Multicultural Students’ Perspectives on Their Mathematics Education

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Abstract

As the achievement gap widens, so does the body of literature on multicultural education; yet many secondary schools are not successfully addressing the large populations of failing students. Equitable achievement in mathematics is essential for student success in school and in a highly competitive economy. Multicultural mathematics education aims to teach all children math, show the contributions of diverse cultures to the field of mathematics, and to address issues of social justice. Multicultural education champions the experiences of students as learners and teachers. Students’ perspectives of their own education must be taken into account in the body of research in multicultural education.

This study examines characteristics of multicultural education and student perspectives on their educational experiences in a San Francisco Bay Area community. Fifteen students of diverse multicultural backgrounds participated in focus group discussing what they feel are successful mathematics teaching practices. A change in classroom pedagogies is necessary to educate increasingly diverse student populations however any pedagogical changes in education must include diverse student voices.

In general participants in the focus felt that their school was culturally inclusive and felt that there was very little overt racism at their school, but they were uncomfortable discussing issues of race and culture and had difficulty describing any multicultural programs our units in the school’s curriculum. During the hour-long focus group, students showed that they are proud of how the diverse populations interact within the school, however students overall discomfort and ignorance of multicultural teaching practices shows a lack of institution of these practices within the school.
Introduction

“I don’t need to learn math; I’m Mexican.”

-Juan C. *(Name changed)

Juan is a student at a high school in the San Francisco Bay Area. He struggles in his Algebra class partially because he believes that what he is learning in class has no practical application to his life. He does not see himself represented in the textbook or the curriculum. It is not just Juan who struggles. I have taught mathematics in this district for 4 years, and I have noticed that there is an inflated number of minority students enrolled in low-level mathematics classes. As the math teacher and an academic advisor to students, I see adolescents who are uninterested in learning math and under-prepared for life beyond the classroom. Some students, like Juan, have failed Algebra IA three or four times. I am curious how multicultural students experience mathematics education at this school.

Statement of Problem

This Bay Area suburban school district is not alone in its difficulty on educating all students; the state of California is struggling to address the needs of its diverse population. There is a discrepancy between the standardized test scores of White and Asian students and their Black, Hispanic, and American Indian/Native American peers (Barron & Sanchez, 2007; Grigg, Donahue, & Dion, 2007). Students of color are dropping out of high school at higher rates than White students. (Barron & Sanchez, 2007). Classes of minority students are more likely to be taught by inexperienced and unqualified teachers (Barron & Sanchez, 2007). Minority students are also underrepresented in college enrollment (Barron & Sanchez, 2007).
Statistics on standardized mathematics achievement show a discrepancy between students who self-identify as Caucasian and students who self-identify as Black, Hispanic or American Indian/Native American (Barron & Sanchez, 2007). On the 2005 12th grade mathematics assessment, students were scored on a scale from 0-300, 150 representing the average score. White and Asian/Pacific Islander students’ scores averaged 157 and 163 respectively, while Black, Hispanic, and American Indian/Alaska Native students scored significantly lower with 127, 133, and 134 respectively. The results also showed that English Language Learners earned lower scores. The mean score for this group was 120 points (Grigg, Donahue, & Dion, 2007).

In addition to a gap in test score performance, students of color are dropping out of high school at higher rates compared to Caucasian students. “While 78 percent of white students graduate from high school, only 60 percent of Latinos, 57 percent of African Americans and 53 percent of Native Americans graduate” (Barron & Sanchez, 2007, p. 9). Only 27% of students identified as English Language Learners in 9th grade, receive a high school diploma (Barron & Sanchez, 2007). California High School Exit Exam (CAHSEE) pass rates for 2006 also revealed the achievement gap. While 91 percent of students passed the test, pass rates for certain student groups were considerably lower. Only 85 percent of Latino students, 83 percent of African American students, and 77 percent of English Language Learners passed the exit exam. (Barron & Sanchez, 2007).

Teacher training is also an issue. Classes with poor or minority students are more likely to be taught by teachers who do not have a major or a minor in the content area.
being taught (Barron & Sanchez, 2007). Teachers must understand mathematics in order to teach it, but according to the U.S. Department of Education, the average K-6 teacher has only taken 3 or less mathematics classes in college and 20% of high school math teachers do not have a minor or major in mathematics (Caniglia, 2003). “Far more teacher preparation time should be spent unlocking the combinations to pedagogies that value the whole person in mathematics classrooms” (Kress, 2005, p 49). In order for minority students to have equitable participation in mathematics, schools with high minority populations must have qualified teachers who understand math and multiculturalism.

Inequitable access to education also extends to college. According to the Institute of Higher Education and Leadership Policy, fewer minority students enroll in college than white students. “Among California’s 18- to-24-year-olds, 60 percent of Asian and Pacific Islanders and 43 percent of whites are enrolled in college, while only 32 percent of African Americans and 22 percent of Latinos are enrolled” (Barron & Sanchez, 2007, p. 9).

In examining my own classroom textbook, Prentice Hall Algebra © 2000, I found a lack of representation of diverse people and perspectives. In the 14 pictures that featured people, only one picture featured African Americans, one picture featured a Latino man, and two pictures showed women. The rest of the pictures featured white men. Such under-representation can potentially lead to an ethnocentric perspective and can alienate non-white students. Furthermore, Algebra curriculum tends to ignore the practical application of the topics taught and the people and cultures who contributed to these topics (Osler, 2007). In culturally pluralistic society, the curriculum should mirror
the people in the classroom and provide practical applications to prepare all students for success outside of the classroom.

Purpose Statement

The purpose of this study is to examine some of the best practices of multicultural mathematics curricula by examining research on multicultural education and by exploring how students of multicultural backgrounds experience their math education.

Research Questions

What are the characteristics of multicultural education? How does a San Francisco Bay Area suburban community address the needs of a diverse student body?
THEORETICAL RATIONALE

As defined by James A. Banks, “Multicultural education is a field of study designed to increase educational equity for all students” (Banks & Banks, 2004, p. xi). One of the major goals of multicultural education is to help students acquire the knowledge, attitude, and skills to participate in cross-cultural interactions and to promote civic action to make the United States more democratic and just (Gay, 2000; & Lee, Menkart & Okazawa-Rey, 2006).

Multicultural education is rooted in the educational theory of John Dewey, psychologist and educational reformer, who theorized that tapping into students’ prior experiences is key to students incorporating new information into what they already know. Dewey’s theory of experience postulates that once teachers are able to organize their content around students’ past experiences, the content will become more valuable. Soviet psychologist Leo Vygotsky also believed that students build knowledge upon what they already know (McIntyre, Rosebery & Gonzalez, 2001). Vygotsky theorized about how culture and interactions with adults facilitate learning. Multicultural education aims to draw upon students’ diverse backgrounds to reinforce learning, so that students from diverse racial, social-class, and cultural groups have equal access to education.

