

In Pursuit of
Quality Mathematics Education for All
Proceedings of the
7th ICMI-East Asia Regional Conference on
Mathematics Education

In Pursuit of Quality Mathematics Education for All
Proceedings of the 7th ICMI-East Asia Regional Conference on Mathematics Education

Citation:

Vistro-Yu, C. (Ed.). (2015). *In pursuit of quality mathematics education for all: Proceedings of the 7th ICMI-East Asia Regional Conference on Mathematics Education*, Cebu City, May 11-15. Quezon City: Philippine Council of Mathematics Teacher Educators (MATHTED), Inc.

Philippine Council of Mathematics Teacher Educators (MATHTED), Inc.,
Mathematics Department, Ateneo de Manila University, Katipunan Avenue Loyola
Heights, Quezon City 1108 Philippines Tel. (632) 426-6125
<http://www.mathted.weebly.com> / E-mail: mathted1996@gmail.com

Request for permission to use any material from this publication or for further
information should be addressed to the editor.

Printed in Cebu City, Philippines

Introduction

The mark of an excellent academic conference is the high quality of papers delivered and published in its proceedings. It is the pride of every International Program Committee of a conference to have an outstanding collection of papers that enlighten, inspire and most of all, contribute new knowledge to the field.

This book contains original, unpublished papers, especially written and prepared for EARCOME 7. Some papers are derivatives of previous works that have not been shared in EARCOME while others are continuation of works presented in past EARCOMES.

I thank all our colleagues and friends who chose to present their work and send their papers for the proceedings to materialize. I commend the invited speakers for their enthusiasm in sharing their ideas, even if it meant they took the extra time to write when they could have easily declined the request to do so. I am also grateful to the TSG presenters who eagerly sent their full papers for review. Blind reviews are never an easy process; however, it is a necessary part of our academic life and it makes us all better scholars.

In finalizing this book, I needed the extra help from two individuals whom I could quickly call on. I thank Dr. Mary Thomas for her patience and expertise in the English language. I also thank Rebecca Yu for assisting me every night when I needed her skills.

I hope you take the chance to read each and every paper. I assure you that they are all worth your time.

The Editor

Table of Contents

Part 1. Invited Papers

Lesson study: Nice-to-have or must-have?.....1

Akihiko Takahashi

Plenary Paper

Assessment literacy and the mathematics teacher.....9

Cornelia C. Soto

Plenary Paper

Creating and sustaining effective professional development for
mathematics teachers in Korea.....17

KWON Oh Nam

Plenary Paper

Quality mathematics education – The case of Singapore.....29

Berinderjeet Kaur

Panel Discussion Paper

Conceptualizing quality mathematics education.....35

Fou-Lai Lin

Panel Discussion Paper

Lesson study for improving quality of mathematics education.....41

Toshiakira Fujii

Panel Discussion Paper

Examination of the issues related to the teaching/learning of the normal
distribution curve at high school by using CAS calculator.....49

Cheong-Soo Cho

Regular Lecture

A multi-strand framework for assessing Year Four pupils' proficiency in
measurement formulae.....63

Chew Cheng Meng

Regular Lecture

The past, present and future of Australian national assessment.....75

Jane Greenlees

Regular Lecture

Past and future of research on mathematical reading related to proofs...87

Kai-Lin Yang

Regular Lecture

New model of teacher education program in mathematics education:

Thailand experience.....97

Maitree Inprasitha

Regular Lecture

Seeking high quality collaboration and reflection: A Lesson Study on
primary school mathematics.....105

Masataka Koyama

Regular Lecture

Examining TIMSS items through the lens of Origami.....117

Patsy Wang-Iverson and Nick Timpone

Regular Lecture

Profiling teacher capacity in statistical thinking: A comparative study
between China and Australia.....127

Qinqiong Zhang and Max Stephens

Regular Lecture

The role of error analysis in problem-solving lessons to improve the
perception of schoolteachers about the assessment.....141

Yuriko Yamamoto Baldin

Regular Lecture

Part 2. TSG Paper Presentations

Designing mathematical outdoor tasks for the implementation of The
MathCityMap-Project in Indonesia.....151

