Research in Science Education, 1999, 29(2), 171-187

Reproduction of Social Class in the Teaching and Learning of Science in Urban High Schools

Kenneth Tobin, Gale Seiler and Edward Walls
University of Pennsylvania

Abstract

The study examines the teaching and learning of science in an urban high school characterised by African American students from conditions of relative poverty. An interpretive study was undertaken involving a research team that included the teacher in the study and a student from the school. Despite the teacher's effort to enact a curriculum that was transformative the students resisted most of his efforts to enhance their learning. The study highlights the difficulties of engaging students when they lack motivation to learn and attend sporadically. In an era of standards-oriented science in which all students are expected to achieve at a high level, it is essential that research identify ways to tailor the science curriculum to the needs and interests of students.

To what extent is it possible for all Americans to learn science in ways that are transformative in that what they learn enhances their horizons of opportunity? We believe that an effective education in science has the potential to transform the lives of all Americans but we are sceptical about the possibilities of all learners attaining the Standards listed in many of the State and National sets of intended outcomes (e.g., National Science Education Standards; National Research Council, 1996). The National Science Education Standards recognise equity as an essential goal and place the responsibility for providing equitable access to science education on "all those involved with the science education system " (p. 2). However, as Rodriguez (1997) points out, the standards do not directly address "the ethnic, socioeconomic, gender and theoretical issues that afflict science education..." (p. 19).

Because of the enormous diversity of starting out points and interests it seems unlikely that a monolithic description of what is to be attained can suit the goals and needs of all Americans. It is one thing to exhort teachers to enact a curriculum such that all students attain high standards and it is quite another to roll up the sleeves and get it done. Nobody that we know is against high standards for all learners. But how can this be accomplished across geographical areas such as the United States of America in which there are staggering differences in the social and cultural capital available to support the learning of K-12 science students? Barton (1998) concluded that a major obstacle for students in poverty accomplishing science for all is a tendency to regard science as a central, static discourse. Instead, she argues for a reflexive relationship between science and all, a relationship in which both can move. This way of thinking about science leads to a situation in which science knowledge is perceived as connected to the learners and their lived experiences. Her descriptions of research on the teaching and learning of science to homeless children provide numerous examples of highly relevant and socially contextualised learning in which her students attained impressive levels of success. We too want all learners of science to attain the highest possible standards to equip them for productive lives in the communities in which they reside and live their lives. Although we acknowledge the challenge of teaching students in all circumstances, the issues that frame this research relate to the teaching of students from urban schools in which

most are from conditions of relative poverty and experience the hardships of being minorities and obtaining an education that is transformative.

The evidence from research accords with common sense in that a lack of educational resources in urban schools contributes to the failure of students in poverty to perform at acceptable levels (e.g., Diver-Stamnes, 1995). Students in poverty tend to attend schools that use outdated textbooks, have minimal laboratory equipment, and have limited science club participation or provision for after-hours science. In addition, for students in poverty, participation is restricted in summer camps, poorly qualified teachers tend to be assigned to their schools, and science education is not perceived as a priority. Barton (1998) indicates that factors associated with the performance of students in poverty extend beyond the availability and use of resources such as hands-on laboratories, field trips and role models. Barton (p. 539) commented that:

> If children in poverty are to participate in a science for all program in genuine ways, then their education must be viewed as something more than access to laboratory resources and certified teachers, although these are important and, sadly enough, often overlooked.

A framework proposed by Ogbu (1992) allows us to examine teaching and learning of science in terms of sociocultural factors relating to the presence of minorities in a dominant culture. One of Ogbu's categories, involuntary minorities, includes people who are in the mainstream culture against their will, due to historical factors such as slavery, conquest, colonisation, and forced labour. Involuntary minorities often experience difficulties with school learning due, in part, to cultural inversion, a tendency to regard certain forms of behaviour, events, symbols, and meanings as inappropriate because of their association with the mainstream culture. Fordham and Ogbu (1986) noted that peer pressure not to act White was a factor that limited the opportunities of some African American students. Accordingly, teachers might recognise a tendency for some minorities in a classroom to reject the norms of the mainstream white culture and perhaps even endeavour to disrupt that environment. Willis (1977) described a counter-school culture among working-class males in England which also was educationally disabling and thus reproductive.

There is a tendency for the primary discourses of children from the homes of working class or unemployed not to connect well with a scientific discourse. Accordingly, teachers enact the curriculum for such students to emphasise the learning of scientific facts and to de-emphasise conceptual learning, inquiry and scientific habits of mind (Anyon, 1981). Atwater (1996) noted that the discursive resources of the primary discourse do not fit well with the goal of learning canonical forms of science. Because school science typically reflects White, middle-class experiences, and might have little relevance to the lives of students in poverty, there is a risk that school science simply maintains the status quo and pushes minorities even further toward the margins. Since students from circumstances of poverty may enter school science with experiences or language uses that are different from what schools or science legitimate, there is a high priority for teachers to make explicit the assumptions and expectations for participation in school science.

Recent studies undertaken by Yerrick (1998, 1999) provide graphic examples of the difficulties of teaching low-track students in rural high schools. His research shows clearly that teachers can encounter significant challenges while trying to enact a challenging inquiry-oriented curriculum with students from poor rural communities. We recognise distinctive connections between the research undertaken by Yerrick and that described in this paper.

This paper describes what happens in a chemistry class taught by the first author in the spring semester of 1999. The research identifies patterns and issues arising from an analysis of the teaching and learning and pertaining to the reproduction of social class and disadvantage. These issues include students having limited canonical knowledge of chemistry, little evidence of

motivation to learn or participate in the curriculum, sporadic attendance at school, difficulty in enacting whole class interactive activities and low expectations of teachers and students for what can be accomplished.

