The publication of Curriculum and Evaluation Standards (NCTM 1989) marked the beginning of a period of significant change in mathematics education. However, that document and many contemporaneous calls for reform lacked a clear focus on equity (Meyer 1989). A decade later, Principles and Standards for School Mathematics (NCTM 2000) began to address that shortcoming. The first of the six Principles is the Equity Principle: “Excellence in mathematics education requires equity—high expectations and strong support for all students” (NCTM 2000, p. 12). The placement of the Equity Principle as first on the list highlights its importance as a cornerstone for the other Principles. It raises “an essential goal and a significant challenge” (p. 12) that sets the stage for the remaining Principles and Standards. But what does equity mean, and how will we recognize it when we see it?

A yearlong professional development seminar for secondary mathematics teachers that focused on the Equity Principle opened with this question: “What is equity in a mathematics classroom?” The question was posed to provide the teachers an opportunity to make their conceptions of equity explicit. We began with the assumption that teachers would have varying conceptions of equity (Secada 2003) and that these would be largely unexamined (King 1991). Making these conceptions explicit, we believed, could have implications for classroom practice (Borko and Putnam 1996; Weissglass 2003). This article summarizes what we learned from these teachers about their conceptions of equity and highlights a first step teachers can take in working toward equity in their mathematics classrooms.

**THE CONTEXT**

This seminar was offered to high school mathematics teachers as a part of the work of the Diversity in Mathematics Education Center for Learning and Teaching at the University of Wisconsin–Madison. Twenty-six teachers from the same school district met once a month, for two and a half hours per seminar session, over the course of the school year. All four of the district’s high schools (grades 9–12) were represented at the seminar, and these teachers totaled about 25 percent of the district’s high school mathematics teachers.

Each month, the seminar participants were asked to reflect on readings related to equity in mathematics education (see, e.g., Gutstein [2003]; Ladson-Billings [1995]; Moschkovich [1999]; Secada [2008]). Participants explored such topics as conceptions of equity, the effects of pedagogy on student classroom participation, teacher expectations, tracking, institutional racism, support for English language learners in mathematics, culturally relevant pedagogy, and the teaching of mathematics for social justice. Further,
participants engaged in activities in their own mathematics classes that were related to seminar readings and discussions. They observed one another’s classrooms to examine student participation patterns, gathered data about which students were multilingual (so that they could access this information as a resource), and asked their students about their thoughts on gender differences in mathematics learning. Finally, during the seminar itself, participants engaged in activities and discussions structured so that their reflections were focused on how these topics intersected with their classroom practices.

Data collection and analysis
In an effort to document teachers’ conceptions of equity, seminar participants were given pre- and post-seminar surveys. The surveys included questions on teachers’ expectations for low- and high-performing mathematics classes, their beliefs about the nature of mathematics and their role as a teacher, and their definitions of equity. One specific question included on both the pre- and post-seminar surveys was, “How would you define equity in a mathematics classroom?” We also collected teachers’ written reflections and assignments that were informed by seminar readings and activities.

Our analysis consisted of reviewing teachers’ survey responses several times while looking for recurring themes across teachers’ statements. After multiple passes through the data, as themes emerged, we compiled a list of codes by aggregating similar responses. The coding scheme aimed to characterize the nature and content of teachers’ comments.

TEACHERS’ CONCEPTIONS OF EQUITY
Four conceptions of equity emerged from this examination of teachers’ responses: (1) equity is about instruction; (2) equity is about creating a specific classroom environment; (3) equity is about equal opportunity; and (4) equity is about appropriate curriculum. These four categories are explained in detail in the sections that follow, and we discuss the implications of these conceptions for mathematics teachers who are attempting to take a first step toward equity in their own classrooms.

Equity is about instruction
“Some students may need no, or very little, ‘extra attention’ to succeed, some may need more. Equity is giving all students the necessary tools/attention needed to be successful.”

This statement is typical of teachers who conceptualize equity in relation to instruction (36% of responses). Teachers whose responses fell into this category saw equity as being determined by the teacher: It is the teacher’s responsibility to ensure that each student receives whatever he or she needs to be successful. This responsibility, according to seminar participants, includes teachers being responsive to various students’ learning preferences. As one teacher stated, in an equitable mathematics classroom “a variety of learning styles and problem solving methods are validated.”

Equity is about creating a specific classroom environment
“All students should be expected to achieve. The classroom should be set up in a way to convey the expectation and make students responsible to work and achieve.”

In this group of teachers (31% of responses), equity in a mathematics classroom is about creating a particular classroom environment. Responses in this category were focused on having high expectations for all students, as the statement above suggests. Another dimension of this category included responses related to the importance of creating a classroom environment that strives to include all students and that fosters students’ beliefs that they can succeed. Representative of this dimension is one teacher’s statement that equity is “success in a safe environment where nobody feels they cannot achieve.”

Equity is about equal opportunity
“All students should have equal opportunities to reach their full potential. Gender, race, other language learners, etc. should all be viewed with the same potential…”

Some teachers (20% of all responses) related equity in a mathematics classroom with equal opportunity for all students. This conception is slightly different from the previous one, which was focused on teacher expectations and the creation of an inclusive environment within a single classroom, and also includes the broader school-wide context. This notion of equal opportunity in mathematics education was often explained as students having the same opportunity to take particular mathematics courses (e.g., college preparation courses) or receive quality mathematics instruction.

Equity is about appropriate curriculum
Equity in a mathematics classroom requires “[u]sing materials that are relevant to students’ lives and using their background knowledge as a starting point for discussions of math concepts.”

