The Mathematics Educator
2003, Vol. 13, No. 2, 7–21

Hidden Assumptions and Unaddressed Questions in *Mathematics for All* Rhetoric

Danny Bernard Martin

In this article, I discuss some of the hidden assumptions and unaddressed questions in the increasingly popular *Mathematics for All* rhetoric by presenting an alternative, critical view of equity in mathematics education. Conceptualizations of equity within mainstream mathematics education research and policy have, for the most part, been top-down and school-focused in ways that marginalize equity as a topic of inquiry. Bottom-up, community-based notions of education in mathematics education are often of a different sort and more focused on the connections, or lack thereof, between mathematics learning and real opportunities in life. Because of these differences, there has been a continued misalignment of the goals for equity set by mathematics educators and policy makers in comparison to the goals of those who continue to be underserved in mathematics education. I also argue that equity discussions and equity-related efforts in mathematics education need to be connected to discussions of equity in the larger social and structural contexts that impact the lives of underrepresented students. Achieving *Mathematics for All* in the context of limited opportunity elsewhere may represent a Pyrrhic victory.

Portions of this paper are based on the author's published dissertation, Martin (2000), postdoctoral work, Martin (1998), and an earlier paper, Martin (2002a), presented at the Annual Meeting of the American Educational Research Association, New Orleans, 2002.

In this article, I discuss some of the hidden assumptions and unaddressed questions in the increasingly popular *Mathematics for All* rhetoric by presenting an alternative, critical view of equity rhetoric in mathematics education. My arguments will probably generate more questions than answers, but it is my hope that any subsequent discussion serves as a catalyst to move mathematics educators beyond the rhetoric stage in this movement toward meaningful action.

Mathematics for All is a worthy philosophical approach to mathematics education. However, mathematics educators should not be satisfied with working toward equity in mathematics education simply for the sake of equity in mathematics education and settling for small victories like *Mathematics for All*. For reasons of social justice, I also argue that equity discussions and equity-related efforts in mathematics education should extend beyond a myopic focus on modifying curricula, classroom environments and school cultures absent any consideration of the social and structural realities faced by marginalized students outside of school and the ways that mathematical opportunities are situated in those larger realities (e.g., Abraham & Bibby, 1988; Anderson, 1990; Apple, 1992/1999, 1995; Campbell, 1989; D'Ambrosio, 1990; Frankenstein, 1990, 1994; Gutstein, 2002, 2003; Martin, 2000b; Martin, Franco, & Mayfield-Ingram, 2003; Stanic, 1989; Tate, 1995; Tate & Rousseau, 2002).

Danny Bernard Martin is Professor and Chair of Mathematics at Contra Costa College. He received his Ph.D. in Mathematics Education from the University of California, Berkeley and was a National Academy of Education Spencer Postdoctoral Fellow in 1998-2000. His research focuses on equity issues in mathematics education; mathematics learning among African Americans; and mathematics teaching and curriculum issues in middle school, secondary, and community college contexts. He is also interested in school-community collaborations.

Empty Promises and Prior Reforms

In order to add a bit of historical context to my critical remarks, I want to briefly revisit three interrelated events within mathematics education, each occurring about fifteen years ago.

An Attempt to Frame Equity and Achievement.

The first event occurred in 1988. In that year, Reyes and Stanic (1988) published one of the most significant pieces of literature on issues of race, sex, socioeconomic status, achievement, and persistence to have appeared within the field at that time. In that article, they provided a useful, although incomplete, theoretical framework to explain differences in mathematics achievement. That framework served as a foundation upon which to base future research on

equity issues in mathematics education. The paper called for studies exploring relationships among the following factors: teacher attitudes, societal influences, school mathematics curricula, classroom processes, student achievement, student attitudes, and student achievement-related behaviors.

Creating Standards for Mathematics Learning.

The second event occurred in 1989. The National Council of Teachers of Mathematics (NCTM) published its *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 1989). The authors of that document were given two charges (a) create a coherent vision of what it means to be mathematically literate both in a world that relies on calculators and computers to carry out mathematical procedures and in a world where mathematics is rapidly growing and is extensively being applied in diverse fields and (b) create a set of standards to guide the revision of the school mathematics curriculum and its associated evaluation toward this vision.

In addition to creating a vision for mathematical literacy and setting standards for school mathematics, the *Curriculum and Evaluation Standards* (NCTM, 1989) also contained very strong statements about equity, stressing the fact that all students should learn mathematics, not just the college-bound or (white) males:

1. The social injustices of past schooling practices can no longer be tolerated. Current statistics indicate that those who study advanced mathematics are most often white males. Women and most minorities study less mathematics and are seriously underrepresented in careers using science and technology. Creating a just society in which women and various ethnic groups enjoy equal opportunities and equitable treatment is no longer an issue. Mathematics has become a critical filter for employment and full participation in our society. We cannot afford to have the majority of our population mathematically illiterate: Equity has become an economic necessity. (p. x)

2. Finally, in developing the standards, we considered the content appropriate for *all* students…. The mathematical content outlined in the Standards is what we believe all students will need if they are to be productive citizens in the twenty-first century. If all students do not have the opportunity to learn this mathematics, we face the danger of creating an intellectual elite and a polarized society. The image of a society in which a few have the mathematical knowledge needed for the control of economic and scientific development is not consistent either with the values of a just democratic system or with its economic needs. We believe that all students should have an opportunity to learn the important ideas of mathematics expressed in these standards. (p. x)

These statements constituted the early tenets of the *Mathematics for All* movement and characterized the early discourse surrounding this movement. Along with similar statements found in other reform-oriented documents (e.g., National Research Council [NRC], 1989), they also alluded to the fact that African American, Latino, Native American, female, and poor students have traditionally trailed their White and Asian American peers on most measures of achievement and persistence and have lacked access to the kind of mathematics that allows them to fully function in school and society (Meyer, 1989; Tate, 1997; Tate & Rousseau, 2002). Further, these statements acknowledged that both policy and curriculum changes are needed to help reverse these trends.

Underserving a Generation of Students.

At the time, the authors of the *Curriculum and Evaluation Standards* may have believed that strong statements about equity, in combination with the principles outlined in that document, would lead to the kind of reform efforts that would help alleviate inequities in achievement and persistence for future generations of underserved students. However, achievement and persistence data show that African American, Latino, Native American, and many poor students continued to experience these inequities (e.g., Tate, 1997). By way of evidence for this last statement, consider the third event, which occurred in 1990. It was then that the students representing the Class of 2002 entered first grade. Looking back, I would argue that many of those students were not well-served by more than a decade of mathematics education reform and strong statements about equity. Data from the Third International Mathematics and Science Studies (TIMSS) show that American students, as a group, continued to lag behind their peers in many countries (Schoenfeld, 2002). It can also be argued that the most underserved students of the Class of 2002 were large numbers of African American, Latino American, Native American, and poor students. National Assessment of Educational Progress (NAEP) data over the past fifteen years reveal that although there have been some modest gains in mathematics achievement and persistence by these students (Schoenfeld, 2002), disparities continue to exist and there is evidence that

differences in achievement may be increasing once again (e.g., Lee, 2002).

