

New ICMI Study Series

Richard Barwell · Philip Clarkson
Anjum Halai · Mercy Kazima
Judit Moschkovich · Núria Planas
Mamokgethi Setati-Phakeng
Paola Valero
Martha Villavicencio Ubillús *Editors*

Mathematics Education and Language Diversity

The 21st ICMI Study



International Commission on
Mathematical Instruction



Springer

New ICMI Study Series

VOLUME

Published under the auspices of the International Commission on
Mathematical Instruction under the general editorship of

Ferdinando Arzarello, President
Cheryl E. Praeger, Vice-President.

Abraham Arcavi, Secretary-General

For further volumes:

<http://www.springer.com/series/6351>

Information on the ICMI Study programme and on the resulting publications can be obtained at the ICMI website <http://www.mathunion.org/ICMI/> or by contacting the ICMI Secretary-General, whose email address is available on that website.

Richard Barwell • Philip Clarkson
Anjum Halai • Mercy Kazima
Judit Moschkovich • Núria Planas
Mamokgethi Setati Phakeng • Paola Valero
Martha Villavicencio Ubillús
Editors

Mathematics Education and Language Diversity

The 21st ICMI Study

Editors

Richard Barwell
Faculty of Education
University of Ottawa
Ottawa, ON, Canada

Anjum Halai
Institute for Educational Development
East Africa
Aga Khan University
Dar es Salaam, Tanzania

Judit Moschkovich
University of California, Santa Cruz
Santa Cruz, CA, USA

Mamokgethi Setati Phakeng
University of South Africa
Pretoria, South Africa

Martha Villavicencio Ubillús
Ministerio de Educación
Lima, Peru

Philip Clarkson
Australian Catholic University
Fitzroy, VIC, Australia

Mercy Kazima
University of Malawi
Zomba, Malawi

Núria Planas
Universitat Autònoma de Barcelona
Barcelona, Catalonia-Spain

University of South Africa
Pretoria, South Africa

Paola Valero
Aalborg University
Aalborg, Denmark

ISSN 1387-6872

ISSN 2215-1745 (electronic)

New ICMI Study Series

ISBN 978-3-319-14510-5

ISBN 978-3-319-14511-2 (eBook)

DOI 10.1007/978-3-319-14511-2

Library of Congress Control Number: 2015944108

© The Editor(s) (if applicable) and the Author(s) 2015, corrected publication 2021

Open Access This book was originally published with exclusive rights reserved by the Publisher in 2015 and was licensed as an open access publication in March 2021 under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits any noncommercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this book or parts of it.

The images or other third party material in this book may be included in the book's Creative Commons license, unless indicated otherwise in a credit line to the material or in the Correction Note appended to the book. For details on rights and licenses please read the Correction https://doi.org/10.1007/978-3-319-14511-2_16. If material is not included in the book's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

This work is subject to copyright. All commercial rights are reserved by the author(s), whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Regarding these commercial rights a non-exclusive license has been granted to the publisher.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Acknowledgments

The editors are grateful to the following colleagues who reviewed chapters: Cris Edmonds-Wathen, Anthony Essien, Susan Gerofsky, Mercy Kazima, Michael Meyer, Frank Monaghan, Candia Morgan, David Pimm, Ricardo Scucuglia, Denisse Thompson, David Wagner, and Lynn Webb.

Richard Barwell thanks the Faculty of Education, University of Ottawa, for financial support and Farzaneh Salehi for editorial assistance during the preparation of the manuscript.