in this chapter are a series of seven vignettes, which emerged over the course of two years as a result of two major factors. First, working with Theo, Jazz and Rosemary had such a lasting impression on me that I was eager to maintain open and ongoing communications with them. Second, it became increasingly evident through Theo's reflections on the previous year's research that he

felt very strongly about the role that cogenerative dialogues played in a variety of his changing roles within the school.

These vignettes, most of which emerged serendipitously, address answering the essential question, what are the lasting effects of having participated in cogenerative dialogues at the individual (Theo) and at the collective (classmates, classes, school and educational community at large) levels? The illuminations, as made manifest in change in culture, and their associated contradictions and interpretations are presented in this chapter. They serve as structures that Theo can identify with because they resonate with many aspects of his core identity. Additionally, the vignettes highlight the expansion of his role identity and the fusion of Theo's cultural identity into who he is and how he maneuvers in various fields – both within and outside of the urban science classroom.

Vignette: Elected Officials' Breakfast

> Theo is one of a few students who has been blessed with many incredible qualities. He holds education at a high value. What separates him from most students is his presence within the school community...his leadership qualities are always present, demonstrated with grace and humility, not to mention his eagerness to learn (Marvin, teacher, reflection on Theo, grade 10. March 29, 2006).

Every year in the fall, *Collaborative* organizes a breakfast for invited Elected Officials. The purpose of this breakfast is to make known the strides that are being made and challenges that are being met, all in an effort to appeal to elected political and educational officials to assist in maintaining a challenging, well equipped and staffed school. Theo and I had made arrangements earlier in the week to meet for lunch on this day to talk about his familial and cultural background. Unbeknownst to us, the breakfast fell on the same day. The principal had invited Theo to participate in a panel discussion,

which was to detail students' experiences within the school. The acceptance by Theo of the invitation provided evidence for the germination of leadership qualities. Theo wrote the following about his experience:

> *I was asked by Martha[15] to speak at the breakfast. I'm not sure why though, but she thought I would be a good candidate.*
>
> *My job was to speak about the Spanish department here at Collaborative. I explained how Collaborative has an extremely intricate Spanish program that needs to be better funded because we are working on limited resources. To give the officials a reason or motivation to fund us, I summed up the high school Spanish curriculum and I spoke a little about the middle school curriculum because they're pretty extraordinary.*
>
> *I spoke about how the middle school, as well as the high school, does not use textbooks to teach their students because it takes the realism and naturalness away from teachers teaching the language and the students learning the culture. I told them how the 8th graders are exposed to some of the components of the high school curriculum; they seemed rather impressed.*
>
> *I then spoke about how the ninth grade year is an assessment year just to see where all the students are at and to see who's capable of what. But it's also a difficult year because the former Collaborative middle school students who continue on to the high school know more then the new incoming freshmen, and since the Spanish high school curriculum is a sequel to the middle school curriculum the teacher has to delay some of the lessons to get the new kids on track.*
>
> *Then how in the 10th grade students are then put into 3 classes, beginners, intermediate, and advanced, and how the advanced kids take the Spanish Regents a semester before the intermediate and beginners and before many of the high school in New York.*
>
> *In the 11th and 12th grade one is given the option of taking either AP Spanish Literature or Spanish Cinema. I explained each course and how they're both a crucial component in developing ones Spanish-speaking abilities and learning about*

[15] Pseudonym for one of the new principals of *Collaborative*

the Spanish culture.

As Marvin has stated in the caption above, Theo's reputation as a reliable and mature student was becoming increasingly apparent throughout the school community. I can remember colleagues, and students alike speaking of him highly when he was in the ninth grade. In his written reflection, Theo claims not to know exactly why the principal invited him to share his experiences with those attending the breakfast. The forming and reforming of his own identity, both in the science class and out of it, constantly produces and reproduces new ways by which one is presented and represented in varying fields. These new ways are transformative both at the individual and collective levels. Clearly, the external manifestation of being a leader in the school had begun to take shape. Theo has used the capital, which he produces in his science classroom in the ninth grade and in cogenerative dialogues to knowingly and unknowingly work toward attaining his goals in other fields, while simultaneously restructuring all the fields within which he participates. Roth and Tobin (2007) maintain that, "insights into identity and participation in science cannot be fully understood by studies of classrooms in isolation of the other fields in which social life is enacted (Roth & Tobin, 2007, p.341).

Figure 4.1 Theo with other Collaborative students make presentations at Elected Officials' Breakfast in school library. Theo is standing at the podium, flanked by two other students.

Theo was invited to speak at the breakfast about Collaborative's *innovative Spanish department and its need for additional resources.*

Gaining respect by his peers and the adults in the school is based fundamentally around a sense of solidarity that emerged through Theo's science experiences. His interactions and transactions are integral elements of the culture that is created within the fields that are traversed. These interactions and transactions are premised upon collective agreements and responsibilities that individuals partake in, which afford those in a particular field to work toward and implement change. By exploring Theo's individual trajectories over time, the emergence of solidarity with the collective is observed (Tobin & Roth, 2006, p.89). Theo's agency is expanding to a large degree because structures in the field are organized so that it can be afforded. He is able to access and appropriate these resources, which not only expands his own agency, but also expands the agency of the collective. The case in point here is the content of Theo's appeal to the elected officials. Theo is speaking (Figure 4.1) from personal experience and on behalf of the collective student body, the Spanish department of the school itself and, essentially school Spanish departments throughout the district. Theo does so in a confident and

articulate manner.

A noteworthy contradiction presents itself in this vignette, in that this is one of possibly two instances when I have noted that Theo is not wearing a hat.

Theo as Tenth Grade Science Coteacher

> …human beings participate in the shaping of their (learning) environment rather than merely reacting to given conditions (Roth, Tobin & Zimmermann, 2002, p.2).

In the fall of 2005, I happened upon Theo coteaching his 10th grade biochemistry class. In relation to Theo's classroom, my classroom is located on the same side of the building but on other end of the hallway. I had a prep period at the time when this lesson was taking place and had left my room to retrieve some materials for a lab demonstration that I would be conducting during the next period. The materials were located in another lab upstairs and in order to get to the lab I had to pass by the tenth grade science

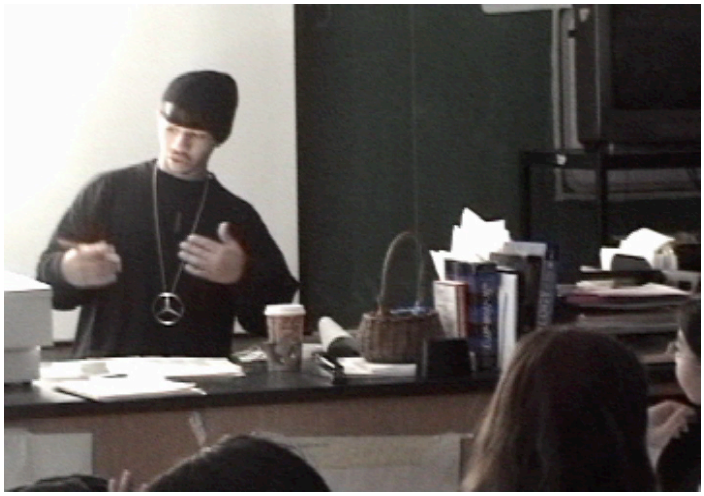


Figure 4.2 Theo leads his class in a discussion around *lab rubric items.*

Theo has taken on an identity as coteacher. He works at the elbows of both his general education and inclusion teachers.

classroom. From the hallway, I heard directives being given by a familiar sounding These directives were being delivered in a manner that exuded confidence. I peeked into the classroom and found Theo at the front of the room (Figure 4.2), leading his class in a discussion around *lab rubric items*. I quickly rushed back to my room to grab my video camera. What appears in the transcript that follows is an effort on the part of the science teacher and Theo to clarify salient features around the skills involved in the assigned *lab rubric items*. This effort demonstrates solidarity between Theo and his coteacher. Additionally, Theo is taking a poll as to how and why students may or may not have elected to choose to address the *lab rubric items* in ways that were expected of them. During the students' ninth grade of the biochemistry experience, addressing *lab rubric items* was also an integral component of the spiraled curriculum.[16] *Lab rubric items* posed a challenge for many students, including Theo and were focal points for discussion in several cogenerative dialogues that were held the year before. This vignette serves as a prime example of how cogenerative dialogues set the stage for change in the learning environment, affording teachers to build credibility with their students and vice versa, as a means to establish rapport and build respect. Clearly, there is a demonstration of respect towards Theo by his tenth grade science teacher (and vice versa) and a general sense of respect among the students who make up the rest of the class. The following vignette provides a sense of the ease and fluidity with which Theo interacts with his teacher and classmates:

Episode 1

```
01  Theo:    …and "achieves standards"
             …all right. 1,2,3,4,5…6,7,8,9,10
             …Exceeds standard…negative…
```

[16] See chapter 2 for details around the nature of 9th and 10th grade science curriculum.

02 Teacher: Wait, senor Morales, could I request you to read exceeds standards and why no one chose that?

03 Theo: Well, it's the same thing as the achieves standard of 2A, "suggests an alternative purpose or testable question using similar materials and importance of the sequence of ALL the steps in the procedure". So they need to explain the sequence of all the steps that you would use in the procedure.

04 Theo: …Um "Understanding the design of the experiment number 3". Who would like to comment on this?...Anyone?...Sumati?

05 Sumati: ((no answer))

06 Theo: Herb

07 Herb: What?...

08 Theo: What did you get for, 'Understanding the design of the experiment number 3'?…

09 Herb: I didn't…((students laugh))

10: Theo: Liz?...

In episode 1 of the above transcript, Theo is able to address and lead his class in a mature, controlled manner. All eyes and ears are focused on the delivery and the content of what is being said. During the first turn at talk, Theo is assessing if and how students were able to address the required homework assignment. A number of students completed requirements for "achieving the standard" as outlined by the *lab rubric*, but no one addressed the requirements for "exceeds the standard," as discerned by Theo's articulation of, "Exceeds standard…negative." During the second turn at talk, the teacher is helping to align her way of finding out more about why students responded the way they did by modeling her way of questioning. Theo quickly interprets what she is asking and in his own words addresses the details of what the students need to have completed in order to respond appropriately (turn 3). Theo proceeds to call on students to share their responses.

Theo may appear to have somewhat of an advantage in understanding what is being

asked of the students. While students have become very familiar with each other, at least since the ninth grade (some have known each other since primary and middle school), only some of the students in this class were in the same ninth grade biochemistry (part I) class the previous year. As such, only those students who were in Theo's class may have benefited directly from the discussions held at that time around *lab rubric items* during cogenerative dialogues, although the capital and resources accrued from those experiences are carrying into the current scenario. Nevertheless, Theo's growing experiences in leadership roles, whether they involve demonstrating a lab technique, speaking to an audience of elected officials, or working at the elbow of another as a coteacher provide structures that resonate with Theo's knowledge resources—disposing him to act fluently in these fields. Each experience schematically leads to the building of confidence and to becoming parts of Theo's stocks of knowledge at hand. The emotions affiliated with these experiences will serve as references and will resonate within Theo with each new experience he has involving leadership roles. They will also serve as a resource for further development and manifestation of confidence in similar and new fields. This scenario serves as an example of the evolving and lasting effects of utilizing cogenerative dialogues (both at levels at which we are aware and unaware) and as an essential and integral component of good teaching and learning practices.