The convergence of affairs described in the three events above leads me to the following conclusion: Despite strong equity-oriented discourse in the 1989 *Curriculum and Evaluation Standards*, the development of equity-based frameworks such as those outlined by Reyes and Stanic (1988) and others (Oakes, 1990; Secada, 1989, 1992; Secada, Fennema, & Adajian, 1995; Secada, Ogbu, Peterson, Stiff & Tonemah, 1994) and despite increased understandings of how students learn, how teachers teach, and improved methods of assessing teachers and students—math educators have yet to produce adequate solutions to differential achievement and persistence along ethnic lines. Equity in mathematics education remains elusive more than a decade following the three events described above.

Renewing the Promise

Nearly fifteen years after publication of the *Curriculum and Evaluation Standards*, the architects of mathematics education reform have produced an updated standards document entitled *Principles and Standards for School Mathematics*[1] (NCTM, 2000). According to Schoenfeld (2002), the *Standards* are "a vision statement for mathematics education designed to reflect a decade's experience since the publication of the [*Curriculum and Evaluation Standards*]" (p. 15). They make explicit the mathematics that is valued and describe the goals for learning this valued mathematics (i.e., mathematics for life, mathematics as a part of cultural heritage, mathematics for the workplace, and mathematics for the scientific and technical community). In the March 2002 issue of the *NCTM News Bulletin*, NCTM past-President Lee Stiff confirmed this when he stated that the 1989 *Curriculum and Evaluation Standards* "described the teaching and learning that were valued. In the updated version of this document… the teaching and learning outcomes that we continue to value are revisited" (p. 3). Like their 1989 counterpart, the 2000 *Standards* also indicate which students should learn this valued mathematics (i.e., *Mathematics for All*), how they might go about learning it, and how we should assess both teachers and students as they attempt to teach and learn it. Noticeably absent are references to teaching and learning mathematics for social justice; that is, having those who have been traditionally shut out of the mathematics pipeline learn mathematics to help them improve the conditions of their lives.

In effect, the old and new *Standards* documents describe what Apple (1992/1999, 1993) calls the *official knowledge* of mathematics education. This term is an outgrowth of Apple's contentions that some forms of knowledge are more valued than others and that these preferred "forms of curricula, teaching, and evaluation in schools are always the results of such accords or compromises where dominant groups, in order to maintain their dominance, must take the concerns of the less powerful into account" (1993, p. 10). Apple indicated that these compromises "are usually not impositions, but signify how dominant groups try to create situations where the compromises that are formed favor them" (p. 10). Having identified mathematics knowledge as a form of *high-status* knowledge and having invoked the questions of *What knowledge is of most worth?* and *Whose knowledge is of most worth?,* Apple offered a critical analysis of the 1989 *Curriculum and Evaluation Standards*. This critique challenged the notions of mathematics literacy called for in the standards. In one part of that analysis, he stated:

> The recognition that mathematical knowledge is often produced, accumulated, and used in ways that may not be completely democratic requires us to think carefully about definitions of mathematical literacy with which we now work and which are embedded in Standards volumes…. My arguments in this article are based on a recognition that there is a complex relationship between what comes to be called official knowledge in schools and the unequal relations of power in the larger society…. I have claimed that one of the primary reasons that mathematics knowledge is given high status in current reform efforts is not because of its beauty, internal characteristics, or status as a constitutive form of human knowing, but because of it socioeconomic utility for those who already possess economic capital. In order for our students to see this and to employ mathematics for purposes other than the ways that now largely dominate society, a particular kind of mathematics literacy may be required. (Apple, 1992/1999, p. 97-98)

In light of this critique, it is reasonable to ask whether the updated *Standards* address the substance of Apple's concerns. The updated *Standards* are based on six core principles: equity, curriculum, teaching, learning, assessment, and technology. Because equity is listed first among the core principles, there appears to be an implied promise that *Standards*-based reform will result in the kind of significant change that will be necessary to improve achievement and persistence among marginalized students (Martin, Franco, et al,

2003). Like its 1989 counterpart, the 2000 *Standards* volume also indicates which students should learn mathematics, how they might go about learning it, and how we should assess both teachers and students as they attempt to teach and learn mathematics.

Moreover, the language of *Mathematics for All* continues to emanate from this and other recent documents that discuss standards (e.g., RAND Mathematics Study Panel, 2003). In writing about standards and equity, Alan Schoenfeld, who is widely recognized as a leader in the field of mathematics education, recently stated "Mathematical literacy should be a goal for all students" (2002, p. 13). Building on the ideas of Robert Moses (Moses, 1994; Moses & Cobb, 2001; Moses, Kamii, & Swap, 1989), Schoenfeld also likened mathematics literacy to a new form of civil rights, highlighting the belief that "the ongoing struggle for citizenship and equality for minority people is now linked to an issue of math and science literacy" (Moses, 1994, p. 107). It is important to accept such statements by leaders in the field as good-faith efforts to bring attention to the inequities faced by marginalized students in mathematics education. However, to ensure that such statements about equity and *Mathematics for All* do not amount to another decade of empty promises and sloganizing, I believe that continued interrogation, similar to Apple's (1992/1999) critique of the *Curriculum and Evaluation Standards*, should be extended to the 2000 *Standards* and other current reform efforts that claim to have equity as a goal. Only through ongoing critical analysis and reflection is it possible to ensure that attention to the issues affecting mathematics achievement and persistence among African American, Latino, Native American, and poor students remain front and center and that high quality mathematics teaching, learning, curriculum, and life opportunities become a reality for these students, many whom have lacked access to and benefited very little from previous reform efforts, despite strong pronouncements about equity (Martin, Franco, et al, 2003).

Indeed, if one compares the discourse about equity found in the 1989 *Curriculum and Evaluation Standards* (see above) to that found in the 2000 *Standards*—which is limited to statements about high expectations and strong support for all students—it is very apparent that earlier language stressing mathematics learning for liberatory purposes and having marginalized students use mathematics to critically analyze the conditions in which they live has subsided. In fact, the Equity Principle of the *Standards* contains no explicit or particular references to African American, Latino, Native American, and poor students or the conditions they face in their lives outside of school, including the inequitable arrangements of mathematical opportunities in these out of school contexts. I would argue that blanket statements about *all* students signals an uneasiness or unwillingness to grapple with the complexities and particularities of race, minority/marginalized status, differential treatment, underachievement in deference to the assumption that teaching, curriculum, learning, and assessment are all that matter[2] (e.g., NRC, 2002). A recent pronouncement by the NRC (2002) involving research on the influence of standards on mathematics and science education held that rigorous research, by definition, cannot be conceptualized as advocacy work. However, the quest to make sure that equity issues are brought to the fore, and remain there, in mathematics education research will involve the kind of advocacy work that some do not see as legitimate.

Mathematics for All: How Do We Get There?

In addition to the publication of the *Principles and Standards for School Mathematics*, a potentially influential paper on equity issues in mathematics education has appeared. That paper, authored by Allexsaht-Snider and Hart (2001)[3], is entitled *"Mathematics for All": How Do We Get There?*. In it, the authors synthesize progress on equity issues in mathematics education over the last decade. Based on their reviews of the research literature and of analysis of math education reform, they suggest three areas of focus for continued research: structural aspects of school districts, teacher beliefs about diverse students and the learning of mathematics, and classroom practices.

The paper by Allexsaht-Snider and Hart is especially timely because its appearance, against the backdrop of persistently low achievement by minority and poor students and critiques such as that leveled by Apple (1992/1999), leads to questions about how far mathematics education for under-represented students has evolved and questions about how researchers and policy-makers will respond to a host of complex equity-related issues that were not of paramount importance fifteen years ago:

- Rapidly changing demographics that will continually challenge our definitions of equity and diversity, both in terms of defining student populations and determining what resources are needed to help these students excel (e.g., Day, 1993).

