IMMIGRATION AND CULTURE AS FACTORS MEDIATING THE TEACHING AND LEARNING OF URBAN SCIENCE

by

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ABSTRACT

IMMIGRATION AND CULTURE AS FACTORS MEDIATING THE TEACHING AND LEARNING OF URBAN SCIENCE

by

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In this dissertation I explore how cultural and sociohistorical dimensions of stakeholder groups (teachers, students, administrators, and researchers) mediate the interests of urban students in science. This study was conducted during the school year of 2006-2007 in a low–academically performing middle school in New York City.

As an Egyptian immigrant science teacher I experienced resistance from my students in an eighth grade inclusion science class that warranted the use of cogenerative dialogue as a tool to improve teaching and learning. In the cogenerative dialogue sessions, participants (e.g., students, teachers, university researchers, and sometimes administrators) make every effort to convene as equals with goals of improving teaching and learning. By seeking the students' perspectives in cogenerative dialogue participants will be able to identify contradictions that can be addressed in an effort to improve the quality of the learning environments. Examples of such contradictions include shut down techniques that teachers use intentionally and unintentionally in

order to have control over students.

This authentic ethnography focused on two Black students from low-income homes, and me, a middle-aged male of Egypt's middle class. Throughout this study, the students acted in the capacity of student–researchers, assisting me to construct culturally adaptive curriculum materials, and to analyze data sources.

This study utilized a sociocultural framework together with microanalysis of videotaped vignettes to obtain evidence that supports patterns of coherence and associated contradictions that emerged during the research. As the teacher-researcher, I learned along with my students how to communicate successfully in the context of structures that often act against success, including social class, ethnicity, gender, and age. The results of this study indicate that as a result of participating in cogenerative dialogues, I as well as the students learned the importance of group membership, and shared responsibilities for learning and acquiring new identities that support teaching and learning, and value diversity. Students reproduced, and transformed cultural practices from other social fields, such as cogenerative dialogues and home, to support their learning. Participating in cogenerative dialogues has produced a higher quality of teacher–student discourse as evidenced in data sources.

Dedication

To my loving wife, Zahra, son Anis, daughters Rania, and Amira for their countless sacrifices; my late father, Anis, my mother, Amira, and my brother, Gamal for their constant support; and to Dr. Ken Tobin, who provided the research opportunity, and the support of this work, from start to finish.

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My appreciation extends to the "CUNY Research Squad." Wesley Pitts, Gillian Bayne, and Chris Emdin, who have all enriched my theoretical, and methodological approach to qualitative research. I am fortunate to have such great friends and colleagues. Heartfelt thanks are extended to my family for their countless sacrifices. My wife Zahra, children Anis, Rania, and Amira who have encouraged and supported me in every way, my mother Amira, who is despite her medical conditions, has traveled to and from Egypt in order to help our family and ensure the completion of this dissertation. Finally, I thank my brother Gamal, who called me every single night for the past three years from Canada to show his support.

As I conclude, I express my recognition to Star, and Steve the true heroes of this dissertation. To all of you, I am grateful for taking the time to support me; your support will never be forgotten.

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Immigration and Science Education

The shortage of highly qualified teachers is more acute in the area of science than in most other content areas. Many of the traditional teacher training and state licensure systems are under-producing highly qualified science teachers. The challenge faced by many localities is how to maintain an adequate supply of highly qualified teachers, which proves to be one of the most important factors in closing the achievement gap. This shortage of science teachers has led to an influx of foreign trained science teachers into the American educational system.

Tobin (2006a) notes that conventional wisdom about good teaching has focused on teachers controlling students to keep them orderly and maintain relatively quiet classes. This myth of *control over* fosters cultural practices that might be interpreted by the participants as disrespectful, and when this occurs the field of the classroom can be a site for power struggles between the teacher and students. Such struggles reduce the quality of learning environments and often are seen as evidence of poor teaching, setting the stage for teachers to be judged as ineffective and for students to fail. One cause of cultural conflicts might be the failure of teachers and students to understand the sociohistorical construction of categorical representations of the participants (students, and teachers), such as race, ethnicity, social class,

and gender. These identity markers are resonance structures that expand and at the same time constrain the individual and collective agency of participants. For example, being a Black student in a low performing class becomes an identity inscription that might truncate a student's agency, and at the same time provide camaraderie with other Black students. The objective of this study is to focus on the use of cogenerative dialogue (i.e., cogen) as a tool to expand the agency for all the participating stakeholders.

A study that tackles the causes and the responses to cultural misalignments is vital to the teaching and learning of science, especially in urban schools such as those in New York City where high levels of immigration fuel many forms of diversity. An analysis of the racial breakdown of the population in New York City (NYC), based on data from the U.S. Census Bureau (2000), is presented in Table 1.1 The data show that NYC is more diverse than the rest of the nation.[1]

TABLE 1.1

New York City Population Estimates by Race

Race	Populations	NYC Percent	U.S. Percent
White	3,576,385	44.7%	75.1%
Black or African American	2,129,762	26.6%	12.3%
American Indian and Alaskan Native	41,289	0.5%	0.9%
Asian	787,047	9.8%	3.6%
Hispanic or Latino (of any race)	2,160,554	27.0%	12.5%
Some other race	1,074,406	13.4%	5.5%
Two or more races	393,959	4.9%	2.4%

1 NYS demographic. Information retrieved online on June 27, 2006, from the U.S. Census Bureau Website: http://factfinder.census.gov/

The Role of Teachers

Reflecting back on my experience as an Egyptian immigrant science teacher in NYC public schools, I discovered first-hand how cultural and socioeconomic differences play a role in mediating the outcomes of teaching and learning in the science classroom. On numerous occasions my minority students expressed their doubts that education is a way to improve their socioeconomic situation. In an informal meeting with two of my students, Pinky, and Trevon[2], I asked them about the reason for the students' apparent lack of concern for education. They said, "They're not learning a thing." I responded by saying perhaps because of the students' behavior the teachers can't teach. They asked why they should study. Pinky elaborated that it was fun to not study, and that her cousin finished LaGuardia Community College and still can't find a job. I offered the possibility that perhaps he studied a major that is not currently in demand in the job market, but she asked, "So why are they offering it?" I started to explain to her that finishing education is not a guarantee that someone will find a job, but it's definitely a step in the right direction. I then asked, "Without education what kind of chances does he have?" She said, "The sanitation department." My father didn't have to study hard and he's making decent money."

Her response made me question our roles as teachers. Do we have to teach our students only how to pass the subject matter? Or do we have the moral obligation to inform them about how macro structures such as, race, ethnicity,

[2] (Proper names are pseudonyms unless already identified as author of this chapter and other cited papers.)

job market and the economy might play a role in shaping their personal lives, and how to counteract the realities of oppressive macro structures with the power to act? Developing a culturally adaptive science curriculum that is based on the students' lived experiences and the needs of the job market are essential constituents in closing the highly publicized achievement gap. One way to deal with the achievement gap is by keeping the students orderly and drilling them on test taking strategies. This approach has the potential for creating learning environments that are imbued with negative emotional energy.

According to The National Science Research Council, "All students… should have the opportunity to attain high levels of scientific literacy" (National Research Council, 1996, p. 20), but the reality is that many inner city schools do not meet this ideal. This view is shared by many science teachers, who believe that all students should have fair and equal opportunities to become literate in science. Most often, the challenge for these teachers is finding a way to help all students feel connected to science. However, numerous factors structure student performance, either directly or indirectly. These include access to a challenging curriculum, qualified and experienced teachers, resources and school environments that support learning and teaching.

Study Context

The research described in this dissertation is situated at Astoria Intermediate School in Queens, NYC. The school is attended by more than 800 students,

poverty stricken or working class families. According to the 2006-07 school report card[3] (New York City Department of Education, 2006) The school is considered multicultural by urban standards: 52% Hispanics, 19% African Americans, (under this category fell students of African origin and students of African origin from the Caribbean islands, such as Jamaicans, and Trinidadians) 7% White, and 22% Asians and Pacific Islanders. The gender breakdown was 51% males, and 49% female, which is a typical gender composition of most urban schools in New York City. The annual attendance rate was about 80%, which is below the city average of 90%. Students' stability as of 2004 was 92%, which was below the city average of 94%. The average class size in the school was 28 students.

Most of the students in the school came from conditions of economic hardship. The percentage of students eligible for free lunch as of the school year 2006-07 was about 84%, which qualified the school to have Title I designation. This classification provided extra funding from the federal government that could be used for after school programs, and to lower class size.

I was assigned to teach a low track eighth grade inclusion class. The class had 14 students, which is far below the school's average of 28 students. The attendance did not exceed 50-70% on any given day, which is far below the school average of 92%. All of the students in the class scored between level

[3] NYS testing and accountability reporting tool. Information retrieved online on January 13, 2008, from the New York State Education Department Web site: https://www.nystart.gov/publicweb

one and level two, on the ELA, and the mathematics citywide tests in grade seven. The racial makeup of the class was 60% Blacks, 33% Hispanics, and 7% Whites. In comparison to the rest of the school the proportion of the Black and Hispanic students in the class was relatively high. The students in this class formed camaraderie with peers in the class that was structured by shared experiences in the school, the class, the street, and the Astoria housing project, where most of the students lived.

Despite my educational background and being a successful science teacher to the fast tracked students, I was identified by the students in this class as culturally "other." The students made fun of my accent, took every opportunity to laugh at me, and refused to do the work. My experience in this class was difficult; I found myself investing so much effort in discipline that I didn't have time to teach. I encountered what I labeled as resistance tactics from the students to my teaching methods. I started cogen as a tool to navigate cultural fields, and improve teaching and learning in the class.

During the first semester the cogen team associated with the class primarily included me as a teacher-researcher and two African American students who acted in the capacity of student-researchers, Star and Steve. The number of participants increased during the second semester. The selection of the participants was purposeful in accordance with the dialectical principle (Guba & Lincoln, 1989) to obtain diverse perspectives on teaching and learning.

The Students-Researchers

Star is an African American female, who struggled academically in science, and the other subjects. She tended to be confrontational, and physically aggressive. Accordingly, she got suspended more than once during the school year 2006-07. Steve is an African American male student, whose academic performance has fluctuated, depending on his moods. He experiences periods of extreme emotional and physical withdrawals, where he puts his head down, and refuses to participate in class discussions. Both Star and Steve lived in the Astoria housing project, and experienced socioeconomic hardships. I met with Star and Steve during the lunch periods and after school.

The Roles of Student-Researchers

The research utilized the experiences, knowledge, and practices of the student-researchers to help inform and improve the learning environment. The use of students as researchers provided a way to obtain their perspectives on what was salient in terms of school, teaching, and learning, as well as myriad other issues. Having collectively identified foci for research, they provided insights into what was happening and why it was happening, in terms of patterns of coherence and contradictions. Their roles varied between identifying, critically discussing, and analyzing video clips that were salient to our research, and interviewing their peers. (Tobin, 2006c) The cogen team met once every Monday during lunch period, or after school to lay a foundation for the coming week.

Tobin (2006b) contends that much of the research in urban education is

premised on deficit perspectives of the school systems, the teachers and the students. Accordingly, when I faced mounting resistance from my students I resolved to undertake autoethnography-to learn from my own efforts to teach science in urban schools, and autobiography to explicate my understanding of the ethnography. Before I learned how to be an effective teacher I had to learn how to communicate with students across the social categories of race, ethnicity, class, gender and age. I had to understand their ways of talking and being, including how to approach and interact with them. I had to demonstrate to students that I could teach them in the ways they expected to be taught and that I would be helpful to them, not only in science but also in their dealing with life's problems. Incorporating microanalysis with authentic ethnography placed a strong focus on transactions of participants with resources. The methodology presented in this chapter is grounded in sociocultural theory, and an ethical standpoint guided by the principles of the Belmont Report.

Methods

The research employed autobiographical reflection, the sociology of emotions, and cogens as tools for examining the social and historical dimensions of the participating stakeholders. The study focused on studying teaching and learning of science in two fields: a science classroom and the affiliated cogen. The research employed autobiographical reflection, the sociology of emotions, and cogen as tools to examine how structure, social and historical dimensions of the participating stakeholders mediated teaching and learning in the context of science education. The broad research questions were:

1. How did participating in cogenerative dialogue structure the practices of the stakeholders?

2. To what extent is the culture produced in cogens enacted in the classroom and vice versa?

3. How does restructuring cogen to one-on-one mediate its outcomes?

4. How did the participation in cogen improve cultural adaptivity among the stakeholders?

5. What roles do successful face-to-face interactions play in fostering solidarity, and entrainment in the classroom?

6. How did the participation in cogen improve science achievement?

Dialectical Dynamics

This study utilized theoretical lenses that are sociocultural in nature. As the teacher/researcher in the study I focused on the unfolding production of teaching and learning, and to the extent possible on the relationships that are central to my research-such as, agency|structure, practices|schema, individual|collective, action|activity and goals|motives. From this perspective, each dialectical pair is interconnected, where each category presupposes the other.

Agency|Structure Dynamics

Bridging the division between structure and agency has been one of the ongoing concerns for educational researchers. Giroux (2001) contends that human agency, and structural features should not be dealt with as a

dichotomy, because that would repress either the individual sovereignty, or structural determinants such as race, ethnicity, and meritocracy that exist outside the immediate encounter of human actors. Structures shape what you do, but they are not deterministic since, if actors exercise their agency they can alter structures—using them to pursue their own goals. Some practices tend to reproduce structures and other practices tend to transform them, hence as culture is produced it is simultaneously reproduced and transformed. Just as structure and agency are considered as dialectical entities, so too are reproduction and transformation. This standpoint places cultural enactment along a triple dialectic relationship of
production | reproduction | transformation. Throughout this study I employed a dialectical framework in which dichotomies are avoided and relationships among social categories are theorized as constituting a whole in which constituents, such as agency and structure, presuppose one another's existence.

The methodology utilized in this study is grounded in sociocultural theory and an ethical standpoint that obligates me to adhere to criteria that give priority to the interests of participants in the research, ensuring that they benefit directly through their participation and that efforts are made to remove inequities that emerge during the study. Since this is an interpretive study I started my data analysis by answering two main questions, namely, what is going on here?- and why is it happening (Erickson, 1986)? In doing so I am guided theoretically by Sewell's theories on culture, whereby culture is enacted as

patterns that have thin coherence and associated contradictions (Sewell, 1999).

Cogen

As the teacher-researcher in the study I discovered first-hand how structural features such as, cultural and socioeconomic differences play a role in mediating teaching and learning in the science context. Most of my students were minorities, and came from conditions of poverty. They resisted my teaching methods, which I acknowledge privileged middle class language and methods of logical reasoning. These resistance tactics disrupted the teaching and learning process, and provided an opportunity for the use of cogen (Tobin, Roth & Zimmermann, 2001) as a tool to produce practices and schemas that are conducive to a constructive learning environment.

In the cogen sessions, participants (e.g., students, teachers, university researchers, and sometimes administrators) make every effort to convene as equals with the goals of improving teaching and learning. By seeking the students' perspectives in cogen there's a probability of having them identify malpractices and shut-down techniques that teachers use intentionally or unintentionally to control the students, thereby giving them voice as active participants in the teaching and learning process. Teachers, through participating in cogens, get to identify which instructional practices are conducive and which ones are not supportive to teaching /learning in the classroom.

The Implementation of Cogen

The varied use of cogen emerged from longitudinal studies conducted in Philadelphia at City High more than five years ago. Students were involved in research as student-researchers in the teaching and learning of science in their own classrooms (Tobin, Elmesky, & Seiler, 2005). The cogens initially were designed to allow for reflective discussions about shared experiences. Gradually an emphasis was placed on the participants in cogens having shared responsibilities not only for what happens in the cogen but also for what happens in the classroom. The shared responsibility can be theorized in terms of the individual|collective, and goals|motives. Hence, over time an emphasis was placed on examining roles of participants in relation not only to individual's goals but also to collective motives. An outcome of cogens was to come to collective agreements on goals, roles and changes in structure. Accordingly, cogens "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).

The use of cogen as a critical methodology in the classroom was expanded to NYC in the fall of 2004 (Bayne, 2008). Dr. Kenneth Tobin invited a handful of his students at the CUNY graduate center to participate in a study that aimed at undertaking research in a select group of urban schools in NYC using cogen. Christopher Emdin, Gillian Bayne, Ed Lehner and I, each teaching in four very different schools took part in this study. Shortly thereafter, Eileen Baker and Wesley Pitts also became involved in using

cogens. Christopher Emdin's (2006) research took place in New York High School (NYHS), in the Bronx. The school has a focus on medicine, nursing and health professions. Emdin's work involved using cogens, coteaching and cosmopolitanism to explore possibilities for transforming physics and chemistry. Emdin's students underscored the importance of out-of-school capital as a resource to mediate the understanding of canonical science.

Pitts (2007) worked at the same school using cogenerative|coteaching dialoging as tools to explore modes of solidarity, which are centered on interest in science and science education across social categories of difference (gender, class, and ethnicity). Pitts used a mixed method approach in his work and used cogens specifically as a method to probe the nature of understanding student-group, teacher-student and student-student interactions.

Lehner's (2006) work focused on using cogens as tools to improve student learning in a suspension center for at–risk students by facilitating the enactment of collective practices. The outcome of his research indicated that on certain occasions, the culture produced in the cogen was reproduced and transformed in class. These transformed practices were mediated by the students' ability to access and appropriate the proper resources. Frequently, cogens supported a student's agency in accessing these resources, allowing culture to be enacted across varying physical fields as well as fields of difference.

Bayne worked at the Collaborative School, a high performing school in Lower Manhattan. She used cogens as a measure of good practice consistently for

three years. In her research, she has followed one student, Theo, who participated in cogens during her first year of using them. Theo's participation in the cogen has expanded his agency, becoming increasingly active inside and outside the classroom. Additionally, his leadership qualities, which involved taking responsibility for looking out for the well being of his classmates and the school community, coteaching, school-wide curriculum planning and project execution all were shaped by the communal nature of cogens.

Eileen Baker investigated the role that cogens have played in the teaching and learning of science in her suburban Long Island classroom. The school highlighted in her research had a very diverse ethnic, racial and socioeconomic student body. Accordingly, it struggles with many of the same challenges as other urban schools. Eileen's interest focused on using cogens as tools to help her students who were primarily African-American females, increase their interest in pursuing science careers. She used the sociology of emotions and interaction ritual theory to elucidate the dynamics of student engagement. In all of these studies cogens have been a catalyst for changing the nature of learning environments. The cogen provided a chance for the participating stakeholders to learn the importance of group membership in developing a new culture that values and supports diversity.

Data Sources

The study was conducted during the 2006-07 school year. The group used interviews, artifacts, videotaping and audiotaping analysis to explore the

agency|structure relationship. I asked the participating students in the cogen group to provide daily narratives about their activities, inside and outside the classroom, to provide evidence for the existence of practices and schema from other fields such as home and school into the cogen sessions and vice versa. Standard procedures of discourse analysis, as well as advanced technological tools such as iMovie, and QuickTime Pro were used in data analysis. The analysis of the information provided by the student-researchers helped in identifying patterns of coherence and contradictions associated with such practices. The study incorporated (Guba & Lincoln, 1989) authenticity criteria, ensuring that the researchers would learn from the study, educate stakeholders about what was learned, ensure what was learned catalyzed positive changes in the fields of study, and assist all participants to benefit from what was learned in the study.

Data Collection

As part of the research, I drew on a variety of qualitative research methods appropriate in the school context, including authentic ethnography, and conversation analysis with its associated gestures. In addition to field notes, I videotaped, and audiotaped the class and cogen meetings. All relevant videotapes were digitized to make them available for analysis using iMovie. The software allowed the research team (cogen group) to slow down, or speed up the recorded frames, to capture interactions at the microlevel that might have been overlooked in real time. The cogen group viewed the videotapes, both individually and collectively, with the intent of capturing the most salient

episodes to our emerging questions. The videotapes were transcribed using the conventions of conversation analysis employed by Roth (2005). As a team we made sense of the data collected by analyzing individually and collectively. We analyzed the data at multiple levels to understand and generalize our findings.

Chapters in Dissertation

The dissertation is organized into five main bodies of work. Chapter 2 is my autobiography/autoethnography. Chapters 3, 4, and 5 represent different research opportunities in Astoria Intermediate School during, 2006-07 school year. Each chapter is meant to stand alone from the others, yet they cohere under common themes of immigration, and improving teaching and learning of urban science education. As such, the reader may experience redundancies in the presentation of methodology. Chapter 6 represents a culmination of what was learned as a result of being involved in this research, and the implications for policy and practice.

Chapter 2

This chapter is an autobiographical account of my journey as a teacher in urban schools in New York City. The chapter provides opportunities to understand the development of my teaching practices, and explicate personal prejudices that might have structured my findings throughout the dissertation. Roth (2005) argues that, "Autobiography, paired with radical doubt, is a legitimate strategy to arrive into intersubjectivity thereby avoiding false

claims to objectivity." (p. 3)

In this chapter I start by describing the opportunities, and the challenges associated with globalization. It has facilitated immigration, the transfer of goods, and cultural artifacts along the borders of nation-states, but at the same time it has aggravated economic inequalities between the rich and the poor. These inequalities have been the driving forces behind the recent trends in immigration. As an immigrant science teacher, it is imperative to highlight the role of globalization, and immigration in construing my educational practices.

My first assignment at an urban school in East Flatbush, NYC, helped me in exploring how categorical representations such as race, ethnicity, socioeconomic, age, and social class could be detrimental structural features that might mediate my chances of being a successful teacher. Neither the White nor the Black teachers accepted me as one of their own despite my "biracial" lineage. This "othering" process did not limit itself to the staff but extended to the students as well. My lack of understanding for my students' diverse cultural and socioeconomic backgrounds produced a classroom field imbued with negative emotional energy. I unconsciously projected my lived experiences on their reality, and expected them to live up to these expectations.

As part of my exploratory journey, I stated to assign values to the different categorical representations. For example, in Egypt the society is deeply imbued with British class-consciousness. Social class mediates a person's chances in life, and determines to a large extent one's chances of getting a

well paying job, and even the chances of getting married within a certain class. Social class is the predominant stratifying category in society; not race. Accordingly, I thought that my students' problems were primarily the manifestation of their social class, placing race, and social class in a dichotomous relation. In simple terms, I was what Freire (1970) described in his book, *Pedagogy of the Oppressed, "*A prisoner of a 'circle of certainty' within which reality is also imprisoned" (p. 39). Through dialoging with my students, I attempted to understand what it means to be them. My attempts might not have captured their reality, but it was a step deeply appreciated by my students. I learned about the students' home lives through private conversations with the ones who failed to hand in their homework more than once.

As a doctoral student at the CUNY Graduate Center I came to experience deracialization; I was inscribed as White by the census bureau. Appiah (2005) argues that racial inscription shapes actions and life plans. Accordingly, this racial inscription of being White expanded as well as constrained my agency. After 9/11, religion became a salient identity inscription for me. Being Muslim became a structural feature that truncated my agency, but at the same time it afforded me the opportunity to identify with other Middle Easterners who experienced similar circumstances. Moving to Astoria was a step towards developing and identifying the newly formed diasporic identity. Recounting my autobiography represented a critical tool that helped me in making my claims justifiable.

Chapter 3

The research described in this chapter is situated in urban low–performing middle school in Queens, NY. The school has been identified as "needs improvement" for three years, which forced it to restructure into three small learning communities (SLCs). This restructuring aimed at addressing the educational needs of the low tracked students by providing intensive instruction in the subjects English Language Arts (ELA) and mathematics. The school experienced a communication failure among the participating stakeholders (administrators, teachers, parents, and students) with every group blaming the other groups for the current academic state. As an immigrant science teacher with successful teaching experience with the upper tracked students I was assigned to teach a low performing eighth grade inclusion class. I failed to interact successfully with the students as a result of cultural misalignment.

These failed interactions afforded the opportunity to use cogen as a tool to navigate cultural fields, and improve teaching and learning in the classroom. Initially I started the cogen sessions with a large group, but that design failed to develop a coherent plan aimed at transforming the culture of the classroom. The students focused on their differences (skin color, socioeconomic status, and ethnicity), underscoring their intolerance to diversity. I downsized the cogen group to two Black students Star, and Steve. Both students came from low economic status, and a history of family troubles.