New ways to understand Theo's interactions and learning may be theorized also from a biological standpoint. Recently, a small group of researchers in Italy **(**Rizzolatti, Gallese et al., 2006**)** became interested in studying the brain's motor cortex, especially the F5 area, which is associated hand and mouth movements while learning how actions are encoded by the pattern of neuron firing. It was discovered through positron-emission

tomography (PET) and functional magnetic resonance imaging (fMRI) that when an individual watches someone else perform the same task as he or she did, a small group of neurons, mirror neurons, would discharge in exactly the same manner as when the individual performed the same acts.

This research involving mirror neurons is exciting because it may help us to understand social life, its emotional constituents and how culture gets appropriated and enacted, especially in fields like science classrooms and cogenerative dialogues. As such, culture, its nexus of schemas and practices that are produced align through mirror pathways and when appropriate, with the reappearance of structures, provide for the embodiment of cultural resonance. This resonance then enables the production, reproduction and transformation of culture. Evidence indicates that mirror neurons, located in the anterior insula are activated when test participants, "experience the emotion and when they see it expressed by others…[T]he observer and the observed share a neural mechanism that enables a form of direct experiential understanding" (Rizzolatti, Gallese et al., 2006**,** p. 58). This research points to a biological grounding of solidarity and for structural resonances being associated with neural activity as relevant stocks of knowledge come to hand in structural arrangements that approximate those present when the knowledge was first produced (as in the case of Theo's coteaching, for example). In addition, further interpretation points to not necessarily having (or needing) solely another individual serve as a resonant structure in order to evoke emotions. Rather, reflection upon a personal experience by an individual which is emotionally charged, may also elicit stimulation of mirror neurons along the same pathway, reinforcing the notion that culture, and its associated emotionality, is experienced and generated at both

the individual and at the collective levels.

Education: Priority Number One

I had been interested in finding out how Theo's family and his Dominican cultural identity factor into his own dispositions, attitude and identity in his educational experience. I had an opportunity to speak with him informally one afternoon during his tenth grade, after he received his first report card and around the time when he was anticipating grades for the second marking period. The following vignette speaks to parts of Theo's family identity, specifically as they relate to his and his parents' sentiments around education. We had been speaking about some of the sociocultural theory I had been introduced to in my research group at The Graduate Center and began using in cogenerative dialogues as well as in informal conversations. Additionally, I had been reading quite a bit about science educators using A. Wade Boykin's (1986) notion of nine interrelated dispositions of Black culture to help theorize and appreciate the culture of many urban students through a lens that is not deficit laden. With the understanding that all students bring cultural capital to a field, I was interested in gaining a better understanding of Theo's capital and a sense of who his parents are and how familial culture contributes to the shaping of a student's (Theo's) core and role (i.e., student, expanded) identities. This becomes especially salient when considering that many in urban education value the culture of schooling over the culture of home which create misalignments and hence, misunderstandings involving issues that implicate racial, ethnic and language differences, as well as those concerning poverty (Barton, 2001).

Episode 2

01 Theo: My mom is doing training in different schools and stuff and I think she has something like six months of training before they place her in a school where she can work.

02 Gillian: Did your parents go to college?

03 Theo: No. My dad didn't even get to finish middle school and my mom went to George Washington High School.

04 Gillian: So your parents have been here for a while, then…

05 Theo: Oh yeah. My mom came from the DR when she was 13 and my dad maybe when he was 16 or 18….but they knew each other…

06 Gillian: Can you talk a little bit about how your family feels about education and about how they feel about their education, your siblings' education, your education … Can you just give us a little insight into that?

07 Theo: I guess it's like priority number one. My dad didn't graduate from middle school, or go beyond the eighth grade but, he's pretty smart and he knows a lot about everything. I guess it's just from being out and stuff and just watching the news…but he's a perfectionist so, all my grades have to be pretty tidy and stuff. And my mom is more lenient towards my grades 'cause, she's like the mother role and she's all caring and stuff. But, she tries to be as strict as she can…

08 Gillian: So what does that mean, as it relates to your dad being pretty firm with grades? How does that get translated?

09 Theo: In terms of like…well…he sees what we are all capable of. Like my brother wasn't the brightest person in the world and my father understood that and so my dad would always encourage him to do better…and if he did do better, then that would be his new standard and he couldn't go below that…So as you increase your grade, you can't go below that.

10 Gillian: When you say that you can't go below that, what does that mean for you? How does that get enforced?

11 Theo: He doesn't enforce it, 'cause, he expects us to enforce it unto ourselves…He trusts us enough to know that we should know better than to lower our grades, after we've reached a certain point.

12 Gillian: And how does he go about encouraging you?

13 Theo: I mean, luckily, we've all turned out to be pretty mature, and he doesn't really go into all these debates and lectures, he just kind of reminds us that how we do in school reflects on our future and, if you don't do well in school, your future is not looking too well…so for most of us, that's been enough to just encourage us to do well…

Although Theo's parents do not have formal degrees of higher education, he concedes that they are very intelligent and loving people. They value education highly and have had high expectations of Theo and his siblings both academically and professionally. These family values have factored into Theo's approach to his schoolwork and how he maneuvers within fields. Opportunities, to speak with urban students critically about their families and other factors that influence dispositions toward school and learning, such as this one, afford insider perspectives and genuinely enable educators to embrace the histories, cultures, and epistemologies of our students.

Peer Tutor

Tobin and Roth (2006) talk about the spontaneity and value of peer tutoring in relation to having participated in cogenerative dialogues. As time is spent paying attention to the details of what is being said and done, student researchers use the resources and capital that they have acquired by helping others very much in the same way that they have received help. After reviewing and studying a large amount of videotaped classroom and laboratory activities, including that which was captured in

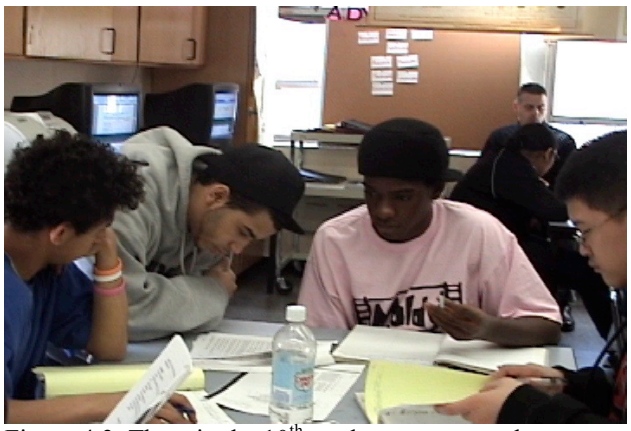


Figure 4.3 Theo, in the 10th grade, spontaneously peer tutors male students who are having difficulty with an assignment.

The *role identity* (Turner, 2002) of co-teacher has become incorporated into Theo's habitus. These students were having difficulty understanding concepts behind the relationship between absorption rate and surface area.

Figure 2.4, I noticed that the ways in which I commonly interacted with Theo during the previous year were very similar to how he was interacting with his peers. When studied side by side, the body orientations, gestures and tones of voices are very similar. All of these components of interactions were occurring at the levels at which Theo was unaware, a common feature of enacting reproduced culture.

Theo was drawn to this table of ninth grade boys (Figure 4.3) because there was some refusal on their part to complete an in-class assignment that I had given. Students were preparing for a lab that investigated the relationship between surface area and absorption rate. I had visited each table and when I arrived at this one, there was quite a bit of confusion around terminology and concepts. Voices had escalated until one of the students informed me that he was not interested in completing the assignment. I spent some time at this table making several attempts to help the students when Theo, who had only meant to be in my classroom to borrow a computer to print out an assignment for one of his own tenth grade classes, heard the commotion and took it upon himself to intervene. I quickly located my video camera, which had been charging in preparation for taping the subsequent class that was regularly involved in cogenerative dialogues, and began to tape the interaction. Theo was immediately able to capture the students' attention and help them with that which I could not. It is likely that being of the same gender and a peer group gave Theo an advantage – capital – that I did not have. Also, Theo had completed a similar assignment in my class the year before and was able to help them move through the assignment with ease. The idea of having multiple ways of addressing students' needs with multiple individuals, including student researchers, is a means by which those engaged in the teaching and learning process have many human

resources to whom they might turn as *par for the course* and as a means by which one can "have another's back."

Just a couple of months earlier, I had spoken with Theo again about his thoughts related to his identity as a science student, to which he said:

> *Science class had to be my worse class [in middle school], which to this day still holds true at Collaborative. In most of my classes I felt that I could not pay attention because I could either just study it and learn it at home in our text books or because I felt that I didn't needed to devote my full attention in that class to do well. In science that wasn't the case; I did poorly, and I didn't do anything to better the situation because I simply didn't care for science and I didn't like it.*

While Theo has time and time again presented himself as a smart, interested, and dedicated science student, I find this statement very interesting. One might even think of it as a bit of a contradiction. This statement and other scenarios involving Theo presented in this chapter capture the idea that identity is not stable. It changes with place and time, and is dependent upon the individual in relation to others (the collective) dialectically. Therefore, identity is historically constituted and is made manifest within the narratives of life (Roth & Tobin, 2007). As such, identities are created and recreated as life is lived in lifeworlds and fields that permeate throughout with their own inherent histories and meanings. When viewed through a sociocultural lens that characterizes identities as being in a state of constant creation, reproduction and recreation (to a great degree because of structures within fields) at the macro, meso and micro levels, we are forced to view and interact with students from a non-deterministic perspective. Hence, Theo's science identity must be viewed as one that is not fixed, but one that is constantly evolving.

Learning about Dispositions to Act

During the spring of 2006, I spoke again to Theo of A. Wade Boykin (1997) and his description of the triple quandary of the schooling of African American students. In his work, Boykin endeavors to more completely understand issues of social culture and structure that may directly or indirectly affect numerous challenges that Black students have encountered during their educational experiences. What I have found is that the triple quandary is not a phenomenon that solely illuminates the complexities of Black students, but is one that speaks to many other racial and ethnic groups, including Latinos. The triple quandary takes into consideration three forces shaping education challenges of such students, (a) mainstream culture and ways of being (b) African-rooted Black culture and (c) the status and effects of being oppressed. Boykin proposes that are at least nine interrelated dimensions of Black culture (dispositions to act) that must be taken into account when considering the schooling of students. Articulated in Boykin's work is that dispositions revolve around spirituality, harmony, movement, verve, affect, communalism, expressive individualism, oral tradition, and social time perspectives. He emphasizes that by understanding that these dispositions are in direct opposition to the Euro-American (schooling) culture, the interpretation of misaligned interactions that commonly occur between teachers who are often very different from their students – racially, ethnically and socioeconomically – is not misconstrued. Misinterpretations could be projected upon urban students who are not uncommonly labeled, for example, as lacking in interest or focus and other perceptions that are of a deficit nature. By drawing upon notions, like those of Boykin, we can make inroads into viewing urban students,

their schooling and learning from a lens that is not deficit laden--a perspective that respects them and provides for rich new means by which obstacles that plague urban youth can be transcended.

One of the dispositions that resonate within Theo's way of being is communalism. During cogenerative dialogues and also in informal meetings, there have been opportunities to discuss some of the theoretical lenses that underlie my research. Theo's sincere desire and actions toward communalism and solidarity have been evidenced in many ways – in hearing his descriptions of working with other students on science related class work and projects, observing him tutoring middle and high school students who have been challenged in either math or Spanish classes, and talking with him about how to raise money for a trip to Spain so that all driven students, irrespective of their socioeconomic status, could share in the experience.

