

# Chapter 4

## Leveraging Asynchronous Online Instruction to Develop Elementary School Mathematics Teacher–Leaders

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### ABSTRACT

*This chapter describes how the author leveraged asynchronous online instruction to develop elementary school teacher-leaders' knowledge of elementary school mathematics content and pedagogies in a graduate program in the United States. This chapter provides the theoretical framework of learner-centered professional development and explains how the six courses in the program embody the framework and support teachers' development of knowledge and skills related to mathematics teaching and learning. This chapter also shares the findings of a study that evaluated teacher-leaders performance on five student-learning outcomes in the program as well as feedback on course evaluations and end-of-program surveys. Data analysis indicated that every teacher-leader demonstrated proficiency on each student-learning outcome. Implications for the design of asynchronous online programs are also shared.*

### INTRODUCTION

#### The Need for More Elementary Mathematics Leaders

Internationally, there have been recommendations to develop and employ school-based personnel that have the knowledge and skills related to leading and supporting efforts related to mathematics teaching and learning (Bay-Williams, McGatha,

Kobett, & Wray, 2013; Polly, 2012; U.S. Department of Education [USDE], 2008). This need is especially prominent in elementary school settings (Ages 5–11), as teachers commonly are responsible for teaching multiple subjects and hence, do not have the opportunity to focus more deeply on only one or two subjects (Bay-Williams et al., 2013).

In some schools, resources have been provided to hire faculty members to hold mathematics-specific jobs and positions, such as mathematics

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coach, mathematics facilitator, mathematics lead teacher, or curriculum specialist. In other cases, however, elementary mathematics leaders are full-time classroom teachers who take on additional roles of leading their colleagues by providing resources, leading planning meetings, and facilitating professional development (Polly, 2012). As the number of these mathematics-specific positions has increased, there has, in turn, been a need to delineate and specify the types of knowledge and skills that elementary mathematics leaders should have.

Seeing a need to specify the knowledge and skills related to leadership in elementary school mathematics, the Association for Mathematics Teacher Educators (AMTE) published a set of Standards specifying the needs for elementary school mathematics specialists (AMTE, 2013). These standards speak about specialists as school-based personnel who have knowledge about mathematics content, pedagogy, as well as how to support their colleagues who teach mathematics in their school (AMTE, 2013). This work follows the Report of the National Mathematics Research Panel (USDE, 2008) who called for more school-based mathematics leaders to support teachers. The authors of the National Math Panel wrote:

*The panel identified at least three types of “math specialist teachers”: the math coach (lead teacher), the full-time elementary mathematics teacher, and the pull-out program teacher. Math coaches are more common than the other two types, but there is considerable blurring across types and roles. Math coaches (sometimes called lead teachers) tend to act as resources for their colleagues and do not directly instruct students. They work at the state, district, and school levels, providing leadership and information to teachers and staff and often coordinating mathematics programs within a school, a district, or across districts (p. 43).*

Regardless of the job title or specific job requirements, there is a need to provide specific types of support to faculty in elementary school settings to develop the skills and knowledge related to leading and supporting efforts related to mathematics teaching and learning.

### **North Carolina’s Response to a Need for Elementary Mathematics Leaders**

In a response to these calls and recommendations, a group of mathematics educators and mathematicians in North Carolina convened with other mathematics leaders from across the United States for a week-long conference. The purpose of this meeting was to study and explore the potential content of professional learning activities that would develop knowledge and skills related to the duties of elementary school mathematics leaders.

As a result of that meeting and extensive discussions about potential ways to design these learning experiences, a group of faculty from across the state convened in order to create a graduate program of six mathematics education courses focused on mathematics content and high-leverage teaching practices (pedagogies). Those individuals who complete all 6 courses successfully would earn an additional teaching license in Elementary School Mathematics. The program was designed for individuals that already had initial teaching credentials and teaching experience in elementary school classrooms. This working group originally included 13 faculty from 7 universities who synthesized the AMTE Standards and applied their expertise from the fields of mathematics education and mathematics to design the program. These faculty initially taught the courses in face-to-face settings to 2 different cohorts of teacher-leaders across the state. Through feedback from elementary school partners and North Carolina’s university administration, the working group was advised to create online formats of the course in order to increase

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