The cogen team aimed to highlight patterns of coherence and their associated

contradictions. Collectively, we designed a research procedure that aimed at capturing segments of the students' lived experience and connect it the learning environment. The protocol in the study utilized different ethnographic data sources (e.g., audio, and videotaping of the cogens, the classroom, and the science lab). The interpretation of data provided evidence that supported the lack of cultural alignment as a result of a large cultural gap. Following the advice of my mentor Kenneth Tobin I downsized the cogen group to one-on-one.

Chapter 4

The accounts in this chapter evolved as a result of my efforts to deal with a major problem that faces immigrant science teachers as they attempt to teach in inner city schools. The problem arises from the cultural gap between the teachers and their students. Endeavors to bridge the gap mainly foster a positivistic middle class ethos and reproduction of cultural forms like those of their inner city peers. This cultural breach is often larger for students of socioeconomic hardship (Roth, Lawless & Tobin, 2000).

This chapter highlights some of my experiences in the class. I started the chapter by providing evidence of cultural misalignment based on conversation analysis. The lack of successful teaching and learning experiences made me explore a culturally adaptive approach to teaching. I used one-on-one cogen as a tool to explore my students' cultural practices. I argue that this design proved to be successful based on the data analysis. The interstitial culture produced in the cogen got produced | reproduced | transformed in the larger

classroom field.

Chapter 4 provides concrete evidence that the culture of the classroom has been transformed with evidence of solidarity and entrainment among participating stakeholders. Participating in one-on-one cogen helped me gain the social capital necessary for successful teaching. The success of the new designed cogen provided me with the opportunities to expand to a large cogen group. This large cogen design proved to be a step forward towards achieving democracy in the classroom.

Chapter 5

In this Chapter, I argue that cultural artifacts from the cogen field mediate what happens inside the classroom and contribute to the learning of students. Specifically, I explore the significance of face-to-face interactions and the associated gestures to the lives and the learning of economically disadvantaged minority students. These particular dispositions have been repeatedly observed in our research, and they can be important resources for the creation of positive emotional energy, collective solidarity, and heightened engagement in learning activities since they provide resources for the (re) shaping of identity.

Chapter 6

In this chapter, I re-examine the questions posed throughout this research. Due to the emerging nature of the research design some of the questions that I posed in chapter 3, and 4 became more important to the study and others

blended into the background. While establishing successful face-to-face interactions is an important notion in achieving solidarity, in writing the dissertation the use of cogen as a tool to produce a successful learning environment dominated my lens.

In the concluding part I start by re-examining the objective of the study, and the salience of cogens, functioning both as a methodology and method, and their influence upon individual and collective agency. Implications for the use of cogens in a variety of forums, including teaching, research, educational policy, teacher education and school leadership, are explored.

CHAPTER 2

Immigration and Identity Formation|Reformation

Globalization, and the Spread of Cultural Artifacts

The World Trade Organization (WTO) is one of the most influential international organizations. It has about 134 participating nation-states including the United States. It is quickly assuming the role of global government with its regulatory power. It has mediated large-scale transformations that included the universalization of trade accords, and the spread of certain cultural artifacts throughout the world, such as the Internet, and the proliferation of rap music.

Globalization is very often used to refer to such incorporation of nationalized economies through trade, migration, and the spread of economic, technological, sociocultural and political forces. Globalization engenders complexity that has restructured the nineteenth, and twentieth century nation-states' doctrine of defined cultural, and geopolitical identities of the colonized nations. It is generating more elaborate demographic profiles, economic realities, and political processes. It is shaping and reshaping our sense making process, constructing new norms. It seems to be implicated in all aspects of life and has mediated the way today's youth respond to social issues: For example, the ideas of liberal democracy, and their interpretation of religious practices.

Recently, I got to watch an Islamic TV station called *Iqraa*, which means *read*

(that was the first command the prophet Mohamed received from the angle Gabriel). The announcer invoked the lyrics of the Irish singer Sinead O'Conner "Nothing compares 2 you" to illustrate his love for God. I found it to be a perfect example of how globalization penetrated many facets of life, including the initially impermeable religious boundaries.

The announcer's understanding of the popular culture in the Arab world equipped him to use globalization as a transformational force that could be harnessed to deliver his message. His religious approach is contradicted by the traditional Islamic view of globalization, which looks at globalization as a threat to many century's long traditions, religious identities, and authority structures. This traditional view is normally carried out in *Madrassa,* which is defined as the traditional Islamic school, where the teacher sits on the pedestal reciting the Quran and interprets it according to his ontology. His discourse is mostly carried out in the form of a monologue where the students listen and copy everything the teacher dictates to them. In these traditional religious settings the opponents of globalization feel that globalization is a proxy for Americanization, imperialism, and neocolonization. This notion did not confine itself to the circles of traditional Islamists, but extended itself to economic policies, and grass root activists.

In his World Bank Presidential Fellows Lecture, Naidoo (2003) argued that globalization has exacerbated economic inequality between the rich and the poor, to the extent that it appears to be driven by the advantaged at the expense of the underprivileged. The persistent glorification of so-called 'free-

trade' in fact masks a set of double standards that protect certain markets in wealthy countries and deny poor and developing countries the chance to benefit from the most promising segments of their own economies. This economic disparity has produced social inequality, segregating the implicated societies into different classes.

Globalization and Immigration

The recent trends of migration around the world seem to be driven partly by economic and social inequities. These immigration patterns have changed the demographics of the host nations, as well as the sending (or nations of origin) nations, producing a new set of problems, namely, how to deal with the cultural, and ethnic differences produced by immigration. The racial makeup of the United States of America and its urban cities in particular has been transformed by immigration. As of 2005 the United States benefited from a net influx of about 38 million immigrants per year. About 1-in-every-3 U.S. residents is part of a group other than single-race non-Hispanic White according to national estimates by race, Hispanic origin and age released by the U.S. Census Bureau[4].

In 2005, the nation's minority population totaled 98 million, or 33%, of the country's total of 296.4 million. Census Bureau Director Louis Kincannon states, "These mid-decade numbers provide further evidence of the increasing

[4] http://www.census.gov/population/documentation%20twps0051/twps0051.pdf

diversity of our nation's population." [5]Hispanics continue to be the largest minority group at (42.7 million) with a 3% increase in population from July 1, 2004 to July 1, 2005; they are the fastest-growing group. The second largest minority group was Blacks (39.7 million), followed by Asians (14.4 million), American Indians and Alaska's natives (4.5 million), and native Hawaiians and other Pacific islanders (990,000). The population of non-Hispanic Whites who indicated no other race totaled 198.4 million in 2005.

Managing diversity is becoming one of the greatest challenges to multicultural countries. Children growing up in these and other settings are more likely than in any previous generation in human history to face a life of working, networking, living with others from different national, linguistic, religious, and racial backgrounds. As an Egyptian immigrant I experienced firsthand how unprepared I was to meet the new challenges dictated by globalization, and the understated identity transformations that immigrants go through by moving to a different nation. I had to face the sociohistorical construction of migration to the United States of which I was not aware. I discovered that contrary to popular myth, immigrants have never been particularly welcomed in the United States. Americans have always tended to idealize the immigrants of their grandparents' generation while casting a skeptical eye on contemporary newcomers.

In the first decades of the 20th century, descendants of Northern European immigrants resisted the arrival of Southern and Eastern Europeans, and today

[5] http://informationpolicy.oversight.house.gov/documents/20070813130538.pdf

the descendants of those once unwanted Italians, Greeks, and Poles are deeply distrustful of current immigrants from Latin America, Africa, and the Middle East. In order to be accepted in their new land, immigrants are forced to go through an identity transformation. Thus, altering an individual's understanding of him or herself as a distinct, separate entity; that includes role identity, and core identity, as defined by Turner (2002). The role identity is a set of connected behaviors, rights, and commitments as conceptualized by the actors in different fields. Core identity does not stand in seclusion from other social factors. It is entangled in structured social relationships governed by reciprocity, which is the underlying base of well thought-out dialectical relationships, and what we elect as social bonds. I see my core identity as a fundamental self, strongly defended and unwavering, it is closer to personal distinctiveness, and defines who I am as an individual.

Landing in New York City

The construction of identity for immigrants takes place at both the conscious as well as the unconscious levels by the state authority, initially as immigrants land at the entry port, and later on by societal norms. The socioeconomic backgrounds of the immigrants, and their goals in life complicate this structuring of identity.

My motivation for moving to New York City was quite unsophisticated; I just wanted to have a better life. I still recall how I felt, as my plane was about to land in New York City. As I looked from the plane's window and saw the statue of liberty I started reciting Emma Lazarus's poem (1883) entitled "The

New Colossus," which is inscribed on the pedestal of the Statue of Liberty, the poem tells of the invitation extended to those wanting to make the U.S. their home. "… Give me your tired, your poor, your huddled masses yearning to breathe free…"

My romantic vision of immigrating to the United States came to a crushing halt as I landed at JFK airport. The visa officer asked me why are you here? Instead of reciting the poem again I told him the second best answer, which was to visit my uncle. He asked me next what my name was, so I told him, "Mohamed Ashraf, my father's name is Anis Oncy, and my grandfather's name is Ali Shady." He told me that he did not ask me to write an essay, and that I should pick a maximum of three names, first, middle, and last. I looked at him with surprise, and said, "O.K., Mohamed Anis Ali." A decision I ended up regretting, because of negative perceptions that many in American society tend to have toward names that have religious or ethnic connotations that differ from Judeo-Christian norms.

My Identity as a Science Teacher

Teaching in East Flatbush

Later on, I experienced firsthand, how a name, physical appearance, or national origin can be grounds for dismissal from a job, schooling and other opportunities. In a subsequent interview for a job as a science teacher in a middle school in East Flatbush, Brooklyn, NY, the principal initially refused to hire me. Two full weeks into the school year she called to offer me the

science teaching position, when she could not find another science teacher who was willing to work in the school. Later on, as she left the school for a better position, she mentioned that she was initially skeptical of hiring me because of her perception of foreign trained teachers. She thought they were poorly educated, could not handle classroom management matters, and expected that just because they were teachers, that they would receive the students' respect. She followed this by saying that here in the United States the teacher has to *earn* the students' respect. Her comment left me with the profound impression that I was going to have to work twice as hard as any other teacher to just change the perception about foreign born and trained teachers.

The demographics of this school were about 90% Blacks and 10% Latinos. Although the Caribbean students were first or second generation West Indians, they had been inscribed racially as African Americans. In contrast, to the racial demographics of students, the racial breakdown of the teachers was about 90% White, and the rest were African Americans, Jamaicans, and Latinos. I was the only Egyptian teacher in the school, but in terms of ethnicity, I classified myself as African American, since Egypt is in Africa, and I immigrated to America. Neither the White nor the Black teachers accepted me as one of them despite my "biracial" lineage—my father was Black, and my mother was White. They could not inscribe a racial label on me, because they could not make the connection between my biracial background, and my physical features. Their definition of racial identity was

influenced by the social construction of race and to a larger extent by the experience of colonization.

This "othering" process did not limit itself to the staff but extended to the students as well. It influenced their perspectives of what they thought was acceptable educationally as a well as culturally from me. Based on my conversations with the students I found out that most of them classified the teachers as either White, with all the privileges that come along with such racial inscription. For example, the students assumed that all White teachers lived in a house with a big garden, and a two-car garage. In contrast, because of their skin color, African American or Caribbean teachers (i.e., Black teachers), were expected to be struggling and experiencing the same oppressive circumstances as the students' parents. However, the students' views were distorted since most of the Black teachers, lived in the same neighborhood, and experienced similar economic status, as their White colleagues.

My students felt deep mistrust of the educational system, because it ill-prepared them to achieve well on standardized tests in the elementary school. Most of the students at this school scored very low on the English Language Arts "ELA," and the Mathematics "Math," citywide tests. The school failed them again at the junior high level when their teachers blamed them for the lack of their educational progress.

Unfortunately, the students took out most of their frustration on me. With no back up from my colleagues, or the administration, they showed their

disrespect by refusing to listen to my instructions. They walked out of the room whenever they felt like it; refused to do the class work, take the exams, or hand in their homework.

At the end of the first quarter I was asked to give them a grade for the marking period, and without hesitation I failed them all. When the students received their report cards they were shocked. They ran to the assistant principal, who in turn came to me with an angry look on her face saying what am I supposed to tell the parents? I told her to tell the truth. The children refused to do the work although I warned more than once, I tried personally to contact the parents, but the kids answered my phone calls instead pretending to be their parents. I was trying to tell her how helpless I felt in her school, but she refused to listen. She asked me to change the grades and pass all the kids. At that point I felt that maybe this should not be my career. I told her, she is the boss, and if she wanted to pass the children she should do it herself. She proceeded with her threat and passed all the kids. Her action sent a clear massage to the children, which is, it does not matter what they do in the classroom they will pass.

Now, as I reflect back on this experience I find that I was mistaken in assuming that education is about doing the class work, passing the exams, and handing in the homework. Dr. Martin Luther King (1947) argued that most individuals think that the purpose of education is to provide them with necessary tools to take advantage of the uneducated masses. He stated that education should provide individuals with the tools necessary to become more

efficient in achieving their legitimate goals in life.[6] I should add to this that I believe that the purpose of education should be to equip individuals to be good citizens in a democratic society that values differences, and aims at achieving social justice for all, and not only for the few chosen ones.

The Notion of Meritocracy and its Impact on Macro, Meso, and Micro Interaction

My lack of understanding for my students' diverse cultural and socioeconomic backgrounds produced a classroom field saturated with negative emotional energy. I inadvertently pushed their wrong emotional buttons, by constantly reminding them that they were not meeting the educational standards.

Turner (1999) argues that if an individual receives an indication of not accepting their behaviors as appropriate, their ego activates *defense mechanisms* that are used to manage the negative emotions. If defense mechanisms are routinely set in motion, ego builds a self-protective system to preserve identity. These mechanisms change the emotional valences and, hence, the flow of interaction. Whether these emotional dynamics become persistent and long term or only temporarily breach the flow of interaction, they learn to function along three dimensions: blocking individuals' abilities to meet their needs; blocking individuals' capacities to manage negative feelings; and blocking individuals' abilities to sustain stable identities.

My teaching methods discounted the students' views as well as their prior experiences. I wrote one chemical equation after another on the board,

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[6] http://www.drmartinlutherkingjr.com/thepurposeofeducation.htm

expecting students to copy the work and do the assigned homework. I assumed that every student had his or her own room at home to study or at least would share one with a sibling, and if they had trouble in understanding any of the topics, they would ask their parents.

I unconsciously, projected my lived experiences on their reality, constructing a mirage that I ended up chasing. Little did I know that most of my students lived with their grandparents or were raised by single mothers in very crowded apartments. Their parents or guardians were caught up in searching for life's basic necessities. I merely attributed the seeming lack of success of some students, particularly those on the lower track, to lack of effort on their part.

I adopted the notion of meritocracy, which could be defined as a social system that gives opportunities and advantages to individuals based on their abilities rather than wealth, or social seniority[7] I was not the only individual who believed in meritocracy as the foundation for successful educational outcomes. So many conservative politicians, teachers, and even parents attributed the children's low performance on standardized tests to not putting in enough effort. This notion was a perfect example of how macro structures such as meritocracy could permeate into the different social settings such as the classroom, the school, home, and the street.

The advocates for meritocracy tend to ignore collective accountability as a way to rationalize success and failure. This is likely because acknowledging

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[7] http://www.merriam-webster.com/dictionary/meritocracy

that the society has a responsibility towards its citizens would require consequent actions at the legislative end that politicians might not be willing to take. It serves them well to place success and failure in a dichotomous relationship. Their argument is that if accomplishments were based on an individual's efforts it would make sense that failure must be an individual's responsibility as well. A commonly held opinion among the meritocrats is that parents fail to instill the importance of working hard as a moral value necessary for students' academic success. In other words, the parents are the ones to be blamed for the students' academic disappointment. The conservative media outlets largely adopt such a view; bombarding us with stories of individuals who struggled until they achieved success. Self-made millionaires are looked upon as an example of what the American dream is all about.

My views of the inherent factors behind my students' failure to achieve success on standardized tests were deceiving, and one-dimensional. They were laden with deficit perspectives of the students that I was supposed to help. My views were saturated by my conviction in the determinism of macro structures such as meritocracy, and the impact of social class on structuring success and failure in the classroom. I did not look at my Black students and identify race and ethnicity as factors that might have shaped their views in life. I thought that the origin of their problems could be attributed to their social class.

Colonization, Race, and Social Class

I had certain assumptions that were reconciled by my life in Egypt; despite my biracial lineage, growing up I never heard my mother or anyone else in my immediate surroundings mention the color of my father's skin in any context. This background definitely influenced my view of race and class as a teacher in the United States, and as a researcher later on. In Egypt the society is deeply saturated with British class-consciousness. Social class mediates a person's chances in life, and determines to a large extent one's chances of getting a well paying job, and even the chances of getting married within a certain class. To readily understand the complexity of my experiences with race, and social class my Black students in the affluent district of Roslyn, Long Island had very little in common with my Black students in East Flatbush. They attended the Quaker School, which is one of the most exclusive private schools on Long Island, took classical piano lessons, and during the summer vacation they traveled to Europe. If they experienced racism, its negative impact on them was far less than its impact on poor Black students. Their parents understood the system and taught their kids how to succeed as minorities in a society governed by a White majority. They experienced race in terms of advantage, which they accept as normal.

At the beginning of the twentieth century, Du Bois (1903) announced that the color line would define the social agenda for the United States. Since then, that line has become increasingly fluid, both politically and culturally. I believe that the shift in the demographics of the United States in the coming

years will lead to a reconstruction in the salient categorical representations. As individuals attempt to appropriate resources based on voting tallies and educational attainment, social class is bound to gain distinction and the construction of race as a social reality is deemed to change.

Presently, the debate about the declining importance of race as a stratifying factor in American society is dominated largely by conservative social scientists. They argue that the problems associated with minorities in terms of having a large subpopulation of low-income families and whose culture contrasted sharply with the culture of the general population is a struggle of value systems. The fear of being charged with "racism" or with "blaming the victims" represented a deterrent to most liberal scholars to study the decline of race as the sole stratifying social phenomena, and the rise of social class as a salient category in the United States. With the exception of some authors who were deemed to be "politically correct leftist" such as Guinier, the research field has been left to the more traditional researchers. Reading Guinier (2007) supported my prior views of race, and social class. She argues that race has been used as a replacement for social class in the United States, because social class is an obscured structure, while race is quite discernible. Although her argument situates race and social class in a dichotomous relationship it provides a theoretical foundation for the current stratification among minorities who share the same racial background.

Wilson (1980) states that grouping African American families and individuals, as a unified group outside mainstream culture is misleading, because cycles of

deprivations have produced a large subpopulation within the African American society. They are characterized with high rates of joblessness, teenage pregnancies, out of wedlock births, female-headed families, geographically contained, and families that have experienced long term poverty and/or welfare dependency. He labeled this group the ghetto underclass. During private conversation with my students about their home life, I managed to identify some if not all of the previously mentioned characteristics. I was drawn to the conclusion that they belong to the "underclass." Assuming such deficit perspectives structured teaching and learning in my classroom, I expected very little of my students, assuming that it was enough to face major life struggles on a daily basis. Basically I felt sorry for them.

Recently, I Googled my name out of curiosity, I found a website called RateMyTeachers.com which prides itself on changing the way the world looks at education by providing students with the unique opportunity to critique their teachers**.** On this website, students can anonymously rate their teachers and professors. When I typed my name I found that the students used this website to rate me. Their responses varied between feelings that I am the best teacher by stating "THE BEST SCIENCE TEACHER IN THE SCHOOL," or I am better as a mentor, and a friend than a teacher "Hes madd kool hes a good teacher, even better as a mentor and a friend," or I am so funny "Hes mad funny yo by fr. Ah." There is one response that struck me with its honesty, and its deep insight to how I felt towards my students. The student

wrote “CCCCCCOOOOOOOOOLLLLLLLLLL!!!! Passed his class with 90's with out trying!!” [8]I felt so guilty when I read this response I felt that I did not do my job in equipping my students to face life issues. My feelings of empathy became a structure that in reality truncated their agency because it did not provide them with necessary tools to achieve their legitimate goals in life.

The Role of Dialogue in Understanding Social Constructs

Through dialoging with my students I attempted to understand what it meant to be like them. My attempts might not have captured their reality, but it was a step deeply appreciated by my students. I learned about the students’ home lives through private conversations with the ones who failed to hand in their homework more than once. My inherent beliefs in the determinism of social class skewed my interpretations of these conversations. In simple terms, I was what Freire (1970) described in his book *Pedagogy of the Oppressed* “a prisoner of a ‘circle of certainty’ within which reality is also imprisoned” (p. 39). My views in education and life were based on my sociohistorical background detached from situational reality. Although I participated in these dialogues my participation had not produced a change in my ontology. I failed to utilize the dialogue as a human experience that aims at constructing reality.

Freire suggested that individuals should analyze the dialogue as a two-dimensional phenomenon within which reflection and action are dialectically connected. In such radical interaction if one is sacrificed even in part the other

[8] http://www.ratemyteachers.com/SearchResults.php?country_id=0&tlname=Shady

immediately suffers. He argued that dialogue is the encounter between individuals, in order to make sense of their world. Hence, dialogue cannot occur between those who attempt to make sense of their world and those who do not wish this making sense process to occur. This dialogue cannot be reduced to the act of one person's "depositing" ideas in another; nor can it become a simple exchange of ideas to be "consumed" by the discussants. It has to produce new ideas that foster change in oppressive structures and coming up with an action plan that would improve social settings such as teaching and learning of science in the classroom.

Unfortunately, all the good intentions in the world would not have helped me, simply because I undertook my teaching with incorrect assumptions. For example, I thought that my students were in bad situations, and it was my role to lead them to a better situation. This notion kept me focused on the negative attributes in their lives. In the end, the students resisted my teaching, and took every chance possible to laugh at my accent, and make fun of me as a way to establish status among their peers. Hence, laughter was used as a tool to communicate students' disrespect for me. In my class the students had the upper hand, and that represented a clear contradiction to my views of teaching and learning. It inspired me to reflect on my praxis through the genres of autobiography, and analyze my previously held views about the role of education in constructing reality. Even with these difficulties, I was determined to teach my students. I was not merely interested in garnering a paycheck. I was interested in the possibility of making a difference in my

students' lives.

Racialization|Deracialization

About three years ago, I felt that I was going to have to take the initiative in learning about pedagogy and the historical roots of the educational problems. I searched the different Ph.D. programs and focused on one program in particular at the CUNY Graduate Center that offered a specialization in Urban Education. In my initial interview I asked the executive officer of the program what they were looking for in a Ph.D. candidate. He simply stated that since the program focused on urban education, students should be willing to learn, have a decent GPA, and preferably be a minority. I felt relieved since I fulfilled most of the criteria including the minority status. As I went further and explained my background the Executive Officer refused to accept my minority status, saying that according to the census bureau if you are Middle Eastern you are classified as White. I was surprised because I never thought of myself as a White. I have always seen my complexion as brown and I have a Middle Eastern accent. It did not matter that I was Egyptian, and that my father was Black, his concern was about meeting quotas. I felt helpless. I was deprived an ethnicity that was central to my identity. I did not identify with being White.

Appiah (2006) argues that racial inscription shapes actions, and life plans. For me the problem with being racially inscribed, as White is that once a label is

applied to a person, this label becomes a structure that operates across fields.[9] There are certain expectations of people for certain races to enact social life in a certain way. These expectations are connected to the performance of their perceived roles, where individuals are anticipated to act in ways that correspond to those societal expectations. So, if I act in a manner that is contradictory to the social expectations of a White person I become an anomaly. This racialization process produced structures that truncated my agency in many ways.

