



# Preface

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This book is specifically designed for educators who wish to improve mathematics teaching and learning. In particular, it is designed to provide mathematics teacher educators and professional development specialists with examples of where and how formative assessment can be integrated into a variety of professional learning efforts on a range of topics (e.g., classroom discourse, Cognitively Guided Instruction, etc.) to support its effective use as a critical component of daily instructional decision-making. The book will be a resource for those who facilitate efforts to promote high quality mathematics teaching by suggesting the value of a regular focus on the set of teaching practices associated with formative assessment. The chapters in this volume illustrate how formative assessment is deeply connected to many other instructional frameworks, tools, and approaches with which mathematics teachers and teacher educators are familiar, such as Cognitively Guided Instruction (CGI) and the Mathematical Tasks Framework.

This book emerged from an initiative of the National Council of the Supervisors of Mathematics (NCSM) and the Association of Mathematics Teacher Educators (AMTE) that was launched in 2013 to promote an intentional and systematic approach to implementing formative assessment in U.S. mathematics classrooms. Toward this goal a joint task force was appointed whose first activity was the development of a formative assessment position paper that was adopted by both organizations.

With support from the National Science Foundation in the form of a grant to the University of Michigan, we developed a national survey and then in October 2014, held a working meeting to explore possible connections between formative assessment and popular research-based instructional frameworks, tools, and approaches. If connections could be identified, we wondered if and how the role of formative assessment might be made an explicit focus of study in teacher education or professional development when one of these popular instructional frameworks, tools, or approaches is being addressed. Working meeting invitations were sent to experienced users of five different instructional frameworks, tools, or approaches (FTAs) widely used in mathematics teacher education and/or professional development: Cognitively Guided Instruction, Classroom Discussion/Discourse Tools, Culturally Responsive Pedagogy, the Mathematical Tasks Framework, and Response to Intervention. Meeting participants were asked to consider closely key features of the formative assessment process and the strategies that support the formative assessment process as described in the joint NCSM/AMTE position paper in relationship to the framework, tool, or approach for which they had particular expertise. For example, we asked participants to identify important opportunities to collect evidence of student thinking that are highlighted within their FTA. We also asked them to consider the ways in which formative assessment strategies might be linked to their FTA or if there were notable disconnections.

As the meeting progressed and it became clear that our experts were identifying strong connections, we then asked them to consider the opportunities and challenges that might be associated with integrating attention to an FTA and formative assessment rather than treating each separately.

From both the conversations held at this meeting of leaders and an emerging consensus from several subsequent conference panel discussions, the idea to create this book was born. These discussions helped to convince us that the work of mathematics teacher educators and professional

development specialists could be enhanced if they a) recognized the connections between formative assessment and many of the mathematics FTA and b) had access to compelling examples of where and how professional learning about formative assessment could be integrated with the professional learning of other instructional approaches—CGI, Discourse, RTI, and so forth. Such integration would make it possible to help teachers see how important ideas in teaching connect to each other. We see formative assessment as playing an essential role in fostering this coherence, and this book rests on that foundation. The examples provided in this book are different from the typical current approach in which formative assessment is treated as a separate professional development effort. The book should provide much needed support for building greater coherence across teacher education and professional development initiatives in our field, suggesting ways that formative assessment—the practice of eliciting and using evidence of student thinking to guide instruction—can provide a unifying thread.

A foreword by Margaret Heritage, a world-renowned expert on formative assessment, opens this book. The remainder is organized into three main sections. In the first section, two chapters lay out the foundations. The opening chapter explores our evolving understanding of the formative assessment process over the last twenty years and the challenges that have impeded its widespread implementation. It also explicates some of the evidence base for the importance of these instructional practices in supporting students' learning of mathematics. The second chapter presents the findings from the survey of NCSM and AMTE members mentioned above, as well as some details about the follow-up meeting briefly described above.

The second section contains six chapters, each discussing an influential instructional framework, tool, or approach that is well-known to educators: Classroom Discourse and Discussion Tools, Cognitively Guided Instruction, Culturally Responsive Pedagogy, Mathematical Learning Trajectories, the Mathematical Tasks Framework, and Response-to-Intervention (RTI). In each chapter, the authors—who are experts in the use of the instructional framework, tool, or approach discussed in the chapter—provide detailed descriptions and examples of ways in which the formative assessment process is an essential embedded element in mathematics classrooms.

The third section contains four chapters that consider major cross-cutting themes and lessons drawn from the earlier chapters. The first chapter in this section examines the connections between formative assessment and the eight Mathematics Teaching Practices named in the National Council of Teachers of Mathematics's (NCTM). The next chapter looks carefully at educational equity and its linkages to formative assessment and the chapters in the second section of the book. A third chapter considers the proposition that focusing on formative assessment might cohere and thereby improve the effectiveness of the professional learning experiences of teachers. The final chapter in this section, and in the book, proposes a few topics that might constitute useful next steps in efforts to promote formative assessment in mathematics classrooms.

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