Supporting Diverse Learners:

Teacher Collaboration in an Inclusive Classroom

"We are trying to establish kids who are confident, who are critical, who are trying to ask questions, and who recognize when something doesn't make sense. [We want our students] to recognize that there are different ways of thinking about mathematics. . . ." "We want students to feel confident about mathematics as a language, as a way of communicating to other people about ideas and problems and their own thinking. . . ." "The goal for the students identified with special needs is to learn what everyone else is learning. The challenge is to figure out what their learning style is, how they do learn, and what kind of extra help they need to stay with the regular class."

These are the collective comments of two general education teachers and one special education teacher who aim for every child in their inclusive second-grade classroom to learn mathematics with confidence and understanding. These teachers participated in a pilot study looking at the impact of mathematics reform on students with exceptionalities. After a brief discussion of the challenges inherent in meeting this aim, this article explores some of the ways these second-grade teachers support the mathematics learning of the diverse group of students in their class.

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The Challenges

Reform-based mathematics instruction encourages students to construct mathematical understanding through problem solving, cooperative learning, and mathematical discourse. Although some researchers have found that students with mild disabilities can be successful with constructivist-oriented instruction associated with mathematics reform (Behrend 1994; Mastropieri, Scruggs, and Butcher 1997; Thornton, Langrall, and Jones 1998), educators agree that success for these students often requires more time and support to master content and skills than is needed by their nondisabled peers. Furthermore, these students often fail to engage in learning practices essential to learning through reform approaches, according to a study investigating the effects of reform-mathematics instruction on students with learning disabilities (LD) in general education settings (Baxter, Woodward, and Olson 2001). LD students often had difficulty paying attention in whole-class discussions, and their limited participation in these discussions consisted of one- or two-word, low-level responses. In cooperative learning situations, they had a tendency to focus on nonmathematical aspects of tasks (such as organizing manipulatives), leaving the mathematical problem solving to their peers. If we want diverse learners to benefit from reform-mathematics instruction, we must find ways to structure classroom experiences such that *all* students actively engage in problem-solving tasks and discussion of mathematical ideas.

Time, structure, support, and complexity are four pedagogical variables that teachers must provide in differing amounts and with differing inten-

sities to meet the learning needs of all students (Coleman 2003). If our aim is to help students with exceptional learning needs reach high levels of complexity in their understandings of mathematics, then we must consider how to flexibly provide the necessary amounts of time, structure, and support to meet that aim. The remainder of this article takes the reader into a second-grade classroom in which two general education teachers and one special education teacher work together to create a structure for inclusion that facilitates a high level of support for students with and without exceptional learning needs.

The Classroom Context

Located in a Title I school in an urban school district in the southeastern United States, this class consists of seventeen second-grade children, including ten males and seven females. The group includes twelve African Americans, two European Americans, two Latinos, and one student identified as mixed ethnicity. Four students receive exceptional children's services with mathematics goals on their individual education plans: two are identified with specific learning disabilities; one, with emotional-mental handicap; and one, with autism. Three additional students are in the process of screening for their special education needs.

To ensure ample instructional support, one full-time and one half-time general education teacher are assigned to this group of second graders. One 45-minute block of mathematics instruction occurs daily at the end of the morning (before lunch), when both general education teachers are present in the classroom. Additionally, the special education teacher provides in-class instructional support daily for a 45-minute block of time at the beginning of the day, resulting in the presence of three teachers for this period of instruction. For two weeks out of every four, this time is allocated for mathematics instruction. (During the other weeks, this time is spent on reading.)

Mathematics instruction in this classroom draws heavily on the reform-based mathematics curriculum titled *Investigations in Number, Data, and Space*. This curriculum includes a series of units focused on specific mathematics content (for example, number, geometry) in which students are encouraged to reason mathematically, develop problem-solving strategies, and represent and communicate their mathematical thinking to others. Within this context, these teachers use flexible grouping and structures that promote student choice to differentiate mathematics instruction and customize support for diverse learners.

Flexible Grouping

When all three teachers are present for mathematics instruction, they frequently use small, teacher-led groups. In these groups, each teacher is responsible for planning and engaging students in tasks that address the specific goals that the team of teachers has collaboratively identified for small-group time.

Sometimes groups are organized around a process goal, such as articulating one's mathematical thinking. When articulation is the primary goal, Randall, a child identified with autism and

limited language skills, is ideally placed in a group of very verbal students. On one occasion, Randall was playing a game called "Snap It" with a teacher-leader and five peers. In this game, one student puts a stick of ten Unifix cubes behind his or her back, snaps some off, and places them on the table. The object of the game is for the other students to determine how many cubes are still hidden. After each turn, the teacher prompts students to share their strategies for determining how many cubes are behind the person's back.