The Role of My Prior Experience

Each individual is the blend not only of the existing relations but also of the history of these relations; identity becomes the summing-up of the past and present interactions. As a teacher my past experiences illuminated and contributed to my current practices. The articulation of these experiences through autobiography genres helped me re-examine my cultural practices, and understand the factors that shaped my identity. One of the factors that constructed my identity was the sense of place of being Egyptian/American experiencing interactions with my African American students in New York City. These interactions would have been entirely different if I had these experiences let us say in Valdosta, Georgia among mostly White students. This sense of place shaped me both consciously and unconsciously and helped

[9] The term field was used by Pierre Bourdieu (1984) to describe a social setting in which agents and their social positions are located. The position of each particular agent in the field is the result of interaction of specific rules, and the agent's habitus, which Bourdieu defined as a system of durable dispositions that provide the necessary skills to navigate within different fields and guides the choices of the individual. This habitus is constantly being remade by these navigations.

me ascribe meanings to everyday interactions. Through reflection on my earlier views of education and life in general, I found that they were facades to a far more important issue, namely how to deal with the unintended shift in my own identity.

The challenge with being a multicultural teacher who had to prove his educational equivalence to his peers was compounded with my formerly held Cartesian view of the "appropriate way to teach science," and my positivistic view of life in general. I believed that science was not only a discipline to be taught, but also a doctrine by which someone could live his or her life. I felt that the reliability and the presumed neutrality component of the scientific procedure would ensure impartiality, and lead to a more socially equitable world. My belief system was constructed partly by teaching experience in Egypt some 20 years ago. I taught chemistry to the undergraduate students at the American University in Cairo. In Egypt, teachers teach in a teacher-directed and centered method, and the students look upon the teacher as a knowledge transmitter. My mentors in Egypt taught me that one of the basic tenets of teaching science is its neutrality. This impartiality sets science apart from other disciplines, because it relies on teaching the facts rather than presenting subjective opinions. I felt that I could assess teaching and learning in my classroom by focusing only on how successful my students were in taking pencil and paper tests. I have to admit that I did not take into account the impact of emotions, motivations, racial background and interests in shaping the students' prospects of succeeding in the educational system or in

life in general. In my mind these variables were not quantifiable. By moving to New York City one would expect that I would have changed my teaching methods, and infused the emotional component of instruction into my teaching, but unconsciously I held fast to my prior experiences, as do most others. Denying the shifting world around me was my way of asserting my identity. Believing in science became more like a religious affiliation than a topic that could be swayed by the views of the participating stakeholders.

During my study in the Ph.D. program, I felt that the answer to most of the problems in the educational settings stem from the fact that we as teachers and policy makers are not preparing students to be competitive in a highly technical global environment. I was product-oriented and it was very hard for me to take my eyes off the product in order to assess the process. I adopted a positivistic view that stressed a market view of supply and demand. My views were reductionist and naive. Even when I took a course in the structure of social knowledge of urban education, I gravitated towards deterministic theorists such as Bowles and Gintis (1976) who argued in their book *Schooling in capitalist America: educational reform and the contradictions of economic life* that unless the structure of schooling changes, schools would remain tools for propagating injustice in the American society. As time progressed, and I took more courses that dealt with issues of social justice I became aware of the historical nature of science, and science education. There could be no real "neutrality" in science because of the way it has been often times constructed. This change in my ontology was part of my identity

transformation.

My Identity Formation|Reformation

Anthony Appiah (2006) states that identity, as a construct, refers to such features of people as their race, ethnicity, nationality, gender, religion, or sexuality. Categorical representations such as these mediated my cultural practices within the different fields. My cultural enactment (i.e., production) within these fields was reconciled also by individual|collective, and goals|motives dialectical relationships.[10] As an immigrant I faced a special challenge with being described by mainstream culture as an alien. This label is infused with deficit perspectives, because it suggests that the labeled object or subject, which is in this case me, is "disturbing, and unfamiliar." The salient identity categories such as race, ethnicity, social class, and gender blur in the face of one big category that inscribed me as an alien.

As I gained legal status, the Census Bureau inscribed me to a racial affiliation that truncated my agency[11] since I was inscribed as White, despite my biracial lineage. Being othered by mainstream culture and the inability to have a say in their decision swayed me to accept passivity, consciously and unconsciously. Roth (2007) states that as we open ourselves to learn about new experiences we become exposed with respect to what happens to us, and how the world affects us. This could be articulated theoretically as passivity|agency, a

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[10] Structurally, the dialectical unit between two pairs of concepts as denoted by the *Sheffer* mark (|), implies that there is a recursion, a back and forth flows where each concept presupposes the other (e.g., Roth & Lee, 2004).

[11] http://en.wikipedia.org/wiki/Agency_%28philosophy%29

relationship that is dialectically interconnected where each entity presupposes the other. I knew that I had to change my approach to teaching and learning, and learn about my students' cultural practices if I ever aspired to succeed as an intercontinental teacher.

My attempt to be a successful science teacher has meant that I have had to undergo an identity formation|reformation in the science classroom. My newly formed diasporic identity helped me attain my immediate goals of being a successful teacher. Hall (1990) elaborated on the development of such diasporic identity as the temporary positioning of identity as "strategic" and "subjective," and then used the three presences--African, European, and American--in the Caribbean to illustrate the idea of "traces" in our identity. Finally, he defined the Caribbean identity in a foreign culture as diasporic identity.

The evolution of this diasporic identity occurs at the conscious as well as unconscious levels. This is mediated by the agency|structure dialectical relationship. Roth (2006) argues that the diasporic identity as a concept, does not limit itself to the experiences deriving from intercontinental immigration and how these mediate science learning but could be expanded to shed light on the experiences of native students in a culture foreign to the one they experience at home. Therefore, in order to promote student science learning, it is important for educators to attend to whether classroom structures foster identity formation in science, as without developing such an identity, students will not have the incentive to acquire and use scientific knowledge in class or

in other settings.

The Middle Eastern Diaspora

Being in situations where I lost the power to act; such as officially denying what I perceived to be my racial identity supported my fears that at any point the United States authorities might perceive me as an undesirable individual based on my ethnic or religious background and decide to send me back to Egypt. I still remember vividly the signs posted on the storefronts during the 9/11 period asking Arabs to go back to where they came from. One of the slogans read, "Love it or leave it!" suggesting that all Arabs hate the United States. As I discussed my feelings with friends I found out that they shared the same concerns, citing what happened to the Japanese Americans during World War II.

Since levels of emotional energy can become associated with particular topics and environment, the constant threat of being sent back to where we came from provided us with the structure necessary to foster successful interaction rituals (IRs), which seemed to contribute to longer-lasting emotional solidarity (Collins, 2004). This solidarity was conjoined by common goals|motives such as working hard towards achieving a better life. This commonality directed me to resort to a more traditional approach in identifying myself. I moved with other Middle Eastern immigrants who experienced the same structural features in the American society to Astoria, Queens.

Today's immigrants face a special challenge as a result of technological

advances associated with globalization. Immigration used to mean that one had to totally desert his or her former country and try to assimilate into the host nation to which they had migrated. Due to advances in communication and transportation technologies, immigration has come to be more about displacement than assimilation. Nowadays immigrants are more linked to their homelands via the Internet, phones and other methods of communication, connecting them to their roots and exposing them daily to the realities of the culture of the host nation and their native land. Globalization has structured the way they experience national identities and has supported the development of diasporic identity. As I enter Steinway Street in Astoria I experience the equivalence of Middle Eastern diaspora. It is a street owned, and operated largely by Middle Easterners. Arabic is the predominant spoken language; women cover their heads with scarves. Men smoke *shisha* (the traditional water pipe) in their traditional Arabic robes, and watch Arabic channels via satellite television. The corner grocery store sells a score of newspapers and magazines flown in daily from the Arab world. This street represents a social as well as a political reality of New York City. It is the hybridization of cultural practices that are unique to its environment; it does not mimic their native culture or the host culture, but represent an amalgamation of both cultures.

The Role of Religion

Within this Arabic diaspora I discovered that it is hard to discern identity markers. Accordingly, religion became a salient categorical factor with which

I decided to associate myself. In a recent conversation with my mentor, Kenneth Tobin, he asked me what religion are you? And without thinking twice I answered "Muslim." But reflecting back I realized that labeling myself as Muslim was not based on religious practices or convictions. It was more of an unconscious affiliation that might assure my distinctions in the face of constant struggle to assert my individuality.

Turner, in his book *Face to Face* (2002), presents a compelling argument that we are not the solidarity seeking emotional animals that theorists like Durkheim, Goffman, and Mead would have us to be. Turner states that humans are exposed to two challenging emotions, they crave strong emotional attachments and at the same time, restrain against the limitations of closed social circles. He asserts that collective actions are not the norm. Individuals aim to maintain their individuality. Hence, in order to help them become part of the collective requires work or effort to initiate, and sustain solidarity. In my case, emotional solidarity was structured by the fear of isolation, and rejection by a society.

These emotions were so intense, that it was because of them that I chose to be part of the collective. The absence of security served as an automatic stimulation that guaranteed the strengthening of my identity. I saw my role as to protect and enhance the identity that is under threat, and because religion is a constitutive factor in defining the self and the other. Religion, then, provided me with a position to draw dissimilarity from other immigrants who share the same ethnic background, and oftentimes the same local space. My answer is

also situational since I know that I would have responded differently if I were asked this question in Egypt. In Egypt tribal association, geographical location, moral responsiveness and ethical outreach become the salient identity markers that replace the need for religion.

Reflecting back on my constant attempts to assert my individuality, and resist integration into the collective I find them to be driven partly by my previous experience in Egypt. As part of mandatory military services I have seen firsthand how too much social integration among Muslim Fundamentalists led individuals to lose sight of their individuality, and became willing to sacrifice themselves to the group's interests, whereby the collective motive takes priority over the individual's goals. Even if that sacrifice was his or her life, as in the case of suicide bombers. Such individuals truly experience the emotional equivalence of solidarity, describing themselves in terms of the collective rather than aiming to assert their individuality.

Emile Durkheim (1957) described their actions as a common case of "altruistic suicide." I believe that as an immigrant I am under constant pressure, both overtly and covertly, to provide justifications for why the host nation would accept me as I am. So, unconsciously my search for distinctiveness was my way to assure others that indeed I do belong to this society. This apparent contradiction is an example of one factor that makes my life as an immigrant different from that of a native. Hence, my endeavors to adopt science as an identity marker and being drawn to have an affiliation with an organized religious culture were not contradictory attempts to draw

dissimilarity from other Middle Eastern immigrants but rather to be identified with them as different from mainstream America. Durkheim (1912) argues in his book *The Elementary Forms of the Religious Life* that it is enough for an idea to bear the stamp of science to be given a certain release from the rule of obligation, because in a modern world we have faith in science, and this faith does not necessarily differ essentially from "religious faith" (p.438).

Learned Lessons

Science and Multiculturalism

I experienced social violence from the seemingly constant resistance of my students to me as a teacher compounded by my struggle with identity issues. The violence I experienced forced me to take a serious look at my ontology as a teacher and at many of the injustices people of color and those who are different face in American society. I decided that I should change my approach to teaching|learning, if I ever wanted to reach my students and succeed as a teacher. I started also to view teaching as cultural enactment that structures the field in which it occurs, and is structured at the same time by the learning that occurs in the same field. Teaching and learning presuppose one another and they are part of a whole. This standpoint places teaching|learning in a dialectical relationship. I observed how cultural and socioeconomic differences play a role in mediating teaching|learning in the science classroom.

Adopting Sewell's (1999) notion of culture as an incorporation of practices

and schema enacted in fields that have no boundaries, allowed me to explore which practices and schema were transferred from the students' lived experiences into the larger classroom field, and vice versa.

In an effort to gain understanding of a variety of facets inherent to the American culture, I began to examine the concept of equal opportunity, and how it serves some more than the others. To assume that all individuals have equal opportunity to appropriate resources is misleading. This is because opportunities are often situated within institutions. These institutions delegate authority to different individuals: for example, if you're a teacher you have the keys to the classroom, or the password to the computer. These delegated authorities inscribe identity on these individuals. These individuals' accesses to structures are constrained by their social and symbolic capitals of various categorical sorts such as sexuality, immigration, and physical appearance.

In view of the structures present, in order to succeed as a teacher I had to alter my standpoint, and adopt multiculturalism as an approach to reach my students. I started by adopting Harding's (1988) argument that multicultural science education is an essential ontological and epistemological standpoint that values the students' cultural backgrounds. I asked my students to research the historical development of indigenous science. My goal in doing this was to help students to see themselves reflected in the history of science, rather than accepting science solely as a universal Western construct. These task-illuminated misrepresentations in the current scientific literature tend to devalue the students' indigenous knowledge, and value the Eurocentric main

culture. Adopting multiculturalism in science education proved to be invaluable in terms of building social capital amongst my students. My ontology started to evolve into a different entity that questioned: What is a scientist? What does it mean to do science and do it well? Who constructs these perceptions of science? What talents are we overlooking in our students, especially historically underrepresented minorities that may enable them to seriously contribute to the fields of science? Are there new ways of thinking about science that may showcase these talents? I felt that my role as a teacher is not only teaching my students science, but also exposing them to the current macro structures such as globalization and how they might structure their endeavors for better life.

Globalization and Education

The rise of the global economy has created structures that supported educational as well as socio-economic inequity throughout the world. Schooling has become a high-stakes process, with the potential to impart — or fail to impart — the skills needed in the rapidly growing knowledge-intensive sector of the global economy. Students that thrive in schools will be better prepared to penetrate the well-compensated opportunity structure; and children who fail will be locked out of this structure. Education could play a great role in ameliorating economic and social disparities, and provide the foundation for building a society that is inclusive.

Youth in school today, whether in Egypt, Canada, New York, or Puerto Rico will encounter a vastly different world from that of our generation. While they

might continue living in local realities, these realities are constantly being challenged and integrated into the larger "Global Village." The global transformations will require them to develop new skills that are far ahead of what mostly is being offered in today's schools. New and broader visions are needed to prepare the students to being an integral part of this changing world. Globalization's increasing complexity necessitates a new paradigm for learning and teaching. It will require individuals to be cognitively flexible, culturally sophisticated, and to work collaboratively in groups made up of diverse individuals. An education for globalization should therefore nurture the higher-order cognitive and interpersonal skills required for problem finding, problem solving, articulating arguments, respecting, and fostering multiple perspectives. This task is far from being easy, but it is attainable if we understand the underlying factors that shape our societal constructs.

Globalization and Cosmopolitanism

One of the desired consequences of globalization may have been to increase the interconnectedness between people, making us citizens of the "Global Village." In reality, humans had historically organized themselves, as nations, cities, and towns. These categories place these immigrants in a unique situation where they become the citizens of the world, "cosmopolitans." Being a cosmopolitan implies that the individual thinks that the world is his/her shared hometown, something that is disparaging upon tribalism. Theoretically speaking cosmopolitanism can be looked at as the creation of community that is theorized around sameness and differences. Theorizing cosmopolitanism

around differences as well as similarities makes it more inclusive, with moral solidarity as the glue that binds the participating stakeholders.

Appiah (2006) in his book *Cosmopolitanism: Ethics in a World of Strangers* states, "If we are to encourage cosmopolitan engagement, moral conversation between people across societies, we must expect disagreements: after all, they occur within societies." (p. 46). In a society that is constantly shifting demographically, differences should be expected, and it is our role as educators to figure out a way to include all the students and not only the selective few who choose to think in terms of the plural. To expect that all individuals should share a common goal defies the underlying principles of the United States constitution, with its implicit, as well as explicit respect for an individual's rights. These constitutional rights could be reinforced at the legislative end, and through educational practices that foster multiplicity.

The struggle for cultural alignment with my students became a challenge of how to navigate through the cultural fields without giving up my own core identity, and associated self-worth. Although immigrants choose to be in a new land, they will always have roots in their old country. These roots might act as an anchor that saves individuals from drifting in a sea of uncertainties, and sometimes it acts as a weight that drags them down and stops them from accepting their new land as the ultimate destination rather than a stop on the way to a better place. This better place becomes increasingly elusive as time progresses; and there will be always the question of what if I had not moved here. Through self-reflection I found that my roots acted as an anchor for me.

Whenever I experience self-doubts I go back to my previous experiences and reinstate my values of what really counts. Since identity is an evolving construct, my autobiography progresses with the phrase, "To be continued.”

CHAPTER 3

Identifying teaching practices that afford students' enactment and success in science education

There is always the potential of different understandings and therefore the potential for contradiction, because teachers *and* students who participate in cogenerative dialoguing, have different biographical trajectories. (Roth, W-M, Lawless, D. & Tobin, K., 2000)

My Challenges as a Science Teacher

As an Egyptian immigrant science teacher I have always struggled with a plethora of issues personally, and in my classroom, such as, democracy, justice, and competing ethical claims. As a new teacher at Astoria Intermediate School for Performing Art[12] I asked myself, "how can I address issues related to power differentials, especially social justice within institutional policies?" After all criticality is about power, building commonality, and allowing individuals the autonomy to make their own decisions. In order to achieve my goal I had to view education as a fundamentally political activity, and adapt my pedagogy to this notion.

Macro social forces such as, race, social class, equity and policy mandates construct our sense making process. They also, contribute to structuring our ontology along with the goals|motives[13] dialectical relationship. The demographics of the neighborhood, the school, and the classroom play an important role in resource allocations, and the educational policies

[12] Astoria Intermediate School is a pseudonym.

[13] In this study, I follow the suggestion of other researchers to use the Sheffer sign "|" for producing theoretical concepts consistent with a dialectical approach (e.g., Roth & Lee, 2004).

implemented. In my current school (Astoria Intermediate School) I experienced first hand how all these factors combine to shape the educational outcomes of my minority students.

The Neighborhood

Astoria Intermediate School belongs to the Queens Community Board, which is a local advisory group in New York City. It encompasses the neighborhoods of Astoria, Old Astoria, Long Island City, Queensbridge, Ditmars, Ravenswood, Steinway, Garden Bay, and Woodside, in the borough of Queens. Astoria is delimited by the East River to both the west and north, by the Brooklyn-Queens Expressway to the east, as well as by Northern Boulevard, the Long Island Rail Road, and Bridge Plaza North to the south. As of the United States Census, 2000[14], the Community Board has a population of 211,220, up from 188,549 in 1990 and 185,198 in 1980. The racial breakdown as of 2000 is 88,606 (42%) White non Latinos, 57,692 (27%) of Latino origins, 21,581 (10%) Blacks, 27,399 (13%) Asian or Pacific Islander, 475 (0.2%) American Indian or Native Alaskan, 3,099 (2%) of some other race, and 12,368 (6%) of two or more races.

The neighborhood is considered multicultural by urban standards. As of 2000, foreign-born persons accounted for 20% of the population, which was far above the national average of 11%. The percentage of students five years and older who were fluent in languages other than English, which is spoken at

[14] U.S Census Bureau**:** Information retrieved online on April 1, 2008, from the U.S Census Bureau Web site: www.census.gov/population.

home, was 28%. This value was 18% above the national average. As an Egyptian immigrant science teacher, this diversity has enriched the teaching and learning experiences in my classroom. Additionally, it has presented many challenges, one of which involves how to navigate diverse cultural fields successfully. These challenges have been augmented by macro structures, including the covert and overt implications inherent in the *No Child Left Behind Act* (NCLB) (2002) educational reform.

The NCLB as a Macro Structure

President Bush signed the NCLB education reform into law in 2002[15]. A major proposed goal of this act is to raise the academic performance of all students, and close the achievement gap that separates students of color and low-income students from their peers by the 2013-14 school year. Schools or districts receiving Title I federal funds, which are earmarked for needy students and go to about 90% of public school districts in the U.S., are subject to penalties if they fail to meet the benchmarks designed to close achievement gaps.

The NCLB accountability provisions indicate that beginning 2002; all students must be tested annually, in both reading and mathematics during grades 3 to 8 and once in high school. Students also will be tested in science beginning in the 2007-08 school year. States must break down test scores by

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[15] *NCLB: Promoting Educational Excellence for all Americans* (2002). Information retrieved online on May 15, 2008, from the U.S Department of Education Web site: http://www.ed.gov/nclb/landing.jhtml?src=pb

subgroup, including racial and ethnic minorities, non-English speaking, low-income students, and students with physical and learning disabilities. At least 95% of students in schools, and in each subgroup, must be tested. Schools also must meet goals set by their state for high school graduation rates.

According to NCLB, provisional test scores must improve each year in order for a school to demonstrate Adequate Yearly Progress (AYP). Schools and districts will be considered "in need of improvement," or failing AYP, if tests scores in any group fail to meet state goals for two or more years. Irrespective of whether schools miss any goals significantly, or marginally, all subgroups must meet all state proficiency goals in order to meet AYP. The number of students that pass state English Language Arts (ELA) and mathematics tests must increase every year until 100% of students are passing by the 2013-14 school year. States are allowed to offer alternative tests to 1% of students -- those who have the most significant cognitive disabilities.

The NCLB attempts to segregate data by racial and socioeconomic status fail to address the sociocultural component of education that has led to such an achievement gap. Pea (1993) argues that the current testing culture relies on the fact that intelligence is largely the property of the minds of individuals. The sole reliance on these periodic standardized assessments as a tool to evaluate teaching and learning tends to value individual intelligence over the collective, although individuals do not really work alone. That tests are not necessarily only measuring the individual’s intelligence, but are also a measure of the access to resources and appropriation of resources by

individuals. In actuality, the resources that structure the success or failure of an activity are dispersed in relationships across environments, and social interactions.

There are alternative methods that could be used to assess the students' academic progress, for example, project based learning. Teachers and administrators alike have to be aware of how the sociocultural background of the student constructs the individual's perception of science. Tobin (2007) argues that the use of everyday language in a science education context might lead to the emergence of science literacy among minority students, who feel alienated by the current educational practices. His standpoint is grounded in viewing science as a cultural enactment that is structured by practices and schema. Adopting such a standpoint would underscore an agency|structure dialectical relationship. This dialectical relationship represents a recursive relationship between the agency of the participating stakeholders and the structures of a field. Hence, the NCLB and its accountability provisions structure the urban schools' culture (i.e., practices|schemas), consequently, restructuring the agency of the participants.

The Accountability Provisions of the NCLB

The NCLB established the following accountability timeline for schools labeled "in need of improvement": after 2 years, schools must develop a school improvement plan, spend 10% of their Title I allocation on teachers' professional development, and allow parents to transfer their children to other public schools. Districts must decide which eligible schools will accept

transfers, and which students will be allowed to change schools. This policy aims at bridging the divide between racially and economically segregated schools by allowing low-income minority students and other minority students to attend integrated schools with higher achievement levels.

According to federal policymakers (U. S. Department of Education, 2002)[16], transfer policies should ideally create "more choices for parents of children from disadvantaged backgrounds" (p. 9). In region 4, where my school is located, the NCLB transfer provisions failed to provide academically challenged students with opportunities to move to schools with high achievement levels. Schools that were chosen to accept transfers were either high achieving overcrowded schools, so they refused to accept the students, or did not have substantially higher achievement levels, on average, than schools required to offer the NCLB transfer option.

The accountability component of the NCLB accentuates the fact that those schools, which are identified to be Title I, should undergo an annual accountability review. This review looks at the school's learning environment including information about the academic progress of the students by ethnicity, students' enrollment, and ethnic diversity among the students, average class size, and teachers' qualifications. The progress is assessed based on the how well the school makes satisfactory progress toward the goal of proficiency in the subjects of English Language Arts (ELA), and mathematics.

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[16] *NCLB:* NCLB and Other Elementary/Secondary Policy Documents. Information retrieved online on May 15, 2008, from the U.S Department of Education Web site: http://www.ed.gov/policy/elsec/guid/states/index.html

During the school year 2006-07, Astoria Intermediate School was in its third stage that meant the school has subsequently missed AYP for the same indicator that resulted in Stage 2 School Improvement for an additional year before exiting school improvement. The school also is required to notify the parents, restructure itself, offer school choice and provide transportation, develop and revise the school comprehensive action plan, and continue to work with a Technical Assistance Provider; such as Kaplan or Princeton Review (private companies that aim at addressing students' inadequacy on standardized tests).