Methodology

This research is set in large urban high school that caters mainly for students living in the neighbourhood of the school. City High school (CHS) has an enrolment of more than 2,000 students, 98% of whom are African American and from conditions of poverty. Enactment of a policy to create small learning communities (SLCs) produces schools within schools, each containing 180 to 230 students. The idea is to allow students to experience a small school and thereby to create a feeling of family, belonging, school loyalty and shared values. The enactment of the SLC policy has markedly changed the dynamics of the school, which is now safer with fewer major fights and disruptions. It also is possible to focus the curriculum to an extent on the needs and interests of students. However, the SLC policy also may have introduced some inadvertent disadvantages, some of which are discussed in the paper.

This study explores the teaching and learning of science in the *Opportunity* SLC[1] of CHS. The students in this SLC have been discharged from other SLCs or other high schools for academic failure, behavioural problems, or non-attendance. *Opportunity* has one science teacher who teaches all science classes. The school bulletin lists *Opportunity* as "an academic and resource program to assist students who need to acquire additional academic credits because of extended absences or other extenuating circumstances. These credits will enable the students to achieve appropriate grade level or graduation requirements." Some stakeholders interpret this stated mission to mean helping students to acquire the needed credits, course content, and behavioural skills to allow them to move out of *Opportunity*, however to others it does not hold this intent. Thus the purpose of the *Opportunity* SLC is rather unclear.

A research team includes Ken, a teacher-researcher, Gale, an experienced urban science teacher and a current doctoral student, and Ed, a student from *Opportunity* who provided insights into the life of a student, the neighbourhood, and the extent to which the home environment supported learning. The study began in the fall semester of 1998 when Gale and Ken observed the teaching of science and arranged for Ken to co-teach with Mr. Spiegel, the science teacher in *Opportunity*. During the spring semester of 1999 Ken taught chemistry to the first period class in *Opportunity*. The SLC had just changed to block scheduling whereby each class was 75 minutes. Students took three classes a day and in the afternoon there was a service learning class. The chemistry class commenced at 8:15 a.m. and extended until 9:30 a.m. After the first week of classes Ken's role changed from co-teaching assistant to principal teacher of the class, with the responsibility for deciding what activities would be taught each day, setting assessment activities and assigning grades. For all intents and purposes he was the teacher of the class and Mr. Spiegel was his assistant.

The data sources for this study are derived from all lessons in a 10-week unit on chemistry. They include field notes written by Ken and Gale, digital photographs of the students at work during the class, and examples of student work such as written classwork, tests, and homework. Two videotapes of Ken's teaching and another of some of the students responding to questions posed to them by prospective teachers were data sources that informed the analyses and interpretations. Ed used a computer to respond in writing to questions posed by Ken and Gale. Ed also participated in oral interviews with Ken and Gale, interviewed other students, and prepared texts about his roles and biography as a student, his home life, and his beliefs about learning and

teaching. The selection of participants to interview was based on a dialectical principle (Guba & Lincoln, 1989) in which we purposively selected eight students to obtain diverse perspectives on teaching and learning. Ed interviewed those students who could provide us with insights into what we were learning at the time and then selected others to get diverse perspectives on those emerging issues. An additional data source consisted of Ed's voice-over commentaries on what he found to be salient in the oral texts of those he interviewed.

The approach we adopted in the writing of this paper was to transcribe the audiotapes of the interviews undertaken by Ed. We then assembled narratives written by Ken about his experiences as a teacher during the chemistry course. These narratives together with the transcribed interviews incorporated a number of significant themes that were identified as those about which we would write. The major integrating theme for this paper pertains to the apparent resistance shown by students to an enacted curriculum that endeavoured to raise the standards of student attainment. At that stage we decided that Ed and Nicole provided the texts that best illustrated the key issues associated with resistance. Nicole was selected from possible students because she was amply represented in the selected themes in both the interview transcripts and Ken's narratives. Although examples from other students could just as easily have been used we opted to use only examples from Nicole and Ed to ensure that the manuscript did not become too complex to follow because of the inclusion of too many characters.

The paper includes descriptions of each of the issues, exemplar data from the various data sources accessed in the study, and a conversation between the authors of the paper around the critical issues. We used the technique called metalogues (Bateson, 1972), defined as "... a conversation about some problematic subject. This conversation should be such that not only do the participants discuss the problem but the structure of the conversation as a whole is also relevant to the same subject" (p. 1).

Resistance

The dictionary defines to resist as to prevent something from happening, or to refrain from accepting or yielding to something. Often in the past few months we have wondered why the students in *Opportunity* are so resistant when we just want to help them learn science and to try to connect science with their lives. Many authors describe the spiral of subject failure and grade retention resulting in disenfranchisement from school. Michelle Fine (1996) described those students who actually dropped out as being more critical of their schools than the students who remained in school. However the students in *Opportunity* do not fall clearly into either of the types of students in Fine's work. They are neither dropouts nor students remaining in their schools. At *Opportunity* some of the students may be considered "pushouts" because they have been discharged from other SLCs or schools and sent to *Opportunity*. Others who have been off-roll for a considerable length of time might be considered "dropins" since they are dropouts returning to school. It is conceivable that since *Opportunity* is viewed by these students as their final opportunity for education, that students might react differently than in more traditional school settings. Other authors have described African American students becoming alienated and apathetic to school. While there are some students in *Opportunity* who might be identified as apathetic and disinterested in a passive sense, others are much more active in their resistance. Perhaps it is because of the last chance nature of this setting that their resistance is so overt, and it can be understood as being directed not toward learning as it appears, but toward the institutionalised failure that is implicit in their school.