- Changing curriculum and course-taking policies in many school districts that now require all students, despite their prior preparation, to enroll in algebra by 8th or 9th grade.
- High-stakes testing in mathematics that will have a disproportionately negative impact on under-represented students given that many of these students have less access to high-quality teaching and curriculum and that accountability measures for low test performance are often punitive in nature (e.g., Gutstein, 2003; Tate, 1995; Tate & Rousseau, 2002).
- A changing economy that now relies on large numbers of foreign-born workers to fill math and science-based technical jobs and less on the large pool of under-represented students who remain on the periphery of mathematics and science.

Critiquing Equity and *Mathematics for All* Rhetoric

In my view, an analysis of equity in mathematics education that takes into the account the issues raised above and that contemplates the tensions that these considerations raise for *Mathematics for All* will help move mathematics educators beyond the rhetoric stage. Below, I attempt such an analysis by focusing on four main themes: (1) the marginalization of equity issues within mathematics education research, (2) the misalignment of top-down and bottom-up approaches to equity, (3) restrictive definitions of equity, and (4) the need to situate equity concerns within a broader conceptual framework that extends beyond classrooms and curricula.

Complicity and Marginalization of Equity Issues.

Echoing similar claims made by others (e.g., Cobb & Nasir, 2002; Gutstein, 2002, 2003; Khisty, 2002; Secada, 1989; Secada et al, 1995), I suggest that a major reason the mathematics education community has struggled with achievement and persistence issues among underrepresented students, and why effective solutions have been slow in coming, lies in how mathematics educators have dealt with equity-related issues, both in terms of the theoretical frameworks and analytical methods that have been employed and the equity-related goals that have been set.

If we examine the way that the "equity problem" in mathematics education has been situated and defined relative to the other research that gets done, it can be said that, contrary to its listing at the first principle in the *Standards*, equity has been a marginalized topic in mathematics education (Meyer, 1989; Secada, 1989, 1991, 1992; Secada et al, 1995; Skovsmose & Valero, 2001; Thomas, 2001). Discussions of equity within mathematics education have typically been confined to special sessions at conferences, special issues of journals, or critical issues sections of books. In my view, the status of African American, Latino, Native American, and poor students has not been a primary determinant driving mathematics education reform. When discussions do focus on increasing participation among these students, it is usually in reference to workforce and national economic concerns. Secada (1989) called this "enlightened self-interest." Gutstein (2003) stated "to discuss equity from the perspective of U.S. economic competition is to diminish its moral imperative and urgency" (p. 38).

Even within the context of the "math wars[4]," an intense political and philosophical debate between those supporting traditional, skills-focused approaches to mathematics teaching and learning and those supporting approaches called for in the 1989 *Curriculum and Evaluation Standards* (i.e. a focus on conceptual understanding, connections, mathematical communication, multiple representations, and analyzing data), the needs of marginalized students have never been the center of discussion in these very public arguments. As such arguments have raged on among academics and politically powerful interest groups, marginalized students have continued to suffer low achievement and limited persistence. When a similar debate about skills versus process approaches to writing erupted in the field of literacy, Delpit (1995) had the following to say:

> In short, the debate is fallacious; the dichotomy is false. The issue is really an illusion created initially not by teachers but by academics whose worldview demands the creation of categorical divisions—not for the purpose of better teaching, but the for the goal of easier analysis. As I have been reminded by many teachers... those who are most skilled at educating black and poor children do not allow themselves to be placed in "skills" or "process" boxes. They understand the need for both approaches. (p. 46)

I would also argue that such debates are symptomatic of a certain kind of complicity that has been largely ignored in discussions involving equity, accountability, and standards-setting. Despite strong statements about equity that were included in the 1989 *Curriculum and Evaluation Standards* and despite the fact that equity has been listed as the first cornerstone principle of the 2000 NCTM *Standards*, one of the great paradoxes of mathematics education reform over the last fifteen years is that the very same community

that has engineered these reforms also has the dubious distinction of overseeing the inequities in achievement and persistence that have characterized the experiences of many poor and minority students (Martin, Franco, et al, 2003).

Because equity concerns have not been central to mainstream mathematics education research, there is also a risk that recent attention to these issues have turned equity into the "problem of the day" in the same way that trends in mathematics education research have shifted from one "theory of the day" to another whether it be cognitive analyses, constructivism, or situated learning. The last several years have seen the rise of cognitive and decontextualized analyses (e.g., Davis, 1986; Schoenfeld, 1985, 1987) followed by a transition to situated analyses (e.g., Anderson, Reder, & Simon, 1996; Brown, Collins, & Duguid, 1989; Cobb, 2000; Cobb & Bowers, 1999; Cobb, Yackel, & Wood, 1992; Lave & Wenger, 1991). The first research approach has resulted in studies that include marginalized students but that do not explicitly address the social and contextual factors that contribute to their underachievement, focusing instead on content and problem-solving behaviors. Studies in the situated approach have addressed issues of context but in such limited ways that discussions of differential socialization, stratification, opportunity structure, ethnicity, and social class are often noticeably absent.

Misalignment of Top-Down and Bottom-Up Approaches.

Rather than responding directly to the needs of marginalized students and centering discussions around what is best for these students, policy makers and mathematics educators have decided what (valued) mathematics should be learned, who should learn this mathematics, and for what purposes equity in mathematics is to be achieved. I want to suggest that conceptualizations of equity within mathematics education have, for the most part, been top-down and school-focused. Very little equity research and policy has focused on bottom-up, community-based notions of equity (e.g., Moses, 1994; Moses & Cobb, 2001). Class (2002), for example, has stated that such bottom-up approaches are unusual among education reformers, who typically focus on curriculum, teaching, and test scores and who believe that equity has been achieved "when differences among sub-groups... of students are disappearing" (Allexsaht-Snider & Hart, 2001, p. 93) as a result of fixing or remedying curriculum, teachers, and funding streams.

On the other hand, equity in mathematics education, as defined by marginalized students, parents, and community members is likely to be related as much to their day-to-day experiences in those out-of-school contexts whose participation is mediated or dictated by knowledge of mathematics as it is to their school-based experiences (Anhalt, Allexsaht-Snider, & Civil, 2002; Civil, Andrade, & Anhalt, 2000; Civil, Bernier, & Quintos, 2003; Lubienski, 2003; Martin, 2000, 2003; Perissini, 1997, 1998). In my own research with African American adults and adolescents, I have found that a failure to benefit from mathematics knowledge, both real and perceived, and perceptions about limitations in the larger opportunity structure has an impact on the desire to invest or re-invest in mathematics learning (Martin, 2000, 2003). Because of the differences in these top-down and bottom-up approaches to equity, interventions formulated by mathematics educators have remained, and are likely to remain, out of alignment with the inequities experienced by underrepresented students, parents, and communities.

Defining Equity in Mathematics Education.