After three years of failing to meet its AYP, the school had to provide eligible students with "supplemental educational services," which generally means tutoring. To meet this provision, my school was required to provide academic intervention programs to meet the students' academic deficiency on standardized tests. The teachers' union voted to allocate 38 minutes of small group tutoring at the end of the school day to accomplish this. It targeted students who scored between levels 1 and 2 on their ELA, and mathematics tests. Unfortunately, most of the students who were eligible to take advantage of this service did not show up for the tutoring services. The students had to pick up their younger siblings from the surrounding elementary schools, which meant that they could not stay for the after school tutoring.

The accountability requirements established by the NCLB structured what academic programs the school could offer, staff to student ratios, and even the allocation for tutoring programs. I argue that based on my personal

experience, the implementation of different provisions of NCLB at Astoria Intermediate School did not assist my students in ways that were most helpful, meaningful, and sensible. According to the U.S. Department of Education website[17], for an instructional program to be deemed as one that works it has to undergo an experimental / control group design to see if the method is effective in teaching children. This approach has a propensity to ignore the bias often encountered in scientific research. It also might ignore the symbolic and social capital (Bourdieu, 1992) that the students bring to the table and how they impact teaching and learning.

Fortunately, new inroads are being made through recent research in some New York City science classrooms, including those described in this dissertation. Specific instances of how urban students' capital mediates science learning and education in general, have begun to be illuminated through grappling with important notions involving cosmopolitanism, solidarity, globalization, and individual and collective agency (Bayne, in press).

My Experience at Astoria Intermediate School

The School

Astoria Intermediate School started as a performance art magnet school, with concentration on music, dance, and art classes. The purpose of this designation was to attract more of the White population from the surrounding neighborhood, thus influencing the racial makeup of the school, and making it

[17] U.S. Department of Education. Retrieved on 09/26/05 http://www.ed.gov/nclb/methods/whatworks/doing.html

more diverse. The school traditionally drew from a large population of Hispanic and Black students from Astoria and Ravenswood housing projects, with a small percentage of White and Asian students from the surrounding neighborhood.

According to 2006-07 the school report card[18] (New York City Department of Education, 2006) the student population is 815: 52% Latinos, 22% Asians and Pacific Islanders, 19% Blacks, and 7% White. The gender breakdown was 51% males, and 49% female, which is a typical gender composition of most urban schools in New York City. The annual attendance rate was about 80%, which is below the city average of 90%. Students' stability (Having been in the same school for a whole school year) as of 2004 was 92%, which was below the city average of 94%. The average class size in the school was 28 students, which is the same the city average.

Most of the students in the school came from conditions of economic hardship. The percentage of students eligible for Free and Reduced Lunch (FRL) as of the school year 2006-07 was about 84%, which qualified the school to have Title I designation. This classification provided extra funding from the federal government that could be used for after school programs, and to lower class size. Tables (1) and (2) provide information about the specific breakdown of students by ethnicity on eighth grade standardized tests during the school year 2006-07. The students' work is evaluated on 4 levels: level 1,

[18] NYS testing and accountability reporting tool. Information retrieved online on January 13, 2008, from the New York State Education Department Web site: https://www.nystart.gov/publicweb

which is work far below grade level; level 2 is work below grade level; level 3, which is work at grade level, and level 4, which is work above grade level. The students were promoted in June if they scored level 2 or higher on both the ELA and mathematics tests. For all students who scored in the level 1 range on either the ELA or mathematics test (or both), an appeal process provides for an automatic, mandatory review of students' work by the teacher.

TABLE 3.1

The math test results among grade 8 students by ethnicity

Ethnicity	# of students tested	Level1	Level2	Levels3+4
African American	54	40 %	40 %	20 %
Hispanic	136	37 %	34 %	29 %
Asian or Pacific Islander	62	23 %	29 %	48 %
White or other	30	40 %	30 %	30 %

TABLE 3.2

The ELA state test results among grade 8 students by ethnicity

Ethnicity	# of students tested	Level1	Level2	Levels3+4
African American	53	11 %	78 %	11 %
Hispanic	123	25%	50 %	25 %
Asian or Pacific Islander	50	2 %	50 %	48 %
White or other	28	7 %	71 %	22 %

By analyzing the data from tables 1 and 2, it is apparent that Black students represented the majority of those who scored levels 1 and 2 on the mathematics and the ELA exams. These statistics were significant because it was one of the benchmarks the school was evaluated on in its AYP, and at the same time it structured the academic decisions when it came to how to address the Black students' shortcomings on standardized tests.

The Schools' Learning Environment Survey

Recently, the New York City Department of Education (NYCDOE) introduced the Learning Environment Survey[19], which is a citywide survey of parents, educators and students on the effectiveness of the school system; 216,914 parents, 31,592 educators and 338,201 students responded. The Learning Environment Survey Report presents response rates and scores for each school, and for schools of the same school type Citywide. The Office of Accountability (OA) designed survey questions targeted specifically to improving learning conditions in New York City schools. The Learning Environment Survey results will be reported each fall in the School Environment category on the Progress Report. Each school receives a score for questions based on parent, teacher, and student responses to surveys. Survey questions are linked to one of four domains: Academic Expectations, Communication, Engagement, and Safety and Respect.

Individual question scores are combined to form scores for each domain.

[19] NYC office of accountability reporting tool. Information retrieved online on May 13, 2008, from the New York City Department of Education Web site: http://schools.nyc.gov/Accountability/SchoolReports/Surveys/2007survey.htm

Those scores appear on the Progress Report. Question scores are determined based on the answers that respondents selected. Each answer choice is awarded a point value between 0 and 10. The answer choice that reflects most favorably on a school's learning environment is awarded 10 points. The answer choice that reflects least favorably on a school's learning environment is awarded 0 points. Each question score is the average point value of the answer choices of all respondents to that question.

Domain scores are determined based on question scores. A domain score is calculated for each respondent group (parents, teachers, or students) by averaging the question scores in that domain. Then, the domain scores for each of the respondent groups are combined to form overall domain scores. Within overall domain scores, respondent group domain scores are weighted equally. To calculate scores for each question on the Survey Report, the percentage of respondents selecting each answer choice is calculated by dividing the number of respondents selecting each choice by the total number of respondents who answered the question. Respondents who left the question blank are not included in the percentages reported per survey question.

Astoria Intermediate School scored below the city average on every single domain. It scored 5.4 on Safety and Respect while the citywide average is 6.6, on Academic Expectations it scored 6.1, while the citywide average is 6.9, on Engagement the school scored 5.5, while the citywide average is 6.1, and on Communication the school scored 5.3, while the citywide average is 6.2.

Teachers' Responses

Seven items in this section were below the threshold of 6.7, thereby reflecting a negative view. By further analyzing the responses of the teachers, parents and students on the different items of the four domains, I found out that the teachers in the school felt that the principal did not convey a clear educational vision for the school.

The teachers responded to the question about the effectiveness of the principal communicating a clear vision for this school by strongly disagreeing, giving the item a score of 4.2. On the item questioning whether the school leaders let the staff know what is expected of them they assigned a score of 5.1. On the item questioning whether the principal places the learning needs of children ahead of other interests they gave it a score of 4.4. On the item discussing whether the principal is an effective manager who makes the school run smoothly they gave it a score of 3.2. On the item addressing whether the school leadership delineates clear academic expectations of the students, the teachers responded by giving it a score of 4.6. On the item labeled principal visits the classrooms to observe the quality of teaching; the teachers assigned it a score of 4.4. On the item dealing with whether school leaders provide regular and helpful feedback about teaching, the teachers assigned a score of 3.9. On whether the school offers the necessary professional development, the teachers assigned a score 4.3. Any score below 6.7 reflects a negative view.

Three items in this section were below the threshold, thereby reflecting a negative view. The teachers' feelings about the effectiveness of the school's

leadership matched their feelings about the school not providing a safe environment that nourishes teaching and learning. For example, on an item addressing whether order and discipline are maintained at the school the teachers assigned a score of 2.7. On the item questioning whether teachers can get help at the school if they face discipline issues, the teachers assigned a score of 3.6. On whether crime and violence are a problem in the school they assigned a score of 4.3. On an item questioning whether students are respectful to the teachers, they assigned it a score of 3.4. Any score below 6.7 reflects a negative view.

Three items in this section were below the threshold, thereby reflecting a negative view. The teachers felt that there were conflicts at the school based on race, culture, religion, sexual orientation, gender, or disability. They assigned a score of 4.6 to the item that dealt with issues related to diversity. Any score below 6.7 reflects a negative view. They assigned a score 4.4 to items that addressed whether students who achieve good scores are respected by other students.

The teachers also had a negative view of the parents; they felt that the parents were not involved enough in their children's lives. On an item questioning how often they receive information about student's learning that was offered by a parent they gave the item a score of 1.4, corresponding to a scale score of just above seldom.

The Parents' Responses

Six items in this section were below the threshold, thereby reflecting a negative view. The parents placed the blame for the lack of curriculum rigor on the teachers. They assigned a score of 3.3 on an item questioning whether the school was communicating information on how parents can help students learn at home. On an item that dealt with whether the school sends written information to parents on what the teachers were teaching and what students were expected to learn they assigned it a score of 2.8.

The Students' Responses

In responding to the survey, the students felt that there were not enough opportunities to talk to the teachers about problems that they were having in the classroom. Under the domain of safety, when the students were asked whether they felt that the other students treated the teachers with respect they gave that item a score of 3.9. Any score below 7.5 reflects a negative view. On an item that questioned whether the students helped each other they assigned it a score of 3.5; On an item that dealt with the school culture the students felt that other students just looked out for themselves, disrespected other students, and liked to put other students down they gave these two items scores of 4.5, 3.5 respectively. They felt that the adults yelled at students, and did not intervene when students got into physical fights.

The results of the Learning Environment Survey indicate that teachers placed the blame for this state of affairs solely on the administration for poor leadership, and the parents for their lack of educational guidance to their

students. Teachers also note a lack of guidance from the school's administration and a system that permitted urban schools to be governed by a business model. In striking contrast, the students placed the blame for the inadequate state of their affairs in their school squarely with teachers and administrators who maintained a mandated curriculum perceived by many students to be a complete waste of their time. The learning environment survey exposed a systemic failure in communication that the school experienced. None of the participating stakeholders took the effort to sit with the others and try to figure out how things could be better. Like other schools, they were trapped in a vicious circle constructed by meeting the educational reform mandates.

Educational Tracking

Much of the research in urban education is built on deficit perspectives of the school systems, the teachers, and the students. For example, the NCLB provisions underscore the fact that scientific knowledge can be demonstrated only through achieving on standardized tests. This assumption is misleading, because it deemphasizes the different modes of learning. Not all students can perform well on standardized tests. The NCLB became a macro structure that permeated through the different social settings, such as the school, and the classroom. Students who failed to achieve on these standardized tests ended-up being stigmatized as underachievers.

Unfortunately, some educators have sanctioned this view as well. On the

cover of the spring 2006 “American Educator” magazine, which is a publication sponsored by the American Federation of Teachers (AFT), the following statement appeared: “We know that poor children enter school with far smaller vocabularies than their more affluent peers… if we do not interfere early to build that background knowledge and vocabulary, it is unlikely that reading scores will rise.” A view loaded with deficit representations of students who experienced socioeconomic hardship, who normally end-up needing academic help as a result of so many macro social forces such as, socioeconomic, resource allocations, and the quality of teachers assigned to teach in their schools. This view fails to value what minority students already know and possess, and concentrates on what they lack in order to be streamlined into the main culture. It tends to blame the students’ immediate environment for their lack of these skills, rather than the educational practices that created such disfranchised groups of students.

To address the academic shortcomings of the students at level 1 and level 2 on the statewide ELA, and the mathematics’ test scores, the school’s administration made the decision of dividing the students into two educational tracks, based on their scores on the state standardized tests. The students did not have the optional mobility between academic tracks, which means they could not attend classes with the upper tracked classes.

The rationale behind tracking these students was to allow the teachers to differentiate the lessons to their ability level. The school administration believed that clustering the students according to their academic achievement

would actually contribute to elevating the students' self esteem, since the students would compare their work only to students of similar educational abilities in the class. They also felt that tracking should encourage more students' participation, since a commonly held notion is that tracking minimizes the intimidation associated with giving the wrong answers in front of high-ability students (reference for this). In terms of the eighth grade science curriculum the fast track group learned the Regents Earth Science curriculum[20], while the lower track group ended up learning a scripted spiral curriculum that teaches to the Intermediate Level Science Examination (ILSE), which is the eighth grade New York State science test. In fact, the science text chosen for this group was a test preparation text.

The Impact of Educational Tracking

These assumptions did not materialize in higher achievement among the students in the lower track, because of the diverse educational needs of the students. Some of the students were learning disable but either misdiagnosed, or not diagnosed at all, and others experienced a difficult socioeconomic. This facts defied the original assumption of creating a homogenous class where the students' academic needs could be met. The problem associated with students' tracking is that it becomes conjoined with a form of low symbolic capital; they get stigmatized as being underachievers. McDermott (1993) states, "If a particular kind of learning is not made socially available, there will be no learning to do" (p. 277). In the end the students assigned to these low tracks

[20] http://www.nysedregents.org/testing/hsregents.html

lacked the necessary information needed for them to pass the ILSE as outlined in the New York City Department of Education (NYCDO) pacing calendar.

The Role of Culturally Informed Pedagogy

As part of my quest to better approach my students, I attempted to employ empirical research utilizing the communal learning construct (Seiler, 2002), which suggests that culturally informed pedagogy enhances academic performance for African-American children. This research became central to my study because although Astoria Intermediate School had a diverse student population, most of the African American students were disproportionally placed in the lower track classes, which I was assigned to teach.

As I moved to the school's vicinity, I started to have daily contact with my students and their parents. These social interactions became a viable tool in building my social capital in the school. My students felt that since I became part of the community, I must have a better understanding of what they go through on a daily basis.

This notion of understanding the students' realities came to the test when I asked them around Christmas time if they believed in Santa Claus; one of the students responded by saying! "Come-on Mr. Shady. Imagine a fat White old man wearing a red suit, trying to sneak in the nonexistent chimneys in the housing project on Christmas Eve; carrying a bag that everybody knows might have toys and gifts! What are his chances of making it alive?"

Her question woke me up to the reality of living in the housing projects. For

them, being resilient against all odds, and surviving every day transactions took precedence over everything else. Although, I might have shared the same space physically with my students, mentally I was miles away. These instances and others like them shadowed my impressions of what my students' educational potential, and made me focus on the negative aspects in their lives. My attempts again focused on how I could make their lives better through education, and mentoring.

The Culture of the Classroom

When I started teaching at Astoria Intermediate school I thought of myself as a competent and resourceful teacher who had seen the worst of conduct. For the first few years, I was assigned the top classes, where I was used to taking charge and living up to my own high standards, where I had an average of 90% passing on the Earth Science Regents Exam. During the school year 2006-07 I was assigned to teach an inclusion class, which was designated a low-tier class, by the students and the types of text used. The class had 14 students, which is far below the school's average of 28 students. The attendance did not exceed 50-70 % on any given day, which is far below the school average of 80%. All of the students in the class scored between level one and level two, on the ELA, and the mathematics citywide tests in grade seven. The racial makeup of the class was 60% Blacks, 33% Hispanics, and 7% Whites. In comparison to the rest of the school the proportion of the Black and Hispanic students in the class was relatively high.

My class was composed of low-income, minority students by the sheer

number of students who ere eligible for free lunch, while the upper track classes were composed of relatively high achieving students and socioeconomically advantaged groups. My students had few social interactions with the other students in the upper tracks. They were by separated by race, ethnicity, and socioeconomic experiences. The upper tracked classes had fewer number of minority students. They were composed mainly of Asia, or White students. The class was part of a small learning community within the larger school setting that emphasized world culture as a symbol for cultural diversity. Through my conversations with the students I discovered that they had very little exposure to foreign cultures. Hence, understandably they had limited tolerance to cultural differences. The students in this class formed camaraderie with other students in the class that was structured by shared experiences in the school, the class, the street, and Astoria housing project where most of them lived.

For the students in this class the stigma associated with being part of the low-track was obvious, it structured their feelings of helplessness. They felt that the macro social forces that they had no control over, such as socioeconomic and social class, mediated their destiny. The students felt that they were treated differently from their higher tracked counterparts. The students in the high track felt elitist, they made fun of the students at the low track calling them names, they went on trips, and were rewarded by their teachers constantly. On the other hand, the students in this class were penalized constantly for their misbehavior. Their teachers banned them from going on

trips. The students in turn had few incentives to follow directions, or listen to their teachers.

I still remember how my assistant principal looked at me when I told him that I would like to take my students in the inclusion class on a trip to the Bronx Zoo. He asked me if I was going be responsible for their conduct. And when I questioned him, “and how do they behave?” He stated, “not the way that they should.” This vague answer definitely intimidated me. I decided to play it safe, and did not take them on the trip. From a social justice stance my decision was not fair; these students deserved more exposure to cultural institutions.

My experience in this class was difficult, I found myself investing so much effort in discipline that I didn’t have time to teach. Nothing I tried seemed to work. The students appeared so distracted that they could barely follow my lessons, they seemed disorganized, and were often disrespectful to me if I tried to reprimand them for not doing their work. These misbehavior problems exerted a heavy toll on me. I struggled to find successful strategies for managing disruptive forms of enactment. I made the common mistake of responding to my students’ misaligned practices, based on my expectations rather than the motivations behind such acts.

Collins (2004) argues that successful interaction rituals (IRs), among individuals of a somewhat equal power differential can result in collective effervescence for most people who are present and result in the solidifying of a status group. If these cultural practices continue over a long period they can

become IRs. According to this interpretation, social interactions in science classes may contribute to a sense of group membership and solidarity with others present, or may instead lead to a lack of solidarity. If they contribute to an increase in solidarity an increase in positive emotional energy (EE) can accrue, while if the social interactions lead to the development of lack of sense of group membership negative EE can accumulate. What is the point in telling the reader this if you are not going to address it?

As a teacher I clung to cultural practices that were perceived by my minority students as disrespectful; such as constantly reminding them that their behavior does not constitute what I perceived to be acceptable, or that their use of science arguments were invalid because they did not use canonical knowledge in making their arguments. Although my intentions were actually to help them make the crossover to the mainstream culture, my cultural practices led to the buildup of negative EE in the classroom. It was very hard for me to give up control as a teacher, and I attributed this to my cultural background and an image of a good teacher being somewhat of a father figure whose sole responsibility was to direct his children into a safe harbor.

My teaching experience in Egypt became a reference point that did not help me to adjust to the culture of the students and provide the structure needed to expand their agency. To make matters worse, my students had a hard time understanding my Egyptian accent. The learning environment in the class was dysfunctional from my standpoint. I did not have the tools to construct and maintain a productive learning environment.

Like most teachers, I failed to recognize that my students spent years learning a gamut of practices for connecting to the world. Some of these practices were incongruent with classroom teaching and learning. However, when the students initially developed these responses, they may have been efficient in building solidarity with their peers. In any case, these behaviors became part of their habitus, a well-practiced routine. I should have taken into account that altering such counterproductive conduct would require a collective effort from the participating stakeholders that is structured by the goals|motives dialectical relationship.

Tobin (2006 b) notes that conventional wisdom about good teaching has focused on teachers controlling students to keep them orderly, and maintain relatively quiet classes. This myth of *control over* fosters cultural practices that might be interpreted by the participants as disrespectful. When this occurs, struggles for *power over* can arise, reduce the quality of learning environments, and set the stage for teachers to be judged as ineffective. Teachers need time and face-to-face experience to adapt their teaching to the cultural capital of urban youth. Similarly, urban youth need time and face-to-face experience to adapt their cultural capital to teachers across the boundaries of age, race, and class.

Cogenerative Dialogues

The resistance tactics that I experienced with this class (patterns of coherence) disrupted teaching|learning in the classroom, and provided an opportunity for

the use of cogenerative dialogues (cogen) (Tobin, Roth & Zimmermann, 2002). In the cogen sessions, participants (e.g., students, teachers, university researchers, and sometimes administrators) make every effort to convene as equals with the goals of identifying patterns of thin coherences, and the associated contradictions. By seeking the students' perspectives in the cogen there is a probability of having them identify malpractices and shutdown techniques that I used intentionally or unintentionally to control them. The cogen sessions represented an opportunity for the participating students to have a voice, and be able to change oppressive structures.

The use of cogens also provided a chance for the participating stakeholders to learn the importance of group membership on developing a new culture that values and supports diversity. The participants in cogens shared responsibilities for what not only happens in the cogen but also for what happened in the classroom. The intended outcome of cogens was to create a feasible action plan that brought to the forefront the stated intentions of improving teaching and learning.

Involving Students as Researchers

The use of students as researchers provided me a way to obtain their perspectives on what was salient in terms of school, teaching, and learning and myriad other issues. Having collectively identified foci for research, they provided insights into what was happening and why it was happening, in terms of patterns of thin coherence and contradictions. Their roles varied between identifying, critically discussing, and analyzing video clips that were

salient to our research, and interviewing their peers (Tobin, 2006 c).

Initially I started cogens with a large group of students, hoping to include as many voices as possible. This practice did not produce a positive outcome. The participating students got involved in side altercations that highlighted their cultural and socioeconomic differences. They made fun of each other's clothes and skin color. I spent my time during these cogen sessions mediating cultural differences (skin color, and socioeconomic status), but my efforts were in vain. Intolerance to differences was so ingrained in their psyche that I decided to downsize the cogen group into smaller groups of two students.

Selection of Participants

In the selection of the two students from stakeholder group (the class), I used a process that involved the use of opposites. I did not use random selection. The participating students in the cogen, Star, and Steve[21], were chosen purposefully based on the contingent selection advocated by Guba and Lincoln (1989) in *Fourth Generation Evaluation*. Their perspectives were judged to be worth knowing and of value to the research. I initially selected Star because she was very critical of my teaching. Having selected Star, I then selected Steven, who was as different from Star as possible.

Star is an African American female, who struggled academically in science, and the other subjects. She tended to be confrontational, and physically aggressive. Accordingly, she got suspended more than once during the school

[21] Pseudonyms

year 2006-07. Steve is an African American male student, whose academic performance has fluctuated, depending on his moods, and family situation. He gets episodes of extreme emotional and physical withdrawals, where he puts his head down, and refuses to participate in class discussions. Both Star and Steve lived in the Astoria housing project, and experienced socioeconomic hardships. I met with Star and Steve either during the lunch periods, or after school twice a week. During the cogen sessions I tried to make every effort to remove any spatial configuration that tended to reproduce power. For example, I sat next to the students on the lab benches rather than at my desk. I started my meetings by clearly stating the rules, such as no one voice is privileged, and respect among the stakeholders should be prevalent at all times. As I discussed the challenges that I encountered in the class with my mentor Ken Tobin, he suggested that since cogens were part of my usual professional development routine I should start doing research in my classroom to ascertain if and how they were making a difference to teaching and learning.

The Research

The research focused on developing a better understanding of teaching and learning. Using what is learned to create and sustain improved learning environments. Initially the videotaping and associated analyses were not done for research purposes, but with the goals of improving learning environments. Even so, the students and their parents or guardians had to give their permission to be videotaped using the standard consent, and assent forms

employed by the NYCDOE. This experience became invaluable because it allowed the cogen team to focus on the priority of student learning. This fact was highlighted in my IRB proposal since the research did not require a significant change to the practices already approved by parents/guardians, school and district.

My perspective on obtaining approval for undertaking research with human subjects was guided by the Belmont Report (1979), which is entitled *Ethical Principles and Guidelines for the Protection of Human Subjects of Research*. The report addressed three general principles: respect, beneficence, and justice. The report emphasizes that the research should respect human participants by maximizing their autonomy to make choices about their participation, that there is a balance favoring the benefits associated with being involved in the research compared to the harms from being involved, and that the research should maintain high ethical standards, especially in regard to social justice.

Methodology

As a teacher/researcher I had to focus on the unfolding production of teaching and learning, and to the extent possible on the relationships that are central to my research, such as agency|structure, individual|collective, and practices|schema. The research conducted was an authentic ethnography that aimed at capturing segments of the stakeholders' social life. The research employed autobiographical reflection, the sociology of emotions, and cogens as tools for examining how social and historical dimensions of the

participating stakeholders structured teaching and learning in the context of science education. Incorporating microanalysis of the collected data(video, and audiotapes) with authentic ethnography placed a strong focus on transactions of participants with resources. The methodology presented in this chapter is grounded in sociocultural theory, and an ethical standpoint guided by the principles of the Belmont Report.