Adi Nur Cahyono, Matthias Ludwig, and Samuel Marée

Topic Study Group 5

Developing PISA-like mathematics tasks for investigating Indonesian
students' profile of mathematical literacy.....159

Ahmad Wachidul Kohar and Zulkardi

Topic Study Group 3

How the first grade pupils express models: Focus on reformulation of
situation models in a modeling teaching.....169

Akio Matsuzaki

Topic Study Group 7

The influence of curriculum, assessment, customised instruction and intervention for providing high quality mathematics education in the lower primary years.....	179
<i>Ann Gervasoni</i>	
Topic Study Group 7	
A study of student-centred activities for low attainers in primary mathematics.....	187
<i>Berinderjeet Kaur, Divya Bhardwaj, Phillip Towndrow, & Nadya Shaznay</i>	
Topic Study Group 2	
Using a PDCA cycle to develop teaching proficiency in prospective mathematics teachers.....	195
<i>Beverly J. Ferrucci</i>	
Topic Study Group 4	
Comparing teacher perceived students' errors and students' errors: Match or mismatch?.....	201
<i>Chew Cheng Meng, Carolyn Sia Jia Ling, & Lim Chap Sam</i>	
Topic Study Group 3	
Exploring the quality of teaching practices of Lesson Study research lessons.....	209
<i>Hui Min Chia, Chap Sam Lim, & Cheng Meng Chew</i>	
Topic Study Group 2	
Developing the number knowledge of low-attaining first- to fourth-graders.....	217
<i>Debbie Verzosa</i>	
Topic Study Group 7	
Empowering local languages to create Filipino mathematical vocabulary.....	225
<i>Eric Siy</i>	
Topic Study Group 6	
A preliminary study of Year 7 students' performance on algebraic concepts.....	233
<i>Ernie Sofinah Haji Matzin & Masitah Shahrill</i>	
Topic Study Group 3	

Force field analysis on higher order thinking skills (HOTS) airtime in Malaysian mathematics classroom.....	241
<i>Ewe Gnoh Ong</i> Topic Study Group 3	
Students' opinions on different types of mathematics tasks.....	249
<i>Fangchun Zhu</i> Topic Study Group 3	
Student perspectives on the factors of being a great mathematics teacher regarding teaching methods.....	257
<i>Feng-Jui Hsieh, Haw-Yaw Shy, & Ting-Ying Wang</i> Topic Study Group 2	
A comparison study of Bruneian primary mathematics teachers' perceived learning in Lesson Study.....	267
<i>Hj Ade Shahren Hj Suhaili & Masitah Shahrill</i> Topic Study Group 4	
A study on change of mathematics teachers in Zambia: Focus on lesson planning on teachers' group discourse in the lesson.....	275
<i>Ishii Hiroshi</i> Topic Study Group 4	
Teaching proportional reasoning concepts and procedures using repetition with variation.....	283
<i>Joel R. Noche & Catherine P. Vistro-Yu</i> Topic Study Group 1	
A study on students' conception of rate of change through Yungbokhap mathematics instruction.....	295
<i>Jong-Eun Moon & Mi-Kyung Ju</i> Topic Study Group 2	
Students' learning of college level calculus.....	303
<i>Jordan Peng Horng Tan & Masitah Shahrill</i> Topic Study Group 1	
Mid-career teacher learning through collaboratively framed mathematics lessons.....	313
<i>Keiko Hino & Tomohiko Makino</i> Topic Study Group 4	