Multicultural education must be more than helping students and teachers relate to people different from themselves. The goal is not to just change the content taught in schools to include information about ethnic groups, cultural groups, social-classes, and women. Multicultural education aims to remove barriers that contribute to inequity, but it also aims for students to analyze and challenge the forces that maintain injustice. “It must be transformative; that is it encourages academic excellence that embraces critical skills for progressive social change,” (Lee, Menkart & Okazawa-Rey, 2006, p. ix). This
philosophy is built on the ideas of Brazilian educator, Paulo Freire. Freire believes that “in an unjust society, the purpose of education is to bring about equality and justice.” He also believes that students and teachers are both learners and producers of knowledge and that students must play an active role in their education (Lee, Menkart & Okazawa-Rey, 2006, p. x). The goals of multicultural education are then three-fold. Curriculum must draw upon the knowledge and experiences of the students, and it must also both address inequities and inspire hope to change those inequities.

Assumptions

The first assumption of this study is that all students are capable of learning Algebra. This study also assumes that minority students who are tracked into remedial math courses often feel alienated by the traditional Algebra curriculum and teaching methods, and that this sense of alienation contributes to lower success rates. This study assumes that parents want their children to succeed in school, however parents may not be encouraged to participate in their children’s academic career or may not have the ability to participate. For example, if a parent works into the evening and cannot make it to a parent-teacher conference, the teacher may assume that the parent is not interested in his/her child’s education. I believe that if the time, language, and geographic barriers were removed, there would be an increase in parental participation. This study also assumes that students can and should be involved in their education. Adolescents have the capacity to evaluate their education and should be encouraged to do that. Including student opinions in education reform can elucidate challenges and validate successes.
Background and Need

As the demographics of California continue to become more diverse, and the disparity between the achievements of whites and other minorities widen, it is vital that educators examine their practices. Achievement in math can often determine ones future economic level. Math achievement is sometimes seen as a ‘gatekeeper’ for high school graduation and entry into college (Barron & Sanchez, 2007; Kress, 2005; Lee, Menkart & Okazawa-Rey, 2006). “Higher order thinking and problem solving skills are necessary for entry into the economic mainstream. Without these skills, children will be tracked into an economic underclass. It is essential that students are able to participate in a highly competitive economy and that includes an understanding of complex mathematics,” (Algebra Project para 1).

Multicultural education has gone through several stages of development since its inception. When the need for multicultural education was first established in the late 1950s and early 1960s by civil rights activists and later with the second wave of feminism in the 1970s, multicultural education aimed at supplementing curricula with achievements of African Americans and women (Gorski, 1999). Moving into the 1980s and 1990s, more scholarship showed that supplemental curricula, like a unit for Black History Month “only further differentiated between the curricular norm and the marginalized other” (Gorski, 1999). James Banks, a pioneer of multicultural education, believed that all aspects of school inequity need to be addressed including school policies, teacher attitudes, instructional materials, assessment methods, and counseling and teaching styles (Gorski, 1999). Now, as the cultural landscape of the United States becomes more and more diverse, the goals of multicultural education have developed to address equity issues and social justice and also to prepare students to participate in an
increasingly diverse society. However, implementation of multicultural education in secondary schools falls short of those goals, still tending to focus on the supplemental curricula and celebrations of heroes and holidays (Marin County Grand Jury, 2003).
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REVIEW OF THE LITERATURE

There is much literature addressing multiculturalism and multicultural education. Some recurring themes include: diversity seen as deficit; color-blind racism; cultivating cultural competency; moving from celebrating diversity toward reaching social justice; bridging the gaps between school and community; and students’ interests as central to the learning process. Case studies have shown positive student responses to multicultural curriculum.

Diversity Seen as Deficit
As the demographics of California become increasingly diverse so do the classrooms, but the teaching force remains predominantly White, middle-class, and female (Adeeb & Bosnick, 1998). The challenge of teaching diverse students is often met with trepidation on the part of teachers and administrators (Larson & Ovando, 2001; Noguera, 1999). Traditional methods for teaching largely homogenous classes do not work in teaching ethnically and economically heterogeneous classes. When diverse students come to a classroom, they come with diverse social and linguistic practices or funds of knowledge (Banks & Banks, 2004; McIntyre, Rosebery, & Gonzalez, 2001). When there is a discontinuity between what funds of knowledge are valued at home and what ones are valued at school, students may not be able to communicate what they understand in appropriate ways. Yet, educators must see all students as capable learners.

English-Only policies in schools where students are not allowed to communicate in their first language ask students to disassociate themselves from their home culture. A case study of a 16 year-old Puerto Rican-American girl, born in the United States, addresses this circumstance:
I used to have a lot of problems with one of my teachers ‘cause she didn’t want us to talk Spanish in class, and I thought that was like an insult to us, you know? Just telling us not to talk Spanish, ‘cause we were Puerto Ricans and, you know, we’re free to talk whatever we want…I could never stay quiet and talk only English, ‘cause sometimes, you know, words slip in Spanish. You know, I think they should understand that.

(Nieto 2004, p.166)

Language biases do not only affect English Language Learners, African American students who speak “Ebonics’ are often seen as speaking “limited” or “incorrect” English. Rather than prizing the “naturally evolved expression of the uniqueness of the community” teachers may view this as a language defect (Larson & Ovando, 2001, p.18). These experiences of subtle and not-so subtle racism can erode students’ self-confidence and desire to learn. “Students have been ‘de-skilled’ because some of their skills have be devalued or unrecognized...They lose their belief in their ability to learn. Sometimes they lose the languages they knew when they came to school because their use has been discouraged in the school setting,” (Lee, Menkart, & Okazawa-Rey, 2006, p. 3)

Minority students who do not conform to the dominant social behaviors and language are often tracked into lower levels in math (Banks & Banks, 2004; Larson & Ovando, 2001) and when English Language learners are assigned to math classes, it is often on the basis of their English proficiency and not on their math ability (Barron & Sanchez, 2007). Remedial classes tend to simplify the curriculum to the point of obscuring it. These classes abstract numbers and concepts rather than applying math to something real (Kress, 2005).
Most educational material and learning environments in the United States, especially those labeled as “developmental” or “remedial,” consist of very superficial, easy work. They involve rote or formulaic problem-solving experiences. Further, making the curriculum more complicated, where each problem contains a variety of learning experiences, teaches in the non-linear, holistic way in which knowledge is developed in context. This way of teaching leads to a more clear understanding of the subject matter. (Lee, Menkart, & Okazawa-Rey, 2006, p. 308)

Rather than regarding math as a stagnant set of disconnected rules that is to be memorized and regurgitated, mathematics classes should encourage critical thinking and problem solving (Adeeb & Bosnick, 1998; Osler, 2007).