Every day Ken encounters tremendous resistance from the students. It no longer surprises us. In planning a curriculum to intersect with their needs, he speaks with as many students as will speak with him and works from his own perceptions of what is likely to be transformative in creating opportunities and expanded horizons for them. He relies on co-planning with Mr. Spiegel and he has become wiser too in the way he deals with students and interacts with them socially and professionally. His goals are to find ways in, to locate cracks in an exterior of hardness that denies him the right to teach them. But each day his plans fall short of the mark, in large part due to student resistance.

In the sub-sections below Ken describes his perceptions of some of the issues associated with resistance. A conversation between the authors and Nicole further elaborates those issues.

Ken's Perspectives on Students' Resistance

The resistance begins in the hallways as I enter the school. At the doors I push through a crowd of students trying to beat the 8:15 a.m. deadline imposed by the school. All students enter through two formidable steel doors because of the need to check for student ID and possible weapons. If students are not through the doors by the deadline they will not be admitted to their first period class and have their student ID taken from them, not to be returned until they serve a detention after school. As I walk along the ground floor corridor toward my classroom I see many of the students from my class. They seem to ignore my presence. If I greet them there is only the slightest acknowledgment that I even exist. When I open the door to the classroom few enter and some of those who are at the door may choose to wander around the hallways, to return some 15 minutes into the class period. Day after day it is the same pattern.

There are several possible reasons for students not wanting to be overtly enthusiastic about my presence in the school. First, it may not be perceived as cool to interact with teachers and few students do interact with the teachers as they pour into the school close to the start of the school day. Second, it might not be customary for teachers to greet students so overtly and the strangeness factor might take time to overcome. Third, it might be a sign of disrespect for a person who is seen as taking away their regular teacher who is a popular figure within *Opportunity*. Fourth, they may not see me as a stable part of the school structure and might expect me to leave as soon as I attain my goals.

The students who enter the school at the appropriate time but then do not enter the classroom until well after the start of the first period are avoiding class. The school has non-teaching assistants and a coordinator for each SLC who are to get students out of the hallways and into the classroom. However the students are able to avoid detection and remain free for extended periods of time. Some manage to avoid coming to chemistry at all and may join other first period classes with their friends instead of coming to their scheduled class.

Speaking out is a tactic employed by the students when they want to gain the support of their peers pertaining to issues involving the teacher. Speaking out occurs most often when a student is being challenged for breaking the rules in some way. The intent is to get others to join the protest and to have me back down. I am disinclined to do that and endeavour to have conversations with students outside the classroom so that I can assist them to argue rationally rather than to resort to irrational ways to gain support for their goals.

My consistent efforts to raise standards and to insist on them working on task for the entire 75 minutes were seen as in-your-face aggression. Several of the male students became hostile and, although there was no physical violence directed against me, at times it felt that such aggression was not far away. The problem was one of me being relatively isolated within the school community. If others had been insisting on equally high standards the students may have seen that

if they came to school they were expected to participate and learn. As it was, I was expecting different ways of acting in his class than in any other class in the SLC. It is potentially dangerous for teachers to be so different from others in the SLC. There is a strong need for the development of consensus on what is expected of students in terms of participation and achievement.

Resistance to learning and resistance to authority were visible in the behaviour of many students, in different ways. Nicole was a student in Ken's chemistry class who has been particularly outspoken and disruptive.

Nicole

Nicole was a law unto herself. Although she usually was in the building prior to the 8:15 a.m. commencement of class she rarely was in attendance for the start of class, preferring instead to roam the hallways, coming to class some 15 minutes late, if at all. When Nicole walked through the door she usually was disruptive and spoke freely and audibly with anyone she chose. In so doing she showed little respect for Ken as a teacher or for the learning of others who may have been trying to follow what was happening at the time she entered.

Nicole's actions often were inflammatory, showed little regard for consequences, and she had difficulty discussing her behaviour without flaring up. It was as if she was inviting suspension, goading Ken to take actions to remove her from the classroom. Nicole summed up her attitude in the following excerpt from an interview with Ed.

> Nicole: You can't make 'em unless they want to do it. When you stand on somebody's back, they'll be like, I ain't trying that. I'm gonna do it because I want to do it, regardless of what you say. Punishment? Nothing. Please.

To the extent that it was possible, Ken ignored Nicole's regular transgressions and focused on the other students in the class. However, she was so disruptive that twice he had to exclude her from the class. Following the first of these occasions Ken met with Nicole and her guardian. During the conference Nicole was cooperative and apparently contrite. However, little changed. In class her behaviour remained consistently disruptive and her attendance continued to be sporadic. She did the minimum amount of in-class work and she answered questions in writing with only one or two words or a short sentence. Her tendency was not to elaborate on any point but to be as factual as possible and not to entertain ambiguity. Answers were right or wrong to Nicole and if questions asked for her opinion she did not regard them as scientific. She described a series of open questions on science in the neighbourhood as poor questions because multiple answers could be considered correct.

Nicole came to CHS because of problems at a nearby high school from which she was expelled. She despises *Opportunity* and believes that the work is so easy as to be a waste of time. Ironically her resistance to learning within *Opportunity* is so strong that she may be destined to spend her time at the school in this SLC.

> Nicole: Because they stereotype us because they feel as though that we're black and we don't want to learn and that's all to it, point blank.
> Ed: There's no type of intelligence or challenge coming from *Opportunity?*
> Nicole: Not from what I see. Ask anybody in *Opportunity*. They'll say no. Come on now. Be for real. This stuff is not even worth me wasting my time. That's why I didn't even want to be in *Opportunity*. They don't got nothin in here for me. It ain't helping me.