How has equity in mathematics education been defined and what essential elements of these working definitions are missing? I raise this question because if we are to get *there*, it certainly helps to understand where *there* is. Moreover, the definitions we use in solving problems also serve as intellectual compasses for the solution routes that we take. As a starting point in their discussion, Allexsaht-Snider and Hart (2001) define[5] equity in mathematics education as follows:

> Equity in mathematics education requires: (a) equitable distribution of resources to schools, students, and teachers, (b) equitable quality of instruction, and (c) equitable outcomes for students. Equity is achieved when differences among sub-groups in these three areas are disappearing. (p. 93)

This definition is in response to the well-documented disparities in achievement and persistence outcomes that have remained among between African American, Latino, Native American, and poor students on the one hand and many White and Asian American students on the other. This is significant because it is only recently that definitions of equity in mathematics education have addressed the students to whom we now apply them. Past concerns with educating the best and the brightest to achieve national competitiveness for the United States have now shifted to a concern for *mathematics for all.* That is, definitions of and

approaches to equity in mathematics education have ranged from being highly selective and conditional to being as broad and non-specific as *mathematics for all*. Rather than centering our discourse in mathematics education on the relationships between mathematics learning and the kind of mathematics that leads to real opportunities in the lives for marginalized students, what I call *opportunity mathematics* (Martin, 2003; Martin, Franco, et al, 2003), we have continued to norm our efforts and discussions around White, middle-class students and the kinds of mathematics that they have long been given access (Stanic, 1989). I would further argue that too little of the mathematics learned by many African American, Latino, Native American, and poor students leads to the kinds of opportunities that improve their conditions in life. Enrollment patterns in high-status mathematics courses substantiate this claim (e.g., Oakes, 1990; Tate & Rousseau, 2002).

If we are truly interested in critically examining issues of equity so that we can be more responsive to the needs of students, teachers, parents, and communities, several questions must be brought to bear: Do our definitions of equity gloss over the deeply embedded structures that produce inequities? Do reform-minded equity efforts get transformed in ways that continue to leave some groups on the outside looking in? Do theoretical perspectives and equity-oriented rhetoric take into account the collective histories of the groups for whom equity is desired, resisting the temptation to attribute low achievement to race and ethnicity instead of highlighting the devastating effects of rac*ism* and the way that schooling and curriculum has contributed to differential opportunities to learn (Apple, 1992/1999). Most important, will we resist the temptation to accept short-term gains (i.e. all students taking algebra) as evidence that equity in mathematics education has been achieved?

Rather than restricting our definitions of and goals for equity to equal access, equal opportunity to learn, and equal outcomes, I would like to suggest that math educators working to eliminate inequities seek to extend Allexsaht-Snider and Hart's (2001) three areas of focus. A focus on structural aspects of school districts, teacher beliefs about diverse students, and classroom practices is important but, in many ways, this focus does not allow us to situate disproportionate achievement and persistence patterns within a broader conceptual framework of sociohistorical, structural, community, school, and intrapersonal factors (Atweh, Forgasz, & Nebres, 2001; Gutstein, 2003; Martin, 2000; Oakes, 1990). I suggest that a *fourth* goal of equity research should be to empower students and communities with mathematics knowledge and literacy as a powerful act of working for social justice and addressing issues of unequal power relations among dominant and marginalized groups (e.g., Abraham & Bibby, 1988; Anderson, 1990; Apple, 1992/1999; D'Ambrosio, 1990; Frankenstein, 1990, 1994; Gutstein, 2002, 2003; Moses & Cobb, 2001). Comments by Apple (1992/1999) are helpful in clarifying this broader conceptual framework:

> Education does not exist in isolation from the larger society. Its means and ends and the daily events of curriculum, teaching, and evaluation in schools are all connected to patterns of differential economic, political, and cultural power…. That is, one must see both inside and outside the school at the same time. And one must have an adequate picture of the ways in which these patterns of differential power operations operate. In a society driven by social tensions and by increasingly larger inequalities, schools will not be immune from—and in fact may participate in recreating—these inequalities. If this is true of education in general, it is equally true of attempts to reform it. Efforts to reform teaching and curricula—especially in such areas as mathematics that have always been sources of social stratification, as well as possible paths of mobility—are also situated within these larger relations. (p. 86)

Situating Equity Within a Broader Conceptual Framework.

Some might ask *What is the marginal gain in adding this fourth goal?* I believe, as do others who support this goal (e.g., Frankenstein, 1990, 1994; Gutstein, 2002, 2003; Ladson-Billings, 1995; Tate, 1995), considerations of social justice force mathematics educators to think beyond curriculum and classrooms so as to situate mathematics learning for marginalized students within the larger contexts that impact their lives. Without attention to the ways in which the arrangement of mathematical, and other, opportunities outside of school further contributes to the marginalization of African American, Latino, Native American, and poor students, I believe equity-based efforts in mathematics education will continue to fall short. Ensuring that marginalized students gain access to quality curriculum and teaching, experience equitable treatment, and achieve at high levels should mark the *beginning* of equity efforts, not the end. If these students are not able to use mathematics knowledge in liberatory ways to change and improve

the conditions of their lives outside of school, they will continue to be marginalized even while mathematics educators and policy makers claim small victories like *Mathematics for All*.

Recent work by Gutstein (2003) with low-income Mexican and Mexican American students and families is also helpful in understanding the goals of a social justice pedagogy in mathematics education. Given the sociopolitical context in which these students and families lived, Gutstein stated "An important principle of a social justice pedagogy is that students themselves are ultimately part of the solution to injustice, both as youth and as they grow into adulthood. To play this role, they need to understand more deeply the conditions of their lives and the sociopolitical dynamics of their world" (p. 39). He set the following goals and objectives for his teaching and his students' learning:

Goals of Teaching for Social Justice	Specific Mathematics-Related Objectives
Develop Sociopolitical Consciousness	Read the World Using Mathematics
Develop Sense of Agency	Develop Mathematical Power
Develop Positive Social/Cultural Identities	Change Dispositions Toward Mathematics

Figure 1: Gutstein's (2003) goals and objectives for student learning

In one project, entitled *Racism in Housing Data?*, Gutstein (2003) asked his students to "use mathematics to help answer whether racism has anything to do with the housing prices" (p. 47) in a particular county. More specifically, he asked his students to address questions such as the following: (a) What mathematics would you use to answer that question?, (b) How would you use the mathematics?, and (c) If you would collect any data to answer the question, explain *what* data you would collect and *why* you would collect the data.

It is clear that Gutstein is attempting to situate mathematics teaching and learning in a context that extends beyond curriculum and classrooms and that he is also attempting to help his students use mathematics to change the conditions of their lives.

I also point out that Gutstein's work and perspective provide evidence for another of my claims: that there are subtle, but important differences, between *achieving equity* (a goal) and *eliminating inequity* (a process) (Tate, 1995). The first conceptualization—equity as a goal—assumes that there is a point to be reached when all is well and the hard work of getting *there* can cease. This view also ignores the fact of changing demographics that will continually challenge us to refine our definitions of equity. Although our current conceptions of equity often do not take into account the realities and needs of marginalized groups, new conceptualizations of equity concerns will have to. When those who are marginalized in mathematics begin to exercise their individual and collective agency and power to demand the kind of mathematical literacy leading to real opportunities, policy makers and mathematics educators will have no choice but to listen to these voices and to formulate visions of equity that move these individuals and groups from the periphery of mathematics to the center. The convenient "compromises" described by Apple earlier in this paper will no longer suffice.