I remember having a dialogue with Theo about the way by which communalism has been demonstrated in his Dominican culture, his family, school and extracurricular lives. We spoke of communalism as, "a commitment to social connectedness which includes an awareness that social bonds and responsibilities transcend individual privileges' (Boykin, 1997, p.61). Theo made meaning of it through his lived experience in the following way:

> *Dominicans, overall as a group of people are pretty loyal, humble and grateful. We stick together more often then not, because there're always those few that think they're better. I most of the time care about the well being of others as much as my own; it's a trait that's been taught to me by my parents because my parents are extremely loving and caring people when it comes family, life and to those who are less fortunate.*
>
> *My family for the most part is pretty isolated into groups, but the few of us that do keep in touch, we make sure everything is okay amongst us, this includes money issues, health issues and any other problems that might come about.*
>
> *In school I try to help others to the best of my abilities because I do like seeing others succeed; which I admit can be a bad thing because it sometimes gets in the way of me*

doing my own work…

From his reflection, it is clear that Theo's habitus, his dispositions to act in particular ways, transcend the various fields within which he moves. His core beliefs and identity are influenced strongly by his family and Dominican culture, and have provided him with a sophisticated way by which he maneuvers through the varied fields of his social life. Most teachers who know Theo concur that he is an individual who genuinely reaches out to other people – students, staff members and parents. There emerged a strong desire to get a better sense of Theo's core identity, and his Dominican culture in light of Boykin's description of communalism. One of the benefits of conducting a longitudinal case study is that as researchers we become increasingly aware that theory and practice both continue to evolve. With that evolution comes even greater understanding.

Emotions that emerge during and as a result of participating in cogenerative dialogues and, Theo's tie to communalism, his sentiments toward his teachers and peers, are resonant structures – one with and for the other – that have become incorporated into Theo's identity. Accordingly, Theo draws from each when he says

> *For the most part I'm pretty social with all my teachers and try to maintain a somewhat friendly and close relationship. As time passes the relationship between teacher and student will only get stronger. It's very possible that the cogenerative dialogues held last year played a role in trusting and allowing myself to feel comfortable around my teachers. Those dialogues also made me more interested in problems that the student body is facing and what the student body has issues with. I then would take these issues to the principal or guidance counselor to see if any changes or adjustments can be made.*

Vignette: An Issue Taken to the Principal

Figure 4.4 Principal meeting organized by Theo and Arthur to talk about buddy system. From left to right are Arthur, Theo and Martha.

Theo has worked hard to build solidarity with his peers over the years. Together, Theo and Arthur, a classmate, use their capital to transform the culture and quality of student-to-student interactions and transactions.

A few days after the 2005-2006 academic school year was officially over, I came into the school building to clean up and put away some things in my classroom. At the school's entrance I bumped into Theo and his classmate, Arthur. They stated that they scheduled a meeting to speak with Martha about some concerns they had with the school. Their major concern, according to their experiences, involved a lack of communalism between middle and high school students. Their goal was to brainstorm with Martha ways by which a more cohesive school could begin to form. Once again, Theo created an opportunity whereby he could be involved in accruing more capital within the school, and with others (Arthur), could be directly involved in the capital exchange cycle through this brainstorming activity. I quickly grabbed my video camera and was able to capture most of the meeting. The vignette that follows is focused around establishing a buddy system – having students from the high school mentor and befriend a student from the middle

school. Theo, Arthur and Martha are trying to figure out what it would entail and, how the elder students could be held accountable for the younger ones.

Episode 3

01 Theo: Awright so, people, like Arthur said, we should have people who have been assigned who will report back, on how things are going…

02 Martha: With the buddy system?

03 Theo: Right. So for *them*, they can have a sheet that they would have to fill out…

04 Arthur: The older buddies…

05 Martha: Oh, O.K., Yeah, like how it's going for the buddy. So it's not a class, it's a… relationship.

06 Theo: Right. So it would be, like kind of a record so, we could have proof of what's going on.

07 Martha: So, it kind of reminds me of like, when team teachers collaborate, they would kind of be evaluating the partnership.

08 Theo: Right.

09 Martha: Right, that makes a lot more sense to me.

10 Arthur: Also, one more thing. In the guidance period that you guys have set up for the curriculum, if there's a topic or whatever that any of us sees is, like big in the school, or that's not being talked about, I think that *we* should be talking about it.

11 Martha: Well, that's a concern I think that the sixth grade guidance counselor and I were talking about for the advisory class. We were brainstorming like, how do we go about talking about thing like internet safety?...You know what I'm talking about? Or like all that kind of stuff being brought up now, we have been talking about…We are generating a running list of concerns that we need to address that we haven't been successful addressing in the past, you know? So I think that you guys are more in a position to know what those hot buttons/things, topics are…

12 Theo: And also. I don't know if you mentioned this but, not for the high school or the middle school, but just for the whole buddy system, but, maybe we could have like a guidance within that, so it would be, like Arthur mentioned, kind of one-on-one. So maybe kids don't feel like sharing something and maybe they don't even feel like sharing within a group – even high school students – maybe they feel more comfortable sharing one-on-one…

13 Martha: Do you think it should be voluntary?

14 Theo: I think it should be – Well, I don't want to isolate anyone but, I know that with some kids, some kids aren't ready for something like this…

15 Arthur: Right.

16 Martha: Right.
17 Arthur: On the other hand, I think that it probably should be mandatory to open the high school students up to something like this…

18 Martha: I know but, the only thing with that is, I don't want to do that at the expense of the little ones. Do you know what I mean?

19 Arthur: Yeah.

20 Martha: But the high school guidance counselor might be able to pair up someone who wouldn't necessarily be the most skilled mentor with someone who really has it together. You know what I mean?

21 Arthur: Yeah.

Apparently, Theo and Arthur are concerned about a lot of issues that students are having both interpersonally and with the school itself. They are willing, as Arthur states, in turn 10, to serve as student representatives who will bring to both the principals and the guidance counselors, concerns and issues that are not being addressed or not being addressed appropriately. Martha recognizes that Theo and Arthur are in many instances in better positions to know what the pressing student concerns are and, the likely need for each student's concern to be addressed on a personal (one-on-one) level (turns 11 and 12). Interestingly, both Theo and Arthur agree that there is a need for a "buddy" system, but disagree whether or not it should be mandatory (turns 14 and 17). I think the idea of not making it mandatory would afford a greater "buying in" of the notion by more of the student body. Martha is concerned about the middle school students not being emotionally ready for the buddy system being mandatory.

Theo's ongoing effort, now together with Arthur, to improve the culture of the school is reminiscent of Stuart Hall's (1990) definition of cultural identity. Within his work, Hall proposes two views of cultural identity, specifically as it relates to Caribbean cultural identity. This view is one that I have found aligns very closely to Theo's culture (the culture of the individual) and the collective culture of *Collaborative*. Hall's view recognizes that as there are similarities within culture, so too are there differences related to 'what we have become'. He says that

> *Cultural identity…is a matter of 'becoming' as well as of 'being'. It belongs to the future as much as to the past…Cultural identities come from somewhere, have histories. But, like everything which is historical, they undergo constant transformation. [I]dentities are the names we give to the different ways we are positioned by, and position ourselves within, the narrative past (Hall, 1990, p. 394).*

The transformations of Theo's identity are vast and span from, for example, being a marginal participant to being a leader. As his identity develops, and as he moves through different fields, Theo is able to produce and engender respect, positive emotions, solidarity and a sense of loyalty for those within the school community. This cycle of transformation utilizes, generates and distributes cultural capital.

Rationale, Planning and Execution of Inter-Grade Project

At the beginning of Theo's 11th grade experience, he, Arthur and I organized a cogenerative dialogue that involved laying out the beginnings of the buddy system. As it turned out, Theo and Arthur revisited the idea of a buddy system, restructuring it to have the same focus, and building community between and within the middle and high school, but carried out within the context of an inter-grade science project. Of course, I was

thrilled to know that the focus would be on science, but was pleasantly taken by surprise when I realized that indeed, the project would be carried out with both 7th and 9th grade students and that the lesson would be written and delivered by Theo and Arthur. The focus, as was made clear by Theo and Arthur, was to foster the development of friendships and communalism amongst the student body.

Figure 4.5 Impromptu cogenerative dialogue involving (from left to right, Darla, Arthur, Theo and Gillian).

Theo and Arthur work diligently to get the inter-grade project off to a good start. They have invested many meeting hours with the various powers that be as well as with classmates to create a useful and enjoyable lesson, which fosters communalism.

Several planning cogenerative dialogues were organized during the next few months, most of which were spontaneous. For example, Figure 4.5 represents one of those meetings with one of the seventh grade teachers, Darla, who would be participating in the project. At this meeting, Theo and Arthur created a lesson plan for the event and were going over the particulars of it with Darla and me. While in most cases, teachers tend to be very possessive of the time that they have with their students to meet a variety of benchmarks and to prepare for high stakes exams, Darla, 7th and 9th grade inclusion

teachers and myself had no reservations about being involved in the project. We immediately saw the value in Theo's and Arthur's proposal and worked closely with them so that it could materialize. Figure 4.6 details the project lesson plan and questions for student reflection.

Through the creation and enactment of the intergrade lesson, student agency was expanded at levels that not only included the meso level but also the macro level – the institutional level. Fields being affected by the expanded agency of students include clusters of fields, and nested fields (one field within another) i.e., many classrooms involving a variety of students, all within the school, or institution. The lesson incorporated science content, required students to learn how to work collaboratively, with a different age group, and also provided students opportunities to draw upon their creativity in an artistic manner. Students were able to be agentic in deciding how and to what extent they would contribute to the project.

Theo and Arthur were steadfast in their efforts to build the lesson on mentoring students and in the building of solidarity by coteaching in small groups (table groups).

MEIOSIS INTER-GRADE PROJECT LESSON PLAN AND REFLECTION

Names: Arthur, Theo, Gillian Bayne, Darla Court
Date to be Taught: April, 2007
Unit Title: Genetics
Lesson Title: Meiosis: The journey through a creative lens
Lesson Rationale: In order to give the seventh graders a chance to work in a high school environment while giving the ninth graders a chance to be mentors.
Lesson Goals: To understand the stages of meiosis through a creative group project.
Content: Students will be put into groups and will be asked to design a comic book that describes in detail each step in the meiosis process. They will need to do outside research.
Developmental: The students will hone their artistic skills as well as display their in-depth understanding of the stages of Meiosis. They will also learn how to work collaboratively with a different age group.
Room Arrangement: Groups of 6 (teacher assigned)
Materials: A bunch of colored paper, markers, and outside research.

Instruction:

1. Assign the groups to the students and let them know which room they will be working in and on which days.
2. Explain the project; Give out the project sheet; talk about how it is graded; Speak to the fact that this should be a collaborative experience and that is the focus of the project.
3. Let them go to their respective rooms and give them a set amount of time to work.
4. They will meet like this for three periods over the course of a week.
5. The rest of the project will be up to them to complete on their own.
6. Each group must come up with a creative way to present their comic book i.e. A rap, skit, movie… Something visual besides reading the book itself.
7. Take two or so class periods in order to present these skits.
8. Take a couple of minutes out of one period in order to reflect on the process of inter-grade collaboration.

7th and 9th Grade Collaboration Reflection:

1. What was it like to work with someone in a different grade?
2. Give one positive example of your collaboration.
3. What would you change about this project for next year? (Be serious.)

Figure 4.6. Lesson Plan and Reflection written by Arthur and Theo and presented to Gillian and Darla (7th grade science teacher) in an impromptu cogenerative dialogue.

