1 Introduction to Mathematics, the Common Core, and RTI

The Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy.

—Council of Chief State School Officers (2010, para. 1)

Today, most teachers, curriculum designers, and supervisors have a shelf full of books, articles, and reports introducing them to the requirements of the Common Core State Standards (CCSS) and the instructional framework known as Response to Intervention (RTI). One result of these multiple initiatives, regulations, and standards is a form of burnout known as "initiative fatigue" (Reeves, 2010). They would rather wait and hope that these complex initiatives will somehow go away, or at least not obstruct their teaching. At the same time, they know that the status quo in American schools is not acceptable. According to *Trends in International Mathematics and Science Study (TIMSS) 2011*, eight nations scored higher than the United States in fourth-grade mathematics and eleven countries scored higher in the eighth-grade level (Mullis, Martin, Foy, & Arora, 2012). Given the mediocre performance of American students on international assessments in mathematics, and the need to maintain a leadership position in the global economy, waiting for policy makers to produce a single, easy-to-implement plan is not an option.

Something has to be done in thousands of mathematics classes, in each individual school, by every teacher, using the programs in place now.

The most pervasive mandates in American schools today are the Common Core State Standards (prescribing the content of instruction) and Response to Intervention (prescribing a data-based method of instruction). Most of the resources available to help teachers work with either mandate treat the two as separate entities, without reference to the other. As a result, mathematics educators are calling for some way of working with CCSS and RTI as a single, unified program that they can use in their classes, rather than as separate, isolated mandates. Discussions with teachers reflect John F. Kennedy's frustration with his advisors when he reportedly complained, "All my economists say, 'on the one hand . . . on the other.' Give me a one-handed economist" (quoted in Krugman, 2003, p. 11). Teachers need a single integrated approach to mathematics instruction—not two, let alone three or more—that addresses the needs of all their students.

In preparation for this book, we reviewed the growing collection of material on CCSS and RTI that is available to educators, and as we listened to colleagues who are introducing the two programs to their schools, it became clear that what they needed was not another handbook telling them what CCSS or RTI is. What they want is, first, a way of untangling the perspectives of the many experts within the fields of the Common Core and RTI. Second, they are asking for help in charting a path through the potential interactions between RTI and the other mandated requirements their schools face, particularly the Common Core, but also the No Child Left Behind legislation, the National Council of Teachers of Mathematics Standards, differentiated instruction and universal design, inclusion, parent involvement, and the demands of their local school policies. Teaching mathematics is a more complex activity than ever before, and the need for a unified instructional strategy to teach all students has never been stronger. There is pressing need for a book that integrates the multiple new requirements into a single, comprehensible process that can help teachers succeed with the mandates of CCSS and RTI, but more important, to help each of their students achieve success in mathematics. That is our goal.

RTI and the Common Core: Casual Friends or the Dynamic Duo?

RTI and the Common Core both became national mandates as part of the shift in educational values launched by the No Child Left Behind Act of 2001: clear and consistent standards (the Common Core), universal screening and response to the needs of struggling students (RTI), and greater accountability for success in every aspect of public education. Taken individually, RTI and

the Common Core each produced a shift of paradigms as we moved from 20th to 21st century education. Each of them presents a formidable task for teachers. Together, they create a perfect storm of challenges. Teachers need to untangle their multiple demands and find a way to transform the two mandates into a single unified process within a school's mathematics program. This calls for placing RTI and the Common Core into a new integrated perspective and in context with the complex world that educators face every day.

Mathematics, the Common Core, and RTI: An Integrated Approach to Teaching in Today's Classrooms addresses this need by developing an integrated approach for introducing RTI and the Common Core to professional educators and to teacher candidates in colleges and universities. The chapters to guide that path are outlined below.

Chapter 2, "Marching Together to Academic Success," reviews the history and importance of the Common Core State Standards for Mathematics (including the Standards for Mathematical Practice and Standards for Mathematical Content) and their relation to RTI. It then expands on a practical approach to Response to Intervention, as presented in our previous work, *The Complete Guide to RTI: An Implementation Toolkit* (Burton & Kappenberg, 2012). Finally, it presents an approach for integrating the academic content and standards of the Common Core for Mathematics with the diagnostic and instructional framework of RTI. The remaining chapters apply this framework to several of the key elements of mathematics instruction, including strategies for students who struggle with mathematics.