However, the second conceptualization of equity—as a process—highlights the fact that the necessary hard work will be ongoing and even when gains are made, a high degree of vigilance will be necessary to ensure that needs of marginalized students are attended to and that our definitions of equity are responsive to who these students are, where they come from, and where they want to go in life. In the context of *Mathematics for All: How Do We Get There?,* mathematics educators may be more focused on achieving the goal of getting *there* than on the process of *how* to get there. This is supported by the large number of school districts that now require all students to take algebra in 8th or 9th grade. In the pursuit of this goal, the inequities faced by marginalized students are further compounded because many of them have not been adequately prepared in their earlier mathematical educations due to lack of quality educational resources (e.g., Tate & Rousseau, 2002). Because of a lack of attention to *process*, the well-meaning *goals* of *Mathematics for All* may actually contribute to the inequities faced by underrepresented students. There is a danger that when many of these students do not achieve up to their potential, there will be a tendency to either (a) locate the problem within the student (Boaler, 2002) or (b) assume that contextual forces are so deterministic that students are incapable of invoking agency to resist these forces. Future equity-based research will have to more closely examine how students and contextual forces influence each other.

In my view, working to eliminate the inequities faced by marginalized students will require an ongoing commitment that extends beyond simply rendering students *eligible* for the opportunities that we *assume* and *hope* will exist for them. Underrepresented students may experience equal access to mathematics,

have equal learning opportunities, and quantitative data could show equal outcomes. However, these students may still be disempowered if they are not able to use mathematics to alter the power relations and structural barriers that continually work against their progress in life.

Let us assume for the moment that the *there* in Allexsaht-Snider and Hart's question of *Mathematics for All: How Do We Get There?* has been reached. The situation is now the following: African American, Latino American, Native American, and poor students now complete substantially more mathematics courses than they did before and their achievement levels have risen to where we deem them acceptable. I pose the same simple, but incisive, questions asked by Gloria Ladson-Billings (2002) during a recent American Educational Research Association symposium: "Now what? What are we going to do for these students?" Will more of these students be allowed to attend the Universities of California at Berkeley and Los Angeles or other universities that are sometimes forced to engage in zero-sum admissions policies (Jones, Yonezawa, Ballesteros, & Mehan, 2002), leaving many qualified minority students on the outside looking in? For example, a state budget crisis has recently forced the Regents of the University of California to consider restricting enrollment at its campuses, signaling a reversal of the state's commitment to guarantee placement for the state's top 12% of graduating seniors. That commitment has been in place since 1960. For spring 2003, the university turned away hundreds of mid-year applications from transfer students and freshman. Budget reductions, fee increases, increasing numbers of college-eligible students, and competition for slots have, subsequently, forced many students to the state's community colleges. The trickle down effect is that many students who have traditionally attended community colleges now find themselves in competition with top-notch high school students. Recently, the state community colleges eliminated 8200 classes, leading to a loss of 90,000 students (Hebel, 2003). Will students who have long used community college as a bridge to higher education now be squeezed out of the community college context and back to their neighborhoods where opportunities are often limited? Will those top high school students now feel that the reward for all their hard work is being taken from them when they are directed to the community college? Where does mathematics fit into all of this? It is well known that mathematics serves as a gatekeeper course for high school graduation and college admissions and many students do not gain access to the kind of mathematics to make these graduation and admissions outcomes a reality.

Even for those students who are successful in navigating their way to four-year colleges and universities and into math and science majors, it can be asked whether hi-tech companies in Silicon Valley will increase their efforts to recruit these students as engineers and scientists? Will there be an increase in the number of women and minority faculty in mathematics and science departments at colleges and universities?

However, such questions may be a case of putting the cart before the horse. If we go back and start with school-mathematics itself, we have to remember that it does not exist in isolation of other curriculum areas. Will marginalized students gain greater access to quality science coursework and instruction? What about literacy? If these students are not able to read and write effectively, how will they be able to handle the rigors of mathematics and science? A common question asked by younger students about mathematics knowledge is *How am I going to use this?* Convincing students that mathematics learning is worthwhile and can have a significant impact on their lives will be a hard sell for many African American, Latino, Native American, and poor students if they continue to experience inequitable treatment and see few people in their communities who have benefited from mathematics learning or if they are only given access to the kind of mathematics that limits their opportunities in life. I reiterate my earlier point: *it is not enough for mathematics educators to work toward equity in mathematics education simply for the sake of equity in mathematics education. Equity discussions and equity-related efforts in mathematics education need to be connected to discussions of equity and in the larger social and structural contexts that impact the lives of underrepresented students.*

The questions raised above are not intended to throw up a white flag and accept inequities as inevitable. Nor am I suggesting that *Mathematics for All* is not a worthy goal. However, if achieving equity as a goal in mathematics education means having all students take algebra and, once this is done, that our responsibilities as mathematics educators have been fulfilled, this is, in my view, not an acceptable goal.

Mathematics Learning and Literacy in African American Context

In advancing my overall arguments, I draw partly from my own research with a diversity of African

American adolescents, community college students, parents, and teachers of African American students in two San Francisco Bay Area communities (Martin 2000, 2002b, 2003). For nearly ten years, my ethnographic and participant observation research in these communities has focused on the contextual factors (sociohistorical, structural, community, school, family, peer) that influence well-documented underachievement and limited persistence issues. I have also devoted a great deal of attention to mathematics success and resiliency among adolescents and adults. In particular, I have focused on issues of *mathematics socialization* and *mathematics identity*. Mathematics socialization refers to the experiences that individuals and groups have within a variety of mathematical contexts, including school and the workplace, and that legitimize or inhibit meaningful participation in mathematics. Mathematics identity refers to the beliefs that individuals and groups develop about their mathematical abilities, their perceived self-efficacy in mathematical contexts (that is, their beliefs about their ability to perform effectively in mathematical contexts and to use mathematics to solve problems in the contexts that impact their lives), and their motivation to pursue mathematics knowledge.

Mathematics socialization and the development of a mathematics identity occur as individuals and groups attempt to negotiate their way into contexts whose participation is mediated or dictated by knowledge of mathematics. Given the wide variety of mathematical practices and contexts in which individuals participate or are denied participation (classrooms, curriculum units, jobs, etc.), mathematics socialization can be conceptualized as both a mechanism for reproducing inequities and for working toward equity in mathematics. A focus on mathematics identity, then, leads to a better understanding of how these experiences operate at a psychological level and give rise to the meanings that people develop about mathematics. I have studied these issues within a broader, multilevel framework that incorporates sociohistorical, community, school, and intrapersonal factors. For the purpose of example, the first two levels of that framework are depicted in Figure 2.

I believe that in studying mathematics socialization and mathematics identity issues from a multilevel point of view, I have also gained greater insight into the *bottom-up*, community-based notions of equity in mathematics education that I mentioned earlier in this paper.

Although studies have shown that African American adults and adolescents hold the same folk theories about mathematics as mainstream adults and students, stressing it as an important school subject, few studies have sought to directly examine their beliefs about constraints and opportunities associated with mathematics learning, both for themselves and their children. My research has shown, for example, that African Americans' conceptions of equity in mathematics education can be deeper, more sophisticated, and even misaligned with those found in reform documents (Martin, 2000, 2002b, 2003). For adults, in particular, I argue that their racialized accounts of their mathematical experiences inside and outside of school reveal that many African American parents situate mathematics learning and the struggle for mathematical literacy/equity within the larger contexts of socioeconomic, political, educational, and African American struggle. As they attempt to become doers of mathematics and advocates for their children's mathematics learning, discriminatory experiences have continued to subjugate some of these parents while others have resisted their continued subjugation based on a belief that mathematics knowledge, beyond its role in schools, can be used to penetrate the larger opportunity structure. I often use case studies (Martin, 2000, 2002b, 2003) to exemplify these varying trajectories of experiences and beliefs about mathematics. Narratives embedded in these case studies often reveal social justice concerns having to do with mathematical opportunity.

