

# Chapter 1

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## What Mathematics? For Whom? For What Purposes?

**T**hroughout this book, we encourage all teachers to reflect on the three questions raised in this chapter's title: What mathematics? For whom? For what purposes? We raise these questions because they strike at the core of equity concerns in mathematics education and serve as reminders that school mathematics simultaneously serves as gateway and gatekeeper for various opportunities in and out of school. These opportunities include access to advanced courses, entrance to college, and access to math-dependent college majors and careers. Teachers play a crucial role in deciding which students will or will not have access to these opportunities.

Mathematics also provides a critical lens for discerning patterns and making sense of quantitative information that we experience in the world every day. However, some students are never given the opportunity to engage with mathematics in rich and meaningful ways that emphasize critical thinking and problem solving. Moreover, educators often use mathematics assessments to make definitive judgments about students' competencies and abilities. Such judgments can follow students throughout their academic careers and have a long-lasting impact on how they see themselves as doers of mathematics (Boaler 2002, 2008; Jackson 2009; Martin 2000, 2009; Spielhagen 2011).

We contend that deep, meaningful reflection on these questions will require teachers to examine their beliefs about learners, learning, and mathematics content, as well as their everyday teaching and classroom practices. This work also demands that teachers take a close look at their own mathematics learning experiences and how these shape their instructional vision and classroom practice. Furthermore, by thinking about how best to support students, teachers may need to reexamine their beliefs and retool their practices, not only to engage students more effectively in learning mathematics but also to partner more successfully with families and communities to support learning in and out of school.

This book provides examples, concepts, and reflective tools that teachers can use to build richer perspectives on issues of equity within the context of their routine, everyday

classroom practices. Key to developing these richer perspectives and practices is attending to issues of identity and competence in relation to and through mathematics—that is, understanding who students are, who they are becoming, and who they want to become. It also means understanding how students are positioned as mathematics learners by what others—teachers, peers, or parents—say about who they are, such as who gets identified as “good at math” and who does not.

Consider the following vignette involving a young student, Baye, his father, and his mathematics teacher. The vignette highlights a number of issues related to student beliefs about mathematics, teacher practice and influence on those beliefs, and parental support for mathematics learning.

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Baye is a third-generation Korean American sixth grader who is in his first year at Crestmont Middle School, located in a mid-sized city in the western United States. He is a rising star on the local track team and volunteers as a faith mentor for younger children at his local church. Although he has many leadership qualities and a strong preference for science, he struggles with learning mathematics.

Ms. Carlson is Baye’s mathematics teacher. She believes strongly that all students can be successful in mathematics if given the right content and exposed to the right pedagogy. She recently transferred to Crestmont because it is one of the schools in the district that will be piloting curriculum units based on the new Common Core State Standards (National Governors Association Center for Best Practices and Council of Chief State School Officers 2010). In addition, Ms. Carlson believes in the added value of Crestmont’s diverse student population. Crestmont is more ethnically and socioeconomically diverse than her previous middle school, Diablo Valley. Although Diablo Valley is a high-performing middle school, according to achievement test scores, Ms. Carlson was not as satisfied with the school’s scores as her colleagues. She knew that many of the students had not developed the conceptual understanding to match their algorithmic mastery, and there were glaring disparities for some students. But whenever she voiced this concern to her colleagues, they told her that she was “creating issues.”

Ms. Carlson was ready for a change. At Crestmont, she teaches Baye and twenty-two other sixth graders in a “support” math class designed to address the mathematics needs of struggling students. Ms. Carlson has the following exchange with Baye after assigning a mathematics task to her students:

*Ms. Carlson:* Why haven’t you gotten started, Baye?

*Baye:* [*Whispers under his breath*] Because this is stupid. The problem makes no sense. Who cares how many different sizes the rabbits’ playpen can be.

*Ms. Carlson:* You haven’t even tried the problem yet.

*Baye:* [*Looks briefly at the students sitting around him and mumbles*] What difference does it make? I can’t do it. That’s why I’m in this class, right?

Before Ms. Carlson can answer, the bell rings, and Baye packs up and rushes out the door. Ms. Carlson reviews the class papers but can’t get Baye out of her mind. “What am I going to do?” she wonders. “How do I get him to try? He seemed em-

barrased when I was talking with him. How am I going to motivate these kids to want to learn math? How am I going to get them to believe they can do math?"

Later, at home that evening, Baye has the following encounter with his father:

*Father:* How was school today?

*Baye:* [*Sbrugs*] OK, I guess.