Chapter 3, "Universal Design and Mathematics: A Framework for RTI and Implementing the Common Core," describes how an understanding of the principles of universal design can help teachers meet the diverse needs of their students. It presents practical approaches that can help teachers seamlessly integrate the knowledge base of current brain-based research into the principles of universal design that has become essential to school programs in recent years. The chapter begins with a presentation of recent brain-based research behind Universal Design for Learning (UDL). It reviews the three commonly identified neural networks of the brain that are central to the UDL process:

1. *Recognition networks:* the area in the brain that processes the contents—the what—of learning
2. *Strategic networks:* the area in the brain that processes the method—the how—of learning
3. *Affective networks:* the area in the brain that processes the meaning—the why—of learning

The discussion includes a summary of the nine principles of UDL:

1. *Equitable use,* which ensures the design is useful to people with diverse abilities
2. *Flexibility in use*, which assures that instruction provides opportunities for choice of instructional media and methods
3. *Simple and intuitive use*, which focuses on the need to eliminate unnecessary complexity in instructions for mathematics assignments
4. *Perceptible information,* which addresses the need for appropriate methods of communicating information, regardless of the student's sensory abilities
5. *Tolerance for error*, which minimizes mathematical errors by assessing students' current level of competence and prerequisite skills
6. *Low physical effort,* which emphasizes the design of mathematics instruction so that students quickly recognize errors and minimize their repetition
7. *Size and space for approach and use*, which reminds us to design instructional settings that provide a clear line of sight to all important instructional elements, such as the blackboard
8. *Creating a community of learners,* which promotes interaction and communication among students and provides opportunities for collaborative problem solving
9. *Creating a welcoming and inclusive environment,* which includes holding high expectations for all students and a policy of zero tolerance for negativity

Several specific examples are provided, demonstrating how to use the principles of UDL to improve the performance of students who struggle in mathematics in the Common Core content and the RTI instructional framework. Chapter 3 concludes with examples of mathematics lessons appropriate for Tiers 1, 2, and 3.

Chapter 4, "Progress Monitoring: Avoiding a Blind Date With Data," begins with a definition of progress monitoring (PM). The chapter reviews the research evidence supporting the effectiveness of PM in diagnosing how well students are prepared for academic work, how it can guide instructional decisions, and its role in the RTI framework. The review focuses specifically on the use of PM in measuring student growth and outcomes according to the Common Core State Standards in mathematics. The chapter is framed around the six basic stages of progress monitoring:

1. Define the behavior: What do my students need to learn?
2. Select the measurement strategy: How do I know my students are learning?
3. Establish baseline assessment scores: Where are my students presently?
4. Create a goal: Where do my students need to be?
5. Develop a chart or graph: Are my students growing?
6. Create a decision-making plan: How do I get my students to where they need to be?

Chapter 4 concludes with a discussion of why it is important for teachers to use progress monitoring as a data gathering and analysis tool within the RTI framework to fully implement the Common Core State Standards.

Chapter 5, "Connecting Mathematics and Literacy: If a Picture Is Worth a Thousand Words, How Many Words Is an Equation Worth?" develops the idea that, from the earliest years of instruction, mathematics needs to be presented as a language in its own right and also one that uses English as part of its own special vocabulary. The chapter begins with a definition of mathematics literacy and describes seven strategies for promoting it, along with activities to develop mathematics literacy in class. The chapter then focuses on specific provisions of the Common Core State Standards that address math literacy and offers ideas on connecting these standards to the screening processes used in a Response to Intervention program. This leads to an extended review of seven strategies for integrating literacy into instruction in mathematics guided by the Common Core:

- Strategy 1: Authentic performance tasks
- Strategy 2: Cooperative learning, metacognition, and verbal discourse in mathematics instruction
- Strategy 3: Teaching vocabulary using five types of context clues
- Strategy 4: Use of graphic organizers
- Strategy 5: Games, magic squares, and puzzles
- Strategy 6: Oral reading of children's books
- Strategy 7: Direct instruction in mathematics vocabulary

Chapter 5 concludes with specific examples of ways to introduce math literacy activities into each of the three tiers of a school's RTI program.