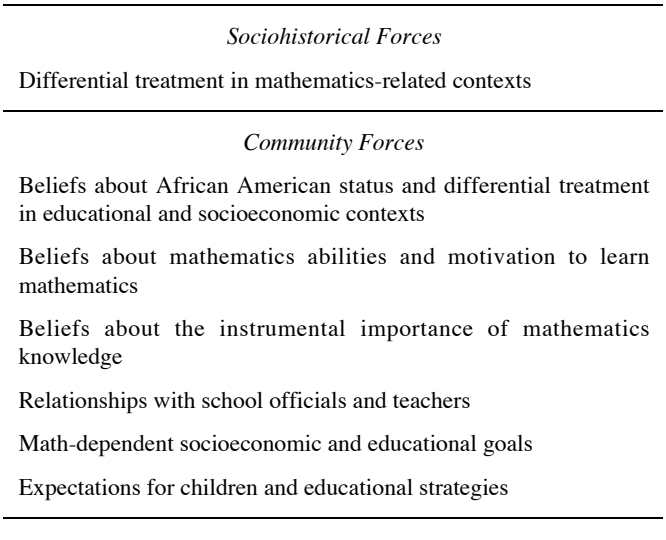

Figure 2: Mathematics socialization and identity among African Americans: Sociohistorical and community forces.[6]

In an excerpt from an example that I present elsewhere (Martin, 2000), an African American father offers an insightful opinion about the relationship between African American students' efforts in

mathematics and their perceptions of subsequent opportunity:

DM: Do you think [low motivation is] true for a lot of kids now?
Father: I think that's true for a lot of kids now, yes.
DM: It's mainly that a lot of them don't see the opportunity attached to [math]?
Father: They see the opportunity…. For me, all I wanted was an opportunity. The opportunity wasn't even there. So, I didn't pursue it. But what opportunity was there required so much [math] and I satisfied that. Today's kids, I think, have the opportunity but they need more than just the opportunity. They need the guarantee.
DM: Can we guarantee?
Father: Yeah, we can. If we will. I mean I can guarantee you that if you do these things, given the way the social structure is set up, there's a place for you. But you've got to set the social structure up first.

This view represents just one point in the constellation of African American voices but it offers some evidence for my claim that it will not be enough to *achieve equity* in mathematics education and settle for that as an end goal.

While student ability, teacher bias, tracking, and inadequate curriculum are often cited as causes of low mathematics achievement and limited persistence among African American students (see Martin, 2000), the comments made by this father highlight the fact that not only do adults situate mathematics learning in a larger socioeconomic and political context, but marginalized students may do the same. Addressing teacher bias, tracking, and inadequate curriculum in the name of equity and undoing the role the of mathematics as a gatekeeper may address school-level issues but if students are not able to use mathematics in the out-of-school contexts that define their lives, then underachievement and limited persistence may be rational responses to perceptions of the larger opportunity structure.

In addition to my research, my fourteen years of teaching mathematics to students who have often fallen through the cracks and for whom mathematics education reform has done little has convinced me that attempts to achieve equity which focus on content and curriculum issues, teacher beliefs, and school cultures alone will probably have limited impact on negative trends in achievement and persistence if, for example, (1) community forces counteract any good that is done within schools despite the best efforts of good teachers who use quality curriculum and exemplary (*Standards* and non-*Standards*-based) classroom practices and (2) no attempt is made to leverage these community forces to support in-school efforts designed to eliminate inequity. Eliminating inequities in access, achievement, and persistence in mathematics is not an issue that can be separated from the larger contexts in which schools exist and in which students live.

Integrating Theory, Methods, and Practice

To improve the status of underrepresented students in mathematics, mathematics educators will need to move beyond the initial rhetoric of *Mathematics for All* and any tendency to frame equity issues using only the theory and methods of mathematics education. Clearly, our approaches to equity need to be extended in ways that draw on perspectives outside of mathematics education where issues of culture, social context, stratification, and opportunity structure receive greater and more serious attention. Areas like critical social/race theory (e.g., Ladson-Billings & Tate, 1995), sociology of education, and anthropology of education (Ogbu, 1988, 1990) come to mind. Read from one vantage point, one could take from Allexsaht-Snider and Hart's (2001) definition of equity the assumption that inequities in mathematics education are caused by and can be remedied by fixing school-related factors. Although Allexsaht-Snider and Hart clearly do not assume this, some mathematics educators might. As a result, there might be continued reluctance to analyze the complex social issues that have an impact on mathematics teaching, learning, and disparate outcomes, despite the fact that these issues have been cited in the research literature as being critically important. To return to my preview of recent history in our field, Reyes and Stanic (1988) stated:

> In the field of mathematics education, there is little, if any, research documentation of the effect of societal influences on other factors in the model. Documenting these connections is both the most difficult and the most necessary direction for future research on differential achievement in mathematics education. (p. 33)

This foregrounding of the complex social issues involved in equity are not yet taking center stage, 15 years later.

Finding a way to maintain our concern with mathematics content, mathematics teaching, and learning, while using powerful sociocultural analyses to understand how the arrangement of mathematical opportunities inside and outside of school interact and

further contribute to inequities continues to represent the next difficult step in equity-focused research. A second step involves designing meaningful interventions, inside and outside of school, to empower marginalized students with mathematics so that they can change the conditions which contribute to the inequities they face (e.g., Gutstein, 2002, 2003). If equity research in mathematics education is to move forward, we must recognize that inequities in mathematics are reflections of the inequities that exist in out-of-school contexts. Parents, teachers, and students often recognize this parallel to the outside world (e.g., Civil et al, 2000; Civil et al, 2003; Civil & Quintos, 2002; Martin, 2000, 2003; Martin, Franco, et al, 2003) as have critical and progressive mathematics educators (e.g., Abraham & Bibby, 1988; Anderson, 1990; Atweh et al, 2001; Campbell, 1989; D'Ambrosio, 1990; Frankenstein, 1990, 1994; Gutstein, 2003; Hart & Allexsaht-Snider, 1996; Secada & Meyer, 1989; Secada et al, 1995; Tate, 1995).

I would also suggest that mathematics educators be wary of transforming equity issues into issues of learning mathematics content. Whether underrepresented students can learn mathematics should not be the main issue of concern. As a field, we should be well beyond deficit-based thinking and trying to fix students so that they conform to normative notions of what a student should be and for what purpose mathematics education should serve these students.

Because so much research has been devoted to student failure, there is also the danger that underachievement among underrepresented students will be accepted as the natural and normal starting point for research involving these students. But rich data collected across the many contexts where underrepresented students live and learn will help us reformulate our understanding of both failure *and* success. As a result, we can begin to look for more meaningful explanations and solutions to problematic outcomes and build on what we learn about success. By focusing on diverse contexts, we can begin to uncover a range of solutions focused on what works, where, when, and why, rather than trying to lump all students together and applying one-size-fits-all interventions. *Mathematics for All* will require that we find a variety of ways to bring underrepresented students into mathematics and a variety of ways—working through schools and communities and at the individual student level—to support their continued development and empowerment.

