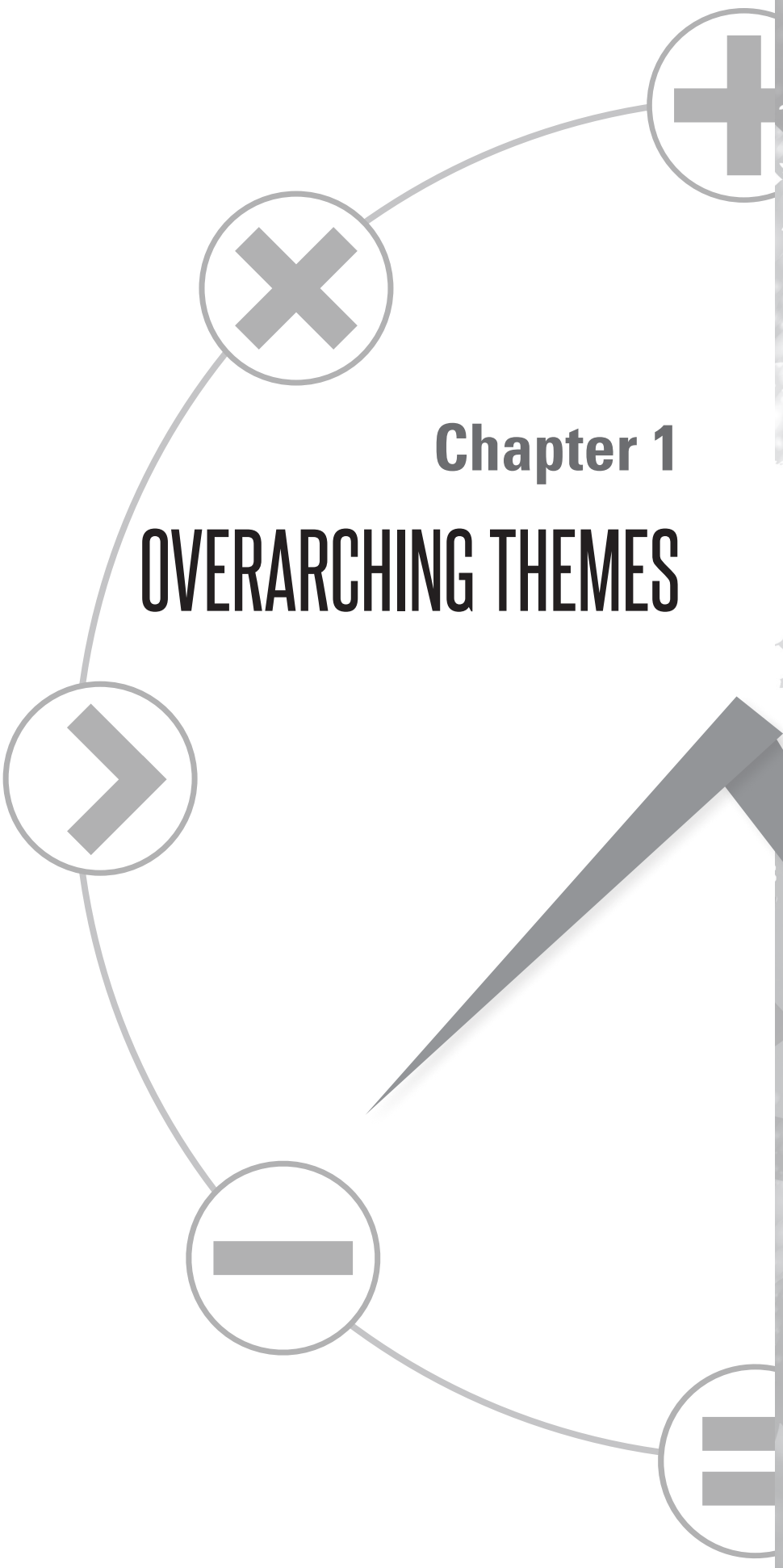

Chapter 1

OVERARCHING THEMES

These are unique times in mathematics education. A high-quality set of common standards guide kindergarten through high school mathematics in most states, representing a long overdue, well-conceived internationally benchmarked curriculum. We have a much clearer sense of the instructional practices that raise achievement. Two state-led consortia, PARCC and SBAC, are developing technologically enhanced assessment systems explicitly aligned to the CCSSM. Teachers have unparalleled access to ideas and resources on the web that transfer to interactive whiteboards and other digital devices. Well-trained mathematics coaches are increasingly prevalent in schools. There is a much stronger research base to guide our actions than ever before. Thus, we have an emerging infrastructure that provides a stronger foundation for change and improvement than has previously existed.