Chapter 6, "English Language Learners," shows how the approaches to mathematics instruction outlined in Chapter 3 (UDL) and Chapter 5 (math literacy) can be applied to English language learners (ELLs). Here again, the complex demands of the Common Core in mathematics and Response to

Intervention need to be untangled so that teachers can develop a focused and coherent approach as they introduce these programs to their instruction. Chapter 6 provides guidelines to help accomplish this. It begins with a review of the most critical barrier that ELLs typically face: the error that teachers and schools frequently make in mistaking mathematics difficulty for mathematics disability. While only 6%–7% of the general population is known to have a clinical disability in learning mathematics (Fuchs & Fuchs, 2005), a much higher percentage of ELLs receive this classification in our schools (Flores, Batalova, & Fix, 2012). Chapter 6 examines the reasons for the discrepancy. It then discusses the difference for ELLs between their acquisition of social language and the academic language they need to succeed in mathematics. It presents strategies for teaching the Common Core content in mathematics to ELLs in each of the three tiers of RTI. The chapter concludes with examples of differences in mathematics teaching and learning between various cultures and examples of CCSS-aligned lessons in Tiers 1, 2, and 3.

Chapter 7, "Teaching Mathematics in an Inclusion Classroom Guided by the Common Core," extends the applications of RTI and the Common Core to a challenge that now faces almost every mathematics teacher: the inclusion setting. Inclusion can take a wide range of forms, but in most cases it calls for a special education teacher (who may have little expertise in mathematics) to work with a certified mathematics teacher (who usually has little knowledge of the learning needs of students with disabilities and other learning challenges). The task of inclusion is to combine their expertise and design a new approach to instruction that meets the needs of both the general education and special needs students in the same classroom, using the same curriculum content. Not since the K–12 one-room schoolhouse of a century ago have teachers been required to be so adaptive and creative.

In one sense, inclusion—the mandate that most special needs students be educated in the same classes, using the same curriculum, as their general education peers—is the ultimate standard for both the RTI framework and the Common Core content.

The chapter explains the hierarchy of relationships among the Common Core, RTI, and inclusion that can be used to design a unified educational program for an inclusion class. The key to success is the level of preparation for both the professional staff and the students. The kinds of preparation needed are discussed in detail.

Chapter 7 presents practical ideas on teaching the Common Core mathematics curriculum within an RTI framework in an inclusion setting. The interrelationship among these is emphasized and reference is made to the practical legal requirements that schools need to follow to protect the rights of all students—both special education and general education—in an inclusion class.

One of the central strategies for inclusion is the variety of co-teaching models available to professionals. These are analyzed with an eye toward helping

teachers understand which strategies are most likely to be successful in their own setting, and also when several different approaches may be needed within the same classroom. Chapter 7 then discusses another important aspect of co-teaching: the shared and complementary roles of the general education mathematics teacher and the special education teacher. Critical elements of co-teaching, such as common planning time, are emphasized.

Chapter 7 continues with examples of mathematics lessons that can be taught in inclusion settings for Tier 1 and Tier 2. It concludes with a discussion of the wide range of groups in addition to "classic" special education students, that need to be recognized in designing an inclusion program in mathematics: talented and gifted, twice exceptional (special needs students who are also talented and gifted), ESL students, and others.

Chapter 8, "The Role of Parents Helping Students to Achieve," introduces a professional skill that is rarely covered systematically in teacher preparation and is often lacking, even in veteran teachers: the strategies needed to develop a productive relationship between teachers and parents. This is particularly critical in programs based on RTI and the Common Core, which place new emphasis on the needs of individual students. As educational practice becomes more focused on the individual student—in conjunction with group instruction—the need for parental involvement, support, and consultation has increased significantly. This chapter presents approaches that can lead to parent involvement that enhances, rather than obstructs, math instruction.

Chapter 8 introduces contrasting approaches to the teacher-parent relationship: the traditional "client relationship" and an alternative "consultant relationship." The client relationship assumes that the teacher possesses the professional training to make decisions about a student's educational program, and the parent's role is to support these decisions. The consultant relationship recognizes the professional judgment of the teacher but adds to this the teacher's need for insights into the student that only the parent can provide. The parent is seen as an essential resource in designing the individual program for the student, which is particularly critical in approaches to instruction that are based on the Common Core, RTI, and Universal Design for Learning.

We then use role-playing scenarios of teacher-parent conversations to illustrate how these approaches differ, what they sound like in practice, and the contrasting outcomes of each. Chapter 8 concludes with an extensive list of resources for facilitating the collaboration process between parents and teachers, and online resources devoted to RTI and the Common Core that are available to parents and educators.

Before we can forge that path, we need to enhance our knowledge base of the Common Core and RTI. Chapter 2 is designed to do just that. The adventure has begun!