They were eager to model their coteaching in this manner with the expectation that the process would become a fundamental component of the school's culture in novel ways. During the planning, they would reflect upon a project that they worked on when they were in my biochemistry class two years earlier. Now, this recreated and varied lesson is interpreted as the enactment of culture that has been reproduced and, as such,

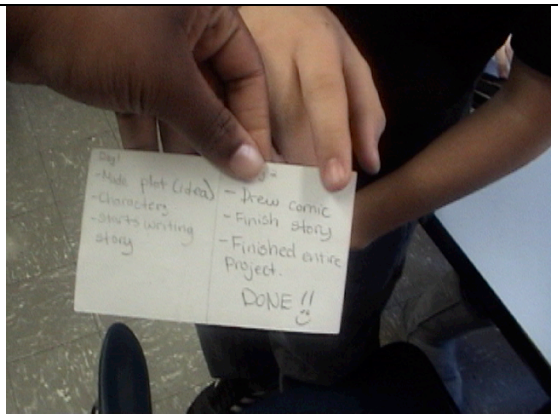
has been transformed. Additionally, as the 7th and 9th grade students work through the project itself, they are furthering the process, which in essence has now emerged as a result of a rippling effect that cogenerative dialogues have had on a variety of fields within *Collaborative.*

Figure 4.6 provides a snapshot of how Theo and the students are enacting various roles that will lead to the successful completion of the intergrade project. Theo has made an effort to greet every student in each class and has modeled a sense of communalism by learning everyone's name. Over all, the students enjoyed having an opportunity to work with others from different grade levels. The experience did not unfold without challenges. There were some student concerns around the quality and amount of work that others did or did not carry out. This is not an unusual occurrence with collaborative work. The emphasis, however, as Theo repeatedly stressed, was to provide students with an opportunity to bond to those which they would not ordinarily do so.

Figure 4.7. Theo directing students in the details of the meiosis intergrade project.

While Theo is giving directions, he is spending some time entertaining emergent concerns at each table. Early into the process, part of Theo's praxis involved having interactions with each 7th and 9th grade student – an effort to ensure that he had personal contact with each of the students involved in the project.

Each day of the intergrade project allowed teachers and student teachers (Theo and Arthur) an opportunity to work and to become acquainted with students who they may have either not been familiar with before this experience, or had not worked with in a similar manner previously. While they were involved in a variety of planning cogenerative dialogues, Theo's and Arthur's particular roles within the class and with students were fleshed out at other times. For example, they both decided that each would spend time with a different class each day. They agreed to each be responsible for a particular class's work, ensuring that the process and experience were progressing smoothly. Figures 4.8, 4.9 and 4.10 provide a glimpse into how students worked individually and collectively, what their daily goals for the project were and to what extent the goals were met. In figure 4.8, students are seen working enthusiastically and collaboratively. Each group was composed of three ninth and three seventh grade students. Darla and I discussed the particulars of which ninth and which seventh grade students would work well together during the planning stages. Our goal was to place students in groups whereby each would be able to maximize his or her individual strengths. A generous amount of in class time was woven into the lesson plan as a means to give students enough time to feel comfortable with each other and to appropriately plan their projects. Students found creative ways to represent their work. Along with skits and video animations were authentic comic books, complete with original student writing and illustrations (Figure 4.9). Students were instructed to document the goals that they collectively agreed upon at the outset of the project and the responsibility of each group member (Figure 4.10). At the end of each day of their week-long experience, students identified what was accomplished.

 Figure 4.8 Collaborative research and brainstorming takes place during the planning of meiosis project.	Students work comfortably within their groups around their designated project time frame.
 Figure 4.9 Students worked enthusiastically and creatively.	Each student found creative ways to represent his or her work. Along with skits and video animations and raps were authentic comic books, complete with original student writing and illustrations.
 Figure 4.10 Group members report on their project goals and accomplishments.	Documentation of the goals and accomplishments were requisite for project progression and completion. At the end of each day of their week-long experience, students identified what they had accomplished.

Looking Toward the Future by Learning from the Past

This chapter examined the lasting effects of having participated in cogenerative dialogues at the individual and at the collective levels. The overarching theme that emerged throughout involved both Theo's and his classmates' agency. It is because of relationships that were created and sustained in cogenerative dialogues and the ripple effect that they have had on Theo and others that multiple roles emerged from expanded agency. Additionally, the expansion of agency, as it occurred concurrently and as a result of new and recreated culture, and its effects on multiple fields have been studied.

The big ideas highlighted in each of the seven vignettes detailed in this chapter support the notion that the expanded agency of the individual (Theo) has had a significant effect on changing the culture of the collective – the school. In an effort to improve himself, Theo's leadership qualities emerged, as did a reputation of being a reliable and mature young person. Throughout his involvement in finding new ways to create a sense of solidarity, both intentionally and at a level at which he was not aware, Theo's identity was constantly being produced and reproduced. A very important attribute of Theo was his ability to work toward attaining individual goals and helping to achieve motives of the collective –restructuring the fields within which he participated.

Not only has Theo been building a strong sense of communalism with his schoolmates, he has also had a significant influence upon adults. He has appropriated a large amount of capital, respect and trustworthiness amongst those who govern the school as well as his teachers, other staff members and parents. I feel very fortunate to have had the opportunity to follow Theo for three years during the course of this study and to be

able to study the many benefits that he and his collective have reaped because of having an opportunity to participate in cogenerative dialogues. The potential for transformation on a much larger educational scale is very encouraging when we consider how much has changed because of one cogenerative dialogue participant's ontology and habitus of *being for and with the other.*

CHAPTER 5

Capturing Essential Understandings of the Learning Environment Through Communities of Practice

Introduction

Popular notions that urban students are lacking in both interest and competence, especially in the math and science disciplines, because of cultural poverty, deprivation, social reproduction (Seiler, 2002) and the like, have proven to be neither transformative in student or teacher attitudes and practices, nor in the governance of urban schools. Rather, these perceptions tend to be laden with deficit views of marginalized youth, and commonly reinforce tendencies to dismiss and deny the existence of the rich resources that these youth bring to their learning environments. Amongst five additional characteristics, Richard Valencia (1997) noted that deficit thinking is commonly utilized as a means to explain failure among individuals as linked to group membership by, for example, racial, ethnic and/or socio-economic standing. It is because today's urban science classrooms are becoming increasingly heterogeneous along such lines as learning styles, language differences and racial and ethnic domains, that the need to gain appropriate views of the classroom and how social life is experienced in these fields may have never been more urgent. While researchers and teachers are beginning to recognize the richness and value of what urban students bring to their learning environments (Martin, Bayne & Lehner, in press), there have been calls for the utilization of multiple methods and constituents of analyses to help understand the dynamics of the interactions between students, their teachers, and the urban science classroom.

While the details of who specifically makes decisions in urban schools and individual classrooms, such as science, and why those decisions are made are complex and evolving processes, characterized primarily in New York City, for example, by The Department of Education and to a lesser extent by a school's individual needs and culture, salient considerations related to the creation and implementation of pragmatic pedagogical practices that become enacted at the level of the urban science classroom are becoming increasingly apparent. In many instances, at the core of these concerns are challenges that stem from both teacher and student impressions that are often misaligned. Student impressions and involvement with their science classrooms are commonly mediated by (a) the type of curriculum utilized and its implementation; (b) familial involvement in formal and informal exposures to science; (c) quality of instruction and instructors; and (d) student accessibility to instructors, staff and administrators (Armstrong & Thompson, 2003). Factors affecting how teachers view their urban science students may include (a) a student's standardized test scores; (b) the type and frequency of a student's participation in class; (c) student classification (e.g., special education or inclusive education status); (d) parental involvement of a student; and (e) implications that can become aligned or misaligned with issues related to race, class, gender, language differences and age in the teaching and learning of science at levels of understanding of which one is aware and unaware. Utilizing a mixed methods approach that employs the CLES and cogenerative dialogues, which specifically address many of these concerns, addressed in the survey help to flesh out the details of these experiences and perceptions.

Despite these and other challenges, urban science classrooms offer a wealth of

opportunities to begin to understand and remedy the breakdown between and amongst those parties involved in the education of our urban youth and the leadership of the urban schools they attend. Emphasis in these schools has often been placed on problems, primarily focused around 'standards' and high stakes testing, especially their ramifications. Practices, which provide windows of opportunities to create new learning environments, aligned with a sensitivity and awareness toward urban youth culture– through fostering an understanding of the power of culture, its creation and enactment – are examples of foundational essentials, requisite for positive changes toward sustaining successful urban schools. Taylor, Fraser and Fisher (1997, p. 295) echo these ideas and emphasize the need for

> …opportunities for teachers and students to become critically aware of the influence of the repressive myths of objectivism and control that govern the social realities of schools and classrooms. We also need to establish *critical discourse* aimed at examining critically the prevailing (invisible) myths that disempower teachers and students from developing classroom learning environments in which richer and more equitable educative relationships can flourish.

As a result of employing a mixed methods approach in this research, which focuses on the utilization of the cogenerative dialogues, it was intended for the participants to not only be involved in relating their learning of science, but to share accounts of their experiences in their learning environments in an emancipatory manner. This generative strategy affords a more impartial account of existent teaching and learning complexities, and therefore a more holistic familiarity of the practices and processes, which help to shape one's epistemological and pedagogical understandings. Additionally the strategy plays a very important role in informing and shaping the content studied and the ways by which the learning of content in subsequent classes may take place.

The Value of Studying Urban Science Learning Environments

Learning environments, the social atmosphere in which learning takes place, such as science classrooms and laboratories, from a sociocultural perspective are often referred to as fields (Swartz, 1997) – places and sites that are separated both temporally and spatially and, within which culture gets enacted. Fields have resources (human and material) that constitute structures that can be used by participants as they pursue their goals. Social life also, is structured and at the same time is structuring, becoming a resource for the agency of individuals. Agency, the power to act within a field involves being able to access and appropriate needed structural resources. Hence, there exists a dialectic relationship between structure and agency, and inherent to this dialectic, there exists an element of uncertainty. Learning takes place within a variety of fields and it is the structures of these fields that become closely connected with the agency of the participants within them. Culture gets enacted within fields and is viewed as the dynamic interaction between schema and practices – a system of symbols and its associated meanings and practices (Sewell, 1999). The nature of fields is such that they have boundaries. Commonly these boundaries are weak and porous, and, as in the case of schools as well as other fields, allow for the culture from new fields to traverse between and within them freely. Culture influences action by shaping a collection or "tool kit" of symbols, stories, rituals and worldviews, from which individuals create strategies of action (Swidler, 1986). In recent studies involving urban youth in The Bronx (Emdin, 2007), Brooklyn (Lehner, 2007) and Philadelphia (Elmesky, 2003) several demonstrations of how the culture in the students' lifeworlds is embodied and exists as part of nested cultures (Seiler, 2002) within overlapping fields due to porous boundaries

have been articulated. We are made aware of the students' cultural toolkits, and how they can be intimately involved in the negotiating and shaping of culture within the urban science classroom and laboratory fields (Pitts, 2007). Often, this shaping takes place on an unconscious level, and becomes incorporated into an individual's habitus and cultural capital (Bourdieu, 1986).

The notion that that which takes place in schools is mirrored by that which takes place in arenas directly or indirectly related to schools at both the meso and macro levels (Turner, 2002), is not unusual; rather, it is likely to be the norm. It is not surprising to find, therefore, that culture – its associated practices (patterned actions that are habitual and intentional) and schemas (beliefs, values and ideas) – within a field shares many commonalities, including, for example, views and perceptions related to factors involving race, class, gender and age, with those of society at large. While the work in this study involved students from a public high school in New York City, which is unique in many ways from most, urban schools designated as gifted, specialized or geared toward high performing students are often said to have different types of problems than traditional urban schools. At *Collaborative*, as with other schools, concerns abound at every level of teaching and learning, including those related to student interest, motivation, standardized test performances, classroom behavior, stereotypes and equity issues. The details of some of these concerns have become known through student responses on the CLES and through details that emerged while engaging in cogenerative dialogues and during interviews with students.