Twelve percent of teachers’ responses fell into this final category. Here, responses centered on the importance of making mathematics curriculum relevant to students and building on students’ life experiences to engage more students in the mathematics. As one teacher stated, equity in a mathematics class-
Instruction, classroom environment, equal opportunity, and curriculum are all under the control of teachers.

WHOSE RESPONSIBILITY IS IT?
Working toward equity may seem an overwhelming task for a classroom teacher, but teachers must remember that it takes many groups of people to work toward equity. To illustrate this point, we divided the seminar participants into groups of four or five and assigned each group one of the following perspectives: (a) teacher, (b) student, (c) families and community, (d) school and district administrators, (e) policymakers, and (f) university teacher educators. (This activity is adapted from a presentation given by Fran Arbaugh of the University of Missouri, Columbia, Mo.) These perspectives were drawn from the roles and responsibilities outlined in chapter 8 of Principles and Standards for School Mathematics (NCTM 2000). Each group was then given multiple sheets of flip-chart paper, markers, and this prompt: “We can close the achievement gap by ....” Using their assigned perspective, the teachers in each group brainstormed for specific actions that could be taken to close the achievement gap. These lists were displayed on the wall. Participants moved around the room, read the lists, and added responsibilities they felt were missing before discussing the lists as a whole group. Every group, no matter its perspective, easily identified numerous actions that could be taken.

The majority of the discussion centered on the actions teachers could take to address the achievement gap. Not too surprisingly, some of these actions closely reflected the participants’ conceptions of equity: having high expectations for all students, using appropriate pedagogy, and having an interesting, meaningful, and connected curriculum.

However, additional responses highlighted the role of the teacher in the larger school community (e.g., communicating with administrators as well as with parents and community members) and the importance of connecting with students (e.g., caring about students and encouraging them to value education).

The teachers’ reflections on this activity clearly indicated that they recognized the nature of any attempts to address the achievement gap. When they saw all the responsibilities enumerated for the different groups, their own extensive list did not seem as overwhelming. However, because few of the actions went beyond what teachers felt they were already trying to accomplish in their own classrooms, they expressed a need to get more specific and to examine these “good teaching” practices through an equity lens.

FOCUSING ON THE INDIVIDUAL STUDENT
To help the teachers identify more specific actions they might take, we asked each to identify one current student who was performing below proficiency level or with whom there was little personal connection. Over the course of one month, each teacher was to get to know his or her identified student better and use this information to guide subsequent teaching. We suggested that teachers start with the following questions:

- What is the student’s racial or ethnic identity?
- What does the student’s appearance indicate about him or her?
- What is the student’s family like? With whom does the student live? Does he or she have siblings? Gather information about the student’s family.
- What are the student’s hobbies or personal interests outside school?
- What are the student’s plans beyond high school?

In addition, teachers were asked to write a one-page reflection about what they learned about this student and how it informed their teaching. Without exception, the teachers felt that they had benefited personally from getting to know the targeted student better, and some also reported benefits for the student.
One teacher modified her instruction (pseudonyms have been used for all students):

I have already modified my interactions with Richard regarding tests, as I believe he needs confidence as much as anything.

Another teacher experienced more empathy for his student:

Getting to know Cheng has helped me understand where he's coming from when he has a question on homework or a test. Quite often it's just a language thing and I just have to define a word for him or rephrase something for him. I also understand what's going on, for instance, if he doesn't get his homework done on a particular day because he really had to work since he's a bread winner for his family and he is dealing with all the stress that goes along with having to take on those responsibilities.

One teacher saw increases in student achievement:

There have been two positive results from my intervention with Wilfredo. The first is that he has been noticeably more friendly when he sees me out of class. He has smiled and said "hi" several times. The second is that Wilfredo earned an A on the third test of the quarter. I can't prove this was a result of the connection I made with him, but it's a reasonable assumption.

One teacher detected a change in her student's level of engagement:

I am not quite sure how it was that Sara and I bonded. One day she made a comment to me and I worked it from there. When I found out she knitted, I related that to my roommate who knits and told her that she was actually teaching me to knit too. It is a great thing to talk about and create some trust. Now Sara talks to me about all kinds of things, what she does on the weekends, what she's reading, what is going on in her other classes, and that sort of thing. I am not too sure how this new relationship has informed my teaching, but I know I have created a better environment for Sara and the rest of the class benefits from that. Sara now answers more questions in class and it is good for the other students to hear her answers and explanations. Sara is a great math student.

These responses suggest that a teacher's personal connection with mathematically struggling students can affect students' participation and achievement in mathematics.

CONCLUSION

This study and the seminar activities suggest that, as a first step to providing support for all students in learning mathematics, teachers should explore their conceptions of equity, their role and responsibilities in closing the achievement gap, and their knowledge about individual students. Explicitly identifying conceptions of equity can help teachers recognize their role in working toward equity and help them focus on aspects under their control—instruction, the classroom environment, and curriculum. Getting to know a mathematically struggling student better can remind teachers that they are teaching not just mathematics; they are teaching students. Developing a relationship with a student with whom you are not connecting can serve as a first step toward the goal of equity.

As the seminar participants began to explore their conceptions of equity and take this first step toward equity within the context of the seminar, implications for classroom practice arose, leaving these teachers with ongoing questions about mathematics education to consider:

- What are some ways teachers can create these proposed classroom environments, and what are the results of these actions for teachers and students?
- What are some ways teachers can take a traditional curriculum and make it relevant to students?
- How does a teacher balance meeting the needs of each student, perhaps through assigning different tasks for different students, with providing equal opportunity and maintaining high expectations for all students?

Further consideration of these questions in relationship to teachers' conceptions of equity is necessary as teachers and teacher educators collaborate to develop additional strategies to address the Equity Principle in mathematics classrooms.

REFERENCES


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