Preface

In 2001, a group of researchers at the University of Pittsburgh launched the ASTEROID (A Study of Teacher Education: Research on Instructional Design) project funded by the National Science Foundation. The project investigated what mathematics teachers learned from participation in practice-based teacher education courses—courses that used cognitively demanding mathematical tasks, narrative cases, and student work as a focus of critique, inquiry, and investigation (Smith, 2001). Mary Kay Stein and I (Peg) were co-principal investigators of the project and I was the course instructor.

The first course, taught in the summer of 2002, focused on proportional reasoning. The goals of the course were both to enhance teachers' own ability to reason proportionally and enhance their capacity to teach proportional reasoning. The students in the course were 14 elementary and three secondary teachers, some of whom had just completed their Master of Arts in Teaching degree and others who were working on masters of education degrees. In order to investigate what teachers learned and how our instruction supported or inhibited learning, we videotaped each class session. We also gave teachers pre-/post-tests, interviewed them, and kept notebooks of all work produced in the course.

As the research team watched videos of teacher-students solving cognitively challenging (aka high-level) tasks, they noticed a certain pattern in the way I, as the instructor, facilitated work around and discussions of the tasks. I had solved the problems in multiple ways prior to the class, often seeking input from graduate students on alternative approaches. The researchers saw how I interacted with students as they worked and how I made notes of what specific students were doing. They saw how I identified students to present their solutions, how I ordered the solutions in particular ways, and how I helped my students make connections between different strategies, ensuring the mathematical ideas were central. While I was aware of what I was doing, I did not give much thought to why I was doing it, and I did not codify my actions.

The research team noticed the regularity of my teaching pattern and the impact it appeared to have on the quality of the discussions around high-level tasks. They recognized the parallel between a teacher educator teaching teachers and K–12 teachers teaching children. They were excited by the potential this model had to support the work of K–12 classroom teachers. We all knew we were on to something powerful. We gave labels to each of the identified actions so that others could learn them and voila!—

the five practices—anticipating, monitoring, selecting, sequencing, and connecting—were born!

From that moment forward—in collaboration with others—I have written about the five practices in journal articles, and my co-author Mary Kay Stein and I published the book that anchors this new series, which you may know as *5 Practices for Orchestrating Productive Mathematics Discussions* (2011). The book sold over 100,000 copies before we published the second edition in 2018.

What accounts for the surprising success of the five practices? Over the last three decades, there has been a growing consensus that traditional forms of mathematics teaching were not sufficiently preparing students for success in school and beyond. The release of the *Common Core State Standards* (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) brought new demands for more ambitious teaching and an increased focus on the importance of engaging students in mathematical discussion. Such discussion gives students the opportunity to share ideas and clarify understandings, develop convincing arguments regarding why and how things work, develop a language for expressing mathematical ideas, and learn to see things from other people's perspective.

So one answer to the question is that the five practices provides a five-step model of what teachers can do before and during instruction that gives them some control in facilitating discussions—an aspect of instruction that has proven to be especially challenging. The five practices are *doable* and something teachers could continue to get better at doing over time.

Despite the uptake of the five practices by teachers and teacher educators, teachers continue to find aspects of the practices challenging. Questions such as "Where do I find good tasks?," "How do I find time to adequately plan?," "What do I do if students all think about a problem the same way?," and "How do I wrap up the conversation at the end of a lesson without taking over?" abound.

In addition, teachers and teacher educators repeatedly ask me, "Do you have any video of teachers doing the five practices?" The need for authentic examples of what these practices look like in real classrooms was clear.

The Five Practices in Practice: Successfully Orchestrating Mathematics Discussions in Your High School Classroom (Smith, Steele, & Sherin, 2020) is the third book in a series that addresses many of the questions that teachers have raised with me over the years, and it provides what teachers and teacher educators have been clamoring for—classroom video of teachers engaged in orchestrating productive discussions. (The middle school book was published in Spring 2019 and the elementary school book was published in Fall 2019.)

This book goes beyond the first and second editions of the original *5 Practices* by providing a detailed unpacking of the practices and by identifying specific challenges teachers face related to each practice. The book includes numerous examples drawn from high school classrooms to illustrate aspects of the five practices and the associated challenges. A central component of these examples is video excerpts from high school classrooms that provide vivid images of real teachers using the five practices in their efforts to orchestrate productive discussions.

We hope this book will be a valuable resource for teachers!

—Peg Smith