The Constructivist Learning Environment Survey

The CLES utilized in this study (Taylor, Fraser & Fisher, 1997) is a revised version of the original (Taylor & Fraser, 1991), which was based on a psychosocial view of constructivist reform. This perspective was one that viewed students as co-constructors of knowledge but neglected to incorporate the cultural context of the classroom. Hence, Taylor, Fraser and Fisher felt that the theoretical framework only supported a "weak program of constructivist reform" and because in their own research they came across domains of cultural beliefs which were an integral part of the histories of math, science and schooling, they identified a need to redesign the survey so that these cultural beliefs would become an integral part of that which was to be taken into consideration when responding to the particulars of the survey.

The CLES has been used in a variety of studies both nationally and internationally to investigate a wide range of concerns and parameters within math, science and technology classrooms. For example, Johnson and McClure (2004, pp. 67-68) have identified these surveys as a means to facilitate understanding (a) the nature of science knowledge and the learning of science teachers (b) science education reform efforts in Korea (c) preservice science teachers' self-efficacy and science anxiety (d) a comparison study of classroom environments in Taiwan and Australia (e) secondary preservice teacher beliefs (e) the relationships between classroom environment and student academic efficacy (f) the effects of integrating technology into the classroom, and (g) the varying dimensions of a multilevel study involving classroom observations, student diaries and teacher interviews.

The intention of each of the five scales – Personal Relevance, Uncertainty, Critical

Voice, Shared Control and Student Negotiation – of the CLES (1997 version) was to be able to measure students' perceptions of the incidence of key dimensions of a critical constructivist learning environment, a key component in this work at *Collaborative* together with cogenerative dialogues that afford the real richness of a learning environment to be made evident. Factor analysis, a statistical data reduction technique, was used to explain variability among the relationships between the students' responses to the items on the CLES. Examination of five survey factors revealed that four were closely aligned with the five scales of the CLES. The fifth factor, which accounted for the least difference, was associated mainly with one variable. Examination, therefore, was limited to produce a 4-factor solution, within which student representatives who participated in cogenerative dialogues were found. Survey response options were Almost Always, Often, Sometimes, Seldom, and Almost Never.

Using Cogenerative Dialogues as a Method

Through viewing "the studying of science as culture and the learning of science as cultural production, reproduction and transformation…" (Elmesky & Tobin, 2005, p.4), and engaging in the practice of cogenerative dialogues, urban science classroom practices are proving to be fertile environments for the strengthening and production of new culture. Urban youth culture is a valuable resource, which readily affords the learning of mainstream discourse, including science. Cogenerative dialogues are conversations between participants in which actors within a particular field create and enable the enactment of new culture. The outcomes of cogenerative dialogues most often times include shared commitments to and the generation of plans by which changing the structures of the classroom and resultantly the expansion of individual and collective

agency will be made. Culture takes place within fields, and is viewed in terms of an agency|structure dialectic. The dialectic, as denoted by the Sheffer mark, implies that there is a recursion, a back and forth flow between the power to act - by accessing and appropriating resources – in order to meet the varying needs within, for example, an urban science classroom. The integration of these critical notions into this research is essential in providing insights into the culture of an urban science classroom and thereby the ability for us to share with our students (a) a means by which they can examine who they are as individuals with specific core, meso and macro identities (Turner, 2002) and as learners and, (b) work to transcend social and educational injustices as evidenced through the demonstrations of misalignments and through the understandings and exertion of their own agency and abilities to access and appropriate various forms of capital.

Cogenerative dialogues and their differing uses emerged from longitudinal studies which were undertaken in urban science classrooms in Philadelphia more than five years ago. This particular study is one of several involving cogenerative dialogues, initiated simultaneously with four other different types of public schools within New York City in 2005. Historically, cogenerative dialogues have taken on many configurations. Most commonly cogenerative dialogues have involved 6-8 participants, including 2-3 students who have been selected from the same class based on their differences from one another, so as to ensure a higher likelihood of sharing varied perspectives. Additionally, one or more teachers from the class, one or more school administrators and/or counselors, and 1-2 teacher educators and/or researchers have participated. The cogenerative dialogues that took place at *Collaborative* during the second year of utilizing the practices, involved 3-

5 ninth grade biochemistry students, an inclusion teacher, on occasion a guidance counselor, and myself, a general education science teacher. The focus for dialogues involved a shared experience of participating together in a field, typically, a classroom or laboratory. There were often opportunities for students to talk about events and or conversations which took place in other commonly traversed school fields as well, including math classes, visits to guidance counselors and meetings with the directors of the school. Usually the discussion involved careful evaluation, interpretation, and commentaries on events considered to be worthy of discussion, including contradictions inherent within these events. Shared experiences within the classroom, that needed to be resolved, practices and roles of participants, and suggested changes discussed related to how to improve the quality of teaching and learning within these fields. Examples include all participants having equal turns at talk and all talk being respectful of other participants.

TABLE 5.1

Heuristic for the establishment and unfolding of cogenerative dialogues at *Collaborative* High School in New York City (adapted from Roth, Tobin and Zimmermann, 2002).

1. **Respect and Rapport**
2. **Inclusion of stakeholders**
3. **Ways to participate**
    1. Listening attentively
    2. Initiating dialogue/ideas around critical questions/concerns
    3. Staying on topic
    4. Utilize free writes as a springboard to meaningful conversation
    5. Providing evidence
        a. Expressing an opinion
        b. Speaking freely; not privileging any voice or hurting others' feelings
        c. Clarifying and elaborating on ideas
        d. Suggesting alternatives for actions
        e. Evaluating ideas and practices
4. **Opportunities to participate**
    1. Contributing to an equitable playing field
    2. Listening attentively
    3. Making space to participate
    4. Showing willingness to participate
    5. Making invitations to participate
    6. Refusing all forms of oppression
5. **Discussion topics**
    1. Learning to teach
    2. Teaching and Learning
    3. Curriculum
    4. Equitable and Ethical Teaching Opportunities
    5. Coteaching
    6. Transformative potential of individuals and activities/curriculum

A basic heuristic for cogenerative dialogues included, for others, all participants were attentive listeners, and successive turns at talk were to have addressed previously raised issues, and agreements should have been negotiated prior to proceeding with the discussion of new issues (see Table 1). A collective agreement was made involving what

was expected to take place in the next classroom lesson or lab, and a shared responsibility for enacting the details agreed upon so as to improve experiences in teaching and learning.

The 9TH Grade Biochemistry Learning Environment

I have taught two different science classes at *Collaborative*. One, a required ninth grade, spiraled biochemistry class that continues on into the tenth grade. The second, an elective advanced biology class for senior students who have an interest and aptitude in biology is grounded in a curriculum that I created and is divided into four major foci – histology, anatomy and physiology, a project that introduces primary research sources and a section which addresses bioethics and controversial issues in science. The biochemistry course was selected for this study. It is a prescribed course, by the school, which was introduced by a science staff developer and educational consultant. I was hired at the time when an integrated approach to teaching and learning biology and chemistry was desired by the administration and others. The notion of teaching a course which used biology as the context within which chemistry concepts could be introduced and studied became a serious consideration in the school due to the intense anxiety and concern that gets generated around standardized exams, specifically the Chemistry Regents exam. Having had several unpleasant experiences myself with various chemistry classes at the undergraduate and graduate levels, I readily identified with the need to create opportunities, which decrease anxieties and feelings of estrangement around the science curriculum, and was excited to use a new approach.

The first year of implementing the curriculum has turned out to be the year that I felt and had the most autonomy in employing authentic teaching strategies and

techniques. The staff developer was formalizing the details of her curriculum profile and packaging during this time and hence, I did not feel as constrained as I have felt in the subsequent years.

Many dimensions of the school and, therefore, each class that I have taught at *Collaborative* have differed over the years. During the last three years, the school has become increasingly more inclusive of learning styles and has utilized a "push-in" versus a "pull-out" strategy involving special education students. Approximately one third of 'inclusion classes' – two of four ninth grade classes – are comprised of inclusion students. I have co-taught these inclusion classes with Miss Corda, a ninth grade inclusion teacher who works both in science and math classes. The challenges of meeting the needs of every student in these classes abound. Especially salient is the need to maintain academic rigor, while generating appropriate modifications for students whose motor skills are challenges, or whose cognitive processing abilities are delayed, for example.

The content of the ninth grade biochemistry curriculum has five major foci that include: environmental science, genetics, food composition, its processing and utilization, energy dynamics, the structure, organization and health of body systems. In many instances the curriculum directly addresses concerns and content requirements around the New York State Regents exams, it also provides some in depth exposures to science content and their applications, which often get discussed in some first year college level courses. While the curriculum is one which attempts to readily incorporate web-based learning and is meant to be one that is paper free, invariably students receive many documents and are required to have access to them for up to two years. This tends to be

problematic for many, as students find themselves being held accountable for hundreds of papers that are ideally housed in a five-inch binder.

During the course of two years, students will have opportunities to engage in over thirty laboratory experiences. They generally look forward to laboratory work and are expected to collect, record and interpret data in ways that parallel the work habits of research scientists. There is an affiliation of the educational company with Riske University[17] in New York City, one of the most highly regarded international research institutions. Despite *Collaborative's* status as one of New York City's high achieving public school, it is not surprising to find varying levels of engagement due to the heterogeneous nature of the student population. Over the years, students have become vocal about their concerns and have articulated some of them on the CLES in conjunction with capturing some essential details of their experiences in their learning environment through participating in cogenerative dialogues.

Using Hermeneutics to Understand Shared Events

An immediate understanding of life as it unfolds in a learning environment field, requires analysis that is critical (explanation seeking) and is hermeneutically sound – both fundamental tenets that comprise the heuristics of cogenerative dialogues. Hermeneutics involves striving to understand an account of a shared event, for example, by sharing the interpretations of each individual involved who experienced that event. Through a personal understanding at the individual and collective levels of praxis, "the patterned

[17] pseudonym

ways in which we actually do something in a situation, the doing of work and the living of life" (Roth, 2005, p. xxiv), such an analysis is made possible. One way that cogenerative dialogues allow for this is by affording successful interactions across power differentials of participants. Tobin and Roth (2006) ascertain that meaning making of a shared event and of the interactions and experiences that are endemic to them, exist as a dialectic between understanding and explaining. Through the activity of explanation seeking, insights, along with their associated contradictions, will invariably arise. It will require that which we may not have been aware of, to become something that can be grappled with in a conscious, active manner. Ultimately, the goal of creating a better and deeper understanding of the social life within a learning environment can become a reality through the used of cogenerative dialogues as a method of research.

Cogenerative Dialogues Augment Interpretations of Quantitative Measures

This study explored the insights gained from interpreting student responses on the CLES through the utilization of cogenerative dialogues. The following overarching research question has helped to guide the study: How do students experience their learning environments? Answers to more specific questions substantiate the overarching one. These questions are:

1. What is the relevance of utilizing *cogenerative dialogues* in science classroom?
2. What views do students have about their learning environments?
3. What can cogenerative dialogues reveal about the nature and the content of quantitative assessment tools, such as the CLES, which are used to address a classroom's culture and climate?