Authenticity Criteria

In conducting my research I used the four criteria advocated by Guba and Lincoln (1989), as a safeguard measure for qualitative research, to ensure the dependability of the study being conducted. These safeguards are the equivalent of the validity process necessary for quantitative research. The processes emphasize that educational research with human subjects must benefit those who are involved in the study and that researchers have a responsibility to those who are involved in the study that benefits are not realized only in the future, but will also lead to improvement as the research is enacted.

Criterion 1: Ontological authenticity

This authenticity criterion relates to the ways in which participants in the study alter their perceptions of the nature of social life, as it pertains to the research foci. The role of the researcher is to document these changing perceptions. Tobin (2006 c) notes that one way to do this is to undertake auto/ethnography and dedicate a significant part of the writing of a study to

the documentation of changing ontologies and making sense of such changes in relation to what is learned from a study.

Criterion 2: Educative Authenticity

In a process of informing stakeholders about what is learned from a study it is important to educate each stakeholder group about the different stages of a study, what is learned from the different stakeholder groups, assisting them to understand the patterns of coherence and contradictions.

Criterion 3: Catalytic Authenticity

Researchers have an obligation to educate all participants in ways that afford improvements in regard to what is learned from the study. Accordingly, to the extent possible, situations of disadvantage, inequity and oppression are addressed in ways that expand the collective agency of stakeholder groups. Hence, the results of the study are expected to change over time as adjustments are made by stakeholders to create and sustain environments in which all stakeholder groups can meet their goals.

Criterion 4: Tactical Authenticity

Researchers have an obligation to help those participants who are unable to help themselves. That is, the researchers would provide additional structures for those individuals for whom the efforts to educate them and catalyze worthwhile changes were not enough. The four criteria should be demonstrated at all times. They are dialectically interconnected.

Data Sources

As part of the research, I drew on a variety of qualitative research methods appropriate in the school contexts, including authentic ethnography, and conversation analysis with its associated gestures. In addition to field notes, I videotaped, and audiotaped the class and cogen meetings. All relevant videotapes were digitized to make them available for analyses using iMovie. The software allowed the research team (cogen group) to slow down, or speed up the recorded frames, to capture interactions at the microlevel that might have been overlooked in the real time. The cogen group viewed the videotapes, both individually, and collectively, with intent of capturing the most salient episodes to our immerging questions. The videotapes were transcribed using the conventions of conversation analysis employed by Roth[22] (2005). As a team we made sense of the data collected by analyzing individually, and collectively. We analyzed the data at multiple levels to understand and generalize our findings.

In order to make sense of the data resources it was important to answer two main questions of interpretive research, namely, what is going on here? And, why is it happening? Throughout my research I viewed teaching and learning as cultural enactment, a dialectical relationship between sets of practices and

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[22] 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 arrows indicate shifts to higher or lower pitch in the immediately talk; ↑↓ 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; (.)—noticeable pause of less than 0.10 s

schemas (Sewell, 1999). This standpoint allowed me to adapt my methodology to search for patterns in social life that have thin coherence and are interconnected with contradictions. The purpose of the research then was not to explain away the contradictions, but to understand them as an expected part of social life. The identification of contradictions can become foci for possible change, as can the identification of patterns of coherence.

As I learn from the study I make sure that I have sufficiently compelling data to support the patterns of coherence and the associated contradictions. Tobin (2005) notes that one idea is to identify the contradictions and either reduce their rate or if the contradictions are advantageous, increase their incidence. Of course in enacting a change, additional contradictions will be introduced and these may also have to be foci for cogenerative dialogue. Through succeeding interactive dialogues, agreements can be reached on whether or not changes need to be made. Video vignettes are used to establish a shared focus on what is to be done, one that is collectively owned. In addition, each participant should consider his or her role in enacting what has been agreed, thereby taking advantage of the social fact that individual roles are interconnected dialectically to the collective roles of participants.

As the teacher/researcher I incorporated Roth's (2005) notion of the dialectic figure|ground relation. This reflexive relationship requires researchers to know the places of significance for the stakeholders well enough so they can reliably interpret the data. Roth argues that some articles become relevant as figure that stands against a more or less diffused ground. What represents figure

relies on an individual's past experiences, as well as current goals and objectives. Accordingly, I had to be conscious of how my cultural, socioeconomic, and lived experiences played a role in construing a value on the different pieces of evidence that supported my claims. To offset the possibility that my background would distort my views I made sure I used the techniques of peer debriefing (relationship with independent colleagues without interest in the local situation), and member checking (validation of situation description by research participants) for ascertaining the reliability of the research's findings (Guba & Lincoln, 1989).

I also applied Collins' (2004) theory of Interaction Ritual Chains in order to examine the circumstances under which IRs developed in the classroom and the conditions under which solidarity evolves and how to sustain it for long periods of time. The broad research questions: what is happening? And why is it happening? Evolved into the following more specific questions, which focused the study.

1. What practices do students enact when they encounter unfamiliar culture?

2. What emotions do students display when interacting with culturally unfamiliar participants in the science classroom?

3. To what extent is the culture produced in cogens enacted in the classroom and vice versa?

The Penny Lab

Like most teachers I felt that I had to cover the state and school district

standards and so I worked from them to plan a lab centered approach that would cover these mandates. In accordance with my usual practice I would normally discuss the labs in advance with my cogen group. One of the ideas that I suggested to the group was the penny-lab. In this lab I asked the students to find out how many drops of water a penny could hold, and to identify the variables that might influence the number of water drops. For example, the size of the dropper, the distance between the dropper and the penny, and the force applied to the dropper. The class was then supposed to share their results, and identify the results together. I went over the specifics of the lab with Star and Steve.

As the bell rang, signaling the beginning of the period, the students came into the room. I explained the lab and asked them to proceed. Although the activity was discussed with the cogen group in advance using inquiry as a basis of learning, the unit was built around teaching the students how to identify the different variables that might affect the outcomes. This became apparent in the students' responses during the lab; they were confused about exactly what I asked them to do. They appeared perplexed. About 10 minutes into the lab Star started splashing water in one of students' faces. Within a few moments, the whole class ended up participating in a water fight. All my attempts to stop the chaos were futile, so I just sat at my desk fuming, contemplating how my student researchers, out of all the students, could have done this to me. I felt that this was a behavior that was uncalled for so I decided to address it right after class. I asked Star and Steve to come for a cogen session.

My intentions were clearly to address the preceding mayhem, and to make sure that this situation was not about to repeat itself. I started the meeting by asking Steve about his progress in science. At that point I knew that he was not doing well from the work that he has been turning in. To my surprise Star interjected and said no, as a matter of fact he does his work, and Steve agreed with her. I was disconcerted. How can these students look at me with a straight face and tell me that everything was OK? In attempting to understand what happened I referred to the video clip.

In Episode 1 and in subsequent fragments I refer to myself as Shady, which is my last name.

Star is smiling and looking at Steve, while I am trying to find out why he has not been turning his class work

Fig. 3.1. Cogen session about what happened in the penny-lab, Star (left), Steve (right) and me (center) in the beginning of the cogen session

Episode1

1. Shady: so steve↓ (1.3) there are couple of things that I want to talk to you about ::first of all, I noticed that after being interested in science, (1.5) lately you have been having your head down again, and not paying attention. (1.7) is there any reason behind that?
2. (2.0)

3. Steve:(2.8) h::mm*((*he is looking at Star, and smiling*)*
4. Shady:*((*I turn my head towards Star and direct the question to her*))*
   ↓have you noticed that?
5. Star: =no↑ *((*she looks at Steve, and smiles))
6. Shady: =the reason I am saying this↓
7. Star: [he do his work↑]
8. Shady: so:: you think you're better now?
9. Star: [better::I think so↑] ca:::use he usually say sure, good when he does his work
10. Shady: =so:: how are you doing in your other classes? ↓
11. Steve: huh? ↓
12. Star: =better↑
13. Shady: *((*I turn around and ask Star*))* is he doing better?
14. Steve: =I don't know↓
15. Star: [I ↑think so]

The following episode is about one minute into the vignette; its effect is one in which Star managed to appropriate speech patterns such as, pauses, and sound pitch as resources to meet her goals. This became apparent through her interjections, with the associated higher pitch in her immediate talk (turns 5, 7, 9, 12, and 15). As the meeting progressed, negative emotional energy started to build up. I used interrogative speech patterns, I used utterances such as what, , when, how, and why as it is apparent in (turns 1, 4, 8, 10, and 13) that positioned the participants on the defensive. There was a clear cultural misalignment represented in disproportionate turn taking. I spoke for longer turns than the other participants, and more often (6 turns out of 14) About ten minutes into the conversation, I decided to switch the topic from talking about Steve's progress to discussing Star's progress with the purpose of getting a hint into what happened during the above-mentioned lab.

While I was talking to Star, my face was turned to her while she avoided me by looking at the pole, while Steve stared down, most of the time showing no interest.

Fig. 3.2. Star is talking about her home life, while Steve is staring at his hands

Episode 2

16. Shady: how about you Star? (1.7) what is going on?:: you have been driving me crazy lately
17. (2.3)
18. Star: everybody↓
19. (2.3)
20. Shady: what's going on? ↓ (1.3) do you want to tell me about it? ↓(2.5) are you upset at something?
21. (3.6)
22. Star: h::mm↓
23. (2.5)
24. Shady: are you upset with something that I need to know about?↓
25. (3.4)
26. Star: i was↓
27. (2.5)
28. Shady: at me or at something else↓
29. Star: [something else↓]
30. Shady: [and you decided::to make me pay the price? ↓]
31. Star: [no-everybody pays the price]

Although Star responded to my questions about her conduct in a fading voice that she has been angry lately with everybody. She was in control of the conversation by utilizing the pauses as resources. The episode was imbued with negative emotional energy, as it is apparent in discernable pauses (turns 16, 17, 19, 20, 21, 23, 25, and 27). There are speech patterns between the

turns. For example, I spoke for longer turns (16, 20, 24, 28, and 30) than Star, and Steve. I continued questioning them in a format similar to the interview, where I used utterances such as "what," which is followed by Star's response. I did not know what the conversation might lead to, but it was definitely slipping towards Star's home life, as it is evident in the pauses, and utterances such as h::mm, where she confessed that she was experiencing physical abuse at home.

As the conversation continued I began to feel weary. I promised my students that what happens in the cogenerative group stays within the group, but at the same time, under the *Child Abuse Prevention Act* of 1985, I am a mandated reporter. I asked Star if she reported the incidents to the proper personal. She said, "no." At that point I felt the importance for what happened in the penny-lab diminished in comparison to what she had told me. I encouraged Star to report the incidents of abuse to the guidance counselor. The guidance counselor and the principal in turn reported the incident to the proper authorities based on Star report.

The Children Welfare Services investigated the situation in her home and opened an abuse case, placed Star in a foster home where the mother was not allowed to get in touch with her while the case is being investigated. In a subsequent meeting I asked Star to write afterwards why she shared her situation with me. She wrote, "I felt good about telling Mr. Shady what had happened because I felt like I can trust him. He is the only teacher I can talk to about my life and how I feel when I am in the house. When I spoke to Mr.

Shady I felt good, relieved." It made me feel good that I helped Star better her home life situation.

Peer Debriefing

Once a week I participated in a scheduled meeting of the larger research group at my graduate school. Usually each participant in the group was involved in his or her own research, and we came together to discuss what we were learning. The purpose of these meetings was to enrich a study through the critical insight of peers.

I took my vignette to the research meeting to argue for the ethical dimension of the cogen, and the role of the teacher/researcher when he or she encountered issues that required reporting. My mentor Ken Tobin suggested that I would follow the protocol required by the board of education, but I should reconsider my methodology. He stated that from the vignette it appears that there is a cultural misalignment between the participants in the cogen group. A one-on-one cogen might be a more appropriate methodology for the participants to talk over age, race, ethnicity, and social class. As I discussed the vignette further with the rest of the research group members at the graduate center, my colleagues mentioned that it was obvious the girl was "playing" me, since she got the boy on her side by claiming that he was doing well in school (episode 1). They proceeded to say that obviously there was a cultural gap between the students and me, which became apparent when I missed their cultural cues (Star looking at Steve, and backing him up when I quizzed him about his science work in Fig. 3.1).

In the next episode the cultural gap became even wider as it was expressed in the number of discernable pauses, the voice intensity, and speech pattern. I have always acknowledged that there were cultural difference between the students, and me. My actions and the structures that shape these actions were mediated by a combination of our past experiences with the social, cultural and economic relations we live within. Although I might not have liked my peers' critical comments it allowed my research to progress. I was learning from their perspectives.

By adopting the third person objective perspective the cultural gap became apparent. In my first analysis of the vignette I was too emotionally invested to even consider other possibilities. I was still in the first person subjective mode, an approach that shielded my interpretation of the events. Reflecting back on this cogen session I found that my transactions lacked fluency. They were not timely, anticipatory or appropriate. There were inherent contradictions between my understandings of the role of the teacher as a knowledge imparter and how I was expecting my students/researchers to act. I expected Star and Steve to act as coteachers.

By further analyzing the vignette I noticed that as I went to the meeting, rather than treating the participating students with respect and making every attempt to remove power differentials, I took on the role of a teacher whose students have failed his expectations. This standpoint led to the production of power disparities among the participants, thus supporting the development of negative emotional energy. For example, avoiding eye contact and body

language, as it is apparent in Fig.3.1, and Fig. 3.2 as the session proceeded; the home-life became the driving force as well as an escape route for the participating students from a cogen session going badly. During the cogen session the ethical dimensions of the conversation became far more important than the success of the cogen.

The physical features of the lab also played a role in distorting my attention to details. I can only conduct the cogen meeting by sitting next to one student while facing the other. In this particular vignette, as I sat next to Star, I failed to recognize the verbal cues between her and Steve Fig. 3.1. Only later through microanalysis, such transactions became apparent. In addition, my sympathetic emotions towards their home environment moved to the foreground, while their potential to survive, and succeed in life in general receded to the background, and became more diffused. Roth (2005) argues that the researcher's past experiences, and his or her current objectives and intentions restructure the dialectical figure|ground relation from a researcher perspective. My historical, as well as cultural background has definitely influenced my analysis, as well as my observations. The initial development of negative emotional energy in the meeting was the result of me trying to establish a power differential to meet my goals of reprimanding my cogen students. These cultural practices were perceived by the students as disrespectful.

Learned Lessons

Because of increasing diversity of the student population and the shortage of science teachers, a study that tackles the impact of cultural and social boundaries becomes vital to teaching and learning in the American educational system. This study points to several implications for helping science educators in developing and advancing democratic practices within the science education context. Overtime, it is anticipated that participating teachers will develop a new dimension that scaffolds science education for democratic citizenship. By examining the emergence of growth, and development through cogens, teachers, together with students, should be able to create an alternative space to build a collective framework that informs teaching and learning standards, practices, and citizenship.

As an Egyptian immigrant science teacher I used cogen not only as a methodology to navigate cultural fields, but also as a field where interstitial culture was produced. Cogens provided me with the space, and time to produce a better understanding of my students' cultural capital and they got similar opportunities to learn about my culture. The cogen provided me with the face-to-face transactions to adapt my teaching to the cultural capital of my students. Similarly, the students needed the cogen experience to adapt their schemas and practices to mine.

The research results indicate that cogens became sites for the production of new culture that intended to expand the agency of the participating stakeholders and were oriented toward success. These new understandings and

sensibilities that unfolded in cogens resulted when I engaged in conversations about daily practices with my participating students. These conversations aimed at producing a culture of shared responsibility within the classroom. Because fields have no boundaries, some of these new skills and practices get reproduced, and transmitted in the classroom and in other fields. Hence, the participation in cogens gave rise to a culture of improving teaching and learning of science.

Policy Implications

Foreign trained teachers should undergo a continuous system of cultural training, early coursework, clinical experiences, induction, and career pathways. This support should take place through ongoing professional development that includes using cogens as a methodology that address patterns of coherence and the associated contradictions. Those who enter the profession from other science careers (as I did) need opportunities to link their professional knowledge and experience to the knowledge base in teaching and learning and the realities of working in classrooms. These insights become even more critical as the challenges of globalization create a growing tension between local and global cultures.

CHAPTER 4

Restructuring Cogenerative Dialogue: One-on-One Cogen

> Taking time outs to figure out how to interact successfully with others can be detrimental to collective outcomes and it is for this reason that it is important for all participants to be knowledgeable about others' capital and how to interact adaptively. (Tobin, 2006, p.249)

The accounts in this chapter evolved as a result of my effort to deal with a major problem that faces immigrant science teachers as they attempt to teach in inner city schools. The problem arises from the cultural gap between the teachers that mainly foster a positivistic middle class ethos and those of their inner city students. This cultural breach is often larger for students of socioeconomic hardship (Roth, Lawless & Tobin, 2000). As an Egyptian immigrant science teacher I experienced this cultural gap on numerous occasions, but it appeared to be more profound when I taught students who had been tracked into classes with lower academic achievement. These failed interactions afforded me the opportunity to do research in my school using cogenerative dialogues (i.e., cogens) that aimed at helping me navigate the cultural fields, and improve teaching and learning in my classroom.

In this chapter I explore how the design of cogen session in an inclusion low-tired class structures the outcome of cogen. In a commonly structured cogen, multiple realities, voices, and discourses conjoin and clash in the process of coming to know. The tension between being and becoming represent a far

greater challenge to the low-track students who suffer abuse at home. These students need more fostering, and far more support. In adopting such a standpoint, I have to consider the fact that individuals are born into a culture that is constituted of schema and practices. Unconsciously, that structures their sense of being, and allows agency|passivity to write their identity.

Accordingly, it is imperative that as a researcher I connect the different ways of knowing to the cognitive aspects of the participating students such as pain and suffering. One way of doing this is by reconsidering the design of cogenerative dialogue (i.e., cogen) in order to reflect the realities of the participants. I argue that the one-on-one cogen becomes a more appropriate setting for these students than cogen between a teacher and two or three students. Such restructuring becomes necessary for the goal of producing more productive cogen sessions. Considering such standpoint would allow me to explore agency|passivity||schema|resources as dialectical relationships, where the different parts constitute a whole.

The research was informed by a sociocultural approach to research in science education. This framework tends to look at teaching, learning and cogen as social fields where culture gets enacted. This culture gets produced, reproduced, and transformed as it is appropriated at the microlevel by the participants in the different social fields. Hence, these fields are connected by a triple dialectical relationship teaching|learning|cogen. This triple dialectical relationship represents recursive relations between the different parts where if one part is compromised even slightly the other parts get compromised as

well.

Study Context

The Research Site

The study was conducted during, 2006-2007 school year in Astoria Intermediate School in Queens, NY[23]. The school is attended by more than 800 students in grades six, seven, and eight. Most of the students come from minority, poverty-stricken or working class families. The school had to restructure into three learning communities (SLCs), which are small schools within the larger school as a result of being identified as a school that "needs improvement" for three continuous years.

According to the School Learning Survey as I elaborated in the previous chapter there appear to be cultural misalignments between the different stakeholder groups (administrators, teachers, parents, and students), with each group squarely placing the blame for the failed learning and teaching environment on the other.

The Class

I was assigned to teach science to a low-tiered inclusion class. The class had 14 students, which is far below the school's average of 28 students. The attendance did not exceed 50-70% on any given day, which is also far below the school average of 92%. The students would come to school but decide to hang out in the hallways instead of going to class. All of the students in the

[23] pseudonym

class scored between level 1 or level 2 on the ELA, and the Mathematics Citywide Tests in grade seven. The racial makeup of the class was 60% Blacks, 33% Latinos, and 7% Whites. In comparison to the rest of the school the proportion of the Black and Latino population in the class was relatively high. I argue that external forces such as grades and test taking strategies had measured the students' success in this class.

The Impact of Cultural Misalignment on Teaching and Learning

I struggled to teach this class in the ways I preferred to teach. Even though I had a history of being a successful science teacher to the upper tracked students, I simply could not enact the curriculum as I intended. Based on my prior teaching experience in the high track I believed that there is a body of knowledge to bestow on the students, and that pedagogical methods (group work, etc.) are so much coddling. I felt that there is an actual knowledge base of what kids should know at the end of high school; otherwise, they will not be able to graduate. I taught my students how to pass the tests, thus improving their chances of getting accepted to the elite high schools So, did they? . My lessons lacked the engagement and the in-depth knowledge reflecting my inherent belief in the remedial nature of my students at the lower track Huh?. The failure to connect with my students provided me with the opportunity to start a research on my classroom using cogenerative dialogue (i.e., cogen). The cogen team chose the following vignette to highlight the change of ontology as a result of doing research.

In a lesson about global warming I attempted to teach my students about the factors that might have contributed to the current increase in the atmospheric temperature. I started the lesson by drawing on the students' cultural reservoir. Then I attempted to link the Infra-Red (IR) radiation on the electromagnetic spectrum to the movie "Predator." In this movie an alien invades earth and targets humans using an IR device to track them. I assumed that the students would make the connections between the movie and IR as another manifestation for heat, but my assumption was wrong. The students did not make the connection; in fact some of them had not even seen the movie.

I started the lesson by drawing a greenhouse on the board, and explained how it traps heat from the sun. I followed this by making the connection between the greenhouse glass panels and the greenhouse gases (CO_2, H_2O and CH_4), and how they act in a similar manner by trapping heat, thereby preventing it from escaping to outer space.

An essential component of the lesson dealt with how of visible light changes wavelength as it is absorbed by dark surfaces into the infrared part of the electromagnetic spectrum. In (turn 1) I endeavored to solicit answers from the students by connecting their everyday interactions to the different segments of the electromagnetic spectrum. In (turn 3) Dre responds to my question by explaining that his mother asked him not to stand in front of the microwave. I took his answer as an opportunity to tell him that infrared radiation is heat, and that microwave radiation also produces heat.

Episode 1

1. Shady: all right::: infrared which is a: form of heat:: what comes before the infrared? (2.5) something that your mother asked you not to stand in front of
2. (3.5)
3. Dre: microwave↑ *((*clapping his hands with excitement*))*
4. Shady: *((*pointing at Dre*))* you are:: the man↑
5. (1.9)
6. Star: *((*clapping her hands rapidly and laughing*))* o::ven↑ (.)
7. Shady:[so::: ↑what comes before the microwaves?]
8. (4.0)
9. Dre: don't tell me yoo::↑ don't tell me yoo↑ (2.5) the sun↑
10. Shady: [radio:: ↑ waves] (1.2), and the radio waves are broken up into two type
11. (1.0)
12. Dre: but you can't↑stand next to::o::ooh
13. Star: [mr. sha::↑dy this is hard I don't know this↓]

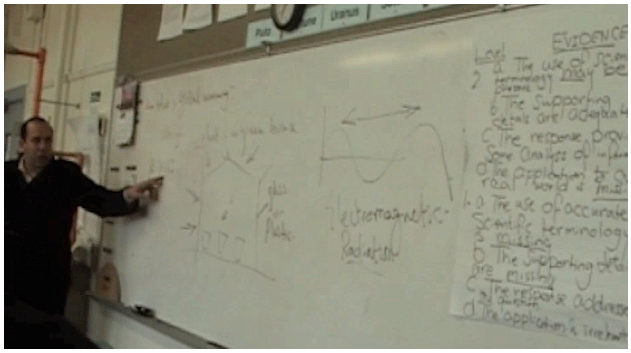

Figure 4.1: I am standing toward students in the front side of the classroom pointing at the electromagnetic wave spectrum

In this vignette, the roles of the students were to listen and answer the questions I had asked them. My questions were not directed to individuals but were designed to elicit thinking that would drive interpretation of the data from the board. However, there was an expectation that there would be responses and when the students failed to deliver the expected response, a higher pitched voice was used to deliver the message. I attempted to create and maintain the students' focus (turn 4), and create resonant structures for them.

