

What Can PISA 2012 Data Tell Us?

What Can PISA 2012 Data Tell Us?

Performance and Challenges in Five Participating Southeast Asian Countries

Edited by

Lei Mee Thien

SEAMEO RECSAM, Malaysia

Nordin Abd Razak

Universiti Sains Malaysia, Malaysia

John P. Keeves

Flinders University, Australia

and

I Gusti Ngurah Darmawan

The University of Adelaide, Australia



SENSE PUBLISHERS
ROTTERDAM/BOSTON/TAIPEI

A C.I.P. record for this book is available from the Library of Congress.

ISBN: 978-94-6300-466-4 (paperback)

ISBN: 978-94-6300-467-1 (hardback)

ISBN: 978-94-6300-468-8 (e-book)

Published by: Sense Publishers,
P.O. Box 21858,
3001 AW Rotterdam,
The Netherlands
<https://www.sensepublishers.com/>

All chapters in this book have undergone peer review.

Printed on acid-free paper

All Rights Reserved © 2016 Sense Publishers

No part of this work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the Publisher, with the exception of any material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work.

TABLE OF CONTENTS

Preface	vii
Acknowledgments	xi
Prologue	xiii
<i>John P. Keeves</i>	
1. PISA: Malaysia's Wake up Call for a More Balanced Approach to Educational Delivery and Attainment	1
<i>Azian T. S. Abdullah, Muhammad Zaini Mohd Zain, Sheela G. Nair, Rusliza Abdullah and Ihsan Ismail</i>	
2. A Multilevel Analysis of Singaporean Students' Mathematics performance in PISA 2012	17
<i>Qian Chen</i>	
3. Education Assessment System and PISA 2012 in Vietnam	35
<i>Le Thi My Ha</i>	
4. Students' Performance in PISA and the Adequacy of Teaching and Learning	51
<i>Precharn Dechsri</i>	
5. Diagnosing Weaknesses of Indonesian Students' Learning	63
<i>Harry Firman</i>	
6. Factors Associated with Malaysian Mathematics Performance in PISA 2012	81
<i>Lei Mee Thien and I Gusti Ngurah Darmawan</i>	
7. Problem-Solving Skills among Malaysian Students: What We Learned from PISA	107
<i>Sharifah Norul Akmar Syed Zamri</i>	
8. The Variation in Teaching and Learning Practices and Their Contribution to Mathematics Performance in PISA 2012	123
<i>Nordin Abd Razak and Azadeh Shafaei</i>	
9. Assessing the Quality and Equity of Student Performance in Five Southeast Asian Countries	159
<i>I Gusti Ngurah Darmawan</i>	

TABLE OF CONTENTS

10. Understanding PISA and Its Impact on Policy Initiative: A Review of the Evidence <i>Petra Lietz, Mollie Tobin and Dita Nugroho</i>	181
11. What Comes Next – Insights for Reform Initiatives and Future Research <i>Esther Sui Chu Ho</i>	207
12. The Foundation Problems for Educational Research Arising from the PISA Studies: Important Issues for Research into PISA Studies <i>John P. Keeves and I Gusti Ngurah Darmawan</i>	219
Epilogue: The Challenges Confronting All People Living on the Planet Earth <i>John P. Keeves and I Gusti Ngurah Darmawan</i>	239
About the Contributors	249

PREFACE

The Programme for International Student Assessment (PISA) that was launched in 2000 and conducted by the Organisation for Economic Co-operation and Development (OECD) is an ambitious large-scale assessment study that attempts to measure and compare proficiency in Reading, Mathematics, and Science Literacies in a large number of OECD and partner countries. PISA assesses to what extent the 15-year-old students are acquiring key knowledge and skills that are essential for full participation in modern societies. The assessment tests are administered every three years, which does not only find out whether students can reproduce what they have learned. It also examines how well they can extrapolate from what they have learnt and apply the knowledge and studies in unfamiliar settings, both in and outside of school or to real-life situations and be equipped for full participation in society.

In the 2012 cycle, all 34 OECD member countries and 31 partner countries and economies participated in PISA which represented more than 80 per cent of the World economy. In total, 510,000 students between the ages of 15 years 3 months and 16 years 2 months completed the assessment tests in 2012, representing about 28 million 15-year-old students in the schools of the 65 participating countries and economies. Notably, five Southeast Asian countries participated in PISA 2012: Indonesia, Malaysia, Singapore, Thailand, and Vietnam.