Research in a Diverse Classroom

This study is situated in a small urban New York City high school for high achieving youth. In 1988, three administrators who were seeking to create a child-centered school, where the classroom would be the ultimate experience in a collaborative setting, established the *Collaborative*. A vision of the school was to create both a middle and high school. The fourth year of the school's existence marked the first year of the high school's commencement, beginning with one ninth grade class, followed each subsequent year by an additional grade level until a full high school was in operation. Historically, the majority of the high school student body has consisted of those who have attended its middle school, with students entering who a) live within the district b) have taken and performed well on a school required entrance exam, consisting of a math component and essay requirement c) have passed an interview and d) have performed well on the Citywide math and English standardized tests with composite scores that range between 3 and 4. Of those students who elect not to continue on into the high school, the majority has traditionally gone on to attend specialized public or private high schools, like Bronx Science, Stuyvesant, LaGuardia and Townsend Harris. *Collaborative* has prided itself on being an alternative to other schools with high caliber academic programs, and on endeavoring to develop questioning, reasoning citizens within society by encouraging practices which integrate compassion, diversity and pluralism, academic rigor and collaboration as central themes. With a strong school culture and student body that has become very savvy about how to successfully maneuver within and outside of varying educational and other fields, students graduate from *Collaborative* with a strong educational and worldly foundation.

Working with an Inclusion Science Class

All students (32) in a ninth grade inclusion biochemistry class were invited to participate as student researchers in small group cogenerative dialogues. Student researchers who were very different from each other were either self-selected or invited by peers or their teachers to participate in cogenerative dialogues regularly during the school term. In this research participants in the cogenerative dialogues are researchers and hence, student participants are student researchers. Student researchers have played pivotal roles in (a) videotaping classroom lessons, activities, and laboratory experiences (b) selecting specific vignettes for whole class and small group discussions, both at the *meso* and *micro* levels and (c) participating in, and sometimes leading discussions around the nature of the unfolding of events in specific vignettes. Cogenerative dialogues and classroom lessons involved these student researchers as well as the class general education teacher researcher (myself) and the inclusion education teacher researcher. Through the participation of different students and the sharing of varied voices, the amalgamation of a very rich understanding of the learning environments becomes possible.

Of the 32 students in the biochemistry class, I was especially interested in Audrey and Pearl, 2 of 5 Black student researchers in a class of predominantly White and Asian students. I was curious to learn about how they experienced certain aspects of their learning environment and, what factors played into the selection of their survey responses. In both formal and informal settings, in mixed and single gendered discussions, Pearl and Audrey spoke of their experiences in our biochemistry class. They spoke of what it was like to be in the minority – both in regards to their race and their

academic struggles within the class – and, happily, their decreased anxiety about approaching me because of a shared sense of kinship because of our shared gender and race.

Evaluating Constructivist Epistemology

The evaluation of classroom and cogenerative dialogue videotape selection served as seedbeds for change in the classroom. Feedback regarding individual and/or collective practices, mutual focus, entrainment, solidarity and positive emotional energy (Collins, 2004) became salient factors by which the nature of the varying learning environments functioned. The school term culminated with students sharing their perspectives on the classroom learning environment by participating in the CLES. The use of this survey affords researchers to, "assess the degree to which a particular classroom's environment is consistent with a constructivist epistemology" (Fraser, 1998a, p. 535). An interview and cogenerative dialogue detailing qualitative data around particular survey items ensued, critical components to obtaining more accurate perspectives from the diverse student population of the biochemistry class. Finally, the authenticity of this research was evaluated using Guba and Lincoln's (1994) criteria: ontological, educative, catalytic and tactical authenticity.

Taping, Evaluating and Dialoguing

Multiple sources of data were accessed during this 10-month study. All of the six student researchers were interviewed at varying times during the academic year. Video data were collected regularly during the study – during classroom lectures, laboratory assignments and small group activities. Approximately 4 hours of footage was taped per

week, which included a once a week opportunity for participation in cogenerative dialogues. The cogenerative dialogue participants typically included one general education teacher, one special education teacher, and 5-6 student researchers. On occasion, an assistant principal and guidance counselor participated as well. Finally, weekly lesson plans, journal entries, student made artifacts, field notes and completed CLES surveys served as additional data resources. Interviews were transcribed and video excerpts were reviewed, generating short clips or vignettes. Student researchers participated in the data analysis, providing an insider perspective on the data constructions and interpretation.

Outcomes of the CLES

A factor analysis of student responses to items on the CLES was conducted. While it demonstrated congruence with the 5 scales of Taylor, Fraser and Fisher, results pointed to four factors that were coherently aligned, and hence generated a four-factor solution.

Factor analysis was used to explore the relationships between the students' responses to the items on the CLES, initially exploring the common variance using the maximum likelihood method of extraction from SPSS 11. An initial review of the factors revealed that seven Eigenvalues were greater than 1.0, which encouraged me to examine the potential use of solutions containing up to 7 factors. Upon examination of the Scree plot and, based on the proportion of variance attributed to successive factors (i.e., the change in Eigenvalue), an exploration of solutions consisting of 4 and 5 factors followed.

Because Fraser and Taylor had included 5 scales in the CLES (Taylor, Fraser & Fisher, 1997) the first factor analysis was constrained to produce a 5-factor solution. The nature of the scales and a considerable number of earlier studies suggested that the five

scales would be moderately interrelated.

Inspection of the 5-factor solution revealed four factors that were closely aligned with the five scales of the CLES. The fifth factor, which accounted for least variance, was associated mainly with one item. Accordingly, the analysis was constrained to produce a 4-factor solution, accounting for approximately 62 percent of the common variance.

The factor pattern coefficients for the four-factor solution reflected the scales critical voice and student negotiation (factor 1), shared control (factor 2), personal relevance (factor 3), and uncertainty of science (factor 4). The possible meaning and usefulness of the 4-factor solution was discussed within a research group of 10 science educators and there was consensus that the new combined scale, referred to as critical potential, was conceptually meaningful to the group's overall research on learning environments in urban high schools. Empirically there was support too. The alpha reliability of the scores in this scale was 0.9, providing a sense that the data were dependable for differentiating individuals in the class based on their scores on critical potential. The decision to accept the other three factors was based on their robustness across numerous worldwide studies that have employed the CLES.

Table 5.2 contains the factor pattern coefficients for the 4-factor solution. I adopted a rule of thumb to accept coefficients of 0.4 and greater as significantly related to a factor. Only these significant coefficients are reported in Table Ia. The correlations between the four factors ranged from 0.3 (3, 2) to 0.5 (3, 1).

TABLE 5.2

Factor Loadings for the Constructivist Learning Environment Survey

Item	Critical Potential	Shared Control	Personal Relevance	Uncertainty of Science
1			0.59	
2			0.40	
3			0.49	
4			0.87	
5			0.94	
6				0.41
7				0.45
8				0.85
9				0.58
10				0.53
11	0.56			
12	0.66			
13	0.64			
14	0.85			
15	0.87			
16		.91		
17		.57		
18		.99		
19		.67		
20		.80		
21	0.42			
22	0.75			
23	0.69			
24	0.69			
25	0.49			
Reliability	0.90	0.91	0.82	0.74

The scale means and standard deviations for each scale are provided in Table 5.3. The means for critical potential and personal relevance corresponded to the scale point *sometimes* with about a standard deviation corresponding to *seldom* at the low end and *often* at the high end. Shared control occurred *seldom* with about a standard deviation of one scale division, that is from *almost never* to *sometimes*. The uncertainty of science scale proved not to be salient in this study of urban sciences.

TABLE 5.3

Descriptive Statistics for the Four Scales of the CLES

Scale	Salient Item	Mean	Standard Deviation
Critical potential	*It's OK for me to express my opinion.*	*3.1*	*0.9*
Shared control	*I help the teacher to decide which activities are best for me.*	*2.0*	*1.0*
Personal relevance	*I learn interesting things about the world outside of school.*	*3.0*	*0.8*
Uncertainty of science	*I learn about the different sciences used by people in other cultures.*	*3.4*	*0.6*

Student Perceptions of the Learning Environment

Hierarchical cluster analysis of student responses on the CLES produced a meaningful solution of four clusters, within which students shared membership based on their patterns of responses to the items of the CLES. These groups differed significantly

in terms of their perceptions of critical potential ($F=11.9$, $p<0.0001$), personal relevance ($F=7.6$, $P<0.001$), and shared control ($F=62.8$, $p<0.0001$). Interestingly, within each cluster, there were one or more students who were actively participating in cogenerative dialogues. Hence, within the cogenerative dialogue group there were students having diverse perspectives on the learning environment. Interviews involving student researchers who were representative of each cluster group and who participated in cogenerative dialogues discussed their views of the questions posed within the survey. That is they explained what they understood by each item and why they rated it as they did. Some examples of concerns voiced by student participating in the cogenerative dialogue included item wording and the limited opportunity for respondents to amplify responses qualitatively. All students exhibited a sense of satisfaction at having had an opportunity, through interviews and cogenerative dialogues, to elaborate on questions and responses that they felt were salient. Their stances emphasized the importance of being able to interface quantitative analysis with ethnography. The items on the CLES focused attention on constructs likely to be important and their subsequent conversations allowed the salience of these constructs to be elaborated and exemplified.

While the uncertainty of science (factor 4) is valuable when considering science education in general, in this study it was found not to play as strong a role in this study as it may have in other teaching instances. This is because the curriculum employed in this study was highly prescribed both by the school and by the department of education. Both teacher and student researchers had little input into designing and or redesigning of most aspects of the school's adopted biochemistry curriculum.

Even though there is a clear pattern within the empirical data and there is internal

consistency among items that conform to a particular factor**,** there are contradictions based on the interpretation of these items. Cogenerative dialogues permit polysemic and polyphonic opportunities to talk about the saliency of each of the sample items. This is clearly discernable in section 7.3 of this paper that highlights some student reflections about the meanings and interpretations of their CLES responses. Tables 5.4, 5.5 and 5.6 for example, depict some diverse perspectives of the various scales, despite the fact that students in the same biochemistry class at *Collaborative* shared like cluster membership and were active participants in cogenerative dialogues. Table 5.4 identifies the responses to factors within the critical potential scale. The critical potential scale fused salient issues addressed in the CLES scales, including critical voice and student negotiation. The critical voice scale incorporates students' comfort levels and their abilities to question a teacher's pedagogical plans and methods. The student negotiation scale assesses the extent to which students' ideas can be reflected upon and validated by themselves and their peers. The focus of Table 5.5 depicts perspectives related to shared control in the classroom, is to have student input and control of the learning environment. This incorporates the design and implementation of lessons, laboratory experiences, activities and assessments. Table 5.6 addresses responses to the personal relevance scale, which aims to identify the alignment of students' formal and informal science exposures and how these exposures are used to develop students' mathematical and scientific knowledge content foundations. Interestingly, the students in the cogenerative dialogues had different perceptions of the learning environment. Evidence for this is they belonged to different groups based on the cluster analyses and their conversations showed that their experiences differed from one another. That is their experiences with science, in terms of

the scales of the CLES, differed from one another. These differences are not regarded here as measurement error but as evidence for the occurrence of polysemy. Because these students have experienced social life in ways that reflect their differences from one another, they experience this aspect of social life differently too. When given a chance to describe their experiences of the science class, the students provide glimpses of their social lives and as we hear different students a landscape of difference and diversity unfolds. Our goal as researchers is not to change these descriptions to reflect one existing truth, but to acknowledge the presence of multiple realities and ensure that we all learn from one another's lived experiences in our science class. This is the heart of what we refer to as educative authenticity. Through the selection of participants to assure difference in the cogenerative dialogues and care to allow all to have voice and be heard, we begin to understand classroom learning environments from a polysemic perspective.