But standards do not teach; teachers teach. It is the translation of standards into engaging tasks and powerful assessments in millions of classrooms that determines the quantity and quality of learning. It is *how* educators use available resources to provide an opportunity to learn that matters. Assessments are only valuable to the extent that the data are reliable and teachers use results to refine and improve instruction. Professional development that fails to provide opportunities for practice, feedback, and collaborative reflection has little real impact on teacher knowledge, teacher practice, or student achievement. All the research findings that fill our journals are of little use if they are not translated into practice. Most important of all, any honest interpretation of a broad array of National Assessment of Educational Progress (NAEP), Trends in International Mathematics and Science Study (TIMSS), and Programme for International Student Assessment (PISA) outcomes reveals that rarely does mathematics work for more than half of the student population, leaving an unacceptably high proportion of the population for whom the system has failed.

Before we can capitalize on the opportunities and address the challenges of the 21st century, we need to better understand why so little has changed. We have identified four factors to explain this lack of change and to frame the essential changes that need to be made.

1. There is a widespread lack of mathematics content knowledge and pedagogical content knowledge required for teachers to maximize student learning and to effectively implement the Common Core. This is not a statement of blame. Teachers and leaders were duly trained, certified, and hired. However, initial training and induction programs are often inadequate for first- and second-year teachers to be successful, certification requirements are frequently minimal, and opportunities for continued learning are very limited. Improvement and real change require a much more effective, ongoing system of developing mathematical and pedagogical content knowledge for all teachers of mathematics during every phase of their careers (Ma, 2010).

2. There are few mechanisms in place and insufficient time to improve mathematics content knowledge and pedagogical content knowledge. In too many schools and districts, teachers are poorly supervised, undersupported, and professionally isolated as they endure systems

of evaluation that too often are not aligned with research-affirmed instructional practices. Evaluation should be a process of continuous improvement, but in many places this is not the case. Improvement and real change require systematic, intensive, and high-quality coaching and dedicated allocations of time and structures for professional collaboration.

3. Too many schools fail to maximize the learning of their students. Again, this is not a statement of blame, but the facts are that few teachers have the benefit of a research-based vision of effective teaching practice. Far too many schools fail to make effective use of data to improve teaching and learning. In addition, teachers do not widely understand, encourage, model, or implement effective, high-leverage instructional practices in classrooms. The gap between what we know and what we do remains unacceptably wide. Improvement and real change require a much more effective system of supporting the teaching and learning process.

4. In mathematics education, to a much greater degree than in English language arts, our efforts are often severely stymied by a culture of beliefs and mindsets that lower expectations and limit the opportunity to learn. This is not to cast aspersions on people or systems, but we must acknowledge that mathematics is still frequently conceived as a sorter of talent and the rightful domain of only some. Many view mathematics as a nonessential domain of understanding and not as a critical source of empowerment for everyone. Too often, our perceptions, policies, and practices fail to provide opportunities for all students, and in far too many places, the link between high-quality mathematics education and social justice is missing from our actions, as students fall through cracks and leave school unprepared for the needs and expectations of today's workplace. Improvement and real change require reconceptualizing the unique role of mathematics in the development of an informed citizenry and a prepared workforce and having an unwavering commitment to the moral imperative to ensure mathematical proficiency for all.

Our challenge, and the purpose of this book, is to merge the unique opportunities we face with our understanding of the conditions that have compromised systemic change in the past to create an accessible and feasible framework for leaders and teams of leaders.

Before turning to the specific conditions and imperatives that leaders and teams of leaders must address to raise achievement in mathematics for *every* student and effectively implement the CCSSM in *every* classroom, we begin with three overarching themes for raising mathematics achievement: (1) social justice, (2) systemic thoughts and actions, and (3) leadership.

Three overarching themes for raising mathematics achievement:

1. *Social justice*
2. *Systemic thoughts and actions*
3. *Leadership*

Social Justice

The CCSSM is composed of two significant dimensions. On one level, the CCSSM sets forth clear expectations for content understandings and

standards for mathematical practice to ensure quality in what mathematics content is taught. On a second far more significant level, the CCSSM calls for social justice by demanding achievement in mathematics by *every* student. Effectively implementing the CCSSM requires schools to address both dimensions—high-quality content and a commitment to all students.