During one round, a student explained that he saw four cubes on the table and he extended one finger each for 5, 6, 7, 8, 9, and 10. He extended six fingers, so the answer is 6. Another student said that she knew that 5 + 5 is 10 and that 4 is one less than 5, so the answer is 6. Randall was reluctant to share strategies when the teacher called on him at the beginning of this game. But after several rounds, Randall began to volunteer to share his ideas. At one point, 2 cubes were showing on the table, and Randall shot his arm up quickly. He said that he knew the answer was 8 because the previous problem had been 8 + 2 and the current problem was its opposite.

At other times, groups are organized on the basis of the teachers' ongoing assessment of students' mathematical content knowledge. For example, a big goal in this second-grade class is to move students toward thinking about numbers in terms of grouping by tens. Whereas some students in the class readily group by tens to solve problems, others continue to solve problems primarily by counting ones. The following problem was used with a small group of four students to encourage grouping by tens:

> We are going to have a party with 34 children. We want to buy enough cookies so that each child gets a cookie. Cookies come in packages of 10. How many packages of cookies do we need to buy?

After several moments of silence, the teacher prompted students to retell the story problem and identify important information, but the students were still unsure how to tackle the problem. On a sheet of paper, the teacher drew a rectangle with two rows of five circles inside and explained that this arrangement is what she means by a package of ten cookies. Next she asked, "What if we bought only one package—would we have enough cookies?" Three of the students shook their heads, indicating no. By asking questions, the teacher got the students to explain how they knew that they did not have enough. One student explained that the package did not look like it contained thirty-four cookies, and another student noted that the package contained only ten cookies.

At this point, three of the four students were ready to work on the problem alone. One selected a hundreds board, and the other two began to make models with cubes. The fourth student did not begin working. After about a minute, the teacher joined this student and used explicit prompts and questions to guide him to a successful solution. After the lesson, the teacher noted that the problem used had clearly been too difficult for this child and that he likely would have given up if she had not been there to press him to continue working on the problem. In contrast, the problem was a good choice for the other three students, who were able to devise successful solution strategies with minimal support.

Organizing classrooms such that students can regularly participate in small-group, teacher-facilitated instruction allows students greater opportunity to engage in discussion and active learning in supported ways. Through the use of questioning techniques and explicit instruction, the teacher can provide initial support for the acquisition of concepts, support for developing multiple ways to represent and communicate information, and encour-

agement to persist with mathematical tasks. Teachers can also quickly identify when tasks are too difficult for individual students and decide whether to provide additional support or to modify the tasks.

Although flexible grouping promotes many benefits, the potentially negative impacts of *in*flexible grouping practices are important to note. As one teacher stated, "The last thing you want is for all the special education kids to get stuck in their own low group all the time with the special education teacher." One of the primary goals of inclusion is to have the special education students be regular class members. Minimizing the negative messages that students might receive about their capabilities from grouping practices is an important outcome. All students should be engaged in meaningful tasks, and as instructional goals change, so should group membership and the role of the teacher as facilitator.

Opportunities for Choice

Although flexible groups present opportunities for teachers to work closely with children, an important consideration is how to encourage students to take responsibility for their own learning. One way to support students in building autonomy is to offer opportunities for them to make choices about how and what they will learn.

When this class has two blocks of mathematics instruction in one day, the second block of time is often used as a *choice time*. Similar to centers, students choose from a menu of mathematics tasks, most of which they have worked on previously with teacher support. As the teachers decide on the choices to include, they consider students' mathematical needs and provide a menu of activities reflecting that range. At the beginning of one choice time, six activities were listed on a sheet of chart paper: Snap It, Get to 100, Hundreds Board, Word Problems, Cover a Flat, and Tower Game. These activities focus on number combinations that make 10, understanding the structure of a hundreds board, and addition and subtraction of one- and two-digit numbers with and without story contexts.

Randall, the child with autism who was introduced previously, decided to work on the hundreds-board activity. The materials for this activity include a large pocket hundreds chart with number cards labeled 1–100, paper copies of a blank hundreds board, and an instruction card. Perhaps because of his weak reading skills, Randall is often reluctant to read the instructions at center activities. Aware of his reluctance, a teacher visited Randall's table almost immediately and prompted Randall and the other two students to help one another read the activity instructions and use their own words to explain what they were supposed to do. The instructions prompted students to first place the number cards into the hundreds board pocket chart, then make their own paper copy of the chart on a worksheet, and finally, to write about a pattern they noticed.

Randall led the other two students at the table in placing the first two cards, 31 and 20. Then, as the other two students were placing cards, Randall sorted through the deck and pulled out several cards with a 1 in the ones place. He placed 41, 51, 61, and 71 down the first column of the hundreds board. Next he saw that one of the other students had placed 43 in the spot for 33, and he corrected the error, using 31 as a guide to determine the correct row. After placing a few more cards, Randall got a blank hundreds-chart worksheet and began filling in the first column, starting with 1, 11, 21, 31, and so on. Even though Randall's process clearly indicates that he is aware of patterns on the hundreds board, he skipped the last step of this activity, which was to write about a pattern. During choice time on the following day, Randall's teachers required him to start by finishing this last step of this hundreds-chart activity. Although Randall required little support to complete the initial activity, finding words to describe patterns proved to be very difficult for him, and he needed a teacher's support to complete this part of the task.

