

Review of *Mathematics Education: The Singapore Journey*

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The emergence of Singapore as an economic power together with the Republic of Korea, Hong Kong and Chinese Taipei is well known. Over the 40- year period from the 1960s, Singapore's Gross Domestic Product per capita increased ten-fold and the island state now serves as an important global financial centre. Coincidentally these four East Asian countries, more popularly known as the Four Asian Tigers have also shown outstanding performances in some international comparative mathematics studies. In the Trends in Mathematics and Science Studies (TIMSS) 2007 report released recently, these four countries had the highest scores in mathematics at both the Grade 4 and Grade 8 levels (Martin, Mullis, & Foy, 2008). Hong Kong, Singapore and Chinese Taipei were tops in Grade 4 scores (the republic of Korea did not take part) while Chinese Taipei, the Republic of Korea, Singapore and Hong Kong were the top countries in Grade 8.

The meteoric success of Singapore in mathematics education as was evident in the TIMSS studies over the last 20 years has perhaps compelled many educators to look at the island state to provide some sort of benchmarks in the development of the school mathematics (Barber & Mourshed, 2007; National Mathematics Advisory Panel, 2008). What made the Singapore students perform so well in mathematics? What is the Singapore education system like? The publication of this book will no doubt attract the attention of those who have been following Singapore's success in education and in particular in the field of mathematics education. Yet this book is not so much about Singapore's journey in developing its mathematics education from the past to the present, but rather about the nation's journey into the future in search of excellence in mathematics education. *The Singapore Journey* attempts to chronicle the state-of- the-art in both research and practice of mathematics education in Singapore. This book endeavours to provide a comprehensive glimpse of the educational landscape of current contributory

efforts that have been deemed critical in preparing Singapore's students for the future.

The 23 chapters in the book are divided into three parts: 1) Singapore education and mathematics teacher education, 2) teaching and learning of mathematics, and 3) comparative studies in mathematics education. Chapter 1 traces the development of Singapore's education system and describes its structure as well as the Ministry of Education's initiatives to provide sound basic education such as the different streams that are available for the school children. For those unfamiliar to the education system, it is a must read before proceeding to the other chapters of the book. But even for those who are familiar, Chapter 1 is still a good place to start as it provides the readers with the Singaporean context and background to the subsequent chapters in the book. Chapter 1 also provides a setting to the terms that are used in the book. For example, the different streams that are available for the students in Singapore: *Special*, *Express*, *Normal*. Reading about Singapore's educational system alone gives one the feeling that it is tailored and structured for the country to reach the highest echelons in education. The remaining chapters in Part 1 focuses on the efforts in developing high quality teachers who are so vital in making any educational system work. These chapters include a discussion on the challenges in linking theory to practice in both pre-service and in-service teacher education, and examples of its teacher development initiatives such as Learning Circles, action research, Lesson Study and the 4-I model of teacher change. Part 1 thus provides readers with the necessary background knowledge of Singapore's education system and teacher development efforts in this island state before readers are taken into Part 2 of the book that deals with the heart of teaching and learning issues in mathematics education. The chapters are arranged in sequence so as to provide a flow for the readers. However, each chapter seems to be written in an easily comprehensible and intelligible manner that makes it easy for the reader if he or she so wishes to read the chapters independently in non-sequential order.

Part 2 touches on numerous topics that cover what the editors aptly describe as the "diverse topography (that) adds richness to the journey". Five of the chapters in this section touch on mathematical thinking: algebraic thinking, statistical thinking and problem solving. One chapter which was particularly interesting was on the roles of working memory and the model method in solving algebra word problems. In this chapter, functional

neuroimaging was used to compare the processes associated with problem representation which provides a welcome change to the research methodologies normally found in mathematics education books. To complete Part 2, the editors have chosen several areas to map the terrain and topography of teaching and learning mathematics. These include the use of information and communication technology (a topic which has garnered much interest lately especially in the Southeast Asian region), mathematics and test anxiety, social climate, curriculum for the gifted, numeracy at the kindergarten level and assessment. There is also a chapter that describes efforts at early intervention of pupils who are at-risk of encountering mathematics difficulties. It describes a learning support system that has been put in place - how these students are identified and the approach that is used, to help these students. This systematic effort towards improving mathematics achievement at all levels and not just among the more cognitively able students is one that can be easily overlooked even when great pains have been put into developing a well-designed curriculum.

In Part 3 of this book, the authors compare Singapore's performance in mathematics education in various international studies. The section provides a deeper discussion as the authors benchmark the various factors that contribute to mathematics performance in international studies that Singapore participated in, namely the TIMSS, the Kassel project, and the International Project on Mathematical Attainment.

Reading this book gives one the sense of the intense competition in the pursuit of excellence that seems to be present in Singapore schools as well as in the research institutions in Singapore. Perhaps this keen sense of competition serves well for Singapore in its search for excellence. Perhaps too, this competitive spirit which seems to be embedded in the general culture of the Confucian Heritage Countries is one of the secrets of Singapore's success (Leung, 2001; Fan, Wong, Cai & Li, 2004). This issue which would be of interest to mathematics educators however was not discussed. Nonetheless, this book does provide a comprehensive view of the landscape and terrain of Singapore's journey towards excellence as the editors aim to achieve. This would provide many countries with directions for emulating Singapore's success in mathematics education. But as education officers in Singapore often warn the many visitors who may seem awed by Singapore's success, "What works for us in Singapore, may not necessarily work in your country!" All things considered, this book is indeed a significant contribution

that has added to the knowledge of research and practice of mathematics education in the world at large.

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