Color-Blind Racism
Many educators believe that to be non-racist, they must ignore the racial and cultural differences of their students (Andersen & Collins, 2007; Banks & Banks, 2004; Nieto, 2004; Larson & Ovando, 2001). This color-blindness assumes that ignoring the differences is being fair, impartial and objective. This perspective sees race and other differences as irrelevant and places emphasis on individual achievement. Although this approach may seem to be nondiscriminatory, this line of reasoning actually equates differences with defects and inferiority (Nieto, 2004) and ignores the systemic racism that exists in our society privileging White people. Students are often tracked in schools based on their ability, however minority students are disproportionately represented in lower tracks while honors tracks are traditionally filled with White students (Kress, 2005).
The color-blind perspective is appealing for schools, because it rejects dividing and isolating students by race categories, however the refusal to look at race as a category can sometimes lead to polices that are not in the best interest of minority students. According to the UCLA Civil Rights Project, African American students make up only 17% of public school enrollment in the United States, but were represented in 33% of out-of-school suspensions, and while White students represent 63% of the schools’ population, they represent only 50% of suspensions (UCLA, 2007). The disproportionate rates of suspension and expulsion of minority students and the disproportionate number of minority students in lower tracks may not be examined by a school if they do not treat race as a category.

The color-blind teacher can inadvertently invalidate and de-skill students by refusing to address minority students’ knowledge and experiences.

Many people believe that being non-racist means being color-blind – that is, refusing to recognize or treat as significant a person’s racial background and identity. But to ignore the significance of race in a society where racial groups have distinct historical and contemporary experiences is to deny the reality of their group experience. Being color-blind in a society structured on racial privileged means assuming everyone is “White.” (Anderson & Collins, 2007, p. 68)

The color-blind philosophy reinforces the dominant culture while alienating minority students, because it does not acknowledge or validate students’ experiences. “Color blindness is a logic that keeps inequity intact in our society as well as in our schools” (Larson & Ovando, 2001, p. 2). Curriculum in most American schools is built
upon the lived experiences of White, middle-class students, ignoring the experiences of minority and working class children (McIntyre, Rosebery, & Gonzalez, 2001). In order for teachers to successfully teach minority students, they must have an understanding of the cultures of the children they teach.

A knowledge of the deeper elements of culture—beyond superficial aspects such as food, clothing, holidays, and celebrations—can give teachers a cross-cultural perspective that allows them to educate all students to the greatest extent possible. These deeper elements include values, belief systems, family structures and child-rearing practices, language and nonverbal communication, expectations, gender-roles, biases—and all the fundamentals of life that affect learning. (Diaz-Rico & Weed, 2002, p. 259)

By framing instruction to align with students’ cultures, teachers can use curriculum that honors each students’ life experiences. Including students’ cultures in the classroom can enrich and support students whose culture differs from the dominant culture. Teachers must move from the color-blind perspective and recognize students’ cultures rather than ignore them.

Cultivating Cultural Competency

In order for teachers and administrators to successfully address the needs of a diverse student body, they must first understand their own culture and examine how whiteness permeates education (Andersen & Collins, 2007; Larson & Ovando 2001; Lee, Menkart, & Okazawa-Rey, 2006; Nieto, 2004). Teacher education courses can help white teachers look honestly at white racial identity. It is important for educators to examine the
“Eurocentric cultural values, norms, and expectations that form the dominant
perspectives through which many of us theorize about education and develop curriculum”
(Lee, Menkart, & Okazawa-Rey, 2006, p. xii). Peggy McIntosh discusses her work to
illuminate the pervasiveness of white privilege and power: “Whites are taught to think of
their lives as morally neutral, normative, and average, and also ideal, so that when we
work to benefit others, this is seen as work which will allow ‘them’ to be more like ‘us’”
(Andersen & Collins, 2007). In order to have a truly multicultural education, the
curriculum must reflect diverse cultures. It is not possible to have a multicultural
classroom that only illuminates the Eurocentric ideals.

A common cultural mismatch in the public school system is the competitive
model that places emphasis on individual achievement. Students are expected to work
independently and are rewarded publicly with grades and teacher accolades. (Diaz-Rico
& Weed, 2002) “Dominant North American culture is centered primarily on the
individual as opposed to many other cultures that place a higher value on family and
community” (Lee, Menkart, & Okazawa-Rey, 2006, p.xii). Mexican American culture,
for example, places emphasis on interdependence and commitment to helping others. A
classroom that is structured to support cooperative learning can help students extend their
culture into the classroom. “A workable synthesis of this individualism/interdependence
would come from classroom activities that are carried out as a group but that affirm the
unique gifts of each individual student” (Diaz-Rico & Weed, 2002 p. 249).

There can also be a cultural mismatch of behavior expectations. For many Latino
parents to be a “good student” or educado, “means being polite, respectful, and obedient”
(Nieto 1996 p.167). This can be a departure from the Eurocentric idea of a “good
Student Perspectives on their Mathematics Education

Guadalupe Valdes studied Mexican children who, having been taught not to be disruptive or interrupt adults, did not readily call out or volunteer answers. These children did not respond to the competitive individualized classroom and were classified by teachers as having communication or social development problems (Banks & Banks, 2004).

Teachers who understand students’ cultures can design instruction to meet each student’s learning needs. They invite students to learn by welcoming them, making them feel that they belong, and presenting learning as a task at which they can succeed. Barriers are often erected between students of culturally diverse communities and the school because teachers and students do not share the same perceptions of what is acceptable behavior and what is relevant learning. Teaching styles, interaction patterns, classroom organization, curriculum, and involvement with parents and the community are factors that are within the teacher’s power to adapt. The result is culturally compatible teaching. (Diaz-Rico & Weed, 2002, p.259)

Moving Beyond Celebrating Diversity

As stated earlier, multicultural education is much more than learning about the achievements of different cultures; one of the purposes is to address issues of social justice while inspiring hope (Banks & Banks, 2004; Gay, 2000; Lee, Menkart, & Okazawa-Rey, 2006; Nieto, 2004). A curriculum that only looks at the superficial elements of culture can be inaccurate and perpetuate stereotypes.