Conclusion

As both a teacher and a researcher, I am a strong advocate of ensuring that all students experience equal access, equal treatment, achieve to their highest potential in mathematics, and participate freely in all forms of mathematical practices that appeal to them inside and outside of schools. I also agree with those who conceptualize mathematics as a gatekeeper and filter (Sells, 1978) and who identify math literacy as a new form of civil right (Moses, 1994; Moses & Cobb, 2001). Yet, I also advocate critical examination of *Mathematics for All* rhetoric that, in my view, is limited in its vision. By making problematic the *there* in *How Do We Get There?*, I hope that my discussion of the hidden assumptions and unaddressed questions in *Mathematics for All* rhetoric will contribute to a reconceptualization of our equity efforts and our attempts to help students who are marginalized in mathematics.

The transition from *mathematics for the few* to *mathematics for all* will undoubtedly be an arduous task. As the mathematics education community gives greater attention to equity issues, we cannot assume that *Mathematics for All* and *Algebra for All* represent victories over the inequities that marginalized students and their communities face inside and outside of mathematics. Moreover, the people who comprise the communities that we wish to help must become equal partners in mathematics equity discussions and in formulating solutions that address not only content and curricular concerns but issues of social justice as well.

It is also my hope that the students who were first graders in the year 2000, the year of the updated *Standards*, will benefit from a renewed focus and a true desire to move beyond rhetoric so that these students fare better than the Class of 2002.

REFERENCES

Abraham, J., & Bibby, N. (1988). Mathematics and society. *For the Learning of Mathematics*, *8*(2), 2–11.

Allexsaht-Snider, M., & Hart, L. (2001). Mathematics for all: How do we get there? *Theory Into Practice, 40*(2), 93–101.

Anderson, J. R., Reder, L. M., & Simon, H. A. (1996). Situated learning and education. *Educational Researcher, 25*(4), 5–11.

Anderson, S. (1990). Worldmath curriculum: Fighting Eurocentrism in mathematics. *Journal of Negro Education*, *59*(3), 348–359.

Anhalt, C., Allexsaht-Snider, M., & Civil, M. (2002). Middle school mathematics classrooms: A place for Latina parents' involvement. *Journal of Latinos and Education, 1*(4), 255–262.

Apple, M. (1993). *Official knowledge: Democratic education in a conservative age*. London: Routledge.

Apple, M. (1995). Taking power seriously. In Secada, W., Fennema, E. & Adajian, L. B. (Eds.). *New directions for equity in mathematics education* (pp. 329–348). Cambridge: Cambridge University Press.

Apple, M. (1999). Do the Standards go far enough? Power, policy, and practice in mathematics education. Reproduced in *Power, meaning, and identity: Essays in critical educational studies*. New York: Peter Lang (Original work published 1992).

Atweh, B., Forgasz, H., & Nebres, B. (2001). *Sociocultural research on mathematics education: An international perspective*. Mahwah, NJ: Erlbaum.

Boaler, J. (2002, April). *So girls don't really understand mathematics?: Shifting the analytic lens in equity research.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*(1), 32–42.

Campbell, P. (1989). So what do we do with the poor, non-white female?: Issues of gender, race, and social class in mathematics and equity. *Peabody Journal of Education*, *66*(2), 96–112.

Civil, M., Andrade, R., & Anhalt, C. (2000). Parents as learners of mathematics: A different look at parental involvement. In M. L. Fernández (Ed.), *Proceedings of the Twenty-Second Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Vol. 2* (pp. 421–426). Columbus, OH: ERIC Clearinghouse.

Civil, M., Bernier, E., & Quintos, B. (2003, April). *Parental involvement in mathematics: A focus on parents' voices.* Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

Civil, M., & Quintos, B. (2002, April). *Uncovering mothers' perceptions about the teaching and learning of mathematics*. Paper presented at the annual meeting of American Educational Research Association, New Orleans, LA.

Class, J. (2002). The Moses factor [Electronic version]. *Mother Jones*, May/June. Retrieved November 14, 2003, from http://www.motherjones.com/news/feature/2002/05/moses.html

Cobb, P. (2000). The importance of a situated view of learning to the design of research and instruction. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 45–82). Westport: Ablex.

Cobb, P., & Bowers, J (1999). Cognitive and situated perspectives in theory and practice. *Educational Researcher, 28*(2), 4–15.

Cobb, P., & Nasir, N. (Eds.). (2002). Diversity, equity, and mathematics learning [Special double issue]. *Mathematical Thinking and Learning*, *4*(2/3).

Cobb, P., Yackel, E., & Wood, T. (1992). A constructivist alternative to the representational view of mind in mathematics education, *Journal for Research in Mathematics Education, 23*(1), 2–33.

D'Ambrosio, U. (1990). The role of mathematics in building a democratic and just society. *For the Learning of Mathematics*, *10*(3), 20–23.

Davis, R. (1986). The convergence of cognitive science and mathematics education. *Journal of Mathematical Behavior, 5*, 321–335.

Day, J. (1993). *Population projections of the United States by age, sex, race, and Hispanic origin: 1993 to 2050.* Washington, D.C.: U.S. Department of Commerce (vii–xxiii).

Delpit, L. (1995). *Other people's children: Cultural conflict in the classroom*. New York: The New Press.

Frankenstein, M. (1990). Incorporating race, gender, and class issues into a critical mathematical literacy curriculum. *Journal of Negro Education*, *59*(3), 336–347.

Frankenstein, M. (1994). Understanding the politics of mathematical knowledge as an integral part of becoming critically numerate. *Radical Statistics*, *56*, 22–40.

Gutstein, E. (2002, April). *Roads to equity in mathematics education*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education, 34*(1), 37–73.

Hart, L., & Allexsaht-Snider, M. (1996). Sociocultural and motivational contexts of mathematics learning for diverse students. In M. Carr (Ed.), *Motivation in mathematics* (pp. 1–24). Creskill, NJ: Hampton Press.

Hebel, S. (2003, October 10). California's budget woes lead colleges to limit access. *The Chronicle of Higher Education*, p. 21.

Jones, M., Yonezawa, S., Ballesteros, E., & Mehan, H. (2002). Shaping pathways to higher education. *Educational Researcher, 31*(2), 3–12.

Khisty, L. (2002, April). *Equity in mathematics education revisited: Issues of "getting there" for Latino second language learners*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA

Ladson-Billings, G. (1995). Making mathematics meaningful in multicultural contexts. In W. G. Secada, E. Fennema, & L. B. Adajian (Eds.), *New Directions for Equity in Mathematics Education* (pp. 279–297). Cambridge: Cambridge University Press.

Ladson-Billings, G. (2002, April). *Urban education and marginalized youth in an age of high-stakes testing: Progressive responses*. Symposium presented at the annual meeting of the American Educational Research Association, New Orleans. LA.

Ladson-Billings, G. & Tate, W.F. (1995). Toward a critical race theory of education. *Teachers College Record, 97*, 47–68.

Lave, J. & Wegner, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lee, J. (2002). Racial and ethnic achievement gap trends: Reversing the progress toward equity? *Educational Researcher, 31*(1), 3–12.

Lubienski, S. (2003, April). *Traditional or standards based mathematics?: Parents' and students' choices in one district.* Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

Martin, D. B. (1998). *Mathematics socialization and identity among African Americans: A multilevel analysis of community forces, school forces, and individual agency*. Unpublished postdoctoral project completed for National Academy of Education/Spencer Postdoctoral Fellows program.