I have not learned nothing. They give me half a credit. I need whole credits to get to the 12th grade. Now I'm going to be behind because they failed me.

It is difficult to see a way out for Nicole. Her infrequent attempts at responding to questions did not earn her high grades for in-class participation and her failure to do homework made it impossible to earn a high level of pass. Nonetheless, when Ken compared her performance in the course to others she was awarded a D+. This level of "pass" is enough to facilitate her goal of graduating from high school, but not enough to count positively toward entry to College. Furthermore, as she realised, she did not learn enough chemistry for the credit to be negotiable currency for further studies in science, either in another SLC or at College. She learned enough to scrape through and in all likelihood her academic resume will not be competitive for the types of employment to which she aspires or of which she is capable.

Nicole has very strong feelings of dislike for *Opportunity* SLC and she faults it on many counts. These are clear in the well crafted and perceptive critiques she offers of her school. She questions why it is even called "*Opportunity*."

Ed: How you feel about this school?
Nicole: I don't like it.
Ed: Why is that?
Nicole: Because I don't like the SLC I'm in. And I don't like Ms Reid and I don't like some of these teachers in here. They try to discipline you for dumb stuff. Like if I do something wrong I get suspended for five days. I mean, that's not helping me out. That's not helping me get my school together or my behaviour together. I mean, I don't like that. I don't like this school, period. I'd like a different SLC, whatever like that.
Ed: So what would you change about *Opportunity*?
Nicole: I would make it so that these kids in here can get an opportunity to get better grades. Everybody here in *Opportunity* is failing. How this helping them out? Come on now.
Ed: Why do you think they're failing?
Nicole: They giving us dumb work, you know. Work that's not even, you know, challenging to us or nothing. That work is like when I was in like eighth grade. Come on now. Please. I can do that just in a heartbeat. They be callin this *Opportunity*. They supposed to give you the opportunity to do real work. What have I actually learned in *Opportunity*? Nothing. I had chemistry, English and conflict (a conflict resolution class). What have I actually learned from any of them classes? Nothing. I can sit here and tell you, honestly. Nothing. And this is what SLC? *Opportunity* right? It ain't *Opportunity*. It's just a regular dumb SLC.

From these rather harsh criticisms levelled at *Opportunity*, it is clear that Nicole has a more or less realistic picture of what has been going on in this SLC. She cites low teacher expectations that result in little real learning. Later in the interview she makes it clear that she understands the impact of not learning while in *Opportunity*. She states, "If I was to pass every class and I go to *Motivation* (another SLC), I still probably gonna fail, cause of the fact that I didn't know nothing."

Ed: I was told that you got a lot of smarts but you don't want to do the work. You wanna slack back. Why is that?
Nicole: When I do care, I put my all into it. When I feel as though I'm ready to do that, I mean, then I'll change. But until then I'm gonna be me a smart-ass mouth little girl. And I'm not gonna stop. That's who I am. The authority can't do nothin about it. What they gonna do, lock me up, or suspend me? That ain't helping me, not at all. That's making me, like all right I don't care, suspend me, whatever. That ain't nothin, a couple days out. They ain't helping the student. ... They be callin this *Opportunity*. They supposed

> to give you the opportunity to do real work. They suspend you for 5 days. That's the whole week. Then what if you sick for two weeks? They drop you from roll. They ain't helping nobody. They just make the kids feel less about themselves.

The school's policies which result in epidemic suspensions and removal of students from the roll for excessive absences convey the message that the students are not really wanted in the school. Nicole astutely recognises that the suspension policy is not designed to help students learn, to increase their academic success, or to encourage school attendance. Nicole also expresses dismay with the lack of sensitivity of teachers to problems the students may have outside of school. This strengthens her feelings that not only do the institution's structure and policies diminish the students' chances of success, but the lack of a caring, empathetic ethos on the part of the teachers and staff further reduce their possibilities for learning.

Institutionalisation of Low Expectations

The formation of an *Opportunity* SLC has produced a low level track in terms of academic performance since the students in the SLC either are having trouble succeeding in other SLCs, have sporadic attendance, or are not adapting to school in the manner expected by the school. From the outset there is a realisation that the students have not been successful at school and will be difficult to teach. The teachers and students prepare accordingly and there appears to be a downward spiral of expectations despite the intentions of teachers like Ken to enact a curriculum that is rigorous and demanding for the students. The following discussion suggests there is a perception that the students in *Opportunity* have low academic ability and the curriculum has few demands.

Ed: Most people are sent to *Opportunity* because they don't do work in the other SLCs. So they pile them all into *Opportunity*. Some teachers and NTAs think that just because you are in *Opportunity* you are stupid and can't learn anything. But that's just a stereotype. Some students in *Opportunity* are just as smart or even smarter than some students from the *Magnet* or *Motivation* SLC, or any other SLC.

Gale: Many of the teachers surely have a deficit view of the students. They attribute their poor performance to deficiencies in the students' social and economic conditions, families, and culture. This is not to suggest that the teachers are indifferent. Many are quite caring, but they accept the economic and social conditions as grounds for low expectations and therefore do not consider how to improve the students' experiences and academic performance. This belief puts the problem outside the school and beyond the realm of traditional teacher responsibility.

Nicole: I'm more advanced than what they're teaching me really. This is nothing. It's not a challenge. ... What are they doing for me? This SLC ain't doing nothing for me. Nothing, and I don't think it ever will. Not at the rate it's going. Not giving me half a credit and not with them failing me. How can you fail somebody in *Opportunity*? You are supposed to be helping these students. Helping them.

