

**Exploring the Development of Mathematics and Mathematics  
Teacher Education in Singapore: A Review of *Mathematics  
Education: The Singapore Journey***

*Mathematics Education: The Singapore Journey*.(2009). Wong Khoon Yoong, Lee Peng Yee, Berinderjeet Kaur, Foong Pui Yee, Ng Swee Fong. (Eds.), Singapore: World Scientific Publishing Co. Pte.Ltd., 551 pp. ISBN-13 978-981-283-375-4 (hbk).

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The outstanding performance of Singaporean students in a number of international comparative studies in mathematics, for example, the Trends in International Mathematics and Science Study-1999, 2003 and 2007, have attracted much attention of mathematics educators and also politicians world-wide to the “secret recipe” of Singapore mathematics education. Hence, a book like, *Mathematics Education: The Singapore Journey* which is written by a distinguished group of Singaporean math educators can be a great source of reference to many. Certainly, postgraduate students, researchers, educators and public policy makers will find this book useful.

This book is a state-of-the-art review of the current practices and research studies in mathematics education and mathematics teacher education in Singapore. It traces the development of Singapore mathematics curriculum from the 1950s to the present day. It contains 23 chapters which are divided into three main parts. Part I (Chapters 1 - 6) provides background information of the Singapore education system and mathematics teacher education. Part II (Chapters 7-18) covers local studies of various topics, from teaching strategies of algebra, problem solving, the use of ICT and cooperative learning to curriculum for the gifted and at-risk students as well as assessment in Singapore. Part III (Chapters 19-23) discusses four major international and one cross-cultural comparative study that Singapore has taken part. Overall, the arrangement of the chapters was well planned and exhibits careful organization and this clearly assists the smooth reading of the book.

Like many edited volumes, the quality and contributions of some chapters vary widely. However, out of the 23 chapters, I would recommend a few “must read” chapters. The introductory chapter by the editors, “Introducing the landscape of the Singapore mathematics education journey” not only outlines the objectives and contents of the book, it also provides a comprehensive overview of each chapter.

For example, “A good place to begin especially for readers who are unfamiliar with the Singapore education system is chapter 1 by Wong and Lee” (p. 3). The readers are thus guided to read whichever chapter based on their needs and interests. Hence, I would recommend all readers to read this introductory chapter to gain an overview and to plan for future reading of the other chapters.

The next “must read” chapter would be Chapter 1 by Wong and Lee (pp.13-47), particularly for international readers or whoever is not quite familiar with the Singapore education system. The first part of Chapter 1 describes the structure and aims of the Singapore education system. The second part systematically and logically traced out the historical development of the mathematics curriculum in Singapore. This chapter provides the readers with a good context to understand the Singapore education system and in particular its mathematics education system. One significant observation is that the authors not only described a list of incentives, but also highlighted or reflected the strategy which made these initiatives successful. These reflections are of paramount important as they provide specific and valuable tips as well as guide the international readers to follow through if they are interested in implementing the same initiatives. For example, on pages 26-27, the authors described briefly the historical implementation of one of the major initiatives, “the Thinking Programme”. Reflecting upon its implementation, they commented that “Some teachers were initially dismayed by these changes, but in-service training was available to help them modify their practices to infuse these initiatives into their subject-based lessons” (p. 27).

For readers who are interested to have a deeper understanding of the mathematics teacher education in Singapore, Chapter 2 by Lim-Teo described in details both the pre and in-service mathematics teacher programme provided by the National Institute of Education (NIE), which is the sole supplier for Singaporean mathematics teachers. She highlighted the strong and dynamic relationship between the Singapore Ministry of Education and the National Institute of Education (NIE). Perhaps the close relationship/collaboration between the two institutions might be one of the success factors for teacher education in Singapore.

To further understand how Singapore teachers received professional supports, interested readers might read Chapter 3 to Chapter 6. For instance, Chapter 3 describes the various platforms such as Teachers Network (TN) teacher-led workshops, TN conferences, TN website and organizations (e.g. learning circles, learning centre, teacher network, learning communities, zone of excellence) that provide supports and promote teacher professional development for in-service teachers. Chapter 4 documented three case studies of Lesson Study which is another newly adapted teacher professional development programme in some Singaporean

schools. Chapter 5 provides a potential framework to explore teacher change while Chapter 6 explains the nature of the Master Teacher scheme.

Depending on the area of interest, readers might be selective when reading chapters in Part II and Part III. If you are interested to know about what is “model method” which is considered “a Singaporean creation” (p. 36), you may read Chapters 7, 8 and 11. The “model method” is a heuristic strategy which “involves drawing bar diagrams to help students make sense of a word problem by organising the given information in a visual form that may lead them towards solutions.”(p. 271). Ng and Kerry Lee have done extensive studies on the “model method” and linking it to students’ working memory (see Chapters 7 and 8 for full details). Likewise, for those who are interested in analyzing international comparative studies, the five chapters in Part III provide a critical analysis as well as draw out some useful implications for Singapore mathematics education.

Coherent with the organisation of the book, the final concluding chapter, “Looking forward and beyond” is another “must read” chapter. It provides a list of potential research topics and ideas focusing on three main aspects: students, teachers and comparative studies. This list provides valuable tips and potential research issues for future research. It should be especially useful for those who are contemplating on doing future research particularly graduate students and novice researchers. The list of suggested future research topics was drawn based on a careful review of previous studies and reflection on the needs for future research. For example, the call for longitudinal studies to map the mathematical development of students from kindergartens to the end of secondary schooling; to analyse mathematics autobiographies of adults who are successful in mathematics, and those who have mathematics phobia beyond their school days (p. 527). In the proposed teacher aspect, the editors pointed out “the lack of understanding of the links between teacher preparation and professional development on students’ mathematics learning outcomes (p. 530).

The use of abbreviations was a good way of reducing the cognitive load of the readers; however, excessive use of abbreviation could be counterproductive. One conspicuous observation is that most chapters in this book tended to use abbreviations to represent names of organizations (e.g. MOE); types of programme (e.g. PGDE) and types of initiatives (e.g. PW). Particularly, Chapter 1 and Chapter 2 depict excessive use of abbreviations (e.g. curriculum studies = CS). These abbreviations might be familiar to the local Singaporean readers or some of them might only be familiar to the mathematics educators. However, these abbreviations might hinder the smooth understanding of readers who are unfamiliar with them. Hence, I would suggest the editors to display the list of abbreviations at the end of

each chapter to assist the readers. Nonetheless, this shortcoming should not in any significant way negate the meaningful contributions of this book.

In conclusion, I would highly recommend this book to all mathematics education students, both undergraduate and post graduate students as well as researchers and public policy makers who are interested in Singapore mathematics education. Regardless of your area of interest, every chapter marks a milestone or process of development and research in Singapore mathematics education. In this aspect, I will congratulate the editors that they have successfully achieved the main goals of the book that is, to “trace the journey from the development of the Singapore mathematics curriculum in the 1950s to the present day” and to report “on how that curriculum is put into practice and what research can enlighten the readers about the effects of those practices” (p. 1).

For the international readers, this book provides an excellent source of ideas for mathematics curriculum reform, teacher education and teacher professional development. Knowing more about the various approaches, government initiatives and teacher preparation provisions in this high-performing and highly centralized Singapore school system would benefit the international readers in enhancing the development of mathematics education in their own countries. For example, setting up “Teachers Network”; “Learning communities”; promoting the policy of “bottoms-up approach with a top-down support” and the vision of “thinking schools learning nation” might be adapted to improve mathematics education in one’s country.

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