Kaye Stacey · Ross Turner *Editors*

Assessing Mathematical Literacy

The PISA Experience

Springer

Assessing Mathematical Literacy

Kaye Stacey • Ross Turner
Editors

Assessing Mathematical Literacy

The PISA Experience

Springer

Editors
Kaye Stacey
Melbourne Graduate School
of Education
The University of Melbourne
Melbourne, VIC, Australia

Ross Turner
International Surveys,
Educational Monitoring and Research
Australian Council
for Educational Research (ACER)
Camberwell, VIC, Australia

ISBN 978-3-319-10120-0 ISBN 978-3-319-10121-7 (eBook)
DOI 10.1007/978-3-319-10121-7
Springer Cham Heidelberg New York Dordrecht London

Library of Congress Control Number: 2014954104

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

The initiative for this book came from the PISA 2012 Mathematics Expert Group, which had worked together with a team from the Australian Council for Educational Research (ACER) for nearly 4 years in the preparation of the OECD's 2012 PISA survey. The mathematics assessment for the 2012 survey underwent substantial changes, building on and further developing the structures and conceptualisation of the 2003 survey (when Mathematics had last been the major domain) and responding to the wide-ranging international feedback that had arisen in those 9 years. The Framework has grown steadily since its inception for the 2000 survey, and its impact has expanded dramatically over this time. The item design has also been substantially refined. The expert group came to realise that the work that goes into an international survey such as PISA should be better known: hence this book. We hope it is a contribution both to thinking about the most fundamental goals and activities of mathematics education and toward better understanding the results of the PISA surveys.

It has been a pleasure to work with a team of such talented, engaged, and well-informed authors in the preparation of this book. Many chapter authors were also members of the Mathematics Expert Group for the PISA 2012 survey and the mathematics teams of international contractors for PISA 2012 led by ACER. We thank them for contributions to the book as well as for their contribution to the Mathematics Framework and items for the 2012 survey. Other authors have played important roles in using PISA to improve mathematics education in their own countries. The editors have also enjoyed bringing their own two different perspectives together as they worked on this book: Ross's experience as the leader of the ACER team responsible for delivering the mathematics framework, items, and coding since the first PISA survey and Kaye's view from research, teaching, and national policy and as chair of the Mathematics Expert Group for PISA 2012.

It is essential to acknowledge that many of the ideas in the book are the outcome of the joint work of the members of all the Mathematics Expert Groups from PISA 2000 to PISA 2012. Their names are listed at the end of this Preface along with

other key mathematics staff members of agencies contracted to develop and implement PISA mathematics over its first several survey administrations.

We also acknowledge the valuable input of the Springer editors and especially of the anonymous reviewers whose useful comments helped sharpen the text. It is a special pleasure to acknowledge the work of Pam Firth from the University of Melbourne for her able editorial and administrative assistance.

Opinions expressed in this book are those of the authors and do not imply any endorsement by the Organisation for Economic Co-operation and Development (OECD) or any other organization.

Melbourne, VIC, Australia Kaye Stacey
Camberwell, VIC, Australia Ross Turner
3 Dec 2013

Membership of Mathematics Expert Groups and Other Contributors

2000

Jan de Lange (Chair, Netherlands), Raimondo Bolletta (Italy), Sean Close (Ireland), Maria Luisa Moreno (Spain), Mogens Niss (Denmark), Kyungmee Park (Korea), Thomas Romberg (United States), Peter Schüller (Austria)

Margaret Wu and Ross Turner (ACER, Executive Officers)

2003

Jan de Lange (Chair, Netherlands), Werner Blum (Germany), Vladimir Burjan (Slovak Republic), Sean Close (Ireland), John Dossey (United States), Mary Lindquist (United States), Zbigniew Marciniak (Poland), Mogens Niss (Denmark), Kyungmee Park (Korea), Luis Rico (Spain), Yoshinori Shimizu (Japan)

Ross Turner (Executive Officer)

2006

Jan de Lange (Chair, Netherlands), Werner Blum (Germany), John Dossey (United States), Zbigniew Marciniak (Poland), Mogens Niss (Denmark), Yoshinori Shimizu (Japan)

Ross Turner (Executive Officer)

2009

Jan de Lange (Chair, Netherlands), Werner Blum (Germany), John Dossey (United States), Zbigniew Marciniak (Poland), Mogens Niss (Denmark), Yoshinori Shimizu (Japan)

Ross Turner (Executive Officer)

2012

Kaye Stacey (Chair, Australia), Caroline Bardini (France, Australia), Werner Blum (Germany), Solomon Garfunkel (USA), Joan Ferrini-Mundy (USA), Toshikazu Ikeda (Japan), Zbigniew Marciniak (Poland), Mogens Niss (Denmark), Martin Ripley (England), William Schmidt (USA)

Ross Turner (Executive Officer)

Other Contributors

We acknowledge the contribution of other ACER staff members, consultants and staff of organisations working closely with ACER to develop PISA mathematics over its first several administrations, but who did not contribute directly to writing this book.

Kees Lagerwaard, Gerben van Lent (both formerly of Cito in the Netherlands), Hanako Senuma (formerly of the National Institute for Educational Policy Research, NIER, in Japan), Margaret Wu (formerly of ACER), Raymond J. Adams (ACER), Béatrice Halleux (HallStat SPRL, Belgium).

Contents