Ken: The students and teachers seem to have negotiated a collusion of low expectations. When a teacher tries to re-negotiate out of this agreement, the resistance is strong, since a critical education is viewed as having no value to the students. A consequence of the tracking and the relatively low status of *Opportunity* compared to other SLCs is a shortage of resources to support the curriculum and limited access to facilities such as laboratories and networked computers. As is evident in the following conversation the shortage of resources constrains the curriculum in deleterious ways.

Nicole: There's so many things you can do on the computer ... But they don't have no computers that you can come in and learn.

Ed: There are not a lot of science books or material in *Opportunity*. We take notes from the teachers' books because there's not enough to go around to everyone. But I think my teacher does his best to try and give us all the knowledge we need, and that he can give. I think if we had more books and raw material the students in *Opportunity* would have learned better and faster. With more material to work with students would be able to understand more about what they are doing. Because it's not all about writing and listening to learn, it's about doing so they can keep the information in their brains.

Ken: *Opportunity* does have fewer resources than other SLCs and this has a negative effect on learning. I found it very difficult to find suitable textbooks to support the teaching of either of the courses I have taught so far. The initial chemistry texts I obtained were almost 30 years old and then I located a set that was only 20 years old and used it. In both cases the texts were too difficult for the materials we were trying to learn. Not having texts makes it very difficult to set homework. The failure of the school to provide books to be taken home leads to a situation whereby students cannot easily review or extend what they have learned at school. There is a depressing feeling among students that they are locked into *Opportunity*. Few students manage to leave and succeed in a new SLC. For example, although Ed tried twice to leave *Opportunity* he returned to the SLC on each occasion because of a perception that he is a troublemaker and a low achiever. Other students simply don't care that they are in *Opportunity* and that they can pass by just turning up. Others enjoy the chance to obtain more credit for less work. Like Nicole, a significant number want to leave but find their existence in *Opportunity* to be such an affront that they refuse to participate and thereby seal their destiny to remain in *Opportunity*. A sense of having to remain in *Opportunity* is communicated in the following exchange between Ed and Nicole.

Nicole: *Opportunity* is supposed to be *Opportunity* to get more credits. Where are the students who got more credits at? Tell me this. Find out for me. How many people that came to *Opportunity* actually moved up to another SLC in a whole school semester? I wanna know how many students leave.

Ed: So why don't you try to get out of *Opportunity*?

Nicole: I am and if I do I'm not coming back here.

Ed: Do you feel as though they don't want to let you go?

Nicole: I don't know. I never tried to leave. Well I did, and they be like well you got to stay here because if I go up to the other SLC I'd be like so much behind, whatever like that. Because I be comin in the half of the semester and I'd be behind and I'd still have failed and I wouldn't get no credits. But they haven't benefited me at all. That's a shame.

At first sight the presence of *Opportunity* makes good sense. Put the students who do not come to school regularly or are unable to handle school together in one place. However, already we perceive two problems associated with this policy. First, it is very difficult to deal with large numbers of students who are not motivated to learn and who resist efforts to teach them. Second, the curriculum is so lacking in expectations that even a good grade may not be negotiable elsewhere, including entrance to other SLCs. As Nicole provocatively states, it seems as if very few students successfully transfer to other SLCs.

Nicole senses that she is very likely locked into *Opportunity* and thus to academic failure. She recognises that the curriculum is severely watered down, that the chances of moving to another SLC or school are slim, and that *Opportunity* is not preparing her for success even if she receives a diploma. Viewed in this light, her response is to not cooperate in class and to not do what was asked of her. Her tardiness, absences, lack of effort, and confrontational behaviour can perhaps be viewed as a means to show that she is unwilling to accept or yield to this situation.

Perceiving the institution as not enabling her to succeed, she resists all attempts to motivate and involve her. She challenges someone to show her she is wrong in her assessment.

So why does Nicole come to school at all? Like other students, she talks about school as a place to come just to be somewhere, but she has also thought about her goals for the future and recognises that school plays some part in those.

Ed: What would you say to a friend that didn't want to come to school?
Nicole: I'd tell em to come anyway. Just like my girlfriend. I'd be like come anyway. Because from 8 o'clock till 2 or 3 o'clock, I mean what could you possibly be doing? Watch TV everyday? Come on. It gets boring sometimes. ... Come to school, learn something, whatever. Just come in, why not? Ain't nothing else to do. Sleep late? You can sleep late on weekends.
Ed: So you think another SLC would be more challenging work?
Nicole: Yes.
Ed: Like what SLC is that?
Nicole: The health SLC 'cause that's what I want to pursue in my life, is medicine.
Ed: All right, so you want to be a doctor?
Nicole: Probably a nurse. I don't wanna go all like that.
Ed: Do you think some people don't come to school cause they think the things they learn in high school they're not going to need?
Nicole: Some people do but that's not true.
Ed: Why do you say that?
Nicole: If never just one little small thing, you're gonna need something from what you learn out of high school. Just like whatever you learn in middle school carries on to high school, just like high school's gonna carry on when you go to college, college gonna carry on with your job, your whatever.
Ed: What's your highest goal in life?
Nicole: It's to not let myself, you know, to get, you know down, where everybody else is like on drugs, wind up with disease, or nothing like that, or be a bum, or somebody on the street.

How will Nicole meet her goals when she is so ill-prepared? Although Nicole attributes some value to education she does not do what the administrators and staff of *Opportunity* expect her to do. Nicole wants to extricate herself from *Opportunity* while at the same time recognising the difficulty and unlikelihood of this occurrence. The low level of expectations and academic challenges not only make the school day unmotivating, but serve to poorly prepare Nicole and her peers for life after *Opportunity*. In the following section we explore the prevalence of low expectations in greater depth.