In this book, these five countries show a diversity of performance in Mathematics, Science, and Reading Literacies. Singapore and Vietnam record high performance in Reading, Mathematics, and Science Literacies. The performance on PISA 2012 tests in Indonesia, Malaysia, and Thailand indicate the challenges to improve students' Reading, Mathematics, and Science Literacies.

The purpose of this book is to present the details of the performance as well as school, teacher, and student factors that influence students' performance in Mathematics, Science, and Reading Literacies among these five Southeast Asian countries. The first five chapters focus on the performance issues in the five specific countries in all three literacies as well as the countries' initiatives to improve in the next cycle of PISA performance in Malaysia, Singapore, Indonesia, Thailand, and Vietnam. Chapter 6 discusses the factors that are associated with the Malaysian Mathematics Literacy in PISA 2012 using multilevel analysis in order to identify school and student level effects.

The results of the computer-based assessment (CBA) of problem-solving skills in PISA 2012 among Malaysian students are no doubt a cause for concern. Chapter 7 provides a critical analysis of the CBA problem-solving performance among the Malaysian students in PISA 2012. The chapter begins with a view of the overall poor performance relative to the international mean performance, followed by an analysis of the possible factors accounting for this poor performance.

PREFACE

The influence of teaching and learning strategies on student performance in PISA 2012 differ substantially across countries and relatively little is known about the processes contributing to these differences. With respect to this issue, Chapter 8 discusses the differences in teaching and learning strategies between the five participating Southeast Asian countries as well as the effects of these strategies on students' Mathematics Performance. Specifically, a number of reports using PISA data show that school systems differ not only in their average performance, but also in how equitably they distribute educational opportunities among students after allowing for individual, family, and Socioeconomic background. In relation to this, Chapter 9 focuses on issues regarding the quality and equity in learning outcomes of students in the five participating Southeast Asian countries by examining the distributions and the levels of student performance in the PISA 2012 assessment study, as well as the effects of Gender and Socioeconomic background on student performance in all three domains of Mathematics, Science, and Reading Literacies.

In addition to monitoring the quality of education in national systems, the PISA empirical results provide the necessary evidence base for making changes to both policies and practices in education. In this regard, Chapter 10 presents evidence from two systematic reviews of the impact of large scale assessments including PISA on educational policy. Particular attention is given to the types of assessment programmes undertaken, their goals and uses, the stages of the policy process informed by assessments; and the facilitators of and barriers to the uses of assessment data in the educational policy-making process. This chapter concludes with considerations regarding how the capacities of large-scale assessments to inform both policy development and implementation may be increased. Chapter 11 is concerned with 'What comes next?' and shed light on a new direction for future research and practices based on the findings from the first ten chapters.

Chapter 12 discussed three important issues that relate to the conduct of the PISA Studies. The first issue is related to the simplistic employment of each country's mean score in each domain of Mathematics, Science, and Reading Literacies. These mean scores are argued to be unsatisfactory indicators of the national educational enterprise in each country. This chapter strongly argues for research into a change in the key criteria and the recorded emphasis of the PISA Studies from mean levels of performance in each participating country to consideration of the importance of educational yield, namely 'How many get how far'. Chapter 12 also considers the issues associated with measurement on an absolute interval scale, in order that changes across countries and over time can be measured accurately and can be meaningfully compared. In addition, this chapter draws attentions to the influence that computer-based assessment is having on the processes of learning and teaching in countries throughout the World. There is clearly need for research to be undertaken into the problems of yield and measurement as well as computer-based learning, teaching, and assessment.

PREFACE

The Epilogue examines the challenges facing all countries and economies operating on planet Earth and argues that the PISA Studies are critical components of the UNESCO 'Education for All' movement with concern for the 'Challenged Earth'.

This is the first book regarding the issues of PISA that has been published with respect to the Southeast Asian region. It is hoped that the content of this book can benefit and provide greater understanding for readers of several important aspects: (a) country performance in PISA 2012 for each participating Southeast Asian country, (b) the need for international comparative studies from the perspective at all levels of the teaching and learning process, (c) equity and quality of education, (d) how PISA impacts on policy making, and (e) the initiatives and future directions, and challenges to improve PISA performance in the future cycles of the PISA Studies. In these regards, the readership of this book could be extended to the educators, officers from the ministries of education, researchers, policy makers, practising teachers, lecturers in universities and teacher training institutions, postgraduate students, as well as both primary and secondary school principals and teachers.