Teachers who lack a solid foundation of cultural knowledge are often guilty of trivializing the cultural content of the curriculum. The sole
cultural reference may be to holidays or food, or they may have “ethnic”
bulletin boards only during certain times of the year (Black History
Month). Books about children of color are read only on special occasions
and units about different cultures are taught once and never mentioned
again. People from cultures outside the United States are only shown in
“traditional” dress and rural settings or, if they are people of color, are
always shown as poor. Native Americans may be represented as from the
past. Moreover, students’ cultures are misrepresented if pictures and books
about Mexico, for example, are used to teach about Mexican Americans or
books about Africa are used to teach about African Americans. (Diaz-Rico
& Weed, 2002 p. 249)

Mathematics curricula should dispel the myth that math is a Western invention.
Infusing the contributions of females and minorities should be an everyday objective, not

Multicultural curriculum should illuminate multiple sets of experiences and
challenge perceptions. Math classrooms that work towards social justice, teach math
literacy while examining social institutions and economic inequities. Marilyn
Frankenstein and Betsy Bannier are two well-respected multicultural educators. In their
classrooms they use social justice issues to make math meaningful. In Marilyn
Frankenstein’s classroom for example, students examine the unemployment rates in the
United States and discuss how the U.S. classifies unemployment (Lee, Menkart, &
Okazawa-Rey, 2006). By tackling more complex problems without easy answers,
Frankenstein’s students learn fractions and percents within contexts while exploring the
politics of mathematical knowledge. In Betsy Bannier’s college level math class, *Applying Mathematical Thinking*, students examine the poverty line. They create a budget for a single parent with two children household living at the poverty line.

“Students discover that they are able to use their emerging quantitative literacy to make sense out of the new contextual information, it is rewarding indeed” (Bannier, 2006 p. 37).

Another example of tackling social justice in the math classroom comes from the Algebra Project. “The Algebra Project acknowledges the presence of racial and economic inequality in education and addresses them methodically and with hope and humanity,” (Lee, Menkart, & Okazawa-Rey, 2006 p. 313). “The Algebra Project seeks to impact the struggle for citizenship and equality by assisting students in inner city and rural areas to achieve mathematics literacy,” (Algebra Project http://thealgebraproject.org/). Students participating in the Algebra Project link social history with technology and are active in the community, often visiting the homes of civil rights leaders” (Lee, Menkart, & Okazawa-Rey, 2006).

**Bridging the Gaps between School and Community**

Creating a classroom culture where all students can learn means getting to know your students. Educators can fall into the stereotype trap when trying to teach students of diverse cultures. Rather then getting to know their students and the community’s expectations of education, educators may believe that all students of a certain racial or ethnic background learn the same way. This line of thought can lead to lower expectations of students. “When educators do not cross the racial and ethnic borders of
their communities, they become vulnerable to accepting dominant society’s demeaning images of racial, ethnic, and economic others.” (Larson & Ovando, 2001, p.2)

It is vital that educators develop caring relationships with their students and their parents. In a study to determine what funds of knowledge students possessed, parent-teacher conferences were held in the students’ homes. Teachers were made aware of what parents expected schools to teach their children and teachers discovered that a wealth of mathematic knowledge was present in students’ lives outside of the classroom.

As the teachers were able to document during their household visits, the content knowledge and range of activities in Puerto Rican and other Latino households are both rich a variable, dispelling a number of stereotypes about these low-income household, notably that they lack resources for learning, (Banks & Banks, 2004, p.707)

By learning about students’ lives and their families’ expectations, teachers were able to apply students’ funds of knowledge in the classroom, creating a meaningful context for new learning while tapping into prior knowledge. This approach validates the experiences of the students by using instruction that puts their knowledge at the heart of their learning.

Another way to bridge the school and community is to have parents and other local community leaders participate in the classroom. This shows that the community is an intellectual resource. Developing social networks within the communities that the school serves radically changes how students of minority communities are perceived and described (Banks & Banks, 2004). The Algebra Project uses community members as resources, following the civil rights pattern of community-based action. (Lee, Menkart, &
Okazawa-Rey, 2006). Using the community as a resource can change perceptions about who is an expert and who is a learner.

Transcending the classroom walls can be another way of bridging the community and the classroom. In order to give math a context beyond the classroom, one must leave the classroom. Innovators in the field have been doing this. The Algebra Project extends learning by taking fieldtrips. “Some programs work with the arts, including music and dance, deconstructing the tempos and beats and exploring questions of space and geometry through the movements of the students’ bodies.” (Lee, Menkart, & Okazawa-Rey, 2006, p.313). Math in the City takes students outside the classroom to explore places and examine how they can relate math to them. This approach is student centered with teachers as facilitators. Students make connections between their funds of knowledge and what they are learning in math (Caniglia, 2003). Build San Francisco is an architectural program, where students take courses in architecture, urban sociology and urban ecology. Local San Francisco architectural, engineering, construction, and interior design firms mentor students after school (Ellis, 2007).

Student Centered Learning

In the tradition of Paulo Freire, the curriculum must also allow the learner to be an active part of the learning process. Students create their own problems and bring their own analysis to what is being studied. Teachers and students are seen as producers of knowledge. “To generate a mathematical experience which is more likely to be socially just we have to relocate authority from the discipline to the learner” (Burton, 1996, p. 140).
In the Build San Francisco program, students design projects that come from their interests and problems they see in the city. After students expressed a concern with the lack of affordable housing in San Francisco, instructors developed a design problem called the Million-Dollar Condominium in which students design their own million-dollar condominium using San Francisco building costs, $800 per square-foot. Students’ mathematics skills are challenged when they have to apply the area, perimeter, and scale standards to a real problem (Ellis, 2007).

How Present Study Extends the Literature

There is a great deal of literature about the need for multicultural education and much of the curriculum that has been developed is directed toward English or language arts and social studies classes, but there is less information about how to make a math classroom multicultural. I have found very few articles that give specific enough examples that a teacher could duplicate them in her classroom to test their success. A practical guide for creating multicultural mathematics curriculum is needed. Future research could explore how to make a mathematics classroom culturally relevant.

There seems to be a disparity between how researchers describe the best practices of multicultural education and what diversity programs are present in the local school district in which I teach. “Feedback from the field suggests that a gap between research and practice persists while bridges between them remain tenuous and unsteady. It appears that little of what is written and thought about by scholars and policy makers actually has appreciable impact on classrooms or drives durable system-wide reform efforts” (Davis 2007 p. 569). In a study by the Marin Grand Jury, diversity programs instituted in the county were superficial, consisting mostly of curriculum supplements (2003). The report
lacked an understanding of current multicultural theory and championed video presentations, diversity rallies, and holiday celebrations. Programs focused on non-confrontational communication, like the use of “I” messages, not challenging perceptions or understanding one’s own culture and ethnicity. Goals focused more on getting along than making any lasting societal changes.

The Grand Jury report does recognize that these programs are simplistic answers to complicated issues, but states that these programs are a positive step in broadening social awareness. Then there is an immediate contradiction; in the next sentence, the report states that they believe diversity programs do not make an impact. “Realistically, no one expects to solve complex issues by a series of curricula, no matter their excellence” (Marin Grand Jury Report, 2003 p. 7).