The direct link between mathematics education and social justice confronts us when Robert Moses and Charles Cobb declare algebra a civil right, when stark achievement gaps in mathematics among racial and ethnic groups remain the norm, and when policies and practices continue to systematically limit access to opportunities (Moses & Cobb, 2001). By *social justice*, we mean equality and fairness among diverse people. We advance social justice when we advocate for, expect, and achieve fair outcomes, basic rights, security, and opportunities in school and society. Equity in mathematics achievement refers to equitable *outcomes* for all students, not just equity of *access* or *opportunity*. In its position statement on equity in mathematics education, NCTM (2008) argues that "a culture of equity maximizes the learning potential of all students."

"A culture of equity maximizes the learning potential of all students."

Conscious and unconscious biases—whether blatant, subtle, personal, or institutional—have inappropriately and unnecessarily compromised learning in school. These biases often lead to lower curricular and instructional expectations. When schools identify at-risk students based on "perceptions of student demographics and characteristics, such as past achievement, learning disability, language acquisition, ethnicity, learning style, family structure and family income" students' options can be limited (Stiff & Johnson, 2011, p. 86). When schools differentiate expectations for success, school experiences, and resources based on preconceived notions and bias, they cannot attain the goal of mathematical proficiency for all. Schools must identify and purge these biases.

In the broader sense, equipping all students with an awareness of the pressing political, health, environmental, economic, and social challenges—and a recognition of the critical role of mathematics in understanding and addressing these challenges—underscores mathematics as an engine of social justice by maximizing opportunity to participate fully in our society. Expecting, even demanding, that all students have the opportunity to engage in rigorous, relevant mathematics that is learned with high levels of cognitive demand also supports a social justice agenda. When all students have opportunities to become agents for change on these issues, we strengthen our society.

This is why an overarching prerequisite to strengthening mathematics programs is establishing safe and respectful school and classroom environments for students, teachers, other staff, and parents. Such environments have a culture of dignity for all, are free of harassment, and are welcoming to diverse backgrounds, beliefs, and ideas. These enabling environments send the message that all students are valued, can safely take risks, and know they belong.

We can only create lasting and productive change when we understand and account for the interconnected systems of our educational enterprise.

Systemic Thoughts and Actions

Because our work in mathematics education revolves around a number of complex systems, we can only create lasting and productive change when we understand and account for the interconnected systems of our educational

enterprise. At its highest level, mathematics education operates within an interconnected system of students, teachers, and mathematics. We have the interrelated system of content (what teachers will teach), instruction (how teachers teach it), assessment (how well students learn it), and professional culture (how we interact and the beliefs we share). We have a systemic progression from teacher preparation to induction, to novice teaching, and to experienced practitioner. We have the interconnected knowledge of mathematics, specialized content knowledge for teaching mathematics, pedagogical knowledge, curriculum knowledge, and knowledge of students. And we have the critical support systems of time, resources, specialists, coaches, and leaders.

The surest way to limit one's impact is to attend to only one piece of a system, or to only one of these systems, without regard to how it affects the other pieces and systems. Efforts that merely tweak a single component seriously limit improvement and change. For example, adopting new instructional resources without commensurate professional development and coaching jeopardizes both the implementation of the materials and the relevance of the professional development. Similarly, focusing improvement only on enhancing mathematics content knowledge, without commensurate attention to pedagogical content knowledge required to make effective use of the mathematics content knowledge, also limits impact. When we ignore the need for coherence in our messages and alignment of our actions, we also seriously compromise impact. Thus, in *It's TIME*, while we categorize our imperatives into distinct components, schools must see and address them as but one element in an interconnected dynamic system. *It's TIME* will guide schools and leaders in linking all of their actions to the end goal of raising achievement in mathematics for *every* student and effectively implementing the CCSSM in *every* classroom.

Leadership

None of this is possible without leadership.

Finally, none of this is possible without guidance, nudging, cajoling, informing, and modeling—that is, leadership. It must be acknowledged that changing people's behavior is one of the most difficult aspects of leadership. There is, however, much that we know about changing behaviors.

- People cannot do what they cannot *envision*.
- People will not do what they do not *believe* is possible.
- People will not implement what they do not *understand*.
- People are unlikely to do well what they do not *practice*.
- People are unlikely to show much progress without *feedback*.
- People's efforts are unlikely to be sustained without *collaboration*.

The combination of these simple truisms leads us to the heart of providing effective leadership for school mathematics programs. Leaders at every level must help people envision, believe, understand, practice, receive feedback, and work collaboratively (Leinwand, 2012). That is, leaders and teams of leaders must be held, and must hold themselves, accountable for ensuring steady

progress toward the broad implementation of the leadership framework for Common Core mathematics.

Upon this foundation of overarching themes, we turn now to the supportive conditions that are essential prerequisites for systemic change.