Lei Mee Thien

ACKNOWLEDGMENTS

We would like to thank the Southeast Asia Minister of Education Organisation Regional Centre for Science and Mathematics Education (SEAMEO RECSAM) for their great effort in organising the first Symposium on PISA: Critical Review and Findings of PISA 2012 in year 2014. This book presents the central outcomes of the symposium. Our special thanks to the Centre Director, Dr. Hj. Mohd Johan bin Zakaria and Deputy Director in Research and Development Division, Dr. Suhaidah Tahir for their great support that leads to this book. The first editor wishes to thank Prof. John P. Keeves, Assoc. Prof. Dr. Nordin Abd Razak, and Dr. I Gusti Ngurah Darmawan who spent a great deal of time despite their tight schedule in providing constructive comments and suggestions to improve each book chapter in addition to proofreading and editing. A note of appreciation is also extended to Ms. Mei Yean Ong who helped by organising, reformatting, and redrawing the figures and tables in this book. Last but not least, we would like to thank our families for their love and moral support so that we could ensure the success of this book.

JOHN P. KEEVES

PROLOGUE

It is now 50 years since the first substantial report on a cross-national study of educational achievement was released from the Unesco Institute of Education in Hamburg, with the purpose of building a deeper understanding of the processes of education across a changing World. Twenty-five years later in 1990 UNESCO conducted a World Conference at Jomtien in Thailand which gave rise to the program of “Education for All” that introduced a world-wide policy which was endorsed by the United Nations Organisation (UNO) in the field of education. This required a monitoring program. Subsequently, the Organisation for Economic Co-operation and Development (OECD), following a meeting that had been held at Poitiers in France in 1988, introduced in the year 2000, the Programme for International Student Assessment (PISA) from a centre in Paris. Initially PISA tested in three fields in order to measure and compare proficiency in Mathematics, Science, and Reading Literacies in a large number of OECD and partner countries. These fields would appear to have been chosen, without theoretical or empirical research foundations on the grounds of the importance of Mathematics and Science in the developed countries of Europe and the significance of fluency and strength in the national language of each country involved. The PISA Studies were conducted on a triennial basis and gradually spread to the developing countries and economies that became partners in the Programme. Furthermore, these fields were different from the tests of knowledge that continued to be conducted by the International Association for the Evaluation of Educational Achievement (IEA), which maintained an operating centre in Hamburg and offices in The Netherlands. In the intervening years IEA had conducted courses in Thailand, and scholars had been sent to work in Malaysia, Singapore, Thailand, and Vietnam, and had welcomed educational leaders from two countries that are also involved in the preparation of this book namely, Indonesia and Australia to work in Hamburg and Stockholm.

It is not surprising that the five countries of Southeast Asia which are participating in the current study are working together to compare their experiences in the PISA Studies with a view to disseminating information about the PISA Programme across the developed and developing countries of the World. There are five major issues that are associated with the PISA Studies that are being addressed in this book.

1. Within each of the five countries of Southeast Asia, there is the need to report to the Ministries of Education involved on the lessons learnt and the policies and practices that had been introduced or may be introduced which result directly from participation in the PISA Studies.

JOHN P. KEEVES

2. There are issues that need to be considered as a consequence of the population explosion currently taking place across the World, as well as the challenges confronting the people living on planet Earth during the twenty-first century.
3. There are short-comings in the administration of the PISA tests that need both consideration and research associated with (a) the random sampling of the schools and the students, (b) the accuracy of the absolute interval scale of measurement, (c) the scores recorded across countries and the different languages involved, and (d) the measuring instruments employed between occasions.
4. The rapidly advancing uses of computer-based learning and teaching as well as assessment are beginning to modify the nature and processes of educational provision at all levels of operation.
5. In addition, the availability of increasingly powerful computers is giving rise to new analytical procedures for the statistical examination of the data that are obtained from the students tested and the levels of operation of the variables that are hypothesised to influence the outcomes of the educational processes involved.

These five major issues warrant investigation and reporting to all countries of the World, including not only those countries that were engaged in PISA 2012, but also to the approximately 200 countries that are currently members of the United Nations Organisation.

John P. Keeves