For students with and without exceptionalities, choice time allows them to reinforce their emerging skills as they reason through the problems inherent in the activities they choose. For students with exceptionalities, who often require more experiences to master new concepts, this structure gives the student some control over how that practice will occur. Another benefit of choice time is that teachers are free to assess students as they work and to provide support and extension as it is needed.

Another kind of choice that students are often prompted to make in this class are choices about how they will work on specific tasks. One morning, a teacher had the whole class sit on the carpet to engage in an activity called Pinching Paperclips. In this activity, students use their pointer finger and thumb to "pinch" as many paperclips as they can from a box of 100. The task is then to figure out how many paperclips were pinched and how many

remain in the box. During the whole-class introduction to the lesson, the teacher had a small group of students who had previous experience with this task explain how it worked. Then the teacher led students to collectively work on a couple of rounds of pinching paperclips, focusing on discussion of strategies. Next the teacher told the students that they would have a choice regarding how they would work on this activity. Students could work independently, with a partner, or with a teacher. First, materials were distributed to those students who chose to work alone. Then the teacher paired students who indicated that they wanted to work with a partner. Finally, the students remaining formed a tight circle on the carpet with a teacher to work on the activity as a small group. The second classroom teacher circulated the room and supported the students as they attempted the activity.

When these teachers first started asking students to make choices about how they would work, several students made poor choices about the degree of support they needed. Some students, who had little understanding and limited strategies, chose to work alone, whereas some students with strong understanding chose to stay with a teacher. As teachers have engaged in conversations with the class and individuals about making good choices and having reasons for their choices, students have become much better at identifying situations in which they require more and less support. By finding ways to offer choices, teachers encourage students to make decisions and take control of their own learning. When students make choices, they are more likely to become confident, intrinsically motivated learners.

Collaborative Planning

To this point, I have described some of the efforts teachers have made to provide learning structures and support to optimize learning for a diverse group of students. *Behind-the-scenes* structure and support, however, is vital to optimizing the classroom experience for students in this inclusive classroom. The two general education teachers and the special education teacher meet at least one time each week to plan for instruction. During these meetings, they talk about individual students, discuss what they noticed happening in the small groups they are working with, and determine new instructional goals based on their observations. All three teachers believe that these meetings are essential to the success of what they are doing with inclusion. One of the general education teachers made the following comment:

> It is important to sit down with Anna [the special education teacher] and have goals and strategies for each kid. By doing that, I feel like I am doing something that is making a difference for each kid and I know what to do. I do not have the expertise to be able to do that on my own. I really believe that [special education] kids need to be in the regular classroom as much as possible, but . . . I need to know that what I am doing for them is worth their time and that they are getting something out of being there.

Through these meetings, the team of teachers carefully considers the kinds of support they should provide on the basis of the strengths and needs of each learner. For example, let us consider the different needs of Randall (discussed earlier) and Eric, a student identified with learning disabilities, when presented with a word problem. Randall's language deficits cause him difficulty in understanding the situation in a word problem, so teachers often help Randall read a given problem, imagine the situation, and retell the story of the mathematics problem. Probing and questioning are often necessary to help Randall devise solution strategies. After Randall has a plan in mind, however, he is able to solve a problem systematically and represent his solution on paper with less support. In contrast, Eric can read and understand a word problem and can think of a way to solve it, but he has difficulty organizing his solution strategy and following through with it. Eric needs support in developing ways to be systematic with his problem-solving strategies so that he can be sure he is arriving at a correct answer. He also needs support in representing his ideas on paper and communicating them to others.

This example shows the importance of avoiding the false assumption that all special education students have similar needs. Instead, teachers should (a) reflect on the strengths and needs of each student, (b) devise instruction that provides needed support, and (c) recognize how to build on students' strengths and move students toward greater independence. Behind-the-scenes collaboration among general and special education teachers is crucial to making inclusion effective.

Conclusion

At the opening of this article are the voices of teachers elaborating on the expectation that all their students, including those with exceptional learning needs, will become confident and critical doers of mathematics. They expect their students to understand mathematics, and they foster that expectation of understanding in the students they teach. These teachers also realize, however, that the kind and amount of support needed by each of their students varies.

One of the six principles for school mathematics articulated by the National Council of Teachers of Mathematics is the Equity Principle: "Excellence in mathematics education requires equity—high expectations and strong support for all students" (NCTM 2000, p. 11). Rather than imply sameness, this charge of equity calls for fairness by demanding that accommodations be made that promote access to, and attainment of, challenging mathematics for all students. This article has described how three teachers have attempted to meet this challenge in their second-grade inclusive classroom by thoughtfully creating structures that allow for just the right combination of time, structure, and support for each child.

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