Analysis of tasks in Statistics textbooks for future English teachers based on statistical cognitions.....	321
<i>Khairiani Idris & Kai-Lin Yang</i>	
Topic Study Group 3	
A collaborative development of a quality mathematics assessment task to promote preservice teacher candidates' professional eye.....	329
<i>Leicha A. Bragg & Cynthia Nicol</i>	
Topic Study Group 3	
Assessment of secondary students' mathematical competencies.....	337
<i>Leong Kwan Eu & Tan Jun You</i>	
Topic Study Group 3	
Observations of classroom practice...Using the Open Approach to teach mathematics in a grade six class in Japan.....	347
<i>Lloyd Munroe</i>	
Topic Study Group 2	
Pupils' interpretations of a problem situation: The case of population density.....	357
<i>Mai Hirabayashi</i>	
Topic Study Group 2	
Effects of Lesson Study incorporating phase-based instruction on grade seventh students' Geometry achievement.....	365
<i>Mak Wai Fong</i>	
Topic Study Group 4	
Teacher professional development through Lesson Study: Adaptation or cultural transition?.....	373
<i>Marlon Ebaegu & Max Stephens</i>	
Topic Study Group 4	
Problem solving in Linear Equations using a graphing calculator.....	381
<i>Mary Ann Serdina Parrot & Leong Kwan Eu</i>	
Topic Study Group 5	
Instruction on the center of gravity.....	389
<i>Masahiro Takizawa</i>	
Topic Study Group 5	

Examining the coherence of mathematics lessons in terms of the genesis and development of students' learning goals.....	401
<i>Masakazu Okazaki, Keiko Kimura, & Keiko Watanabe</i>	
Topic Study Group 2	
The two-axis process model of understanding mathematics as a framework for designing mathematics lessons for high school students.....	409
<i>Masataka Koyama & Yoichiro Hisadomi</i>	
Topic Study Group 2	
An exploratory study of Brunei Darussalam pre-university students' affective mathematical modeling competencies.....	417
<i>Maureen Siew Fang Chong & Masitah Shahrill</i>	
Topic Study Group 1	
Classroom discourse that affects reification of a mathematical object: The case of function.....	425
<i>Kazuhiko Nunokawa, Minoru Ohtani & Keiko Hino</i>	
Topic Study Group 6	
Difficulty in initial stage of Filipino students' concept formation of geometric figures.....	433
<i>Mitsue Arai</i>	
Topic Study Group 7	
Mathematics: Achieving and sustaining success.....	441
<i>Monica Wong</i>	
Topic Study Group 4	
Planning the mathematics lesson through making '90° System Advertisement' -- Focus on mathematical activities and connections in the USA and Japan --.....	449
<i>Naoto Mishima</i>	
Topic Study Group 1	
Mathematics classroom practice of Thai primary school teachers: Four case studies.....	459
<i>Natcha Kamol</i>	
Topic Study Group 2	

Investigating the use of concrete manipulatives in 3-Dimensional problem solving.....	467
<i>Nurul Muiezzah Haji Morsidi & Masitah Shahrill</i>	
Topic Study Group 1	
Secondary teachers' pedagogical content knowledge to promote students' data-based decision-making ability: The cases of Japan and Thailand..	475
<i>Orlando González & Somchai Chitmun</i>	
Topic Study Group 4	
Conceptual understanding of proportional reasoning via poster proofs in teacher professional development.....	485
<i>Padmanabhan Seshaiyer, Jennifer Suh & Mimi Corcoran</i>	
Topic Study Group 4	
Provoking students' argumentation through conjecturing in fourth-grade classroom.....	493
<i>Pi-Jen Lin & Wen-Huan Tsai</i>	
Topic Study Group 2	
Enhancing Van Hiele's level of geometric understanding using Geometer's Sketchpad.....	501
<i>Poh Geik Tieng & Leong Kwan Eu</i>	
Topic Study Group 5	
Quality mathematics classroom instructional practices: Evidence from TIMSS 2011.....	509
<i>Qian Chen</i>	
Topic Study Group 2	
Pre-service teachers' beliefs about mathematics in China and Thailand.....	517
<i>Qiao-Ping Zhang, Irene Nga-Lam Sze, & Yupadee Panarach</i>	
Topic Study Group 4	
Mind Mapping with ProofBlocks: Effects on student geometric level of thinking and mathematics self-efficacy.....	525
<i>Quinn Madiline R. Velasco & Ma. Nympha B. Joaquin</i>	
Topic Study Group 2	
Building professional learning communities with the aid of activity theory.....	535
<i>Romina Ann S. Yap</i>	
Topic Study Group 4	