Table 5.4

Cluster Member Responses for Newly Created Critical Potential Scale

Salient Item Number	Sample Item	Cluster Member Scale Response Varieties
14	It's OK for me to complain about anything that prevents me from learning.	seldom, sometimes, almost always
15	It's OK for me to express my opinion.	often, sometimes, almost always
22	I talk with other students about how to solve problems.	almost always, often, almost never

TABLE 5.5

Cluster Member Responses for Shared Control Scale

Salient Item Number	Sample Item	Cluster Member Scale Response Varieties
16	I help the teacher to plan what I'm going to learn.	Often, seldom, almost never, almost always
18	I could help the teacher to decide which activities are best for me.	Often, almost never, seldom, almost always
20	I help the teacher to decide which activities I do.	Seldom, often

TABLE 5.6

Cluster Member Responses for Personal Relevance Scale

Salient Item Number	Sample Item	Cluster Member Scale Response Varieties
4	I get a better understanding of the world outside of school.	seldom, often, sometimes
5	I learn interesting things about the world outside of school.	sometimes, seldom

Relatedness of Cogenerative Dialogues to the Constructivist Learning Environment Survey

Urban science classrooms are rich fields where researchers can gain insights into the unfolding, creation and enactment of culture. This emergent research has provided ways by which issues related to classroom power and equity may be addressed in an atmosphere that is not threatening and one which values student voice. Student views on, for example, survey questions such as the CLES, teachers and students can obtain

insights into student epistemology, the culture and climate of the classroom. Participants come away from cogenerative dialogues knowing more about addressing and acting upon issues related to individual in and out of field agency|structure dialectic– tools potentially applicable to every aspect of a student's personal life. Because they spend an enormous amount of time in classrooms, students have become 'experts' in knowing the 'ins and outs' of these fields and in anticipating what may or may not improve the culture that gets enacted there. The learning environment has become one that is welcoming of the multitude and diversity of voices and the interpretations of a shared event. These characteristics prove to be invaluable in the transformative processes of the individual and collective.

Several opportunities arose during interviews with student researchers who consistently participated in cogenerative dialogues during the course of this study to expound upon their points of view as they related to classroom matters, including discussions around the CLES. An excerpt from such discussion follows:

> *Pearl: For question number 13, "it's OK for me to complain about activities that are confusing", I put almost always because, you know, with me I get confused even though most times I know what I am doing. There are kids who strive in this class and they do really good and I want to do really good as well and I think that it is always good to ask questions to be clear about what ever it is you are doing.*

> *Audrey: Well, I was thrown off by the word "complain" because the way the question is written you might think that it has to do with whining and that's not really appropriate but I guess if it said, "it's OK for me to question activities or, if you have questions about it" then it would be different but when it said complain, then …*

> *Pearl: And in number 14 as well, there's the word complain again but I guess at least it is addressing the fact that there may be distractions in the class and there may be possible ways that you could prevent these distractions, and I remember, like, during the cogens, we used to come up here after lunch, and we would talk about*

distractions and how we could possibly prevent them and I think that gave me, I guess, a little more courage to speak out about it and really work on finding possible ways to prevent them.

These resonses during interviews support the use of encouraging, for example, the sharing of polysemic interpretations of survey questions, as well as provide rationales for responding to them in the manner that they were. Even though Pearl and Audrey were consistent cogenerative dialogue participants, they fell into different clusters based on how they responded quantitatively to the survey. And, although there is an empirical pattern that has emerged from their responses to survey questions on the CLES, through complementing quantitative analyses with qualitative, there exists a richness that is not normally present when solely employing quantitative analyses. We enrich our understanding of the learning environment, its schemas and practices, by employing qualitative analyses, like cogenerative dialogues and interviews. Ultimately being able to talk about and make sense of our experiences provides insights into the different ontologies and epistemologies that are reflected consciously and subconsciously in both the individual and collective.

Drawing Conclusions

It is because science takes on varied forms of understanding and practice within each individual that there cannot be a fixed domain as to what constitutes scientific activity, how it should be experienced and assessed. Diversity prevails in every aspect of the contemporary classroom and, subsequently so too do the teaching and learning experiences that occur within it. The nature by which understanding and improving the urban science classroom and its culture requires care and thoughtful examination. The mixed methods approach, employing both cogenerative dialogues and affording

discussions around quantitative results used in this research, aids in creating inroads into becoming aware of and understanding urban student perceptions about their learning environments.

Results from the CLES demonstrated that there was variance around the mean of each scale. Analyzing the variance and the way that items are scored points to internal consistency. What this means, for example is that students who experienced the learning environment as one where shared control existed would cluster together. Empirically, five scales existed, with variance around each of the means. The results from this research demonstrated that empirically there were four scales, based on how students responded to each of the items. Students experienced some of the items in the same way as others, and therefore responded to items in the same way, i.e., either high or low. In other words, there was internal consistency among items that were associated with the same factor. Qualitatively, this work has demonstrated that more adaptable forms of teaching, learning and assessing – including assessing the learning environment itself – can support a variety of students, who as a result become better equipped to understand their own ontologies and hence, are more capable of creating their own structures and using them to succeed.

CHAPTER 6

Measuring Three Years:
Research Findings, Interpretations and Implications

Introduction

This chapter provides for an opportunity to summarize the nature of the work presented in this dissertation, revisit the research questions, identify limitations and discuss the implications of the research. Three years ago I began to put into place the practice of cogenerative dialogues in my ninth grade biochemistry class as a measure to learn more about my students and our interactions, to understand contradictions, and to share some of the sociocultural theory that I became aware of through my participation in a research group at the Graduate Center. At the onset of this work, I was admittedly a bit uncomfortable with the notion of students having an equal say in how their classroom was run, especially because in much of my discussions with other pedagogues, despite learning in graduate school about the benefits of creating a constructivist learning environment, a sentiment of having control over students in one's classroom was stressed. Through my involvement with students and other stakeholders in cogenerative dialogues, the belief and practice of sharing control with students as it relates to curriculum, teaching style, classroom practices, student involvement and the like, a more equitable and enjoyable way of engaging all in the learning environment is realized.

Summary of Dissertation Study

Initially, cogenerative dialogues involved only a few students who were different from each other and from the class at large in many ways. During the second and third years of cogenerative dialogues, an increasing number of students acted upon individual and collective needs to voice concerns and strategize around creating successful classroom and laboratory interactions. Finally, what grew out of cogenerative dialogues was a sense that the entire school community could benefit from the ripple effects, especially as changes in identity and expansion of student agency emerged. Discussions and the implementation of school wide science projects, founded upon theoretical ideas discussed in cogenerative dialogues, which build upon the idea of communalism as a disposition of African American youth, took place at the elbows of teachers and administrators. The projects became evidence of one of the lasting effects of cogenerative dialogues, in that inherent in changing and rearticulating the culture of the individual and collective comes a, "willingness to make use of each person's capital to improve the learning of all" in a school (Tobin, 2007, p.25).

Revisiting Research Questions

Chapter 1 of this dissertation presents two overarching questions. They are first, How does studying and utilizing the experiences, knowledges and culture of urban students help to inform and improve science teaching and learning? Second, How can examining the cultural and emotional dynamics of the science classroom, laboratory, and

cogenerative dialogues help to bring about understanding and mediate disparities between students and teachers? Within the chapters that followed chapter 1, the focus of these two initial questions were narrowed into four subsequent ones: 1) How are classroom culture and student agency associated with being involved in cogenerative dialogues? 2) What is the history of *Collaborative*? What are administrators', teachers', and students' experiences like in this school? 3) In what ways are cogenerative dialogues associated with participants' ways of being? 4) How do students experience their science learning environments? What follows is a revisiting and answering of these questions. In so doing, the first two questions, posed in chapter 1, are answered as well.

How are classroom culture and student agency associated with being involved in cogenerative dialogues?

Science has become known as a discipline, which can be alienating to students for a variety of reasons. The urban context, which encompasses complexities inherent to ethnicity, race, socio-economic status, language differences, and immigration can compound challenges around diversity and equity in schools, especially in science classrooms. Also, issues that challenge equity include school size and resource availability. These sources of complexity have been important facets to my research involving cogenerative dialogues. Chapter 2 of this dissertation provides evidence as to how cogenerative dialogues have been used to engage students at risk of being alienated from science. For example, two student researchers, Theo and Jazz, both students of color, were invited to participate in helping to improve the quality of teaching and learning in my biochemistry class. Theo, a new (second generation Dominican male)

student to *Collaborative* emerged as the focus of the chapter. The chapter provides some meso and micro analyses which detail his identity as a math and science student changing during the course of his year's participation in cogenerative dialogues. Theo's personal and academic ontologies –constructions of what was taking place in the science classroom and how his interpretations were changing, were also becoming evident. Through his cogenerative dialogue participation, Theo became positively inscribed and learned how to access and appropriate capital. Capital, as defined by Bourdieu (1986), is an "accumulated labor which when appropriated on a private, i.e., exclusive, basis by agents or groups of agents, enables them to appropriate social energy in the form of reified or living labor (Bourdieu, 1986, p. 241). Theo's involvement in cogenerative dialogues and its rippling effects have served to increase his social and symbolic capital throughout the school and elsewhere through the capital exchange cycle. What was discovered by studying Theo was that capital was often acquired on an unconscious level. By being involved in cogenerative dialogues, Theo's science identity began to change into one that included leadership in the discipline. As such, both students and teachers became increasingly dependent on Theo as a coteacher. Emergent from the act of coteaching was a sense of reliability between Theo, his schoolmates and teachers. This created many opportunities for successful interactions in the cogenerative dialogues, the classroom, and laboratory activities. Theo's sense of *being with* and concern *for the other* became evident through, for example, his volunteering to amend lab protocol, which in turn became a resource that was more student-friendly than it had been initially. Additionally, this act resulted in Theo demonstrating how to more appropriately execute the protocol. At the end of this specific vignette, a demonstration of collective

effervescence (Collins, 2004) in the form of clapping spontaneously emerged. The response of Theo's concern for his fellow classmates had been acknowledged. These types of interactions, between Theo, his teacher and classmates, afforded a good feeling about the science content and execution of labs – inroads that provide for lessening the feelings of being alienated by science content and its practical applications. The success of these experiences was dependent on Theo's actions of being timely, anticipatory and appropriate. While Theo is the focus of chapter 2, Jazz also played a very important role in the research and has benefited from being involved as well. For example, from my perspective Jazz has demonstrated an increased sense of self, voice and agency. In cogenerative dialogues, we created a culture that helped to generate understandings related to the class itself and to individual learning styles and ways of being. These understandings, in turn, created opportunities to adapt the ways by which we planned and enacted teaching and learning. Engaging in understanding contradictions and polysemic perspectives (which value and take seriously the voices of urban students) create opportunities to produce new practices and schema in the classroom as well as in numerous professional fields.

What is the history of Collaborative? What are administrators', teachers', and students' experiences like in this school?

In this chapter, Sandy and Robin, the founders of collaborative have shared their experiences around the creation and history of the school. Along with them, Theo, a veteran teacher, Marvin, and I were all contributors to the metalogue that emerged for an initial set of formal and informal interviews with Sandy and Robin. Throughout this

chapter, data related to the school community; high states testing; curriculum innovation, integration and choice; teacher accountability and hiring; and the acquisition, distribution and utilization of resources were explored. What emerged through the discussion was a strong sense of community on the part of all stakeholders. Additionally, an understanding of (a) how roles are shared as is the handling of the challenges that emerge within the school, (b) decisions around AP classes versus advanced classes, (c) how to integrate disciplines, (d) how make decisions in thoughtful ways when there are time constraints, and (e) how to work with the various components of the Department of Education to get what is needed for students and staff was gained. While Sandy and Robin are proud of the work they have done and the strides they have made in many aspects of the school, they have shared in much of the decision-making process with the school's community, and concede that the school continues to be, "a work in progress." Discussing contradictions in this chapter were as important as the positive aspects of the school. The format of this chapter and the forum of a metalogue provides a means by which individual experiences are shared, adding the dimension of understanding varied points of view and the potential for change. Insights from this work, namely the polyphonic and polysemic qualities, can support a variety relationships in schools and, as a result help to manage the wide range of decision-making processes and practices that occur on a daily basis.