This interaction sequence is characterized by several breaches when Dre, Star, and I spoke at the same time and in opposition to one another (turns 3, 4, 6, 10, 12, and 13). My questioning techniques led Dre to focus on other sources of heat such as the sun (turn 9), which is a logical connection. Instead of stopping and using it as a teachable moment, I continued to name the rest of the electromagnetic spectrum. Even when Star attempted to slow me down (turn 13), I did not stop.

My turns at talk contained relatively long pauses (turns 2, 5, 8, and 11) indicating a breach in the flow of communication. Dre's and Star's efforts showed signs of frustration and there is a hint of anger in their tones. Dre did not follow my logic, and Star did not understand what the electromagnetic spectrum is. At the same time I was focused on explaining to all students a way to figure out the different parts of the magnetic spectrum. Whereas I had the symbolic capital of being the teacher, Dre was supported by structures associated with solidarity among at least several peers. The speech had a characteristic higher pitch (8 turns out of 13), which was associated with the struggle for control (turns 3, 4, 6, 7, 9, 10, 12, and 13).

The fact that my school got evaluated on my students' science scores on the Intermediate Level Science Examination (ILSE) structured my habitus on the conscious|unconscious levels in a way that was not conducive to meaningful learning. I kept focusing on meeting the curriculum mandates. Following the pacing calendar for eighth grade science curriculum became a structure that truncated my students' agency in accordance with the dialectical relationship

agency|structure. I felt that I was in a race with time, with only one caveat, I was running alone. My students stared at me, trying to figure out the point of rushing through the science materials this way.

Cogenerative Dialogue

In cogen, the stakeholders (teachers, students, administrators and researchers) talk about shared experiences with the intent of transforming teaching and learning by expanding the agency of the stakeholders. The participants contribute to the conversations in an equitable manner, where no one voice is privileged. The use of cogen in my classroom provided me with the time and space to talk across the different categorical representations such as class, age, race, ethnicity, and gender. I started with large group-cogen (almost the whole class participated in the cogen), but that did not achieve its intended results because of the diverse educational needs and cultural backgrounds of the participants. They focused on their differences, underscoring their intolerance to diversity. They made fun of each other's skin color and socioeconomic status. I decided to downsize the cogen sessions to two students and me as a teacher/researcher. Even at this level I still experienced cultural misalignment. The home life of the participating students became the predominant structure in construing what was salient in our conversations.

The Role of Research Squads

In one of the research meetings with my mentor, Ken Tobin, I argued that participating in the cogen did not transform teaching and learning in my class

in the manner that I expected. He responded by suggesting that I reconsider the structural features of my cogen, and that a "one-on-one cogen" might be a more appropriate design. He stated that in order for the authenticity criteria to develop it takes a long period of time, especially if there is a large cultural gap between the participants. The participants need time and space to negotiate these differences.

Tobin (2006) notes that conventional wisdom about good teaching has focused on teachers controlling students, and maintains relatively quiet classes. This myth of control endorses cultural practices that might be interpreted by the participants as disrespectful. When this occurs, struggles for who has power can arise, reducing the quality of learning environments. Teachers need the time and space to adapt their teaching to the cultural capital of urban youth. Similarly, urban youth need the time and space to adapt their cultural capital to teachers' capital across the social categories of age, race, and class. A one-on-one cogen would provide the time and space for participants to develop an interstitial culture that is conducive to learning science from one another.

The Participants

The participants in the cogen were selected purposively in a process that involved the choosing of opposites. The participating students, Star and Steve, were chosen according to the contingent selection advocated by Guba and Lincoln (1989). I initially chose Star because of her insightful comments and her vocal practices concerning teaching and learning. Having selected Star, I

then selected Steven to be as different from her as possible.

Star is an African American female who struggled academically, but as the year progressed she seemed to turn around academically. She tends to be confrontational, and physically aggressive; as a result she got suspended several times during the 2006-07 school year. Steven is an African American male whose academic performance fluctuated according to his emotional state. In general he is an introvert; he tends to avoid confrontation as much as he can. Both students are from conditions of poverty and have a troubled family history.

Data Collection and Interpretation

I asked my cogen group to reconsider the current design of the cogen (teacher, with two, or three students), arguing that one-on-one cogen might be a better design. The cogen team agreed, focusing on the following in our analysis:

- How to improve cultural adaptivity among the stakeholders?
- How restructuring of the cogen mediates its outcomes?
- How to develop positive emotions and solidarity in the classroom?

As part of the research, I drew on a variety of qualitative research methods appropriate in the school context, including authentic ethnography, and conversation analysis with its associated gestures. In addition to the field notes, I asked my students to provide personal narratives about education related instances in their homelives. We videotaped, and audiotaped the class and cogen meetings. All relevant videotapes were digitized to make them

available for analysis using iMovie. The software allowed the research team (cogen group) to slow down or speed up the recorded frames, in order to capture interactions at the microlevel that might have been overlooked in real time analyses.

The cogen group viewed the videotapes both individually and collectively, with the intent of capturing the most salient episodes to our emerging questions. The videotapes were transcribed using the conventions of conversation analysis employed by Roth[24] (2005). I used the techniques of peer debriefing (relationship with independent colleagues without interest in the local situation), and member checking (validation of situation description by research participants), for ascertaining the validity of the research's findings (Guba & Lincoln, 1989). As a team we made sense of the data collected by analyzing individually and collectively at multiple levels to understand and generalize our findings. The cogen team selected the following vignettes as examples of successful interactions.

One-on-one Cogen with Steve

The first vignette is selected from a cogen session with Steven that highlights the role of race in constructing the students' perception of good teaching. The

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[24] 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 arrows indicate shifts to higher or lower pitch in the immediately talk; ↑↓ 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; (.)—noticeable pause of less than 0.10 s

vignette was selected because it captures contradictions to what is usually expected from Steven. On the day of this recording, Steven did not show up to the class, though I had seen him earlier in school. I asked Steven to come for a one-on-one cogen. He came to the meeting with a sketchpad. He said that the reason he did not show up to class is that he went to the art teacher (Ms. Paterson) to prepare his portfolio for his audition at the Arts and Design High School, which was part of the admission process. I was pleasantly surprised, because prior to this meeting I did not know that Steven was such a great artist.

When Steve came to the class for the cogen and mentioned that he was with Ms. Paterson, I thought that this could be an excellent opportunity to learn about how he perceives the role of race in education. In a previous conversation with Steven he mentioned that the only teacher that the class respected and listened to is Ms. Paterson (an African American art teacher). When I asked him to elaborate further on why he believes this, he mentioned, "Because she is Black!" His statement disturbed me greatly, because it implied that I might not have a chance of improving teaching and learning in my class, solely based on the fact that I am not phenotypically Black. It also shed light on why the students resisted my teaching especially if I tried to exercise control. On numerous occasions I made attempts to reach my students, but they rebuffed my efforts. These resistance tactics made me experience social violence, because it was an intentional violence.

Episode 2

1. Shady: do you think the color of your skin should determine who you are?
2. Steve: =actually::no but some people judge you that way, because if you are Black::you know when watch the movies:::when there is a Black person in the movie he has to be a gangster or something::every Chinese person got to know karate or something:::a White person has to be rich
3. Shady: ((laughing)) yeah::stereotyping
4. Steve: that is how they separate us especially in the movies::that represent what we are at least in the movies
5. Shady: do you think a Black person would have a better understanding of another Black person than a White person
6. Steve: =yeah::because they share the same circumstances
7. Shady: maybe you are right::but it is not always true (1.3) take Michael Jordan for instance he might have experienced these hardship at one point:::but his kids grew up in money they don't know what it means to be poor
8. (1.5)
9. Steve: yeah ((looking down at his sketchpad, and starts to draw))
10. Shady: s::o when you are going to be done with your portfolio?
11. Steve: i have to finish it soon and deliver it to Ms. Small ((the guidance counselor))::so I can get my ticket to the audition

Fig. 4.2. Steven is talking about race as an identity marker in the media

Fig. 4.3. Steven is drawing in his sketchpad, while discussing his future plans

In this vignette, the role of the participants was reversed, which indicates that one-on-one cogen was structured in a polysemic manner. My questions to

Steven were designed to educate me about his perspectives on race (Fig. 4.2.) The one-on-one cogen provided the structural resonance that afforded an expanded agency for both of us. It allowed Steven to express his opinions about race without fear of being mocked by his peers. It also provided me the space and time to get clarification on the race issue that I thought was of great importance to teaching and learning. Although I might have disagreed with him on the fact that every Black person experiences economic hardship, that did not produce negative emotion (turn 7). In a later conversation I asked Steve, why did he look down (turn 9) and decided not to continue the conversation, he said that because of time constrain he had to deliver his sketches before the end of the day, and the work was going as fast as it should be. There was no breach in the conversations. We took equal turns, with no discernable pauses. I followed this vignette with a few others that addressed teaching and learning.

One-on-One Cogen with Star

The next vignette was chosen because it addressed issues of privacy in cogen. In a prior session, Star complained that the reason she is not doing her work is due to her home life. This issue represented a conflict because, as a mandated reporter, I had to inform the guidance counselor. However, as we laid down the rules of the cogen I promised my cogen group that whatever goes on in the cogen session will stay in the cogen. I convinced Star to report the issue to the guidance counselor.

During this episode I asked Star to come in for our first one-on-one cogen

during her lunch period. As part of my usual routine I purchased food and drinks. I felt that Star was in general doing much better in her classes, and I wanted her to know how I felt about her academic progress. I also wanted to get her perspective on the new structure of cogen, and discuss something that I felt was important. As we started the research procedure as part of the data collection I suggested to Star, and Steve that they should document instances where education gets mentioned at home. This cultural artifact was designed to shed the light on their homelife and how it intersects with the other social fields such as cogen, and the class. I asked Star (turn 1) to focus her attention to education related issues in her writings, because I felt that her writings were drifting into personal issues that I was not authorized to deal with by the Internal Review Board (IRB) as a teacher/researcher.

Fig. 4.4. Star is telling me about her family issues.

Episode 3

1. Shady: there is something that I would like to commend you on:::you have been coming to the class in time instead of hanging out in the hallway (1.3) you know what i want you to do::: i want you to keep track of instances that are related to education in your home life, and recorded in the notebook that i gave you
2. Star: ((shaking her head in approval)) ok
3. Shady: fair enough

4. (1.1)
5. Star: as a matter of fact Ramiek asked me if he could do what we do:::he would like to come to the cogen, and start doing what we do::he thinks that is fun
6. Shady: I would love to (1.6) by the way what do you think of the new arrangement:::of us meeting one-on one
7. Star: I think it's better
8. Shady: [why]
9. Star: because when we talk we all talk at the same time, when a subject come up one person interfere, and then you say let me say something, and it is good cause::when people say something they don't keep it here individually:::i say something ::they go around sayin o::h Star has problems with her mother:::and this and that::that why i like it:::i feel if i don't want everybody to know about me and my family::i know whatever i tell you (1.3) you keep it to yourself
10. Shady: [you know that i will keep it]
11. Star: [i know that is why i tell you:::i don't tell nobody else]
12. Shady: well I tell you the truth i feel more comfortable with this design, because if you have a problem that is not directly related to what is going on in the classroom in terms of teaching and learning and start talking about it, someone else might have the same problem (based on my prior experience in the group cogen meetings), and before you even know it everyone is talking about his or her problems, and nobody is talking about education:::which i think is the answer to most of your problems:::the way i look at it is it provides with the opportunity to change what you don't like in your life:::you are a very smart girl, and i know that you are capable of doing anything that you plan to do::but you need to focus on achieving your goals

In this vignette Star elaborated on her experience of social life across different fields. The cogen represented a field that intersected with other fields such as school, and home. Because fields are borderless, cultural practices from other fields appear in the cogen and vice versa. The restructuring of cogen became a necessity to provide privacy for the participants. The one-on-one cogen provided opportunities for Star and me to discuss issues that might affect her education without fear of divulging her privacy. This vignette addresses

issues that are extremely important in terms of the ethical dimensions of the cogen. Star brought out two important issues during our conversations. The first issue is related to family abuse and the second to privacy. Because most of the students in this class lived in the same housing project, maintaining, privacy of the cogen's conversations became an important issue for Star. For urban youth maintaining respect in the street is an important aspect in their lived experiences (cite something). It is a survival issue that guarantees that no one would "mess around with them." Accordingly, respect is not only a commodity that could be traded in the capital exchange helix (Tobin, 2006), but it is also a safety measure in their homelives.

As a teacher-researcher it has always represented a challenge to me of when to pursue an issue that has not been addressed in the IRB, especially if it does not pertain to teaching and learning. That is not to say that I would intentionally pursue an issue that has not been addressed on the IRB proposal. However, how can all aspects of social life be predicted prior to starting the research? For example, if a student is experiencing a difficult homelife and would like to talk about it, as a teacher I struggled over where to draw the line and divert the conversation into other topic. In the above vignette I tried to address this issue (turn, 12) as I experienced it on a regular basis in my conversations with the students. Second, as a teacher, I have to report instances of abuse to the proper authorities. How would the students receive it? Especially, when they feel that cogen is the only space where they get to express their fears, and aspirations in life?

The conversations were fluid in nature with no discernable pauses. We exchanged turns, and maintained a mutual focus (Fig. 4.4) on what mattered most to us. The one-on-one cogen design provided the structure that afforded the expansion of agency for all the participants. One-on-one cogen provided me with opportunities to express what I believe is our role as educators that is to expand the agency of the students, and one way to achieve that is by gaining cultural capital through education.

Participating in one-on-one cogen helped me gain the social capital necessary for successful teaching. The success of the new designed cogen provided me with the opportunities to expand to a large cogen group. I proposed the idea to the class if they would be willing to join group cogen. I made it clear to them that it was ok with me if they joined in, and also ok if they decided not to join. I made clear to them the intention of the cogen was to improve teaching and learning in the classroom, which meant that all the participants were going to have a shared responsibility for developing a successful learning environment. The next vignette highlights our first meeting as a group.

Fig. 4.5. The whole class cogen. Students had the liberty to join if they wanted, and it was also okay if they decided not join (the female students at the periphery)

Fig. 4.6. The students decide on class rules. The structure provided them with the structural resonance to self-governance. The structure of the cogen was organic in nature as I moved between being peripheral to being central to the discussion when I felt that I had something to contribute.

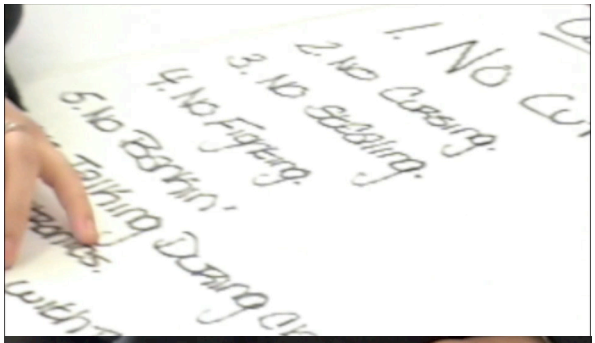

Fig. 4.7. Maria writes the class rules

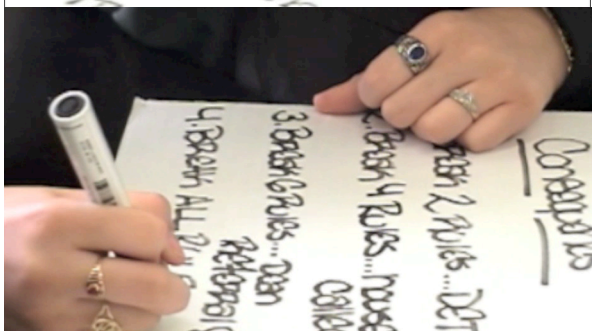

Fig. 4.7. The consequences for breaking the class rules

The cogen team chose this vignette, because it represented a shift in the students' actions (contradiction). Contrary to their patterned behavior (patterns of coherence) of resisting the teachers, and not participating in the class, collectively the class decided which governance rules to institute (Fig.4.6), and what are the consequences for breaking such rules (Fig. 4.7.). Yes, so did they stick to them over time? If not, did they abide by the consequences? What can you say about the rules and consequences? Were they hegemonic? Were they – turn in your hw and if you don't fail? How were they different

from what a teacher would say or do?

Group-Cogen

1. Shady: so:: what do you think of guys? we have to come up with class rules
2. Maria: give me a board so we can post it
3. Tre: no cutting
4. Shady: i know we said no cutting
5. Maria: what you all do in mr. shady's class? (1.7) yeah no talking
6. Ramiek:how about my favorite one?:: no cell phones.
7. Najee: =yeah how about no iPod
8. Maria: ((laughing, and pointing at Najee)) why are you looking at me?
9. Najee: ((laughing)) if you bring yours i am going to bring my mp3 player
10. Tre: treat your classmates with respect
11. Stephanie: like this is going to happen in this class
12. Shady: what?
13. Stephanie: treating your classmate with respect
14. Shady: now:: we didn't discuss what happens if someone break the rules
15. Maria: so you want me to write what happened if we break the rules?
16. Shady: what are the consequences if you break the rules
17. Najee: you get a call home
18. Tre: what else?
19. Shady: how about if you obey all the rules, or part
20. Maria: it's all here (1.3) you get to be invited to pizza party, and go on the next trip

The dialogue in this vignette is characteristically continuous and overlapping speech occurs. There are numerous examples of synchrony. At a mesolevel, the clearest examples are that my oral expression is coordinated with gesture, body movement and rhythm. As I moved between being central (Fig. 4.5) to the periphery (Fig. 4.6) I did it naturally. The students were energetic, called out loudly, and interacted in ways that reflected their enthusiasm and high energy for being central to the decision making process. Students were not passive, and networks of interactions were evident throughout the classroom.

There was plenty of evidence supporting the emergence of solidarity expressed in voice intensity and gestures. Synchrony occurred where students took equal turns in the conversation, with no one voice being privileged. As a teacher/researcher I had to learn how to interact successfully with students and they had to learn to interact successfully with me, especially across the social categories of class, race, ethnicity and age. Hence, learning to teach science at Astoria Intermediate School involved much more than knowing science. (Tobin, 2006)

Lessons Learned

This research aimed at exploring different means by which participants' agency could be expanded. I used one-on-one cogen as a tool to change oppressive structures. The results show that the one-on-one cogen became a site that catalyzed positive change, and improved cultural adaptivity among the participating stakeholders. The participants shared the responsibility not only for what happens in the cogen, but also for the improvement of teaching and learning in the classroom. In addition, the research results also show that urban African American students come to school with schema, and practices, symbols and their fundamental significance from fields outside of school including both the home the neighborhood, class (Elmesky, 2001).

Being a successful teacher to the fast tracked students made little difference to the way I was accepted by the students in my inclusion class. I had to learn the culture of the students and they needed to learn how to effectively interact

with me, and assign me the status of being their science teacher. I had to undergo an ontological transition until I could teach, as I wanted. Tobin (2006) states that effective teaching in urban science classrooms requires more than a conscious understanding of the need to show respect and build rapport with minority students. Success necessitates forms of coparticipation that are culturally fluent (anticipatory, appropriate and timely). These requirements of coparticipation point to the participant' goals|motives. A one-on-one cogen could be one of the ways that this could be achieved. The results show that the one-on-one cogen became a site that catalyzed positive change, and improved cultural adaptivity among the participating stakeholders. It provided the participants with the time and space to improve their understanding of the factors that contribute to the cultural differences between teachers and students.

The research aimed at exploring different means by which participants' agency could be expanded. I used one-on-one cogen as a tool close the cultural gap betweens the participants (students and myself). The participants share the responsibility not only for what happen in the cogen, but also for the improvement of teaching and learning in the classroom. Because of the structure of the one-on-one cogen the othering process was not as explicit in traditionally designed cogen (teacher/researcher, and two or more students). Participating in the cogen has sponsored the production of an interstitial culture that is polyphonic, and polysemic.

The participants in the cogen acted as cultural brokers, exploring issues that

structured their agency, such as race, social class, and self-governance. Through the use of one-on-one cogen I got the opportunity to discuss issues related to race and social class, and how these issues are situational. For example, in Egypt race might not be the most salient categorical representation, social class, and tribal affiliation are key stratifying factors. The cultural practices in the cogen got transmitted to the class and vice versa, because fields are sites where culture gets enacted, and these sites overlap because of their boundless continuity. The cogen team learned how to negotiate differences across the social categories of age, race, and social class.

A higher quality of teacher and student discourse was evident in solicitations; responses, reactions, solidarity, entrainment, and structuring became evident after analysis of our data. For example, one of the issues addressed during the cogen sessions was the impact of the scientific discourse on subverting the goal of "science for all." In dealing with this concern, I mentioned my view of scientific discourses as an accessibility issue and how it would expand the students' communication skills. The cogen team composed of Star, Steven and me then developed different procedures that supported student comprehension of science content. Such examples are pre-assessing student knowledge of relevant vocabulary terms through word grouping activities, and teaching mnemonic devices for easy memorization of definitions. The effort to resolve this concern and other issues developed collectively in the cogen session. As the teacher-researcher I learned along with my students how to communicate across different structures such as culture, social class, gender, and age.

The study points to several implications for helping science educators in developing and advancing democratic practices within the science education context. Overtime, it is anticipated that participating teachers will develop a new dimension that scaffolds science education for democratic citizenship. By examining the emergence of growth, and development through cogens, teachers, together with students, creates an alternative space to build a collective framework that informs teaching and learning standards, practice, and citizenship.

CHAPTER 5

The Role of Face-to-Face Interactions in Mediating Success in Science Education

> If the structure of a field has an historical connection with individuals' habitus in particular ways and the stakeholders are inclined to act (i.e., such actions align with their goals), then resonances can afford the enactment of those dispositions (Tobin, 2006).

The Role of Face-to-Face Interactions

It has been stressed in previous chapters that this study was an authentic ethnography. It started with the exploratory nature of answering the question: what is going in the classroom? And why is it happening? Subsequently, the research evolved to focus on more specific questions that aimed at generating empirically supported results regarding the nature of the face-to face interactions in my classroom. From the inception of this study I explored ways by which I could support the production of positively emotional energy, and reduce instances where transactions would give rise to negative emotional energy. Conversation analysis together with a description of facial and other bodily displays represented a means by which I could draw a conclusion on the production, and reproduction of successful social interactions.

When I did this study, I was familiar with the research on sociocultural theory. That research generally claimed that social reality is 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 triple dialectical relationship. In other words, the three levels, macro|meso|micro, are interconnected where each presupposes the other, and they are parts of a whole. You could do more to explain this.

Turner (2002) argues that face-to-face interactions are “primal and primary” (p.1). They are means by which individuals reciprocally send and receive conventional gestures, both verbal and nonverbal. These transactions become an essential tool in establishing a communicative method through which individuals could decipher transmitted signals, and each other’s standpoint. The postures and gestures such as facial expressions, ways of sitting, walking, speaking, convey social meanings and values. Interactions are always an emotional process; signaling and interpreting always involve the establishment, and communication of emotions that considerably establish the flow of face-to-face actions. For an individual, these emotions are mediated by his or her habitus.

Bourdieu (1977) argues that all societies that want to protect and transmit their culture treat the body as a memory and inscribe the seemingly most insignificant details to it in the form of dress or the verbal and physical manners. Such an inscription is beyond consciousness and it cannot be altered easily by any deliberate transformation. This implicit pedagogy is not merely an individual product; it is the deposit of sociocultural construction - the products of groups and of individuals in their daily transactions. It is how ethnicities or political philosophies are transmitted through such simple acts as

"standing straight." Therefore, even the most insignificant circumstances encompass very general principles.

In this chapter, I argue that understanding the ways in which cultural artifacts from the cogenerative dialogue (e.g., cogen) field mediate what happens inside the classroom and contribute to the learning of students. The production of successful transactions is crucial to addressing current disparities in science performance. Specifically, I explore the significance of face-to-face interactions and the associated gestures to the lives and the learning of economically disadvantaged minority students. These particular dispositions have been repeatedly observed in our research, and they can be important resources for the creation of positive emotional energy, collective solidarity, and heightened engagement in learning activities since they provide resources for the (re) shaping of identity. Thus face-to-face interactions hold potential for transforming the teaching|learning of these students.