Language barriers in mathematics education: Some findings from Fiji.....	543
<i>Sashi Sharma</i>	
Topic Study Group 6	
Research on how young children construct and visualize a cube from an unfolded plane.....	551
<i>Satoshi Watanabe</i>	
Topic Study Group 7	
An analysis of difficulties in learning Probability in high school.....	561
<i>Shao Xiayan</i>	
Topic Study Group 1	
Representations of word problems on iPad and pencil-and-paper test modes.....	569
<i>Siew Yin Ho, Ajay Ramful, & Tom Lowrie</i>	
Topic Study Group 3	
Affordances and constraints by mathematical tasks, questions, prompts and teacher actions: Insights from a lesson on fractions.....	579
<i>Sitti Maesuri Patahuddin, Usman H. Beddu, & Ajay Ramful</i>	
Topic Study Group 2	
The teaching of mental subtraction in Matematika GASING to elementary school students.....	587
<i>Sulistiawati & Josephine Kusuma</i>	
Topic Study Group 7	
Enhancing young children's reasoning about data distribution through model creating and sharing.....	597
<i>Takashi Kawakami</i>	
Topic Study Group 7	
Research on development of the prescriptive model for designing social interactions in elementary school mathematics classrooms.....	607
<i>Takeshi Yamaguchi, Masataka Koyama, Masakazu Okazaki, Tadao Nakahara, Naomiichi Yoshimura, & Hisae Kato</i>	
Topic Study Group 7	

Improving elementary teacher competency to develop the abilities of students' creative thinking through mathematics problem posing and problem solving strategy.....	617
<i>Tatag Yuli Eko Siswono</i>	
Topic Study Group 4	
Functions and equations: Developing an integrated curriculum with the required mathematical activities.....	625
<i>Tatsuya Mizoguchi</i>	
Topic Study Group 1	
How teachers should instruct and represent mathematical ideas to enhance student engagement: Viewpoints of elementary school students.....	639
<i>Ting-Ying Wang & Feng-Jui Hsieh</i>	
Topic Study 2	
The role of test-mode effect: Implications for assessment practices and item design.....	649
<i>Tom Lowrie & Tracy Logan</i>	
Topic Study Group 3	
Research on the teaching methods which deepen the argument in problem solving.....	657
<i>Tsutomu Ishii</i>	
Topic Study Group 2	
Development and evaluation of an interactive learning module on summation notation using comics.....	665
<i>Anna Grace P. Lapie, Vernel M. Lawas, & Cresencia M. Lawas</i>	
Topic Study Group 5	
Integrating the real-world problem-solving and innovation dimension in the teaching of Probability.....	675
<i>Vivian Hiu Man Tsang & Masitah Shahrill</i>	
Topic Study Group 2	
Assessment standards for mathematics written assessment.....	683
<i>Wong Lai Fong & Berinderjeet Kaur</i>	
Topic Study Group 3	

Mathematics teachers' professional learning behaviors in online learning community: A case study on "Milky Tribal" blogs, China.....	691
<i>Xiong Wang</i>	
Topic Study Group 4	
The effect of interaction-with-students field experience on elementary mathematics teachers' beliefs and practices.....	699
<i>Yi Jung Lee</i>	
Topic Study Group 4	
The standards for evaluating elementary school teachers' mathematics teaching.....	707
<i>Yuan-Shun Lee</i>	
Topic Study Group 4	
Conjecturing and proving as an approach to facilitate active thinking and peer discussion in combinatorial class.....	715
<i>Yun-Zu Chen & Yi-Chao Chang</i>	
Topic Study Group 2	
A professional development project for teachers to learn how to teach problem-solving lessons through inquiry, exploration, discovery and extensions of mathematical concepts.....	723
<i>Yuriko Yamamoto Baldin</i>	
Topic Study Group 4	
Characteristics of student's 3D geometrical reasoning in elementary school: Focus on the student's explanations.....	731
<i>Yutaka Kondo</i>	
Topic Study Group 2	
Acknowledgement.....	737

The 7th ICMI-East Asia Regional Conference on
Mathematics Education
11-15 May 2015
Cebu City, Philippines