*Father:* Did you finish your homework after school? [*Pauses while Baye is silent.*] What's wrong?

*Baye:* Nothing.

Baye throws his backpack on the table and heads outside. As his father takes the backpack off the table, he notices a crumpled piece of paper. It is a math assignment, but there is nothing on the page. He sighs and says to himself, "I thought this year would be different. He hates math. I don't know how to help. I didn't have any trouble with math in school. What am I going to do?"

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From our experiences with students, teachers, and parents, we know that situations like the one involving Baye arise every day. We know that many teachers reflect deeply on these kinds of encounters with students. They are concerned about students feeling discouraged and frustrated by mathematics. They want to change the students' negative views of mathematics and of themselves as mathematics learners. We also know that many parents express similar concerns about their children in relation to mathematics. When their child is distressed, they want to help. In this case, both Ms. Carlson and Baye's father are concerned and desire to help. They are at a loss.

In contrast, we have frequently heard educators make statements like the following about particular students, their families, and mathematics learning: "My students come from impoverished backgrounds. They can't handle that kind of math." We have also heard race- and culture-based statements about black and Latina/o families "not valuing" their child's education, whereas white and Asian families supposedly "push their children" to do well in mathematics. Furthermore, some teachers question whether all children should study advanced levels of mathematics, echoing common public refrains like, "Not everybody needs to study algebra. They just need to know the basics," or "There should be other options for those who are less mathematically inclined," or "I didn't do so well in math, and I did just fine. I have a successful career."

Statements such as these are quite common yet may not accurately reflect students' identities, abilities, or interests. They are also not the most reflective, equity-oriented approaches that teachers can take. Moreover, these statements, although well intentioned, may actually perpetuate negative stereotypes about what mathematics is, who can learn mathematics, who supports mathematics, and why students should or should not pursue their studies of mathematics. In our view of equity-based practice, it is important to replace these viewpoints with alternative perspectives.

## Beyond Changing Demographics

A common approach to engaging teachers about issues of equity is to broadly cite changing demographics and the increasing racial, ethnic, and linguistic diversity in the

student population. However, such references do not always lead to the kind of deep reflection about practice that is necessary to strengthen mathematics learning and positive mathematics identity in students. We contend that although many teachers may be aware of and receptive to broad, general discussions of equity in mathematics, general awareness may not be enough to motivate them to address the particularities of working across and within particular student populations. In addition, focusing on demographic changes often positions students who are from different ethnic or language groups as at odds with dominant student groups. The students who are seen as diversifying the student population (often identified in racial, ethnic, or class terms) are frequently called on to conform to the established standards or norms. In our view, meaningful inclusion and interactions with students necessitate knowledge of their personal, family, and community backgrounds as well as their social realities. Gaining this knowledge may require additional effort on the part of teachers and administrators to fully meet the mathematical learning needs of their students.

For example, a few years ago, one of the authors, Danny Martin, gave a presentation at a regional conference of the National Council of Teachers of Mathematics (NCTM) in Chicago. In his presentation, he argued for the relevance of identity as a key consideration in the mathematical experiences of black children. In particular, Martin contended that teachers need to try to understand the ways in which these children make sense of what it means to be doers of mathematics, and, simultaneously, how they make sense of what it means to be black, on the basis of their own emerging understandings of their life experiences and social realities. He suggested that the emerging understandings developed by students reflect not only the assertions that students make about who they are but also the ways in which they accept or resist the racial and mathematical identities that are imposed on them by others, including teachers, peers, parents, community members, and the media.

In his presentation, Martin encouraged the audience, especially teachers, to think more deeply about these identity and learning issues by considering two focused questions:

1. What does it mean to be a learner and doer of mathematics in the context of being black?
2. What does it mean to be black in the context of learning and doing mathematics?

Martin asked teachers to consider the range of responses that might emerge among their own students, given their social realities, and how those responses might be useful to teachers as they reflect on their work with black children.

At the conclusion of Martin's talk, a young white female teacher in the audience raised her hand. She began her comments by noting that she was a teacher in a black school located in a black community on Chicago's South Side. She said that although she had been teaching at the school for a few years, she had "never thought about what it means for my students to be black." Martin's talk was a revelation to her as a teacher of black children.