Martin, D. B. (2000). *Mathematics success and failure among African American youth: The roles of sociohistorical context, community forces, school influence, and individual agency*. Mahwah, NJ: Erlbaum..

Martin, D. B. (2002a, April). *Is there a there?: Avoiding equity traps in mathematics education and some additional considerations in mathematics achievement and persistence among underrepresented students*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Martin, D. (2002b, April). Situating self, situating mathematics: Issues of identity and agency among African American adults and adolescents. Paper presented at the annual conference of the National Council of Teachers of Mathematics, Las Vegas, NV.

Martin, D. (2003, April). *Gatekeepers and guardians: African American parents' responses to mathematics and mathematics education reform*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

Martin, D., Franco, J., & Mayfield-Ingram, K. (2003). *Mathematics education, opportunity, and social justice: Advocating for equity and diversity within the context of standards-based reform*. Research brief (draft) prepared for Research Advisory Committee, National Council of Teachers of Mathematics Catalyst conference.

Meyer, M.R. (1989). Equity: The missing element in recent agendas for mathematics education. *Peabody Journal of Education, 66*(2), 6–21.

Moses, R. P. (1994). Remarks on the struggle for citizenship and math/science literacy. *Journal of Mathematical Behavior, 13*, 107–111.

Moses, R. P. & Cobb, C.E. (2001). *Radical equations: Math literacy and civil rights*. Boston MA: Beacon Press.

Moses, R., Kamii, M., Swap, S., & Howard, J. (1989). The Algebra Project: Organizing in the spirit of Ella. *Harvard Educational Review*, *59*(4), 423–443.

National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: Author.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

National Research Council. (1989). *Everybody counts: A report to the nation on the future of mathematics education*. Washington, DC: Author.

National Research Council. (2002). *Investigating the influence of standards: A framework for research in mathematics, science, and technology education*. Washington, D.C.: National Academy Press.

Oakes, J. (1990). Opportunities, achievement and choice: Women and minority students in science and mathematics. In C. B. Cazden (Ed.), *Review of Research in Education, Vol. 16* (pp. 153–222). Washington, DC: AERA.

Ogbu, J. U. (1988). Diversity and equity in public education: Community forces and minority school adjustment and performance. In R. Haskins & D. McRae (Eds.), *Policies for America's public schools: Teachers, equity, and indicators* (pp. 127–170). Norwood: Ablex.

Ogbu, J. U. (1990). Cultural model, identity, and literacy. In J. W. Stigler, R. A. Shweder, & G. Herdt (Eds.), *Cultural psychology* (pp. 520–541). Cambridge: Cambridge University Press.

Perissini, D. (1997). Parental involvement in the reform of mathematics education. *The Mathematics Teacher*, *90*(6), 421–427.

Perissini, D. (1998). The portrayal of parents in the school mathematics reform literature: Locating the context for parental involvement. *Journal for Research in Mathematics Education*, *29*(5), 555–582.

RAND Mathematics Study Panel. (2003). Mathematical proficiency for all students: Toward a strategic research and development program in mathematics education. Washington, DC: RAND.

Reyes, L. H., & Stanic, G. (1988). Race, sex, socioeconomic status, and mathematics. *Journal for Research in Mathematics Education, 19*(1), 26–43.

Schoenfeld, A. H. (1985). *Mathematical problem solving*. New York, NY: Academic Press.

Schoenfeld, A. H. (Ed.). (1987). *Cognitive science and mathematics education*. Hillsdale, NJ: Erlbaum.

Schoenfeld, A. (2002). Making mathematics work for all children: Issues of standards, testing, and equity. *Educational Researcher, 31*(1), 13–25.

Secada, W. (1989). Agenda setting, enlightened self-interest, and equity in mathematics education. *Peabody Journal of Education, 66*(2), 22–56.

Secada, W. (1991). Diversity, equity, and cognitivist research. In Fennema, E., Carpenter, T. P., & Lamon, S. (Eds.), *Integrating research on teaching and learning mathematics* (pp. 17–54). SUNY: Albany.

Secada, W. (1992). Race, ethnicity, social class, language and achievement in mathematics. In D. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 623–660). New York: Macmillan.

Secada, W., Fennema, E., & Adajian, L. B. (1995). *New directions for equity in mathematics education*. Cambridge: Cambridge University Press.

Secada, W., & Meyer, M. (1989). Needed: An agenda for equity in mathematics education. *Peabody Journal of Education, 66*(1), 1–5.

Secada, W., Ogbu, J. U., Peterson, P., Stiff, L. M., Tonemah, S. (1994). *At the intersection of school mathematics and student diversity: A challenge to research and reform*. Washington, DC: Mathematical Sciences Education Board and National Academy of Education.

Sells, L. W. (1978). Mathematics: A critical filter. *Science Teacher, 45*, 28–29.

Skovsmose, O., & Valero, P. (2001). The critical engagement of mathematics education within democracy. In Atweh, B., Forgasz, H., & Nebres, B. (Eds.), *Sociocultural research on mathematics education* (pp. 37–56). Hillsdale, NJ: Erlbaum.

Stanic, G. M. A. (1989). Social inequality, cultural discontinuity, and equity in school mathematics. *Peabody Journal of Education, 66*(2), 57–71.

Stiff, L. V. (2002). Reclaiming standards. *NTCM News Bulletin, 38*(7), 3–7.

Tate, W. F. (1995). Economics, equity, and the national mathematics assessment: Are we creating a national toll road? In W. Secada, E. Fennema, & L. Byrd Adajian (Eds.), *New directions for equity in mathematics in mathematics education* (pp. 191–206*)*. Cambridge: Cambridge University Press.

Tate, W. (1997). Race, ethnicity, SES, gender, and language proficiency trends in mathematics achievement: An update. *Journal for Research in Mathematics Education, 28*(6), 652–680.

Tate, W. F., & Rousseau, C. (2002). Access and opportunity: The political and social context of mathematics education. In L. English (Eds.), *International Handbook of Research in Mathematics Education* (pp. 271–300). Mahwah, NJ: Erlbaum.

Thomas, J. (2001). Globalization and the politics of mathematics education. In Atweh, B., Forgasz, H., & Nebres, B. (Eds.) *Sociocultural research on mathematics education* (pp. 95–112). Hillsdale, NJ: Erlbaum.

Weinstein, R. S. (1996). High standards in a tracked system of schooling: For which students and with what educational supports? *Educational Researcher, 25*(8), 16–19.

Wilson, S. (2002). *California dreaming: Reforming mathematics education*. New Haven, CT: Yale University Press.

---

[1] I will refer to this document as the *Standards* when a distinction against another standards-based document is unnecessary. Occasionally I will collectively refer to both the 1989 and 2000 NCTM documents as the *Standards*. I have taken care that in each place, the reader will know to which document I refer.

[2] These ideas are from discussions that took place in a Working Group on the Changing Nature of Schooling and Demographics led by William Tate and Pauline Lipman at the National Council of Teachers of Mathematics Catalyst Conference held in Reston, VA, September 11-13, 2003.

[3] Hart (2001) and Reyes (1988) are the same person.

[4] For an account tracing the history of these debates, see Wilson (2002).

[5] The prevailing notion is that equity in mathematics is three-pronged: equal access, equal opportunity to learn, and equal outcomes.

[6] Readers are urged to see Martin (2000) for a more detailed description of this framework.