Resistance to Higher Expectations

Nicole mentioned the low level of work and associated expectations in the daily curricula in *Opportunity*. This is the very first impression we gained from being in the SLC. However, as Ken found when he endeavoured to enact a challenging curriculum it is one thing to exhort high standards and quite another for the enacted curriculum to reflect high standards. Resistance from students was experienced in myriad ways that are described in the sections below.

Ken's Perspectives on Attaining High Expectations

From the first day I endeavoured to lift the cognitive level of the activities and throughout the entire course I did not back away from the goal of engaging students in challenging activities. Hence, I assigned activities to engage the students in ways I thought would be interesting and as I learned about their strengths and weaknesses I adapted the curriculum to allow them to do what they could do and to build skills they needed to be successful learners of science. In addition, I endeavoured to build an assessment scheme that would allow them to build credit for doing activities at school and at home. So that students could retain some hope of gaining a pass right up until the end of the course I increased the number of possibilities to gain credit by participating in high quality ways. However, only those who were already participating somewhat consistently took advantage of such efforts. In the light of this somewhat depressing reality I did not become negative but gave added assurances that all work that was submitted would count toward their grades.

As students walked in through the door I distributed worksheets for them to read and respond to. I explained the activity and encouraged them to commence. If they did not have a pencil or paper I gave them both. In all interactions with the students I endeavoured to model good manners in that I asked about their day so far, sometimes used humour to lighten the atmosphere, and generally practised what I had learned over the years to build a good tone in the class. These efforts were sometimes received well, but by only a small minority of the students. Most ignored me to the extent that they were able and some showed disrespect and hostility. Overt resistance seemed to be a way for some students to gain recognition and respect among peers.

During class I moved continuously to assist students with their work and to re-direct those who stopped engaging. The constant surveillance became an irritant to some of the students who wanted to engage in activities that were not related to the learning of chemistry. The most common activity was for one or more of the males to pull out a newspaper or a magazine and begin to read and discuss its contents. As the 10 weeks progressed the students were less inclined to cooperate with me when I insisted on them putting the magazine away and each time that I confiscated the magazine or paper it led to a rapid escalation resulting in the student concerned being removed from the class.

Throughout the course I endeavoured to earn the respect of students and to have them construct me as a teacher from whom they were willing to learn. In a small minority of cases I was successful and the students concerned constructed themselves as learners with respect to me. However, earning their respect was not easy and never something I could take for granted. In some respects my efforts to persevere in the face of adversity may have shown the students more failed approaches than would normally be the case. I knew that I could get them busy and quiet by giving them notes to copy and activities to do from the textbook. However, I also was confident that what they would learn from such activities would not be worth the effort. I wanted to be respected as an ethical person who had the strong interests of his students in mind when I planned and enacted the curriculum. I wanted them to respect me on the grounds that I respected them and made every effort to support their learning.

> Ed: I think that education is not focused enough for young African Americans. Some teachers don't care if students get a good education. They say that if they don't try to get it then they don't want it, but in some cases students don't know how to get it. I think if a student is failing you should at least try and help that student. Don't sit and watch him/her just fail. Try to put a little knowledge in his head. Try to put him on the right path. Don't just let him fall before he can get on his feet.

Ken: I have witnessed teachers with extremely low expectations and have wondered why. But that was before I began to teach in *Opportunity*. I imagined it would be relatively easy to come into the school and identify curricular activities that would be engaging for the students. I imagined that we could catch their attention with problem solving activities about which they were passionate and then rich discussions would follow. To my utter surprise the students have expectations that are even lower than those of the teachers. Furthermore, their resistance to me implementing the curriculum was pervasive and they managed to almost deny me the right to teach them. They only seemed to work quietly when I had them copy notes from the board or the textbook. In some respects they were most comfortable with copying notes because they perceived this to be what students are to do.

Gale: Attempts to connect science to their everyday lives failed miserably. The students did not see the science in aspects of their neighbourhoods and interests. Perhaps we do not know enough about their lived experiences to attempt to make this connection. It's puzzling that they viewed our attempts to look for science in the streets and homes of their community as not representing real science. They appeared to be insulted by it, and clamoured to return to "real science" which meant book work and handouts.

Low expectations for achievement, participation and attendance were pervasive and all too visible. Irrespective of his intentions the low expectations were visible in Ken's actions as the curriculum was planned and enacted and also in the oral texts during reflective discussions about what happened.

Resistance to Learning

Although Nicole spoke about the frustratingly low challenge of what was to be learned, it is clear that she acted in ways to reinforce the status quo. For example, she spoke out in class to disrupt Ken from teaching and students from engaging in focused ways. In addition, Nicole frequently was absent from school, late, and thereby sent to the auditorium for the first period, and absent from class as she wandered the hallways. When she did participate in the class activities her efforts were minimal and incomplete. For example, when Nicole responded to questions in writing she used the minimum number of words possible to complete the question and did not use open-ended questions as invitations to show what she knew. Also, she did not prepare for tests at home, rarely completed homework and made no effort to complete all of the questions asked on a test or on in-class activities that would count toward her grade. We see all of these actions as examples of social production directed toward establishing Nicole's difference, acts of resistance that reinforced the cycle of social reproduction. Even though Nicole is a sharp individual with a good mind she did not direct her talents to learning chemistry. Nicole increased the likelihood of her failing the course through her efforts to alienate herself from Ken and her rejection of efforts to facilitate her participation and accrual of points toward her grade. Even if she passed the course her actions ensured that what she knew was so fragmented as to be of little value in further learning or in gaining entry to follow-up courses of study. Despite Nicole's confident prediction that she would fulfil her goals within five years, it seems unlikely that she will gain entry to college. Nicole, like most others in the class, came to the first period without any visible signs of being ready to learn. Most had not picked up a book or pencil to study what had been done yesterday and very few students attempted the assigned homework activities. The signs of being unprepared extended to them coming into the classroom and not getting out materials to support their activities in class.