We contend that it is reasonable to ask why this presentation was such a revelation to this teacher. How did this teacher's inattention to the power and relevance of black identity in the lives of her students evolve? And to what extent had her views up to this point affected her mathematics instruction in classrooms with black children? Although one could debate Martin's focus on black racial identity and its role in math-

ematics learning and teaching, attention to the local and larger contexts of this teacher's school and the children that she works with daily highlight its relevance. For example, the public school system in Chicago is the third largest in the United States, with black children making up more than 40 percent of the student population in the district. Chicago's public schools are, de facto, racially segregated, mirroring the racial separateness of the city's neighborhoods. The average black child attending a school in the district is in a school that is more than 80 percent black. Moreover, during the 2006–2007 school year—the year of Martin's presentation—thirty-one schoolchildren were murdered in Chicago, one per school week on average, and most of them black. Statistics such as these certainly make black racial identity socially significant and conspicuous in the day-to-day life of the city—and in the day-to-day lives of black children.

Our reaction to this teacher's response to Martin's presentation does not imply that we believe that the students' *being black* should have been the *only* consideration in the teacher's interaction with her black students. More broadly, Martin argued for teachers of mathematics to move beyond demographic data and reflect on those identities that might be most salient and important to students and to understand how these identities might shape student and teacher engagement with school mathematics. Although Martin's experiences focused on black children, all students bring both school and life experiences to the classroom, and these have an impact not only on how they perceive themselves as mathematics learners but also on how others see them. A goal for all teachers should be to learn enough about these experiences to engage, support, and teach all students, whether they are black students from an urban context, new immigrant students in a rural town, or affluent students in a private school.

Throughout this book, we argue that a number of identity-related issues can emerge as being relevant to how teachers support mathematics learning of their students in different contexts. How teachers recognize and respond to these issues will have an impact on how they address the questions raised at the beginning of this chapter.

## Rethinking Equity

Although the focus of this book is on helping teachers develop equity-oriented practices in relation to mathematics, we embrace a perspective on equity that supports teaching practices and reflective tools focused on empowerment of the whole child. As a result, this equity-based approach includes attending to the multiple identities—racial, ethnic, cultural, linguistic, gender, mathematical, and so on—that students develop and draw on as they learn and do mathematics. In support of this holistic view of equity, we offer the following description of what we believe teachers owe to all students:

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All students, in light of their humanity—their personal experiences, backgrounds, histories, languages, and physical and emotional well-being—must have the opportunity and support to learn rich mathematics that fosters meaning making, empowers decision making, and critiques, challenges, and transforms inequities and injustices. Equity does not mean that every student should receive identical instruction. Instead, equity demands that responsive accommodations be made as needed to promote equitable access, attainment, and advancement in mathematics education for each student.

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This perspective on equity challenges common notions that students need to learn math “in spite of” or “regardless of” who they are. We argue that students need to learn

mathematics *in light of* who they are and the diverse gifts that they bring to their experiences every day. In the case of Danny Martin and the young teacher, this more holistic view of equity-based teaching practice would require attending to and understanding black children's emerging and developing racial identities in the context of local and larger social realities in which they live every day. In the case of Baye, it would mean understanding how all the different experiences in Baye's school life, home life, faith life, athletic life, and cultural life may affect the ways that he experiences school mathematics and that he, his father, and his teacher see him as a mathematics learner. Furthermore, this equity perspective demands attention to the ways that societal views of mathematics performance may fuel stereotypes (for example, the notion that Asian students are good at math) and obstruct the development of a positive mathematics identity.

We also recognize that this holistic view means embracing life complexities that may support and *challenge* children to learn mathematics and develop their mathematics identities. Teachers can inspire students beyond or apart from difficult life circumstances, and they can take advantage of strengths that all children bring to school. They also can disrupt or eliminate, rather than perpetuate, negative images of what it means to learn mathematics and beliefs about who can learn mathematics. They can develop strong partnerships with parents to support a child's learning of mathematics.

## Conclusion

This book offers guidance and support to rethink instructional practice and embrace an equity orientation to promote positive mathematics learning and identity development. Enriching one's practice in this way takes conviction and courage. Reflecting on these possibilities and their impact on instructional practices is key. However, taking *action* to change instructional practice in ways that can strengthen student learning and cultivate a positive mathematics identity, particularly in children who continue to be marginalized, is the most critical step in empowering young people mathematically.

### DISCUSSION QUESTIONS

1. Why is mathematics important for students to learn? Whose interests are served by the reasons that you give?
2. If you could consult with Ms. Carlson and Baye's father, what would you discuss about how best to support Baye as a math learner? Reflect on why those discussion points are important in relation to mathematics learning and identity.
3. Reflect on Danny Martin's viewpoint that it is important for teachers of mathematics to consider the interaction of racial identity and mathematics identity in children's experiences of learning school mathematics. Do you have questions about this perspective?