The lack of understanding of current multicultural theory by the Marin Grand Jury and the lack of institutionalization of such programs demonstrate a discrepancy between multicultural theory and its implementation in the Marin County Schools. Since researchers believe that these types of programs can have a negative impact on minority student, studies should be conducted to examine how students experience these diversity programs. Teachers may be instituting successful multicultural practices in their classrooms and if so this also compels further inquiry. Students’ experiences are at the heart of multicultural education and their perspectives should be included in any study examines a classroom practices. By asking students of diverse backgrounds to think critically about their mathematics educational experience, I hope to produce findings that will help educators better understand best practices in teaching a diverse student body.
METHODS OR PROCEDURES

Sample and Site

Fifteen students from diverse backgrounds participated in a focus group to discuss their experiences in the classroom as multicultural students. The focus group was comprised of 7 male and 8 female participants. As part of the study, students participated in a survey in which they identified their ethnicity and home language. Of the students who participated, 3 students were African American, 5 students were white, 5 students were Hispanic, and 2 students were Asian. The students also represented diverse age groups. 3 students were 14 years old, 4 students were 15, 2 students were 16, 2 students were 17, 3 students were 18, and one student was 19. The students were all enrolled in one comprehensive public high school in a Bay Area city at the time of the focus group. The sample school district is comprised of 8 elementary schools, 3 middle schools, 2 comprehensive high schools and 2 alternative high schools. The school that the students attend, School A, is the more diverse of the two high schools and fed by middles schools P and Q. The other comprehensive school, School B is on the other side of town and is less ethnically and economically diverse. The same is true of its feeder schools Q and R. The sample school is experiencing increasing ethnic, economic, and linguistic diversity.

Table 1: Ethnicity of students in sample high school

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<tbody>
<tr>
<td>Enrollment, CBEDS</td>
<td>1134</td>
<td>1146</td>
<td>1184</td>
<td>1236</td>
</tr>
<tr>
<td>% Ethnicity, CBEDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>20.1%</td>
<td>20.1%</td>
<td>22.3%</td>
<td>24.4%</td>
</tr>
<tr>
<td>Asian/Pacific Rim</td>
<td>6.4%</td>
<td>5.7%</td>
<td>6.7%</td>
<td>7.2%</td>
</tr>
<tr>
<td>African American</td>
<td>3.4%</td>
<td>4%</td>
<td>4%</td>
<td>4.1%</td>
</tr>
<tr>
<td>White (non-Hispanic)</td>
<td>68.7%</td>
<td>67.1%</td>
<td>65.2%</td>
<td>61.7%</td>
</tr>
<tr>
<td>Other</td>
<td>1.4%</td>
<td>3.1%</td>
<td>1.8%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>
The socioeconomic status of the school has also shifted; the number of students qualifying for free/reduced lunches has increased from 16.7% in the 2003-2004 school year to 23.7% in the 2006-2007 school year (unpublished internal report). The school has been striving to address the needs of the diversifying population and although the numbers indicate the school is becoming more successful in educating all students, there is still an achievement gap that needs to be examined.

From the 2005-2006 school year to the 2006-2007 school year, socio-economically disadvantaged students showed a growth in math California Standards Test (CST) scores from 18.6% proficient to 38.4% proficient, and Hispanic/Latino students increased math proficiency 21.9% to 30%. Although there was not significant data for the 2004-2005 or 2005-2006 school years, proficiency rates for African American students increased from the 2003-2004 school year to the 2006-2007 school year from 28.5% to 30.8%. Although these subgroups scores are improving, the scores are dramatically lower than the proficiency rates of White students not of Hispanic origin, whose proficiency rate for 2006-2007 was 79.7% (unpublished internal report).

While the sample school is improving its education of subgroups based on ethnicity and socio-economic status, linguistic diversity poses different challenges. In 2007 the school increased the number of English Language Development (ELD) and Sheltered courses offered from 10 sections to 16 sections to serve the growing number of English Language Learners (ELL). The number of ELL has increased from 8.1% in 2004-2005 to 10.2% in 2006-2007, however the number of ELL who are proficient or above in Algebra 1 has decreased from 27% in 2004-2005 to 7% in 2006-2007. For the 2006-2007 school year, proficiency rates for ELL were a dismal 0% in General Math
(students who are enrolled in Pre-Algebra or Algebra 1A) and only 11% of ELL were proficient or above in Geometry.

While standardized tests scores can show trends, it is important to look at other modes of assessing student achievement. Classroom performance is another indicator of student success. Although disaggregated data was not available for average student grade percent of students who earned a C- or above in their math classes, there have been some interesting trends by math level. At the sample school students must earn above a C- each semester in their mathematics class in order to graduate to the next level. If a student receives below a C- in either semester, s/he must repeat the course. For the 2006-2007 school year low level math classes reported extremely low pass rates. In Pre-Algebra only 35% of students got a C- or above, and only 44% and 54% of Algebra 1A and Algebra 1B students were able to move to the next math level respectively (unpublished internal report). High level math classes see much higher pass rates: 71% in Geometry, 81% in Algebra 2, 82% in Pre-Calculus, 67% in Honors Statistics, and 92% in Honors Calculus.

Access and Permissions

Written permission was obtained from the superintendent of the participating school district. Written permission was also obtained from the principal of the participating high school. As a teacher at the school where this study was conducted, I approached students who were not currently enrolled in my classes to protect against any potential conflict of interest. Announcements were made in English classes to solicit participation. Before the focus group, each student and guardian was asked to sign a letter of informed consent. It was explained to students and guardians that participation in the study was completely optional, that the data would be kept anonymous, and that
participation in the study did not affect student grades. Students were not given any monetary or grade incentives to participate in the study, however food was provided during the focus group.

**Data Gathering Strategies**

Data in this study is anonymous. This work uses student-generated pseudonyms to protect the identity of the individuals. Prior to the focus group, students participated in a survey (Appendix A) using a Likert scale of 1 – 5 from strongly disagree (1) to strongly agree (4). If a question did not apply students were instructed to choose the number 5. The survey included 20 questions, designed to determine the cultural inclusiveness of the students’ educational experiences and the use of multicultural education methods in their classroom. A focus group format was chosen in order for a student-led discussion. Open-ended questions were used to guide the topics of the discussion (Appendix B), but students were encouraged to respond to one another’s stories. Participants in the study were briefed on the norms and procedures that the focus group would follow. During the focus group, students were videotaped and at the conclusion of this study the videotape was destroyed.

**Data Analysis Approach**

Results for the surveys was compiled and analyzed based on the question types. Questions were designed to fit into two categories. The first type of questions was intended to understand if multicultural teaching methods were being instituted in the students’ mathematics classes. The second type of question was designed to see how students feel about multicultural teaching practices in mathematics. Within the survey the
two types of questions were scrambled. Each question was individually analyzed based on the students’ responses and then the questions were categorized based on their type and analyzed to see if there was significant agreement between the students’ responses. The video of the focus group was transcribed and analyzed for themes. The discussion of these themes is included in the findings section of this paper.