Ken: At the scheduled time for starting the class there is only a handful of students in the room and they are not ready for learning. Their bags are often on their shoulders and many are still wearing their coats. The desks in front of the students are bare except for students quaffing down their breakfast, reading a magazine or perusing the sports pages. Most students do not have textbooks, paper and pencil and, as I get them started, others wander in, greet their peers, and often disrupt the lesson. What do you think a teacher should do when this happens?

Ed: I think if a student comes to class without pens or paper then they are not going to work. I would have enough paper and pens that I can pass around the class. But students who receive either will be placed on the detention list and they will receive a Saturday work detail, where they would have to come early Saturday morning and clean the school. I think that would make the students think more about bringing what they need to school. But sometimes it's not the fault of the student and you may have to contact someone at home.

Nicole: Find out why they don't come to school prepared. What if people are not as fortunate as others? They just jump to the conclusion. Oh you're just not prepared because you don't want to work today. They don't try to find out. They just assume and they be wrong sometimes.

Resistance Through Absence

The days absent from school averaged 30% with the range for 29 students being from 7% to 67% absent. Five students not included in these data were withdrawn from school because of their chronic absences. Nicole was absent for 25% of the time. Since Nicole had no chemistry books at home and did not complete homework, her sporadic pattern of attendance completed a cycle of resistance to learning.

Ken's Perspectives on the Problems of Sporadic Attendance

As a teacher the irregular attendance of students was something with which I could not come to grips. Although I planned diligently for every day, latecomers and non-arrivals continually frustrated me. Furthermore, of those in attendance, as many as one-third had not been present for the preceding days. To exacerbate the problem other students arrived throughout the semester and arrived in my class even though they had not studied chemistry before. What was I to do with people like that? No wonder they were angry when I would not let them put their heads down or play cards. I could not work harder and still it was necessary for me to adapt the plans I brought to the class each day. I wanted to move toward a system of independent progression but these students could not work alone and would not work without extremely high levels of attention from me. Any effort I made to move them onto project work was resisted strenuously by the students.

Ken: Lateness and absenteeism are intertwined in this SLC. In a large city there are many reasons for students being late to school. The policy of keeping latecomers out of the first period class is well intentioned but counter productive in that many students miss chemistry because of their tardiness. Their absence leads to them missing work and not learning as much as they would if they attended class.

Ed: I think if the students felt more motivated they would not mind coming to school every day and doing what they are supposed to do. I think the biggest reason students don't like to come to school is because of suspensions. Why come to school when your going to get put right back out, that's what most students say. Many students get suspended every day at CHS, for reasons as small as being in the hallways. I think it's wrong to

put a student out of school, stopping them from getting their education, when the people who work at the school already have theirs. Why tell a child how important it is to have and achieve something, then stop them from entering the door to get it?

Ken: You make an excellent point here. The school seems to have so many policies that keep students from their classrooms and in many cases put them out on to the streets. I know you have experienced this directly. I felt humiliated when you were suspended for five days for being on the second floor for too long. The way the NTA (non-teaching assistant) treated you and then the system supported him in endorsing a heavy suspension should not be tolerated.

Ed: Many students encounter problems at home. So why should they have to come to school and handle more problems? You are told to leave your problems at home. That's what they tell the students. But some NTAs bring their problems to school and take it out on the students. The students should be respected as well as the NTAs are getting respected. Then the school day can flow more easily.

Ken: I agree that the NTAs need to show more respect for the students and for themselves. My feeling is that some NTAs decide who the potential problems will be and harass those students. Perhaps they want to initiate trouble so they can get these students out of the school. Creating and maintaining a safe environment might be at the root of the reasons for why they do what they do.

The system of taking the student ID cards as a means of getting students to attend detention may have the inadvertent effect of increasing absenteeism. If students do not attend a detention right away they do not get their card back and cannot enter the school without it. The only way to get the card back is to attend a detention. If students resist the detention, and many do, they are self-imposing a suspension and can stay out of school. Being late three days out in a row also results in an automatic suspension from school. Hence, the detention system, which is designed to get students to school on time and to maintain order in the classrooms may contribute to a major curricular problem faced by teachers; that of dealing effectively with sporadic attendance at school.

Ed: What do you think about that roll dropping?

Nicole: They shouldn't be dropping somebody unless they know the circumstances. Call their house. Then they can bring the parent in, or bring the child in to talk to them about them coming to school more. There could have been something going on. That's not right. They don't call to find out. They just drop em.

Gale: The institutional suspension and discharge policies decrease learning and create an atmosphere where the students' presence is not valued. The perceived insensitivity to the needs of students on the part of the staff heightens the belief that whether students learn or do not learn is not really important. The students and their lived experiences are not valued. Recognising all of these obstacles, students come to view their time in *Opportunity* as a sentence for failure that will have long repercussions. Why should they not resist and attempt to keep it from happening to them?