A microanalysis of face-to-face conversations and the associated gestures would provide clues of how individuals construct their sense making process. These face-to-face conversations occur at the mesolevel, as stakeholders draw on their habitus, which Bourdieu (1984) defined as a system of durable dispositions that provide the necessary skills to navigate within different social fields. These dispositions guide the choices of the stakeholders in constructing social norms. The position of each participant in the field becomes the result of interaction of specific rules, and the agent's habitus that is constantly being reconstructed by these navigations. The face-to-face

transactions are ritualistic in nature and integrally tied up to the associated emotional states of these interactions.

The Study

Context and Data

In the study conducted I explore teaching and learning of science in the context of Earth science lab activities. I selected settling rate lab activities (as described below in the chapter) as the focus because in many urban schools, such as Astoria Intermediate School, it would be regarded as far too difficult to allow youth to carry on hands-on activities, because teachers often experienced classroom management problems when students were involved in labs. (Tobin, 2008) This section derives from a research project conducted with my cogen team with the intention of improving teaching|learning by identifying patterns of thin coherence and the associated contradictions during the school year 2006-07. I developed my research practices because I wanted to understand why students do what they do and how face-to-face interactions might enable actions as well as constrain them. The answers to this puzzle necessitated a study of what students find relevant in the field of my science classroom. As a research team we attended to the following items: the nature of students' discourse, the integration of gestures and talk, and the nature of student-student and teacher-student interactions.

One of the issues that I have struggled with throughout my research is whether I have accomplished one of the basic tenets of authenticity criteria, which is

ontological authenticity (Lincoln & Guba, 1989). This criterion refers to the extent to which individuals' emic constructions have changed, and expanded as they pertain to the nature of social life, and to the research foci. My role as a teacher/researcher involved documenting the changes in the stakeholders' ontologies as a result of participating in the research. In this chapter I support my claims that the participants have learned from the study with pragmatic results from the cultural enactment in my science class. Evidence of learning would include a changing trajectory of answers to research questions.

The Research Site

The data sources I draw upon in this chapter derive from a study conducted during the school year 2006-07 in a science inclusion class, in Astoria intermediate School, which is an urban school located in New York City. The school had 815 students in grades six, seven, and eight. The racial breakdown of the students was 19% Blacks, 52% Hispanics, 22% Asians, or Native Americans, and 7% White. The average class had 28 students. The annual attendance rate was 89%, which is below the city's average of 92%. The students' suspension rate was 13%, which is higher than the city average of 5%. The school received Title I funding as a result of having 80% of the students' population from poverty-stricken homes, or working class families.

The school is in its third year under the label of "needs improvement" a designation, which forced the school to restructure itself into three small learning communities (SLCs); each SLC is housed on separate floors. Each SLC adopted a specific theme that aimed at developing a common core

curriculum for the students. This physical structure became a resource that school administrators appropriated to institute different educational programs targeting students with low achievement levels on state-level examinations. For example, the school developed two tiers in its academic program, to address the students' specific educational needs. The low tracked students were housed on the second floor next to the principal's office, and the dean's office, while the upper tracked students were housed on the fourth floor. Consequently, the students' academic achievements were correlative to the SLC to which they were assigned.

Classroom Context

The research is based on my experience as an Egyptian immigrant science teacher in an eighth grade inclusion class that was classified as a lower tier. Most students in this class scored between level 1, which is far below average, and level 2, which is below average on the seventh grade ELA, and the Mathematics Citywide Tests. The text assigned to this class is a test preparation text, with an emphasis on strengthening mathematics and reading skills. The science curriculum is arranged as a spiral that covers the three science disciplines, physical sciences, biology, and Earth science. I met the class daily for 45 minutes. The class had 14 students, but the daily attendance rate was 50-70%, which is far below the school's average. The racial breakdown of the students in this class differed from the school profile, with a higher proportion of Black youth. The distribution was 60% Black, 33% Latino, and 7% White.

I experienced behavioral problems with this particular class that disrupted teaching and learning. I used cogenerative dialogue (i.e., cogen) as a tool to improve face-to-face interactions. The cogen group met once every Monday to lay the foundation for the coming week, and design an action plan to transform teaching and learning in the classroom. The team initially was made up of me as a teacher-researcher, and three African American students, two females (Star and Stephanie) and one male (Steve). Stephanie joined the cogen team for the first two sessions, but declined to participate any further. The class was held in a conventional lab, with three U-shaped benches scattered strategically in the middle of the room. The demonstration desk and a whiteboard were placed in the middle of the room facing the benches. This structural arrangement of resources limited the students' seating choices. In order for them to see the board clearly they had to sit on the benches facing the board.

Collection of Material Evidence

I prepared and started the two video cameras immediately prior to students' arrival in the class and stopped recording once the students had left the class. The first camera was placed in front of the class, and aimed at capturing transactions at the meso level. The second camera was placed strategically next to particular group of students to capture segment of the student-student, and teacher- student interactions. Because of the nearly continuous presence of the cameras in my classroom for a period of six months, it had become transparent to our activities

Data Analysis

My cogen team utilized videotaping, audiotaping, participation in cogens, interviews, field notes, journals, and artifacts as resources to answer our emerging research questions. Initially one of the students who participated in the cogen sessions collected data (videotaped and wrote his or her observations) in an ongoing manner while I taught the class. I followed this by writing my own field notes using the first camera, and my own recollection. The student who videotaped the class was taught the materials after school, or during the lunch period. All relevant videotapes were digitized to make them available for analysis using iMovie HD (Macintosh OS X). The software afforded the cogen team to slow down or speed up the recorded frames, to capture interactions at the microlevel that might have been overlooked in the real time actions in class. In addition, an audiotape recorder captured (a) student talk during presentations and (b) teacher-student interactions.

The videotapes were transcribed to describe the students' actions. The soundtrack was enhanced to improve audibility and ease of transcription using QuickTime 3.0. Frames with characteristic aspects of the gestures were captured using QuickTime and were exported to JPEG files. These images were then coordinated with the speech feature.

I collected students' lab reports as data sources. In addition to these data sources, ethnographic observations were documented in my field notes and in photographs. The planned curriculum, all curricular materials, and the artifacts used during teaching became part of the database. The cogen team viewed the

videotapes repeatedly, both individually and collectively, with the intent to come to a better understanding of successful face-to-face interactions that supported solidarity, and to identify practices that were associated with negative emotions, such as anger, grief, and disappointment. The videotapes were transcribed using the conventions of conversation analysis employed by Roth[25] (2005).

In our individual and collective analysis sessions, we formed initial hypotheses that we sought to substantiate or disconfirm in consequent analyses or by running them by one another, in accordance with a member checking process advocated by Guba and Lincoln (1989). Our results emerged from repeated cycles of generating, refining, and discarding working hypotheses. In the process, we generated written analyses of different episodes across the database. From all recorded lab sessions, we ultimately selected the following three episodes for in-depth analysis.

Data Construction

The Earth science course I taught was based on the argument that matching the students' interests to the New York State core curriculum would help my students achieve competence in talking science. Thus, I planned many

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25 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 arrows indicate shifts to higher or lower pitch in the immediately talk; ↑↓ 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; (.)—noticeable pause of less than 0.10 s

activities that engaged the students in Earth science conversations. These activities included (a) investigating the factors that would influence the settling rate of a particle, (b) explorations of simulated lab activities in a computer- based program, and (c) construction of concepts map that highlighted their understandings of tasks. In relation to the first activity type I asked my students to design a particle that travels the distance between A and B in one minute because, as a teacher I believed in inquiry-based, open-ended learning. I knew that doing such activity might provide the students with a context that facilitates their mutual orientation to each other and the joint task. I therefore began to look for evidence of the extent to which mutual orientation occurred in my own videotapes and transcripts.

The unit on the settling rate of particles is an integral part of the Earth science curriculum. The lab was videotaped using two cameras. One focused on a particular group of female students, and the other focused on the whole class. I selected episodes from one of the groups, Star, Stephanie, Maria, and Ashley. The four students were representative of the students in this class. Their academic achievement varied between struggling to high achieving science students. As a group, conflict was part of their transactions, but that did not stop them from being friends. The other groups that I have recorded included a wide spectrum that varied between being either some of the highest achieving students in the class, or some of the lowest achieving students.

Star is African American and participated in the cogens for three months prior to taping the vignette that is the basis for the research in this chapter. She

struggled academically but eventually made headway in most of her classes. Star started to verbalize her concerns to me about passing the other classes as the year drew to a close. I took it upon myself to act as her advocate in relaying her concerns to the other teachers, and making sure that she met the requirements for graduation.

Stephanie is African American and struggled academically throughout the year. She had poor attendance—coming to school, but preferring to hang out in the hallways rather than attend her classes. Stephanie tends to be confrontational. I had to face her more than once about her attendance record, but she rebuffed my attempts by saying "it is none of your business, if I come or go." My attempts to contact her parent did not achieve the intended results.

Maria, who is Latina, did well in most of her classes, and mastered the art of code switching to signal various conversational meanings in ongoing discourse, such as, selecting addressee(s), changing the topic to meet her goals, and signaling dispreference toward specific situation, or individual. She spoke very respectfully to her teachers and attempted to adhere to the rules of the school. On the other hand she would draw flawlessly on shared experiences with her classmates, while she is talking to them. She had a social and symbolic capital among her peers that was supported by deep understanding of their social reality. Accordingly, Maria was a popular student inside and outside the school.

Ashley is a female Latina student who started the school year as an A student, but gradually started to withdraw emotionally and eventually physically from

the class. She experienced family problems that she refused to share with me. Her attendance started to slip she refused to come to the class and preferred to stay in the guidance councilor's office.

The Settling Rate Lab

As the students got themselves ready to begin the settling rate lab, the class was called unexpectedly to the auditorium to watch a video on gang violence, and its consequences. The students felt that it was unfair for them to be deprived the opportunity to do the lab. Consequently, they acted out so they would be expelled from the auditorium. As they left the auditorium the sense of solidarity was evident in their collective effervescence—they were clearly happy to be back in class. Although I might have disagreed with their approach to getting back to the class, I could not have been happier to see my students speak in terms of the collective setting their differences aside for the common good.

I attribute this solidarity to the development in the sense of affiliation among my students. Prior to starting the cogen in my class the students focused on their differences. Participation in the cogen helped diverse parties ("stakeholders") communicates and commit to shared goals, strategies, and outcomes. These dialogues across differences and – more importantly – within differences, emphasized not only a shift from individuals to collectives producing a sense of membership. The stakeholders needed a space to negotiate their differences, and the cogen provided them with such a space to

develop a hybrid culture. This interstitial culture was created, shared, and learned. The constant negotiation and formation of the stakeholders' identities, as efforts of survival, created such culture. If home culture from which the stakeholders came is the first culture, the second culture is the host culture, where stakeholders transact (in this case, the school, or the classroom). The cogen represented a boundary between the two cultures. It became a region of overlap or hybridity – i.e., a third space that contains shifting amalgamation of characteristics of the two bordering cultures. (Bhabha, 1994)

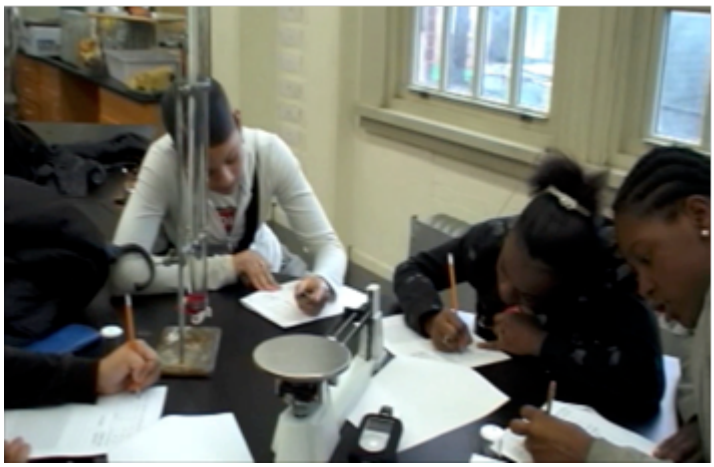

Fig. 5.1. The students are recording the settling time of the different size beads

The students' activities were related to a number of different investigations. First, they attempted to measure the settling rate of different sized beads (Fig. 5.1). After repeating the experiment three times to ensure the validity of the results, they had to calculate the average. They followed this by correlating the settling rate to the particle's size through the construction of a graph. The

last part of the activity dealt with designing a particle using one gram of clay that would travel the distance between two pre-drawn points (A&B) on the cylinder in one minute. During all of these the students were asked to begin with the investigation and to consequently construct concept maps that illustrated their conceptualization of the different aspects of the activity. In this activity the following points are highlighted: simple concepts gave rise to complex ones, and the materials and equipment played key roles in the communicative action. It afforded the students a level of figurative intricacy that they were not able to achieve in speech alone.

The first episode highlights how the students appropriated the structures to meet their goals|motives. Maria followed a lengthy procedure where she repeatedly dropped different sized beads into a cylinder, containing clear liquid soap. Star recorded the time as the bead traveled between the two lines A and B. At the end, the students were required to convert the time measured from seconds into minutes in order to get the average time. The four students recorded the time on a printed sheet, and at the end of the experiment they were asked to construct a graph that related the particle size to the settling time. Star was supposed to calculate the average after recording the results three times (turn 02). The structure of the activity struck a balance between the four stakeholders. For a student to finish the task each had to refer to the other three for information. In the beginning of the episode Star, followed by a brief pause, asks whether she has to calculate the average.

In the context of the group work Star allocated the resources in a strategic

manner that afford her an advantage Fig 5.2.

Fig.5.2 Star maintains control of the resources (the stopwatch, and the triple beam balance)

My first analysis of the episode presented a contradiction. Although Stephanie experienced symbolic violence through Star's utterance in turn 06 that did not shut her down since she continued doing her work. In a subsequent interview I asked a visiting educator why he interjected in (turn 10). He mentioned that he felt that the interactions between Star, and Stephanie in (turns, 06, and 08) might evolve into a dispute. In this Episode, and also in the subsequent episodes, I refer to the visiting educator by (VE).

Episode 1

1. Maria: if you put all the time together (.)
2. Star: [the ↑average?]
3. (1.7)
4. Stephanie: this is 4::5:6:7
5. Maria: [it's 65 seconds]
6. Star: ((laughs and look at Stephanie)) you are slow↑: in the head girl↑
7. Maria: ((looks at both Star and Stephanie and starts laughing))
8. Stephanie: ((stares at Star)) [I just (.) had to make sure↓ and 15seconds? ↓]

9. Maria: uh [m::]
10. VE: ((looking at the group with his hands folded)) have you started the lab?
11. (3.2)
12. Star: ((focused on filling in the data sheet, and without looking at him)) uuuh
13. (2.4)
14. VE: ok↑
15. Stephanie: [we got the last one down]
16. Star: [it is almost finished]
17. (1.7)
18. VE: =ok
19. (1.4)
20. Star: give us some::: time
21. (1.5)
22. VE: =ok

In this episode, as throughout the class, students coped with each other's character by creating a culture that did not sweat the little things focusing on finishing the task at hand. That is, they tuned into some structures and tuned out others. Tuning in afforded resonances and the production of habitus to support action to appropriate the structure, thereby reproducing and transforming culture. This interstitial culture was field specific, and constructed by the sociohistorical backgrounds of the participating students.

During this episode Star managed to appropriate the resources successfully to meet her goals through her interactions with the other students. This appropriation is consistent with the associated higher pitch in her immediate talk (turns 02, and 06), and her resistance to respond, expressed in terms of pauses (turns, 03, 13, 17, and 21). This could be taken by the recipient as evidence of a failed interaction (e.g., VE interjecting in the conversation in turns 10, 18, and 22).

In fact, the students' interactions showed very little evidence of cultural

misalignment. They were characteristically fluid as articulated in overlapping speech acts, speaker exchanges that were not separated by discernible pauses (turns 02,04, 05, 06, 07, 08, 09, 15 and 16) and appropriating any resources at hand to get the job done. I argue that the frequency and the length of silent pauses increased as the VE interjected (turns 11, 13, 17, 19, and 21). Prior to his interjections the group's face-to-face interactions were fluent with little or no pauses. His intervention could be attributed to the fact that he lacked an understanding for the sociohistorical construct of this field. Therefore, his interjection breached the flow of the structured resonances that afforded the students previously fluent transactions. Students got engaged in characteristically resilient and adaptable idioms that were understood by all stakeholders for the purposes at hand, communicating across their differences to get the task done successfully and in time.

In episode 2, Star initially appropriated the resources to meet her learning goals, expressed in her control of the stopwatch in a timed activity, and pauses (turn 24, 26, and 30). Eventually, because the fluid nature of social life, individuals attempt to meet their goals by appropriating resources, Star sought Ashley's help to convert seconds into minutes (Fig. 5.3). In this situation, Ashley appropriated the resources to gain symbolic capital that she could eventually transfer into social capital in accordance with the capital exchange helix. Because of the association of knowledge and power, then, Ashley is the one at that point in control over providing or not providing the sought after answer.

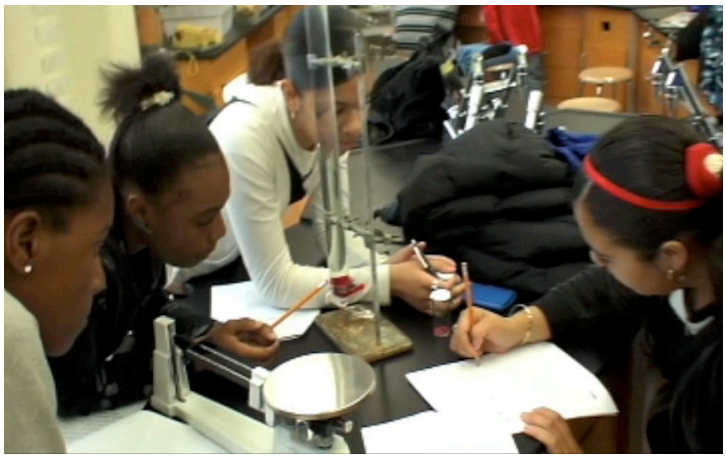

Fig.5.3 Ashley is explaining to the group how to convert seconds to minutes

Tobin (2008) argues that our sense of solidarity or conflict is mediated by the struggle for power during these interactions. Accordingly, one of the issues that I have attended to in my analysis is how students appropriate the structures in order to meet their goals. This appropriation is associated with face-to-face interactions and the production of emotions. The data from this episode suggests that it may be better to think of power differential among students as a data resource that could support the production of positive learning environments.

Episode 2

23. Star: ((looking at the cylinder)) steady::ready::go:o::
24. (1.3)
25. Maria:((drops another particle in the cylinder and when it gets to line A she stares at Star))
26. Star: ((focusing on the cylinder, while holding the stopwatch)) 41 seconds ((everyone on the table is copying the results))
27. Stephanie: it is::changing?
28. VE: do you need a calculator?
29. (1.7)

30. Star: ((without looking at VE)) [no]
31. (2.5)
32. Stephanie: we're done↑ ((the group is copying the results and doing the calculations to get the average))
33. Star: ((doing the calculation using her fingers to add the different times and get the average looking at Maria)) 127 ((Star looks around to make sure that she got the correct answer))
34. Star: how do you put↓-((looking at Ashley))
35. Star: [how did you get 2 minutes:: and 7seconds?]
36. Ashley: ok:: 60seconds::is equal to 1 minute::so, 60 seconds, and 60 seconds is 120, and 7 seconds left
37. (1.7)
38. Star: show your work (2.5), cause you're getting me messed up ((everyone is up looking at Ashley))
39. Star: yeah::cause she's devil in class

At the beginning of the lab Star appeared to be highly involved in the activity in terms of manipulating the equipment. Then, when Ashley stepped forward as an expert on unit conversion, Star was willing to allow her to show them what to do and advise when they should do it. This was evidence of what Tobin (2006) described as "intermittent participation," in which the students maintained intense focus for intermittent periods.

Tobin argues[26] (2008) that the key point that NOT all structures are sites for resonance. There needs to be sufficient resonance/entrainment on resonant structures to produce synchrony —a cultural beat —to which others can tune in (resonate with—the cultural rhythm becomes a structure—which also is a site for resonance). The issue of not sweating the small stuff is much the same idea. If folks who have mutual focus also have a sense of affiliation, they can perhaps ignore much of the dynamic flux and tune in to the rhythm of the classroom to produce success.

[26] Email correspondence dated 08/02

Here, in this episode, the lack of structural resonance (lacking the required knowledge to finish the unit conversion) produces a response from Star that is passive, as distinct from agentic. Passivity writes Star's identity, and is one of the constructs that connects micro|meso transactions (failing to do the calculations) to the macro levels (standardized testing, and how it structures her classroom designation). Star could not confront what inherently is a foreign language to her;[27] she could only meet (undergo) it in passivity, by opening up and allowing herself to be affected Fig. 5.4.

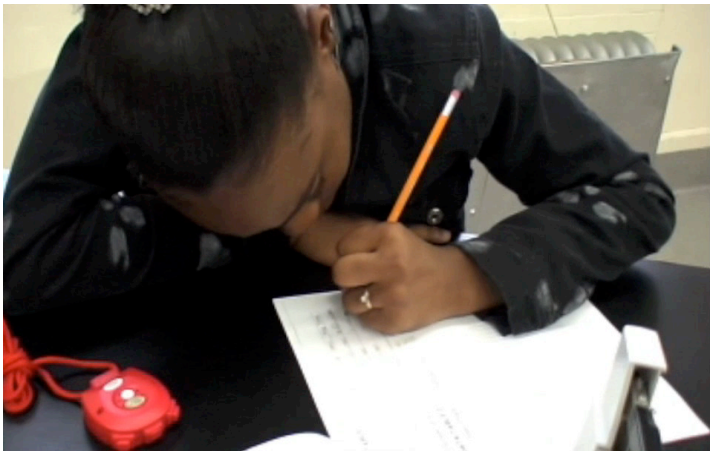

Fig.5.4 Star is attempting to appropriate the resources available (Ashley's method of time conversion)

The Appropriation of Resources

In episode 3, from the moment I arrived at the group, I was an active participant. I interacted with Stephanie and Star and challenged them to come

[27] I take Tobin and Roth's position that science educators need to attend to cultural issues; and they must not treat science language as independent of the everyday language in which ultimate explications are articulated.

up with a particle design that reaches the distance between (A&B) in one minute. Based on my experience I knew that unless I gave the group explicit directions of what to do they would attempt to change more than one variable at the same time to get the correct answer (turn 47). Although I knew the answer I asked them questions that would stir their curiosity, and at the same time made it clear to the students that they would decide what to do, and when and how to do it. That is, through my verbal and non-verbal practices I expanded the agency of all four students. Fig. 5.5 shows the orientation of the four stakeholders in this episode.

Fig.5.5 The stakeholders lean forward to interact about the settling rate of one gram piece of clay.

There was a degree of synchrony among the stakeholders. They leant forward as I gave them directions of how to proceed with the remainder of the lab. Turner (2002) argues that synchronous gestures among individuals are not the norms. It requires the initiation of solidarity that is supported by common goals and motives. This exchange of roles is a learned behavior that Star adopted as a result of being in the cogen. The negotiating aspect of the cogen

became a reference point for Star to appropriate as a resource in everyday interactions.

Fig.5.6 shows that Star is focusing on finishing her calculations. The transactions between the stakeholders were in synchrony, mutually constituting a dynamic structure that afforded individual and collective agency. I spoke for 4 of the 14 turns and in doing so I provided suggestions for conducting the activity (turn 46, 49). I showed evidence of emotional solidarity (turn 49) by understanding what Star meant by her questions (turn 47).

Fig.5.6 Star weighs one gram of clay

Star was central throughout the activity because she controlled the stopwatch in a timed activity and when the activity evolved into a different task that required weighing she moved the triple beam balance directly in front of her (Fig. 5.8). Maria was silent and attentive throughout the transaction, observing the group weighing the different parts of the clay, and shaping them into different designs in order to meet the task. The silent pauses ranged from the immeasurable to 2.8 seconds, providing further evidence of fluent transaction

among the group members.