Ethical Standards
This study adheres to Ethical Standards in Human Subjects Research of the American Psychological Association (Publication Manual of the American Psychological Association, 2001). Additionally, the project was reviewed and approved by the Dominican University of California Institutional Review Board approval number 7021.
RESULTS OR FINDINGS

Description of Site, Individuals, Data

Fifteen students of different ethnic, cultural, and socio-economic backgrounds gathered after school to participate in a 20 question survey and an hour-long focus group to discuss their perspectives on their mathematics education and to investigate the implementation and interest in multicultural teaching practices within the sample school district. Student names have been changed to protect the confidentiality of the students.

Two types of data were collected for this study where students were asked to answer questions about their educational experiences. Students first answered a 20-question survey to determine the utilization of multicultural teaching practices in their educational history and the interest in these practices (Appendix A). When students completed the survey, they participated in a focus group, which was designed to go deeper into the experiences of the students (Appendix B). During the focus group students were encouraged to use the questions as jumping off points and to respond to each other’s experiences. Some students were more vocal than others, and while everyone was encouraged to share their opinions, no students were forced to answer any questions. One student chose not to answer any of the questions, however he respectfully listened to the others’ stories.

Analysis of Themes and/or Inferential Analysis

Analysis of the survey and the focus group showed incongruous themes. From analysis of the survey, most students answered that they disagree or strongly disagree that multicultural teaching practices are being implemented in their classrooms, but from
more in depth discussion during the focus group students felt that teachers generally do a
good job of educating all students. When presented with achievement gap statistics from
their own school, students had difficulty explaining why they thought the gap existed.

The second startling theme from this study is that while the students answered that they
were interested in multicultural teaching practices, they were very uncomfortable
discussing how culture contributes to learning, often preferring to ignore cultural
differences and falling back on ‘color-blind’ dogma. Students credited their success
and/or failure in mathematics to particular teachers. All students agreed that teacher
expectations were a driving factor for student success, however some observed that
teacher expectations were sometimes dependent on a student’s race rather than a
student’s ability. Classroom support of multiple languages was shown in both the student
survey and the discussion, however issues of math placement based on English ability did
come up.
TABLE 2
UTILIZATION OF MULTICULTURAL TEACHING PRACTICES

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can speak my home language/dialect in the classroom</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>2. We address issues concerning social justice in my math class.</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3. My culture has made valuable contributions to the field of</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>mathematics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Individual achievement is important in my math class.</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>5. What I am learning in math is relevant to my life.</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>6. My teachers understand me culturally.</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>7. My math teacher gears lessons to what I am interested in.</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>8. I learn about other cultures in my math class.</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>9. I use critical thinking skills in math.</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>10. I use problem-solving skills in math.</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>11. My teachers care about me.</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>12. I feel like my culture is supported in the classroom.</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>
### TABLE 3

**STUDENT INTEREST IN MULTICULTURAL TEACHING PRACTICES AND MATHEMATICS**

<table>
<thead>
<tr>
<th></th>
<th>Number of student responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>1. I would like to go on a math field trip.</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>2. I use math at work.</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>3. I like learning about other cultures.</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>4. I like it when speakers come in to class.</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>5. I like learning about people who have made contributions to the field of mathematics.</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>6. I am thinking about going into a career in mathematics</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>7. I like math.</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>8. I feel confident when I walk in my math classroom.</strong></td>
<td>0</td>
</tr>
</tbody>
</table>
DISCUSSION

Summary of Major Findings or Results
Students were generally ignorant of multicultural teaching practices and had trouble naming any curriculum or programs that are used in the school system. Students did not know what the word social just meant and laughed at the idea of taking a math field trip. Although students were uncomfortable discussing issues around ethnicity and culture, they are interested in multicultural teaching practices. Over half of the students answered that they either disagreed or strongly disagreed that their culture made valuable contributions to the field of mathematics, but all but one of the students agreed or agreed strongly to being interested in learning about other cultures. 10 students answered positively to learning about people who have made contributions to the field of mathematics while 3 students answered not applicable to that statement, begging the question if they have ever studied the people behind the mathematics. Almost all students were interested in taking a math field trip, although while they were filling out they surveys, one student asked “Where would we go for a math field trip? Like the zoo?” laughing at the absurdity of going on a field trip for a math class. Another student scolded her, “No like the Exploratorium.” I jumped in and explained, “Or we could go to the Golden Gate Bridge and study the curve of the parabola that the cables make. The first student, egger to please asked, “Oh, yeah, can we do that?”

When I asked students to describe a diversity program or multicultural teaching practice that was used in the school, the students had difficultly describing anything that
was instituted within the school. When I first posed the question, Edwin very proudly announced, “I’m brown!”

To clarify the question I defined multicultural as “lots of cultures.” Emma explained to Edwin that multiculturalism means “different cultures, not colors.” Students were still puzzled by this question. Until Ruby said, “So you mean like the GTSA?” The Gay Transgender Straight Alliance (GTSA) is an after school club.

Ana added, “We have the GTSA, which is to help prevent violence and negative feelings towards homosexuals. But we don’t have anything in place to help people understand people of other cultures.”

Edwin: I know something that helps people get along…football.

Ruby: I think it is very important to learn about other cultures, but we really don’t learn about that stuff as much as we should. That’s really important.

Ana: Especially in history, we learn about events, but we don’t really learn about different groups as a whole, and we get a lot of racism and negative feelings towards certain groups. Not just against African Americans or Hispanics, but even against say the French. We have a teacher who is extremely against the French and all things French and that was extremely hurtful.

Emma: There’s Cultural Food day in Health Class where everyone brings in a different food from their culture.

Edwin: I brought flan.

When asked how teachers can better include diverse perspectives in class, Ana had a suggestion from her middle school in San Jose. “For math, especially, it would be nice if we went over how different scholars from different cultures influenced the math that we
are studying. Like in Algebra 2 there were so many scholars in North Africa and the Middle East who made a lot of contributions to those ideas, and yet we never hear about that.”

Students also agreed that allowing for multiple ways of doing a problem is a way of including diverse perspectives. Mayela, who emigrated from Mexico three years ago said, “In Mexico, we do math differently. Like adding and multiplying. Teachers should talk about that, or at least let you do it your way.”

With the lack of instituted multicultural programs and teaching practices, it is little wonder that the students had difficulty discussing multicultural education. Edwin was confused by the questions about culture. Jane was extremely uncomfortable discussing cultural differences and qualified her responses with statements like “I’m not racist, or anything” Ana equated whiteness with the absence of culture, and other students when presented with the questions that made them uncomfortable, looked down at their desks, fiddled with their phones, and declined to answer.

When asked to describe an experience where a teacher made them feel proud of their ethnicity or home language, the students were silent. When I asked why they weren’t responding, Edwin who is not shy tried to clarify, “I don’t understand the question you are asking – straight up.”

