

Preface

This book is about the study of teachers' mathematical knowledge for teaching. The purpose of the research is to identify the categories of South Korean elementary teachers' knowledge for teaching mathematics. It offers ways to conceptualize mathematics teachers' knowledge within a sociocultural context. Our emphasis is on how the general educational context of South Korea affects elementary teachers' knowledge for teaching mathematics. Specifically, crucial elements of this discussion are the influence of South Korea *National Mathematics Curriculum* and *Education Fever* on the mathematical teaching practices of eleven elementary teachers. Throughout this book, we highlight this influence in several ways. First, we discuss the role of South Korea National Mathematics Curriculum in the relevant literature chapter, and then applying a historical lens, we devote an entire chapter to provide the reader with the state of South Korea national curriculum. We also highlight the voices of the teachers, presenting their perspectives about how the national curriculum serves as a guide for planning and classroom instruction. Second, Education Fever embodies Korean society's aspiration to balance the goal of high achievement with the quality of life for its citizens. Thus, in implicit ways, we show its influence on what and how South Korean elementary teachers teach mathematics.

The guiding framework for the research includes both a theoretical orientation and a conceptual frame. Vygotsky's sociocultural perspective offers a valuable context for understanding the role of language and communication in mathematical learning and understanding, including the role of the teacher in fostering student learning of content. An important assumption is that South Korean elementary teachers' language appeared to be critical to understanding their own knowledge for teaching mathematics. The conceptual framework provides an outline of how the research data are explored and analyzed. Furthermore, it presents various notions of teaching practices and components regarding teachers' knowledge for teaching mathematics. The broad intellectual foundation for the conceptual framework acknowledges the importance and influence of the notions and research of Shulman, Ball, Hill and Ma on our work. Their undertaking of this work has benefited us deeply.

The research in this book applies a multiple case studies approach that integrates the tradition of sociolinguistic and grounded theory to construct detailed schemes for describing and analyzing the data generated by eleven South Korean elementary

teachers. Applying the methods of grounded theory, several multilayer models are constructed to illustrate how the categories of knowledge for teaching mathematics are inclusive of Mathematics Pedagogical Content Knowledge and how these categories influence mathematics instruction. Specifically, we examine how teachers use different types of knowledge for teaching mathematics including knowledge related to mathematics concepts in their teaching practices, providing various examples (e.g. lesson plans, notes from observations of mathematics instruction, interviews). It includes discussions about the different types of knowledge for teaching mathematics: Mathematics Curriculum Knowledge, Mathematics Learner Knowledge, Fundamental Mathematics Conceptual Knowledge, Mathematics Pedagogical Content Knowledge, and Mathematics Pedagogical Procedural Knowledge. A common argument we make is teachers need special types of knowledge that enable them to connect information from the different types of knowledge for teaching mathematics. Specifically, this book draws attention to the different categories of South Korean elementary teachers' knowledge for teaching mathematics and the relationships among them. The findings are connected to results from relevant studies in terms of the significant role that teachers' knowledge of mathematics plays during instruction. This research contributes to the existing literature, in that it provides empirical bases for understanding teachers' knowledge for teaching mathematics and shows the relationships among the categories of knowledge for teaching mathematics. The fact that the teachers connected different types of categories of knowledge rather than relying on one type of knowledge might be important to policymakers, teacher educators, professional development providers, administrators and teachers.

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