In what ways are cogenerative dialogues associated with participants' ways of being?

Chapter 4 examined the lasting effects of having participated in cogenerative dialogues at the individual and collective levels. Both Theo's and his classmates' ability

to access and appropriate resources to aid in improving the classroom and the school at large emerged. It is because of relationships that were created and sustained in cogenerative dialogues and the ripple effect that they have had on Theo and others that multiple roles emerged from expanded agency. The expansion of agency, as it occurred concurrently and as a result of new and recreated culture, has had effects on multiple fields.

The big ideas highlighted in each of the seven vignettes detailed in this chapter support the notion that the expanded agency of the individual (Theo) has had a significant effect on mediating changes to the culture of the collective. What was described in the vignettes highlighted the germination of leadership qualities, speaking to the powers that be about the needs of the school. Additionally, coteaching with his tenth grade science teacher as a means to help clarify requirements for laboratory activities emerged. Theo's core identity and that of his Dominican culture was found to parallel many of the characteristics that Boykin (1997) describes as being related to communalism. Theo's role identity of being a peer tutor has become incorporated into his habitus as well. The interactions with his peers and administrators embody a commitment to, and actions taken toward, transforming the culture of the learning environment. Finally, the research in this chapter details Theo's taking an active role with peers and teachers to discuss, plan and execute lessons whose overarching theme is centered on building solidarity between middle and high school students and teachers. This chapter chronicles instances when Theo has appropriated a large amount of capital, respect and trustworthiness amongst those who govern the school as well as his teachers, other staff members, and parents. Both he and the collective have reaped many benefits because of having had an

opportunity to participate in cogenerative dialogues.

How do students experience their science learning environments?

In chapter 5, one of the key objectives was to understand the role that diversity can play on how students experience their learning environments. The mixed methods approach, employing both cogenerative dialogues and affording discussions around quantitative results, using the CLES, aided in creating inroads into becoming aware of and understanding urban students' experiences.

Results from the CLES demonstrated that there was variance around the mean of each of 5 scales. Analyzing the variance and the way that items were scored raised questions about construct validity. Qualitative and quantitative data were needed to obtain a clear picture of the salient structures of learning environments. Based on cluster analysis of CLES data students who experienced the learning environment in similar ways statistically clustered together. Five scales existed, with variance around each of the means. The results from this research, using the CLES and cogenerative dialogues, demonstrated that empirically there were four scales, based on how students responded to each of the items. Students experienced some of the items in similar ways as others, and therefore responded to items in similar ways, i.e., either high or low. In other words, there was internal consistency among items that were associated with the same factor. Qualitatively, using cogenerative dialogues and informal interviewing techniques to better understand how the learning environment is experienced, demonstrated that more adaptable forms of teaching, learning and assessing – including assessing the learning environment itself – can support a variety of students. An understanding of their

interpretations of, for example, comfort level in expressing their opinions, having a role in the planning and execution of classroom and laboratory activities, the personal relevance of that which is learned and, how other cultures learn about and value science, play an equal role in engaging and sustaining student interest. Shared with students, these assessments create opportunities for understanding ontologies and helping to create, access and appropriate resources that will assist in bringing about success in the science classroom.

Research Limitations

Although much was learned throughout the course of this research, there were limitations. One limitation had to do with the fact that our cogenerative dialogues may have involved an even wider range of students, especially male students, had we had an opportunity to have them take place outside of the designated lunch period. Most boys and many girls use their lunch time to engage in a variety of sports. Additionally, had there been additional time for cogenrative dialogues, perhaps more involved discussions related to the nature and application of sociocultural theoretical frameworks could have been explored. As a measure of equity and good practice, ideally all classes should have had an opportunity to be involved in cogenerative dialogues. Temporal constraints limited opportunities for this to occur.

The opportunity to follow Theo over three years was an important one that I was able to seize. While I have had opportunities to engage with Jazz, and have done so, I feel that had I had more time to follow her as well, even more could have been learned, for example, about how cogenerative dialogues may have mediated her science identity in other fields.

Another limitation involved the degree to which I was able to examine other facets of students' lifeworlds. An individual's identity is, after all, lifeworld dependent and is greatly mediated by the dynamic structures, people and experiences, which present themselves and are accessed (or not) in a variety of fields.

Implications of the Research

This research is of relevance to the education community because it has direct implications for practice and policy. Learning more about providing equitable opportunities in science education through the use of cogenerative dialogues becomes possible by studying, analyzing and applying what has been learned about the dynamics of teacher and student researchers, their own practice and praxis, and has tremendous potential to catalyze change in classrooms and schools. Students become empowered and develop into valued participants in the creation of fields that can appropriately foster their academic, social and emotional growth. A glimmer of some of what we might look forward to was presented in this work and through Theo's acting upon his expanded agency. Participation in cogenerative dialogues has afforded the creation, recreation and transformation of culture. When considering the implications for policy, having access to differing points of views about shared experiences from a variety of stakeholders can be funneled back into improving the quality of social life in classrooms and schools, and in turn, afford the addressing of concerns that plague the educational community and have challenged educational policies at large. The intersection between practice and theory intrinsic to the nature of cogenerative dialogues, as described in Martin's work (2006) can be utilized in a variety of forums and ways, including in teacher education programs, in the professional development of preservice and inservice teachers, and in a variety of

research programs.

Conclusions

Hi Theo,

I just wanted to check in with you on a couple of things. I am trying to remember which colleges you said you were interested in and what you think your major will be. Additionally, do you have any idea of what your GPA is and more specifically, what it is in math and science? How about the Regents?

Thanks.

Ms. Bayne

Re: Hi - From Ms. Bayne

The colleges I'm interested in are UNC (Chapel Hill), University of Michigan, North Western, and University of Chicago. I'm not sure as to what I want to major in. I'm thinking possibly an area of business, whether it be business administration or finance; to be honest I'm not sure.

My GPA is 3.82 (I think) I could be wrong. My overall average is 94.2. It should be higher I know. My average in math is 99 which is a 4.0 GPA. My average in Physics is 91 which is 3.7 GPA…

On the Math A Regents I got a 96. Math B Regents I got an 87 (big disappointment). On the Biology Regents I got an 86. Chemistry I got an 80. On the Physics Regents I got an 86.

Sincerely,

Theo

(Email correspondences between Gillian and Theo, July 2007)

Last year when I shared some of my research on cogenerative dialogues with a group of teachers, it took quite a few weeks to recover from the comments, "He's a punk! If I had this kid in my class, I would definitely say that he's a punk and tell him that in the *real* world; he would never get a job looking like that! He's bad news!" As I now read the exchange between Theo and me, the value of cogenerative dialogues becomes imbued

with a new kind of meaning. It has been through cogenerative dialogues that glimpses of how opportunities for learning about students, like Theo, and the capital that they bring to the classroom are discernable and useful in shaping their attitudes, interests and participation in urban classrooms, like science. In the urban educational context, where there are many factors that can put students "at risk" of becoming estranged from the classes within which they participate, we cannot afford to dispel the potential that exists within our students simply because of how they have been inscribed. Cogenerative dialogues can be used as powerful tools that force us, on a conscious level and, at levels which we are unaware, to struggle with the challenges of refraining from prejudging and typecasting others. It is because of engaging in the critical conversations that are provided through cogenerative dialogues, that the individual and collective are able to better understand and transcend the boundaries that exist because of misalignments around ethnicity, age, race, language and social class differences. Social bonds can develop because of expanded teaching and learning roles, and enacted new forms of culture. Becoming aware of who we are as individuals and how we mediate the production and utilization of knowledge are all fundamental to generating individual and critical ontologies.

APPENDIX

What happens in my science classroom?

• Student form •

DIRECTIONS

1. Purpose of the Questionnaire

This questionnaire asks you to describe important aspects of the science classroom which you are in right now. There are no right or wrong answers. This is not a test and your answers will not affect your assessment. Your opinion is what is wanted. Your answers will enable us to improve future science classes.

2. How to Answer Each Question

On the next few pages you will find 25 sentences. For each sentence, circle only one number corresponding to your answer. For example:

		Almost Always	Often	Some-times	Seldom	Almost Never
In this class . . .						
8	The teacher asks me questions.	5	4	3	2	1

- If you think this teacher *almost always* asks you questions, circle the 5.
- If you think this teacher *almost never* asks you questions, circle the 1.
- Or you can choose the number 2, 3 or 4 if one of these seems like a more accurate answer.

3. How to Change Your Answer

If you want to change your answer, cross it out and circle a new number, For example:

8	The teacher asks me questions.	~~5~~	④	3	2	1

4. Course Information

Please provide information in the box below. Please be assured that your answers to this questionnaire will be treated confidentially.

a. Name:	b. School:
c. Grade/Year-level:	d. Sex: male /female (please circle one)

5. Completing the Questionnaire

Now turn the page and please give an answer for every question.

Learning about the world	Almost Always	Often	Some-times	Seldom	Almost Never
In this class . . .					
1 I learn about the world outside of school.	5	4	3	2	1
2 My new learning starts with problems about the world outside of school.	5	4	3	2	1
3 I learn how science can be part of my out-of-school life.	5	4	3	2	1
In this class . . .					
4 I get a better understanding of the world outside of school.	5	4	3	2	1
5 I learn interesting things about the world outside of school.	5	4	3	2	1
Learning about science	Almost Always	Often	Some-times	Seldom	Almost Never
In this class . . .					
6 I learn that science has changed over time.	5	4	3	2	1
7 I learn that science is influenced by people's values and opinions.	5	4	3	2	1
In this class . . .					
8 I learn about the different sciences used by people in other cultures.	5	4	3	2	1
9 I learn that modern science is different from the science of long ago.	5	4	3	2	1
10 I learn that science involves inventing theories.	5	4	3	2	1
Learning to speak out	Almost Always	Often	Some-times	Seldom	Almost Never
In this class . . .					
11 It's OK for me to ask the teacher "why do I have to learn this?"	5	4	3	2	1
12 It's OK for me to question the way I'm being taught.	5	4	3	2	1
13 It's OK for me to complain about activities that are confusing.	5	4	3	2	1
In this class . . .					
14 It's OK for me to complain about anything that prevents me from learning.	5	4	3	2	1
15 It's OK for me to express my opinion.	5	4	3	2	1

Learning to learn	Almost Always	Often	Some-times	Seldom	Almost Never
In this class . . .					
16 I help the teacher to plan what I'm going to learn.	5	4	3	2	1
17 I help the teacher to decide how well I am learning.	5	4	3	2	1
18 I help the teacher to decide which activities are best for me.	5	4	3	2	1
In this class . . .					
19 I help the teacher to decide how much time I spend on activities.	5	4	3	2	1
20 I help the teacher to decide which activities I do.	5	4	3	2	1
Learning to communicate	Almost Always	Often	Some-times	Seldom	Almost Never
In this class . . .					
21 I get the chance to talk to other students.	5	4	3	2	1
22 I talk with other students about how to solve problems.	5	4	3	2	1
23 I explain my ideas to other students.	5	4	3	2	1
In this class . . .					
24 I ask other students to explain their ideas.	5	4	3	2	1
25 Other students listen carefully to my ideas.	5	4	3	2	1
	Almost Always	Often	Some-times	Seldom	Almost Never

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