Ruby: Has a teacher have made you feel good because of your culture basically?

Edwin: Well, I don’t think a teacher would be like “Way to go, you’re Mexican.”

The students laughed.

Emma: Well today, I forgot your name, what is your name?

Emma: Fei-Yen was able to tell us something that our teacher did know and we thought that was pretty cool and she was proud of her for that.

From there a discussion came up about teachers’ allowing students to teach the class about their own cultures. While all students agreed that it was interesting to learn from fellow students, some felt that teachers often don’t let students be information givers because they are insecure about their own knowledge.

Sam: In history when a student mentions something about their culture of the country that they are from that is part of what they are studying, the teacher doesn’t always appreciate that. It’s almost as if they’re mad that the student knows more than they do.

Students were interested in discussing how teacher perceptions of students affected their learning. Several students have moved from more diverse Bay Area counties and had interesting perspectives on how teachers differ in each county.

Edwin: “I don’t think teachers don’t understand your culture, they don’t understand where you’re from – like how your household is, where you’ve been. My 6th grade year when I came to [School P] it was hella different than Vallejo. I don’t know how to explain it, but it was different. In my 7th grade year, in my English class, the teacher would always focus on me for some weird reason. I kept getting suspended and that was how I got to [School S](a special day school). ”

Ana: I moved to [the sample school district] from San Jose during the middle of my 7th grade year. Down in San Jose it was a lot more diverse and the teachers were used to dealing with that and there were more teachers who were Hispanic or part Hispanic or
African American, and up here it’s like all the teachers are white most of the kids are white. The teachers did not know how to approach a student of multicultural descent. And they didn’t seem to be familiar with culture in general and so they would and still do focus on the students who are different than them. I know a lot of teachers who have discriminated against their students because they assume that the students of Hispanic descent are not going to pay attention. One of my English teachers had assumed that this one African American student wasn’t going to do very well, but he wrote the best essays in class. I think they look at people unfairly based on how they think people were raised.

From Ana’s comment students eagerly discussed teacher expectations. Students felt that they had more success in classes where they felt the teacher cared about them. Many students said that they tried harder because they wanted to impress their teachers. Students also said that in classrooms where they felt there did not like them they were less likely to participate or do the homework. In general students had positive things to say about their teachers and their school. In the survey, many students answered that they felt that their teachers care about them. Once student even circled that question with a heart and another put a smiley face next to her circled answer. All students agreed that teacher expectations play a big role in their success, however some students perceived inequities in those expectations.

Jane: A lot of times I guess teachers focus on different colors than white, but recently one of my teachers made an assumption that, I don’t what to sound like racist or something, but like just that white people are smarter, which I totally don’t think, but I guess he maybe thought that. He told me, “You should have gotten an A” and he always says things like, “You are capable of doing this,” but he doesn’t know my capabilities
yet. And the person next to me happens to be Hispanic, he is so much easier on him, and maybe he thinks that he is being ok, but he should just be equal.

Sara: I feel the same way as she does. I think at the beginning of the year they come with a stereotype like, “Oh, she going to do well in the class.”

Ana: I have a lot of friends, who because of their ethnicity, the teachers seem to expect less of them, it’s like sometimes they appreciate it, but sometimes they just feel that they are not motivated to do the work because they don’t think that they are expected to do the work.

While some students felt that minority students suffered from low teacher expectations, Ruby, an African American student felt that her teachers’ high expectations contributed to her academic success. “I like to joke around in class; talk kind of fun. I think my teachers they push me and keep pushing me on to do good, and that gives me more motivation. Last year, my math teacher, she influenced me to get my act together because she knew I was smart and I passed with a B+.”

In talking about teacher expectations, students brought up how the school culture affects student achievement. Students, for the most part, were in agreement about the inclusive climate of School A, but had mixed opinions about the district as a whole. Students seemed to agree that the more ethnically and economically diverse the school, the more inclusive.

Ruby: I think this school has a very good support system of keeping people on track. Cuz I used to do none of my homework and I was like looking at my transcript today and freshman year second semester all my grades were Ds. And like seriously that
is horrible, and like now all my teachers push me and I do all my work and I get way better grades.

  Kate: I think that our whole school district has a really good education system.

  Ana: I might have to disagree with you on that.

  Ruby: (laughs) Yeah.

  Ana: [School A] as far as my experience goes, is completely different from any other school in this district. Like [School R] sucked. We had maybe 3 African American kids and only a couple Asian kids, and they stood out so bad and the teachers made them stand out so bad. They would say “Oh we’re a multicultural school. We accept everybody.” But it was so obvious that they did not. And same with [School B.]

  Ruby: Huh.

  Ana: I went to [School B] for one semester and transferred because of the racist jokes. The rejection of everything that is not white, pink, or sporty just killed me.

  Kate: Well, [School P] has a lot more diversity.

  Rachael: A lot of my friends went to [School B] and I wished I could there, but now I don’t. Now my friends are like “I wish I could go to [School A],” it’s across town, but they can’t stand the racist things.

  Students are pleased with their inclusive school. They cited diversity as a good thing and were proud that they have friends from diverse ethnic backgrounds. When asked about speaking different languages in the classroom all students agreed that teachers did not discourage students from speaking their home language in class. While the school may be supportive of diverse linguistic expression, Fei-Yen, who emigrated from Taiwan in August, told of a story of being placed in her math class by her English
ability and not her mathematics ability. In Taiwan she took calculus, but here she is in Algebra 2, two levels below her mathematics ability “I’m a senior and I am in Algebra 2 and I feel it is a little bit too easy for me, but my problem is that I can’t read the English so I stay in Algebra 2.” Fei-Yen’s brother P’eng has a similar story but his teacher advocated for him to move him to a more appropriate level. He is a sophomore and was placed in Algebra 1B class, two levels below his actual ability. “My first class was too easy, so I ask my teacher from more work because I am bored. My teacher shows my father the book and he wants me to change classes, but the other teachers won't let me because of my English. In class one day, my teacher gave me the Algebra 2 final and I pass with a B+, so now I am in Algebra 2.”

Students were all surprised at the idea that a teacher would not allow languages other than English in the classroom and agreed that that was discrimination, but did not react to Fei-Yen’s story of being placed in a lower level mathematic class based on her English ability as discrimination. While students felt that the sample school was doing a good job of educating all students, their judgments were often based on overt forms of racism and did not address the more subtle institutionalized inequities.

Students were reluctant to discuss any kind of cultural difference and quick to fall back on color-bind statements like “I just treat everyone the way I want to be treated”, but were sensitive to how teacher expectations differed for students of different ethnicities. The general discomfort with talking about culture shows that it is not often addressed in school. Some students found multicultural teaching practices ridiculous because they had never seen them. Britney couldn’t conceive of going on a math field trip and Edwin thought the idea of a teacher making him feel proud of his cultural
achievements was absurd. Ana was the most comfortable with talking about multicultural education, but in her educational history she went to a school where multicultural practices were used.