Conclusion

The most striking aspect of this study was the difficulty the teacher had in raising the cognitive level of the enacted curriculum. Ken began the study with a firm resolve to enact a curriculum that was relevant and challenging for the students. However, the result was far from that. A large variety of factors combined to support the status quo, and the curriculum lacked rigour and coherence. Furthermore, because of the repeated absences of students, Ken was unsure

of how to proceed when most students were out of school for 1-2 days a week. At any given time one third of the class was away the previous day. Because of his belief that learning should build on what students knew and could do, he found himself unable to implement activities as he intended and pervasive resistance from students was a source of frustration and a force with which to contend. Because of the resistance the amount of work covered in any period of time was astonishingly low. Ken's efforts to solve the problems of sporadic attendance and resistance led to numerous different approaches to the teaching and learning of science. However, none was as successful as he would have wanted. Few students from the class appeared to be motivated to learn and few did accomplish significant learning of science.

The students in *Opportunity* did not participate well in open-ended activities. Hence attempts to enact problem solving, inquiry, and hands on laboratories all floundered. Students also did not respond to open-ended questions in either written or oral activities. Student responses and interviews indicated that they adhere to a rather narrow, traditional, and objective view of what science is and this created scepticism when asked to think about and participate in science in different ways. Through our interviews we attempted to make sense of the failure of these types of activities and questions. This seems in part related to the types of work the students have been traditionally assigned in school, that is, work requiring low levels of intellectual engagement. Considering the sociocultural setting in which the class is situated, their reluctance to engage in more active and demanding learning can be understood as resistance to investing themselves in school and can be viewed as an adaptation to the economic and social contradictions that surround them. For more than 10 weeks Ken was unable to come to grips with the amount and type of structure needed to engage students autonomously. He found that the only formula for success was to provide individual attention almost continually and even then some students resisted his efforts to teach them. In fact, the most successful activities were those where students were given highly specific tasks to do. They did not work well together in groups and only considered they were working when they copied notes or worked from a textbook. The challenge for the future is to scaffold from such activities in which they can work quietly and productively to those in which they collaborate with peers to learn science in a deep way. It is also clear that these students will need considerable scaffolding if they are to engage in inquiry-oriented activities. We recognise that routine ways in which knowledge is used, acquired, and displayed within disenfranchised communities have traditionally been viewed by schools as deficits. Lee's work in English classes (1995) has encouraged us to search for ways to build on the potential of these everyday practices; to identify the particular cultural funds of knowledge and practices that are routinely used by the students that are already science-like.

The sources of resistance were numerous and included some of the factors already mentioned in this conclusion. Even when students were participating in the work of the class, student talk was often in an argumentative frame, resulting from and contributing to a mismatch of assumptions and expectations about the structure of in-class talk. A tension exists between the students' primary discourse acquired in the home and peer group and the discourse of science class. Though educationally and economically disabling, the rebellion and resistance demonstrated by the students in *Opportunity* can also be viewed as a potential site for creative, discursive agency (Collins, 1993). In the gap between social structures/expectations and social practice there can be found room for struggles over representation and classification.

One of the most painful sources of resistance was the rejection of Ken as a teacher. Many of the students did not regard him as their teacher and refused to cooperate when he spoke to them or assigned tasks, be they routine tasks associated with getting equipment and returning it to its place, getting textbooks, responding to questions, or more complex problem solving tasks. It was

as if some students resented his presence in the room and presented a hostile attitude when he made requests of them.

The reasons for student absence are varied and to some extent unknown at this stage. First, students just seem to stay away for a day or so a week to engage in other activities. More research is needed to identify the reasons for these activities and the extent to which this is the major reason for being absent. For example, there are many mothers who need to stay at home to tend for sick children or because they could not arrange for child care. Other students report that their guardians leave the home early for work and they simply oversleep and then do not come in for the day. It also is possible that school policies lead to absence due to detentions being awarded for tardiness, three days of tardiness being an automatic suspension, failure to serve a detention resulting in suspension until the detention is served, and suspensions being able to be given by teachers, coordinators and non-teaching assistants. There is some evidence to suggest that certain students may be targeted as trouble makers and given suspensions proactively to keep them out of the school. Finally, when a student is suspended it is necessary for a compulsory conference to occur with the student's guardian before she/he can begin to participate in school activities. This requirement often delayed further a student's return to school.

Sporadic attendance at school resulted in students having only a fragmented idea of what was happening and there were few efforts to find out what had been done during the days they missed or to pick up assignments or worksheets undertaken in class. In an analogous manner Ken could not plan easily for a coherent program of study. It is apparent that the high level of absence is the single biggest factor to be overcome, probably with an individualised program of study.

At the end of the 10-week semester most of the students had earned a failing grade. Most, because of their absences from class, did not submit a sufficient amount of work to have a chance of passing while others whose attendance was better did not complete enough of the assigned tasks. A minority passed the course but in all cases the level of understanding and performance was extremely low. Hence, with very few exceptions, the production of those enrolled in the chemistry course fuelled the cycle of social reproduction in which these students who began the course disadvantaged with respect to students in other SLCs and schools completed the course with their disadvantage reified. This clearly calls into question the purpose of *Opportunity* SLC and its real and imagined impact on the lives of its students. Many authors have studied resilience in African American teens and some of their findings are helpful in understanding this case. Gordon (1995) described several important aspects of academically resilient African American youth. He found that such students demonstrated a better cognitive self-concept and motivational pattern, and a greater emphasis on extracurricular goals. If we are to make strides in reaching the students in *Opportunity,* we must find ways to address multiple aspects of the students' identities.

Notes

1. Hereafter referred to as *Opportunity*.

Acknowledgments

This work was made possible in part by a grant from the Spencer Foundation.

Correspondence: Professor Kenneth Tobin, Graduate School of Education, University of Pennsylvania, 3700 Walnut St, Philadelphia 19104-6216, United States.
Internet email: kent@gse.upenn.edu

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