Episode 3

40. Shady: Star this is my friend.
41. Stephanie: [he told us↑]
42. (2.8)
43. Shady: ((backing out)) i am sorry↓
44. Shady: now::: i am going to give you a piece of clay (1.6) i want you to weigh 1gram:: and design a shape that would travel the distance from point A to point B in 1minute=so what shape do you think is going to travel the distance in 1minute?
45. Star: [does it have to be 1 gram?]
46. (1.6)
47. Shady: ye::s↑ ((pointing at Star and laughing))
48. Star: ((gives up the stopwatch and puts the triple beam balance in front of her, looking at Maria)) are we suppose to break this? ((pointing at the clay))
49. Stephanie: ((roles up the clay into a ball shape, and put it on the triple beam balance))
50. Star: ((holds the stopwatch, and gets ready))
51. Maria: ((drops the clay into the cylinder))
52. Star: 3 seconds
53. Ashley: =try to make it flatter
54. (1.9)
55. Stephanie: make it smaller
56. (1.3)
57. Maria: maybe we should make it a square
58. (1.7)

A striking feature of the settling lab is the intense participation exhibited by the four stakeholders, and in particular Star, Stephanie, and Maria. The students showed a sense of independence, and collaborated effectively to reach their learning goals. The transactions were fluent (timely, anticipatory, and appropriate) with little or no pauses. The ontological authenticity criterion was evident in my response to Stephanie's attempt to shut me down in (turn 41). I backed down (turn 43), instead of confronting her in a manner that might have produced negative emotional energy, and lowered my voice pitch

to attain the larger goal, which was to maintain positive emotional energy.

I have learned through my cogen sessions the value of respect, and its centrality in youth culture. Hence, I made sure that I was friendly, fair, and firm in dealings with the students, but most importantly when to confront a student regarding a mishap, and when to let go. I dealt with misbehavior in a decisive and brief manner. Therefore, even when my interactions led to the production of negative emotional energy, I followed with an appropriate repair ritual, which allows the repair of breaches in social life that might cause the reeducation of feeling of affiliation (Pitts, 2007). For example, it could be as simple as saying to the student "sorry I did not mean to cut you off".

Emotions and Membership

In this chapter the rules that structured the lab afforded the students having the autonomy to decide what, when, and how. Also, they participated in a relaxed way by setting their own pace. As the students interacted in groups they were playful, but highly focused on finishing the task at hand. Although their face-to-face interactions might have been tense at times, that did not produce negative emotional energy because it is a part of their usual rituals. There were no examples of negative emotions such as anger, frustration, and disappointment. Instead there was persistent evidence of satisfaction, interest, curiosity, and perseverance.

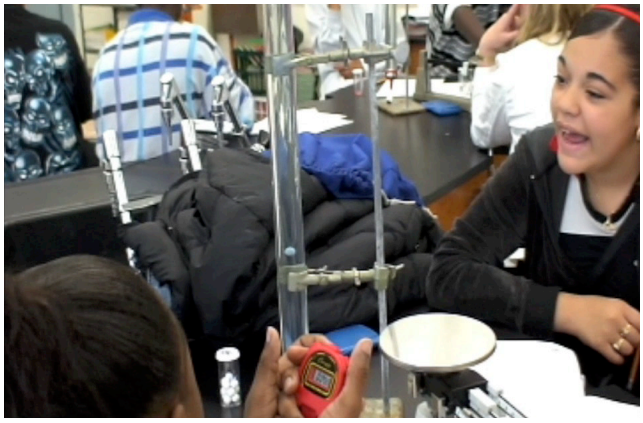

Fig.5.7 The group is enjoying emotional effervescence as their particle made it to point B in one minute

The relationship between the students was playful, humor was prevalent, but was not distracting (Fig.5.7). For example, as I rebuffed Star's attempts to change more than variable at a time to achieve the required results, Star laughed, the other students laughed, and the incident generated positive emotional energy. It was apparent that they enjoyed one another's company, and even when Star attempted to control the resources by holding on to the stop watch, and eventually the triple beam balance it did not produce such a lasting negative effect that hampered the group's effort to finish the task at hand. Throughout the activity there was evidence of collaboration, and successful interaction chains that were sustained across boundaries of gender, race, and class. There was little evidence of down time.

Contrary to the current preferred group methodology (cooperative learning) there were no teacher-assigned roles to the students, a structural feature that afforded students greater flexibility. Watching other students was fine, and so was co-participating in more overt ways. Ashley, who was initially at the

periphery, became central to the activity when she felt that it was appropriate for her to contribute to the group. Her contributions were met with collective effervescence, increasing her sense of group membership. Maria interacted successfully for prolonged periods of time. All four students demonstrated a high degree of resourcefulness in appropriating resources to support their learning.

Self-regulation of learning and behavior was an important aspect of the students' learning and academic performance in the lab context. The students developed their own strategies for planning, monitoring, and modifying their learning. The students' perceptions of the classroom as well as their individual motivational orientations and beliefs about learning were the cornerstones for self-regulating their learning. Based on my conversation with my cogen team members I learned that the important issue for students involved the question, "How do I feel about this task?" Again, there are a variety of affective reactions that might be relevant (such as, anger, pride, guilt), but in the lab-learning context one of the most important issues seemed to be ILSE test anxiety. I made all possible attempts to reduce the students' anxiety by emphasizing that if they learned the materials well that would ensure their success. During my interaction with the students there were numerous examples of successful interactions. That is, there was ample evidence to support the existence of the newly formed interstitial culture that resulted from participation in the cogen. This culture fostered multiplicity of opinions. I listened attentively to the students, and responded to their questions and

assertions. I treated my students with respect and dignity.

Lessons Learned

I began the study by highlighting the importance of successful face-to-face interactions in developing productive learning environments. A microlevel analysis of face-to-face interactions in the lab activity revealed the meanings imbued in verbal and nonverbal gestures of such interactions, yielded supporting evidence that these transactions gave rise to emotions that were "co-articulated and co-communicated-and transmitted" (Tobin, 2008, p.3). These emotions structured a successful teaching|learning environment.

The data from this particular activity suggested that the students produced cultural artifacts across different categorical representations such as ethnicity and social class to meet their goals|motives. This study provided evidence that successful face-to-face interactions produced resources that were appropriated by the students, who also reproduced, and transmitted cultural practices to and from other social fields such as, cogen, and the other classes to support their learning.

Although the lab did not follow the scripted roles of the cooperative learning model, it produced successful transactions that structured fields that were highly productive for science learning and other cultural forms. These included ways of interacting across social categories of difference. These transactions were fluent in science (timely, anticipatory, and appropriate), and provided me with the supporting evidence that my students have achieved the

objective of the lesson. Later, the materials and equipment still functioned as a reference point and constituted part of the physical aspects of the structure that mediated the agency|structure[28] dialectical relationship. Subsequently, students frequently employed different objects or gestures to represent a relevant aspect of the activity. When asked to provide an explanation of a certain phenomenon at hand, students relied on drawing on knowledge acquired in different fields such as; drawing fluently on learned cultural artifacts from the cogen sessions to explain the event.

Roth (2008) argues that as individuals deal with differences, they constantly engage in cultural bricolage, appropriating resources from different social fields to meet their goals, producing not only new, diverse, creolized forms of habitus, but also producing hybrid identities. As a teacher/researcher I have utilized the concept of diaspora, which came to describe the experience of students as they migrated across different social fields as a tool to study and theorize a variety of students' school experiences. It provided me the opportunity to theorize the tacit and almost unconscious modes of cultural/social domination occurring within the every-day social interactions that African American and Latino students face in schools that, at their core, adopt a White middle-class ethos. One characteristic difference between the culture of the school and that of African American culture is the experience of time, and the use of narrative forms. Thus, the typical participation structures in White middle-class culture—one speaker at a time, individual students

28 In this study, I follow the suggestion of other researchers to use the Sheffer sign "|" for producing theoretical concepts consistent with a dialectical approach (e.g., Roth & Lee, 2004).

deliver their answers before the group, thereby subjecting them to public scrutiny; might not produce the intended learning outcomes for African American students as in settings that are structured to afford polyphony.

Accordingly, when attempting to support my claims by using conventions of conversation analysis I had to take into account that they are interpretive in nature, and using them in a verbatim manner might lead to misguided conclusions. For example, as I described in this chapter, based on my initial microanalysis, I felt that the students experienced cultural misalignment, which was articulated in discernable pauses and voice intensity. Contrary to my initial analysis this cultural misalignment did not produce negative emotional energy as evident from the third vignette, because it is part of the students' life worlds. I brought up this vignette to my cogen group in order to resolve what I thought might be a contradiction. The students mentioned that regularly they undergo constant transactions, some of which might be associated with the production of negative emotional energy. As long as these contradictions do not lead to the production of social violence, the stakeholders ignore it, because the students' social network, which is based on affiliation, supports the production of emotional solidarity.

CHAPTER 6

SUMMARY, CONCLUSIONS & IMPLICATIONS FOR THE STUDY

My Intellectual Journey from Dichotomy to Dialectics

All things in the creation exist within you
and all things in you exist in creation;
there is no border between you and the closest things
and there is no distance between you and the farthest things,
and all things, from the lowest to the loftiest
from the smallest to the greatest,
are within you as equal things.

(Oneness by Kahlil Gibran)

Critical pedagogy offered a compelling call for attention to larger contextual factors affecting the performance of marginalized students. It argues that this performance is structured not only by schooling, but also by related issues that include social categories pertaining to students and teachers, such as their socioeconomic background, cultural differences, and personal motivations. Furthermore, academic outcomes of schooling are constructed by complex interactions between forces of racism, and sexism. For example, although my research was conducted in Astoria Intermediate School, which is characterized by being a low performing school, there were pockets of high achieving students at the fast track level, who got accepted to elite specialized high schools. This example shows that students' achievement is mediated by far

more complex factors than just being in the right school, or in the right neighborhood. This study attempts to contribute to our understandings of the structures that are most salient to academic performance in an urban middle urban school, and the ways in which teachers, students and other stakeholders such as school leaders and parents can act to overcome pervasive hegemony.

Schooling, by design, is an intricate process that should involve researchers, curriculum developers, policy makers, teachers, parents, and students at all levels. In order to leverage successful education, the voices of these constituents should be incorporated in the decision making process. This study aims at expanding the agency of all participants by providing them the means to express their opinions and act collectively to transform oppressive structures.

What this Study was About

Because of increasing diversity of the student population and the shortage of effective science teachers, a study that tackles how cultural and social categories mediate teaching and learning is vital to urban science education. This study points to several implications for helping science educators in developing and advancing democratic practices within the science education context. Overtime, it is anticipated that participating teachers will develop a new dimension that scaffolds science education for democratic citizenship. By examining the emergence of growth, and development through cogenerative dialogues (i.e., cogens), teachers, together with students, should be able to

create an alternative space to build a collective framework that informs teaching and learning standards, practices, and citizenship.

This authentic ethnography focused on improving teaching and learning of science in an eighth grade inclusion class in Queens, New York City. The study was conducted during the 2006-07 school year. The research focused on using the participants' cultural capital as resources to inform the design of a research protocol, and assist in choosing and interpreting data sources. The study utilized autobiographical reflection, cogens, interviews, videotaping, and audiotaping as data sources. The cogen team varied in size from a whole class, to two students, to whole class again. The study focused on me, an Egyptian immigrant science teacher, and two urban African American students, Star and Steve. Both students were from disadvantaged homes, with a history of family trouble. They were considered at risk with regard to their positions in society, and as well as within the small learning community of their low academically performing school. The student-researchers were different from one another, being selected in a hermeneutic dialectic manner to represent the most opposite extremes of social space.

As an Egyptian immigrant science teacher I used cogen not only as a methodology to navigate cultural fields, but also as a field where interstitial culture was produced. The culture produced in the cogen got reproduced and transformed in the class. Cogens provided me with the space and time to produce a better understanding of my students' cultural capital and they got similar opportunities to learn about my culture. The cogen provided me with

the face-to-face transactions to adapt my teaching to the cultural capital of my students. Similarly, the students needed the cogen experience to adapt their schemas and practices to mine. In this study, cogens were fields in which culture was produced to afford successful interactions and the accomplishment of individual and collective goals. Importantly, this culture was later reproduced and transformed in my science classes to benefit all learners, not just the participants in cogens.

What I learned

The findings of the research reveal that using cogens in the classroom has expanded the agency of all participants and in particular urban youth from one of most challenging situations. Moreover, the results of the study showed that participation in the cogen provided opportunities for the students to identify the macro|meso|micro structures that truncated their agency and collectively as a research team we developed approaches to alter these oppressive structures. For instance student participants proposed to the administration a different policy for school uniform that allowed for a greater flexibility, and creativity among the students. They also, suggested that cogens could be instituted throughout the school, advocating for their power to transform teaching and learning.

As usually is the case with this type research, due to the emergent research design, some of the questions that were posed throughout the study became more important while others blended into the background. In the section

below I address what I learned in regards to the questions that had most salience to this research.

How did participating in cogenerative dialogue structure the practices of the stakeholders?

General findings throughout the different stages of research have shown an increase in peer's learning, and the use of science discourse, pointing to the importance of the structural features on the students' learning outcomes. By examining the emergence of growth, intersection, new understandings in practice and development through cogens, I, together with students, created the space to build a collective framework to inform learning standards, practice, and citizenship.

The conversations during these cogens became resources to draw upon in designing research protocol, interpreting data, and transforming cultural practices that were not conducive to teaching and learning. For example, after the students' recommendations, I reduced the incidence of some practices, such as putting emphasis on uniform tasks, which contributed to counter productivity amongst the students. A higher quality of student-student, and teacher–student discourses were evident in solicitations; responses, reactions, and structuring became evident after analyses of our data. For example, one of the issues addressed during the cogen sessions was the impact of the scientific discourse on subverting the goal of "science for all." In dealing with this concern, I mentioned my view of scientific discourses as an accessibility issue

and how it would expand the students' communication skills. The cogen team composed of me; Star and Steve then developed different procedures that supported student comprehension of science content. Such examples are pre-assessing student knowledge of relevant vocabulary terms through cooperative learning during a word grouping activity, and teaching mnemonic devices for easy memorization of definitions.

To what extent is the culture produced in cogens enacted in the classroom and vice versa?

The results indicate that cogens became seedbeds for the production of new culture that intended to expand the agency of the participating stakeholders and was oriented toward success. These new understandings and sensibilities that unfolded in cogens resulted when I engaged in conversations about daily practices with my participating students. These conversations aimed at producing a culture of shared responsibility within the classroom. Because fields have no boundaries, some of these new skills and practices get reproduced, and transmitted in the classroom and in other fields. For example, during a lab activity I experienced social violence from one of the students (she shut me down during the conversation), I backed down instead of confronting her as I usually do. My response circumvented the possibility of creating negative emotional energy that might have disrupted the learning environment. I have learned through my cogen sessions the value of respect, and its centrality in youth culture. Hence, I made sure that I was friendly, fair, and firm in dealings with the students, but most importantly when to confront

a student regarding a mishap, and when to let go. I dealt with misbehavior in a decisive and brief manner. Therefore, even when my interactions led to the production of negative emotional energy, I followed with an appropriate repair ritual. Hence, the participation in cogens gave rise to a culture of improving teaching and learning of science across different social fields. As the teacher-researcher, I learned along with my students how to communicate across different categorical representations such as race, ethnicity, class, gender, and age.

These outcomes became a recurring theme across my research findings. For example, the data obtained from the settling rate lab activity suggested that the students produced cultural artifacts across different categorical representations such as ethnicity and social class to meet their goals|motives. For example, when Star (African American) failed to finish the calculations she sought Ashley's (Latina) help to convert seconds into minutes. In this situation, Ashley appropriated the resources to gain symbolic capital that she could eventually transfer into social capital in accordance with the capital exchange helix. When Ashley stepped forward as an expert on unit conversion, Star was willing to allow her to show them what to do and advise when they should do it. This was evidence of what Tobin (2006) described as "intermittent participation," in which the students maintained intense focus for intermittent periods. This intense participation was coupled with mutual focus, and solidarity. The study provided evidence through conversation analysis, with its associated gestures that successful face-to-face interactions produced

resources that were appropriated by the students, who also reproduced, and transmitted cultural practices to and from other social fields such as, cogen, and the other classes to support their learning.

How does restructuring cogen to one-on-one mediate its outcomes?

This research aimed at exploring different means by which participants' agency could be expanded. I used one-on-one cogen as a tool to narrow the cultural diversity among the participants (students and teachers). The participants shared the responsibility not only for what happens in the cogen, but also for the improvement of teaching and learning in the classroom. Because of the structure of the one-on-one cogen the othering process was not as explicit as in traditionally designed cogen (teacher-researcher, and two or more students). Participating in the cogen has sponsored the production of an interstitial culture that is polyphonic and polysemic.

The participants in the cogen acted as cultural brokers, through the use of one-on-one cogen I got the opportunity to discuss issues related to race and social class, self-governance and how these issues are situational. In a conversation with Steve about how the race of the teacher might mediate the outcome of teaching|learning in the classroom, he elaborated that the construction of race as an identity marker is mainly a media product. For, example, if you are Black you would normally appear as a gangster, if you are Chinese you have to know Karate, and if you are White you have to be rich. In return, I had the opportunity to explain that in Egypt race might not be the most salient categorical representation, social class, and tribal affiliation are key stratifying

factors. Through our conversation, and others alike I had the opportunity to explore the stance of some of my students, and they got the opportunity to explore my standpoint. The cultural practices in the cogen got transmitted to the class and vice versa, because fields are sites where culture gets enacted, and these sites overlap because of their boundless continuity. The cogen team learned how to negotiate differences across the social categories of age, race, and social class.

How did the participation in cogen improve cultural adaptivity among the stakeholders?

Being a successful teacher to the fast tracked students made little difference to the way I was accepted by the students in my inclusion class. I had to learn the culture of the students and they needed to learn how to effectively interact with me, and assign me the status of being their science teacher. For example, as I described in chapter 5, based on my initial microanalysis, I felt that the students experienced cultural misalignment, which was articulated in discernable pauses and voice intensity. Contrary to my initial analysis this cultural misalignment did not produce negative emotional energy (as evident from the overlapping speech, voice intensity, and gestures), because it is part of the students' life worlds. The students mentioned that regularly they undergo constant transactions, some of which might be associated with the production of negative emotional energy, as long as these transactions do not lead to the production of social violence, the stakeholders ignore them, because the students' social network, which is based on affiliation, supports

the production of emotional solidarity. That is students can tune into what they sense is salient and tune out distractions that might act as sites for resonance for other fields.

I had to undergo an ontological transition until I could teach, as I wanted. Tobin (2006a) states that effective teaching in urban science classrooms requires more than a conscious understanding of the need to show respect and build rapport with minority students. Success necessitates forms of coparticipation that are culturally fluent (anticipatory, appropriate and timely). These requirements of coparticipation point to the participant' goals|motives. A one-on-one cogen could be one of the ways that this could be achieved. The results show that the one-on-one cogen became a site that catalyzed positive change, and improved cultural adaptivity among the participating stakeholders. It provided the participants with the time and space to improve their understanding of the factors that contribute to the cultural differences between teachers and students.

What roles do successful face-to-face interactions play in fostering solidarity, and entrainment in the classroom?

I began the study by highlighting the importance of successful face-to-face interactions in developing productive learning environments. Microlevel analysis of face-to-face interactions in the lab activity revealed how verbal communications are coordinated with non-verbal transactions to create solidarity and success in learning and teaching science. Microanalysis also provided supporting evidence that these transactions gave rise to emotions that

were “co-articulated and co-communicated-and transmitted” (Tobin, 2008, p.3) These emotions structured a successful teaching|learning environment. Successful face-to-face interactions have proven to be essential constituents in developing solidarity in the classroom, consequently, improving the teaching|learning environment. In a lab activity that could have been a site for the production of negative energy as a result of cultural misalignment the students participated in a culturally fluent manner. The production of a successful learning environment supported my claims that the participation in cogens has transformed the culture of the classroom giving rise to solidarity, entrainment, and identities affiliated with science.

How did the participation in cogen improve science achievement?

Utilizing skills learned in the different social fields such as, cogen, home, street, and the classroom the students produced successful transactions that were highly productive for science learning and other cultural forms. These included ways of interacting across social categories of difference. These transactions were fluent in science (timely, anticipatory, and appropriate), as it was evident in the student-student, and student-teacher transactions across the different fields (the classroom, and the lab). These data sources provided me with the supporting evidence that my students have achieved the objective of the lesson. In addition, all the participating students from the cogen passed the Intermediate Level Science Examination (ILSE), which is the science state test, and graduated Astoria Intermediate School. Steve, moved to Philadelphia with his father, and he is doing well in high school. Star is currently, attending

Long Island City High School, and she is planning to be a nurse.

The following were the general findings of the study:

1. Cogen provided innovative ways to share roles, rules, resources, and promote communal practices

2. The participation in cogen has led to the expansion of teachers' and students' agency

3. Cogen produced a field of cultural production; this culture was based on mutual respect of multiplicity of opinions

4. The use of cogen provided a field where teachers and students acted as coteachers and cultural brokers

Research Limitations

Although much was learned from this research, there were limitations. One limitation had to do with the fact that cogenerative dialogue could have generated the same positive outcomes if it was instituted school wide. Most of the teachers in the school held steady to their notion of *control over* the students. Additionally, union rules did not allow the school to enforce a practice that has proven its success in fostering a conducive teaching|learning environment. As a measure of ethics, equity, and good practice, all classes should have had an opportunity to be involved in cogenerative dialogues. Since structures from within and outside of the school were obstacles to making changes that would have benefited students and teachers there is a necessity

for educators, especially policy makers to be reflexive about the interface between research and practice. We are past the stage of blaming researchers for disconnections and it is time for a policy overhaul to remove hegemonic structures supported by powerful institutions like the Union and the Department of Education.

Most of the cogen meetings were held either during lunch or after school, which limited the participation of large numbers of students. Assigning a specific period during the day for cogen would have been ideal. That is, a within-school structural change is needed to afford participation for all teachers and students. The students suggested that cogenerative dialogue would be instituted instead of the advisory sessions, since the advisory sessions were designed to be gender and age specific.

Policy implications

Implications for Policy Makers and Curriculum

In an era of assessment-driven educational practices, it is essential to identify how cultural and social perceptions among the stakeholders might stir the interest of urban students in science. Diversity in race/ethnicity as well as social class is bound to continue, due to the nature of globalization and the dream of establishing a world without borders. The role of education in such global environments is critical in achieving equity.

This research is of direct relevance to the education community because it has

implications for practice and policy. Teachers should undergo a continuous system of cultural training and professional development that includes when and how to use cogens, early coursework, clinical experiences, induction, and career pathways supported through ongoing development prior to obtaining a teaching license. As an immigrant science teacher I have to admit that I was ill-prepared to teach my minority students. I got my teaching license through what is known as the transcripts evaluation path, in which I was required to take a crash courses in multiculturalism, and special education. Those who enter the profession from other science careers (as I did) need opportunities to link their professional knowledge and experience to the knowledge base in teaching and learning and the realities of working in classrooms. These insights become even more critical as the challenges of globalization create a growing tension between local and global cultures. The awareness of multiculturalism and its impact on education is an essential component of successful teaching. The accidental or the intentional omission of the importance of multiculturalism would interfere in a negative way with teaching /learning of students, especially in high poverty urban schools.

Implications for Further Research

The current push for creating small schools, as communities of shared motives and goals where individuals have to think in terms of the plural, tend to be exclusive rather than inclusive. It exacerbates inequalities in race, ethnicity, class, and sexual orientation. Theoretically speaking, it is cosmopolitanism conceived around sameness. Theorizing cosmopolitanism around differences

make it a more inclusive, with moral solidarity becoming the glue that binds the participating stakeholders. The notion of cogen as a seedbed for the production of culture that is polysemic and polyphonic matches Derrida's argument for the creation of free cities where immigrants enjoy their newly discovered freedom. Cogen could be used as an alternative to the advisory sessions, since so many students believed that their advisory sessions fail to adequately address critical concerns of urban youth, such as sexuality issues and drug and alcohol abuse, and that advisors fail to develop a trusting and caring relationship.

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