When presented with achievement gap statistics of their own school, students were stunned and had difficulty explaining why some students were doing so much better than others. According the student survey, most students were interested in specific multicultural teaching practices: having guest speakers, going on field trips, and learning about mathematicians and the achievements of different cultures in the field of mathematics, but few of the students have ever experienced these. Although the students are interested in other cultures and languages, they did not see how multicultural teaching practices might help underperforming students.

Comparison of Findings/Results with Existing Studies

Many themes in case studies were also present in this focus group, however there was one interesting distinction. African American students who participated in the group said that they took a great deal of pride in celebrating the accomplishments of African American people during Black History month. A great deal of literature discounts school programs that celebrate diversity as a supplemental activity. However students felt that this kind of celebration was an important affirmation of their identity. Perhaps students are lead to believe that their cultures have made so little important contributions to society that celebrations, however small, have a significant impact on them.

It is also good to know that the teachers at the sample school are supportive of students using their home language in the classroom. Research shows that not allowing
Students to speak their home language can have damaging effects on the self-esteem and achievement of the students. However, it is concerning that their appears to be a pattern for placing students in lower level math classes based on their English ability.

Limitations of the Study

Although this study is a step in the direction of understanding students’ perspectives in their mathematics education, it is also understood that these students represent a small sample of the larger student body. Although the focus group was ethnically, racially, and socio-economically diverse, the students in no way represent all of their peers within the school. The researcher does not pretend that the students are speaking for all students of a particular ethnicity, language background, or socio-economic status. They are simply discussing their own experiences and opinions. It should also be understood that these students’ opinions relate to how they experience education this unique Bay Area community and students’ opinions in other areas may differ. The experiences of these students should not necessarily be applied to how students experience mathematics education in other cities.

Implications for Future Research

The majority of students who participated in the study are enrolled in either Algebra 1A, Algebra 1B, or Geometry classes. Although there are a disproportionate number of minority students enrolled in lower-level math classes at this school, it would be illuminating to interview a diverse group of students who are successful in higher level math classes to understand what factors have help them to high achievement in mathematics.
It would also be valuable to get teachers’ reactions to the study. Since the students credited their successes and failures to individual teachers, teachers should be made aware of the profound impact they have on their students. It would be illuminating to have another focus group that included students, teachers, and administrators so all parties could learn from each other and develop curricular and school changes based on the outcomes of the focus group.

Overall Significance of the Study
The student interest generated by this project was remarkable. Students were enthusiastic to have opportunity to share their opinions and experiences with the educational community. Students told their friends about the project any many volunteered to participate in the project. Since student opinions are so rarely valued, this study validated many students’ experiences. The focus group was not only a valuable learning experience for the researcher, the students also gained valuable insight in their experiences and the experiences of their peers. Students met other students that they would not normally talk to and they were able to have an open, honest discussion with them. Students are experts in their education, yet their opinions are not included in curriculum development. This study demonstrates one of Paolo Friere’s concepts of student driven instruction. When students are included in the educational process, they are engaged and learn more. Many of the students were energized by the idea that their opinions were a valued contribution to the educational community.
REFERENCES


Noguera, P. (1999, April). *Confronting the challenge of diversity in education: how we respond to the increase of diversity in America will be a challenge for many schools and communities, but it need not be a problem.* Retrieved July 6, 2008 from www.inmotionmagazine.com/bndivers.html


APPENDIX A SURVEY PROTOCOL

Student Survey

Directions: Please answer each question as accurately as possible. Thank you for your participation.

1. Gender (circle one) Male Female

2. Ethnicity: ________________________________

3. Age: ____________________________________

4. Home language/Dialect: __________________
**Directions:** After each question circle the number that most clearly represents your feelings about it. Although you may feel neutral about some questions or you may agree and disagree about some questions depending on the circumstance, please choose only one answer and do not leave any questions blank. If a question does not apply to you please mark “NA”

<table>
<thead>
<tr>
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<th>3</th>
<th>4</th>
<th>5</th>
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<td>1</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Agree</td>
<td>Strongly agree</td>
<td>NA</td>
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</table>

<table>
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<tr>
<th>Question</th>
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<th>2</th>
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<th>4</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. I can speak my home language/dialect in the classroom</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. We address issues concerning social justice in my math class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. My culture has made valuable contributions to the field of mathematics.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Individual achievement is important in my math class.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>5. What I am learning in math is relevant to my life.</td>
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<td>2</td>
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<tr>
<td>6. My teachers understand me culturally.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</tr>
<tr>
<td>7. I like learning about people who have made contributions to the field of mathematics.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>8. I like math.</td>
<td>1</td>
<td>2</td>
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<tr>
<td>9. I use critical thinking skills in math.</td>
<td>1</td>
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<tr>
<td>10. I use problem-solving skills in math.</td>
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</tbody>
</table>
**Directions:** After each question circle the number that most clearly represents your feelings about it. Although you may feel neutral about some questions or you may agree and disagree about some questions depending on the circumstance, **please choose only one answer and do not leave any questions blank.** If a question does not apply to you please mark “NA”

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>11. I would like to go on a math field trip.</td>
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<td>12. I use math at work.</td>
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<td>13. My math teacher gears lessons to what I am interested in.</td>
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<td>14. I like learning about other cultures.</td>
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<tr>
<td>15. I learn about other cultures in my math class.</td>
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<td>16. I like it when speakers come in to class.</td>
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<td>17. My teachers care about me.</td>
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<td>18. I feel like my culture is supported in the classroom.</td>
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<tr>
<td>19. I feel confident when I walk into my math class.</td>
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<td>20. I am thinking about going into a career in mathematics.</td>
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</tbody>
</table>
APPENDIX B STUDENT FOCUS GROUP QUESTIONS

1. Describe a situation where a teacher really inspired you. What was special about that teacher and that class?

2. Describe a math class where you felt you learned a lot. What did the teacher do to support your learning?

3. Describe a diversity program or a multicultural education practice that is in place in your school. How have those program/units/books influenced your learning?
   a. How do your math classes include multicultural perspectives?
   b. How can your teachers better include diverse perspectives in class?

4. Describe an experience you had in speaking your home language/dialect in school?
   a. Have you ever had a teacher tell you that you couldn’t speak your home language/dialect in school? How did that make you feel?
   b. Describe an experience where a teacher made you feel proud of your ethnicity or home language.

5. Have you ever felt you were unfairly treated because you felt a teacher did not understand your culture?

6. What do you think is good about how the schools address multicultural education?

7. How can this school improve its approach to teaching all students?

8. Is there anything you would like add?