

Preface

“Mathematics specialist” describes individuals employed in a number of different roles in schools across the nation. In this handbook, “elementary mathematics specialist” refers to an individual who has been granted release time from classroom teaching to advance the mathematics program in a K–5 school and provide school-based, collegial, professional development for teachers. This handbook envisions various roles for the elementary mathematics specialist, as described in chapter 1. Typically, the position of mathematics specialist is full time, and the individual who holds this title offers programmatic leadership for mathematics in the school, in addition to providing job-embedded professional development. However, in small schools, the elementary mathematics specialist may have some responsibility for teaching children for part of each school day or each week and may then assume the professional development and programmatic responsibilities of a specialist for the remainder of the school day or week.

Some schools and school systems give mathematics specialists other roles, following differing worthwhile models for using mathematics specialists to improve mathematics achievement, but this handbook does not address those models. In particular, for the purposes of this handbook, the elementary mathematics specialist is *not*—

- assigned to teach mathematics full time—all day, every day—to students in selected grades or at specific achievement levels in an elementary school, as the “specialized teacher of mathematics” or the “mathematics only” teacher;
- responsible for evaluative, performance monitoring of teachers;
- assigned full-time, all-day responsibility as a classroom teacher and in addition charged with providing professional development for teachers after the school day has ended for students;
- assigned as a full-time classroom teacher who is occasionally or regularly released from teaching responsibilities to work with teachers or to support a school’s mathematics program for part of a day, or a few hours, each week.

This handbook has been developed as a resource for the mathematics specialist whose central role is to facilitate and support the job-embedded professional development of elementary school classroom teachers. This role includes coaching individual teachers, coaching small groups or grade-level teams of teachers, providing programmatic leadership for mathematics in the school, collaborating with and supporting other resource teachers, and serving as the face of the school’s mathematics program. This handbook explores how mathematics specialists can be effective in all these areas.

The handbook’s last chapter is intended to be particularly useful for an elementary school principal who is preparing to collaborate with a mathematics specialist, addressing how the principal and the specialist may work together to define and advance mathematics teaching and learning in their school. This chapter, “The Principal and the Elementary Mathematics Specialist Work Together” (chapter 17), also appears at nctm.org/more4u in an electronic version that can be printed out as a freestanding piece for specialists and principals to read and discuss together.

The National Science Foundation has supported research and development initiatives addressing mathematics specialists through funded projects awarded to Virginia Commonwealth University in partnership with the University of Virginia, Norfolk State University, Longwood University, the University of Maryland, and the Virginia Mathematics and Science Coalition (DUE-0926537, “MSP Institute: Mathematics Specialists in Middle Schools”; DUE-0412324, “NSF Institute: Preparing

Virginia's Mathematics Specialist"; DRL-0918223, "Researching the Expansion of K–5 Mathematics Specialist Program into Rural School Systems"; and ESI-0353360, "Mathematics Specialist in K–5 Schools: Research and Policy Pilot Study"). These projects encompass components to achieve the following:

- Develop and offer master's degree programs to prepare teachers to serve as mathematics specialists
- Work with school systems and school principals to deploy mathematics specialists effectively
- Conduct research on the impact of mathematics specialists on teacher beliefs and student achievement
- Disseminate the results of this work and these experiences nationwide.

The mathematics specialist initiative in Virginia has drawn on multiple experiences and materials nationwide, and, in turn, shares lessons learned in this handbook. With National Science Foundation support, this initiative has produced the following results:

- All partners developed and adopted a document titled *Who Are Mathematics Specialists?* (see appendix A).
- Six universities in Virginia collaboratively developed and began offering master's degree programs to prepare mathematics specialists (appendix B provides a description of the program as offered at the University of Virginia).
- Virginia's Department of Education and state legislature adopted a Mathematics Specialist for Elementary and Middle Education endorsement that teachers who hold certification in Virginia may add to their existing teaching license. The licensure expectations for this endorsement parallel the requirements for the master's degree program described in appendix B. To date, more than 400 teachers have earned the endorsement, and a new statewide professional organization of mathematics specialists has been launched in Virginia. This organization has sponsored two annual conferences, each attended by more than one hundred fifty mathematics specialists.
- Research has investigated and continues to study the impact of mathematics specialists on student achievement and teachers' beliefs about mathematics teaching and learning. One large treatment/control study has been completed, led by Patricia Campbell, lead editor of this handbook. Chapter 2, "Research Findings," describes some results from this study, including the finding that students in schools with mathematics specialists who had completed a mathematics specialist preparation program achieved significantly higher scores on Virginia's state mathematics achievement test in each of grades 3, 4, and 5 than students in the control schools. Two additional studies with treatment/control components have been undertaken and will be completed in 2016.

The chapters in this handbook were authored by individuals who have served as mathematics specialists, supervisors of specialists, principals in schools with specialists, instructors of courses in a preparation program for specialists, and facilitators of programs designed to support principals who have specialists placed in their schools. In addition, to ensure that the content and advice in this handbook addresses the reality of practice as experienced by elementary mathematics specialists, an advisory board was formed, consisting of practicing mathematics specialists. Two or more members of this board reviewed each chapter of the handbook for clarity, content, and relevance, offering

suggestions for improvement. The chapters were subsequently revised in response to the feedback, and suggestions and reflections of these practicing mathematics specialists were added to the chapters. The following individuals from Virginia school systems served on the advisory board:

Ché Abdeljawad	Arlington Public Schools
Carolyn Doyle	Richmond City Public Schools
Amy Duffy	Roanoke City Public Schools
Candie George	Mecklenburg County Public Schools
Jennifer Hackley	Staunton City Public Schools
Stacey Lauffer	Culpeper County Public Schools
Sarah Minervino	Arlington Public Schools
Jason Scherm	Westmoreland County Public Schools
Elizabeth Sinclair	Arlington Public Schools
Candace Standley	Culpeper County Public Schools
Carol Walsh	Middlesex County Public Schools
Dana Witt	Roanoke City Public Schools

The editors would like to thank the authors for accepting the challenge of working on this handbook and for writing chapters rich with guidance and advice for mathematics specialists. We would also like to thank the members of the advisory board for their thoughtful reviews of the chapters and their personal stories, which enhance and underscore the ideas presented in each of the chapters in the handbook.