A VOLUME IN **RESEARCH IN MATHEMATICS EDUCATION**

INTERNATIONAL PERSPECTIVES ON MATHEMATICS CURRICULUM

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A volume in
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PREFACE

Since the 1960s, there have been numerous international comparative studies undertaken by the International Association for the Evaluation of Educational Achievement (IEA). Such studies have often involved large-scale testing on content common to participating countries but have also involved the analysis of curriculum, specifically in the Second International Mathematics Study (SIMS; Travers & Westbury, 1989) and the Third International Mathematics and Science Study (TIMSS; Schmidt, McKnight, Valverde, Houang, & Wiley, 1997). These studies have led to conceptualizations of curriculum at different levels, including the *intended curriculum*, the *implemented curriculum*, and the *attained curriculum* (Travers, 1992). Others have since expanded on these levels and considered factors that influence curriculum at each level (Remillard & Heck, 2014). But despite the importance of and interest in curriculum, research on mathematics curriculum is a relatively recent phenomenon (Li & Lappan, 2014).

School mathematics is part of the educational experience around the world. As noted by Schmidt et al., some of students' experiences will be common around the world, and others will be quite different.

> *Curriculum* is the most fundamental structure for these experiences. It is a kind of underlying "skeleton" that gives characteristic shape and direction to mathematics instruction in educational systems around the world. . . . The plan that expresses these aims and intentions, which takes them from vision to implementation, and serves as the broad course that runs throughout for-

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> mal schooling, is *curriculum*. Curriculum provides a basic outline of planned and sequenced educational opportunities. (1997, p. 4)

To understand learning differences, it is important to understand different opportunities to learn that may be linked to differences in curriculum opportunities or fundamental educational structures. That is, a careful look at potential differences in the intended curriculum across countries can shed insight into priorities of a country in terms of mathematical learning, and how cultural contexts influence those priorities. This book provides one such opportunity to consider how diverse countries from five continents (Africa, Asia, Europe, North America, South America) position the mathematics curriculum within their broad educational systems.

OUR CALL FOR MANUSCRIPTS

When we first conceptualized this volume, we were responding to the call by Kulm and Li (2009) that it is important to study curriculum "to reveal the expectations, processes and outcomes of students' school learning experiences that are situated in different cultural and system contexts. . . . Further studies of curriculum practices and changes are much needed to help ensure the success of educational reforms in the different cultural and system contexts" (p. 709). We were particularly interested in a lens that focused on different ways that curriculum might be developed or understood, or perhaps implemented, in various educational jurisdictions or countries.

We invited curriculum scholars from a representative sample of countries to contribute to the volume. Although we gave them much latitude in developing their chapters, we did provide the following guiding questions, which were neither meant to be exhaustive nor limiting:

- How is curriculum defined in your country?
- To what extent does the curriculum reflect current research and thinking in mathematics education?
- What is the underlying framework of the curriculum?
- How is the curriculum organized?
- What vision of mathematics education is portrayed? What does the curriculum value?
- How is the curriculum vision shared among different stakeholders (e.g., teachers, parents, the general public)?
- What are some of the challenges faced in the implementation of the curriculum?

We hope readers will agree that the chapter authors have given us much to think about relative to these issues.

POTENTIAL AUDIENCE FOR THE BOOK

The volume has the potential to be applicable to curriculum researchers, both in mathematics and even more generally, including those interested in comparative issues in curriculum and education. We hope the volume will stimulate conversation about curriculum among the wider mathematics education community and provide a means to consider similarities and differences in curriculum, and how those similarities and differences may relate to cultural and societal differences across countries. The volume might be used by policy makers interested in comparing mathematics curriculum around the world as well as by professors as a text in a graduate course on curricular issues.

We believe this volume is a natural complement to several other volumes published by Information Age that focus on issues in mathematics curriculum, including the following:

- *The Intended Mathematics Curriculum as Represented in State-Level Curriculum Standards: Consensus or Confusion?* (Reys, 2006), which explored the placement of mathematics topics in the intended curriculum in grades K–8 in the United States;
- *Mathematics Curriculum in Pacific Rim Countries—China, Japan, Korea, and Singapore: Proceedings of a Conference* (Usiskin & Willmore, 2008), investigating the mathematical frameworks used to design curriculum in each of the named countries;
- *Future Curricular Trends in School Algebra and Geometry: Proceedings of a Conference* (Usiskin & Andersen, 2010), exploring curricular issues in two specific content areas that are included in most school experiences around the world;
- *Approaches to Studying the Enacted Mathematics Curriculum* (Heck, Chval, Weiss, & Ziebarth, 2012) that identifies instruments used in various curriculum endeavors to study the enacted curriculum;
- *Enacted Mathematics Curriculum: A Conceptual Framework and Research Needs* (Thompson & Usiskin, 2014) that focuses on research related to the enacted curriculum and expands on discussions at a conference related to researching the enacted curriculum; and
- *Digital Curricula in School Mathematics* (Bates & Usiskin, 2016) that considers how researchers in different countries are addressing challenges surrounding digital curriculum in the current educational and globalized environment.

STRUCTURE OF THE VOLUME

The volume consists of ten chapters. Chapter 1 provides an orientation to the volume, and gives the reader possible questions to guide reflection while reading the various chapters.

Chapters 2–9 are the heart of the volume. Each chapter outlines the mathematics curriculum in one specific country (the Netherlands, France, Finland, Canada, United States, South Africa, Brazil, or South Korea, respectively), telling the curricular story from the perspective of the authors, and raising issues and challenges each country faces.

Chapter 10 provides a look back at the volume, with some of our views on the guiding questions from Chapter 1, including some facets that we found particularly interesting or unusual. We end the chapter with possible ideas for future research related to the messages within the various chapters. The volume concludes with brief biographies of the editors and authors.

ACKNOWLEDGEMENTS

We extend our thanks to the many authors for their hard work in writing chapters for the volume. We appreciate all their efforts in generating drafts and responding to our questions and edits. We are also grateful that the authors who attended ICME-13 (July 2016 in Hamburg, Germany) took time to meet with us to discuss their chapters.

In addition, we extend our thanks to George Johnson, President of Information Age Publishing, for his willingness to publish the volume. As co-editors of the series, *Research in Mathematics Education*, we appreciate the freedom provided to cultivate this volume related to our special interest in mathematics curriculum.

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