# TSG 61 Agenda

## TSG 61: International Cooperation in Mathematics Education

### Session 1 (14:30-16:30 Beijing time, July 13th)

Session Chair: Arne Jakobsen

1. Time: 14:30 – 14:35

   Welcome and Introduction

2. Time: 14:35 – 14:47

   Title of the Paper:

   ADAPTING LESSON STUDY IN THAILAND THROUGH INTERNATIONAL COOPERATION

   Authors: **Maitree Inprasitha[1]**; Masami Isoda[2]

   Institutions and Country/Region:
   **[1]Center for Research in Mathematics Education, Khon Kaen University (Thailand)**;
   [2]University of Tsukuba (Japan)

   Short abstract of the paper:
   This article discusses some challenges to adapt Japanese Lesson Study in APEC member economies. The procedures were separated into four phases - Phase I: Lesson Study was selected as the key innovation; Phase II: specialists from each economy developed good practices in teaching and learning mathematics through Lesson Study; Phase III: Sharing and reflecting research results and good practices; Phase IV: Expanding Lesson Study to local in-service teachers. The results obtained during the four phases will be shared such as clarifying the meaning of good practices etc.

3. Time: 14:47 – 15:59

   Title of the Paper:

   AN EXPERIENCE IN DEVELOPING THE REGIONAL MATHEMATICS CURRICULUM STANDARDS

   Authors: **Kim Hong Teh[1];** Masami Isoda[2]

   Institutions and Country/Region
   [1]SEAMEO RECSAM (Malaysia); [2]CRICED, University of Tsukuba (Japan)

   Short abstract of the paper:
   This paper illustrates the roles of cooperating agents in the development of the Southeast Asian regional curriculum standards in three phases. Firstly, the mathematics curriculum of six Southeast Asian countries were compared and mapped to find the minimum essential

contents. However cultural language constraints affected and impacted the outcomes. Secondly, the proposed curriculum standards were benchmarked against the curriculum standards of advanced countries. However, there were difficulties in identifying the necessary competencies. Thirdly, a 21st-century curriculum framework was established with the collaboration of local and global agents. The guidance of the consultant and international experts were crucial in elevating the curriculum standards to an international level and resolving the challenges encountered in consolidating the perspectives of diverse background.

4. Time: 15:59 – 15:11

   Title of the Paper:
   FOSTERING GLOBAL CITIZENSHIP IN MATHEMATICS CLASSROOMS

   Authors: **Russasmita Sri Padmi[1];** Gabriel Matney[2]

   Institutions and Country/Region:
   [1]SEAMEO QITEP in Mathematics, Yogyakarta (Indonesia);
   [2]Bowling Green State University, Ohio (USA)

   Short abstract of the paper:

   Mathematics has long been viewed as the science language of the world. There is a need to explore the potential of mathematics to be the platform to foster global citizenship education. English speaking high school students from US and Indonesia, participated in a mathematical modelling cross-border lesson, to discuss and generate solutions to a problem related to a global issue. This paper will highlight the process of the cooperation; the what, how, and why, as well as the impact on education and future plans.

5. Time: 15:11 – 15:26

   Discussion

6. Time: 15:26 – 15:38

   Title of the Paper:

   DEVELOPMENT OF THE NATIONAL MATHEMATICS TEXTBOOK IN PRIMARY SCHOOLS IN PAPUA NEW GUINEA

   Authors:
   **Ileen Palan[1]**; Steven Tandale[1]; Gandhi Lavaki[1]; Masami Isoda[2]; Satoshi Kusaka[3]; Akinori Ito[4]

   Institutions and Country/Region:
   [1]Department of Education (Papua New Guinea);
   [2]CRICED, University of Tsukuba (Japan);
   [3]Hiroshima University (Japan); [4]Waseda University (Japan)

   Short abstract of the paper:
   This paper describes the development and the impact study of the National Mathematics Textbook for primary schools in Papua New Guinea. It aims to improve mathematics education in Papua New Guinea through the Department of Education partnership through

the Project QUIS-ME with funding and technical support from the Government of Japan through the Japan International Cooperation Agency (JICA). This is the first time the development of the National Textbooks was undertaken by the Department of Education. The project formed the Mathematics working group consisting of curriculum officers and textbook writers who were teachers' and experts to develop the textbooks for a period of 3 years and 6 months. The unique and important process of the development emphasised the validation process. During the validation, the working group conducted an impact survey at schools. The results of the survey, revealed the effectiveness of the new textbooks that had been drafted and was proof that it utilises the best teaching and learning strategies from Japan to improve standards in Mathematics.

7. Time: 15:38 – 15:50

   Title of the Paper:

   THE CHALLENGES OF IMPROVING MATHEMATICS EDUCATION THROUGH TRANSLATED TEXTBOOK

   Authors:
   **Lambas**[1]; Masami Isoda [2]; Wahyudi[3]

   Institutions and Country/Region:

   [1]Center for Curriculum and Instruction, MOEC (Republic of Indonesia);
   [2]CRICED, University of Tsukuba (Japann); [3]SEAMEO, Bangkok (Thailand)

   Short abstract of the paper:

   This paper discusses the cooperation with CRICED, University of Tsukuba to produce the Indonesian edition of Japanese Mathematics Textbook to improve the teaching-learning in mathematical thinking. First, description about translating and adapting Japanese mathematics textbook for Primary and Junior High School into Bahasa Indonesia. Then, the description of textbook structure and discussion about mathematical thinking in the textbook. And last, a discussion about how to promote mathematical thinking in teaching-learning using the translated textbook in Indonesia schools, and discussion about how to empower mathematics teachers related to mathematical thinking.

8. Time: 15:50 – 16:02

   Title of the Paper:
   DEVELOPING MATHEMATICAL THINKING THROUGH ROBOT PROGRAMMING

   Authors:

   **Wahid Yunianto[1];** Uki Rahmawati[1], Masami Isoda[2]

   Institutions and Country/Region

   [1]SEAMEO QITEP in Mathematics (Indonesia)
   [2]University of Tsukuba (Japan)

Short abstract of the paper:

This report presents a training program for mathematics teachers to enhance students' mathematical thinking. To develop students' mathematical thinking, a collaboration project has been initiated through robot programming. Simple robotic media have been donated to SEAMEO QITEP in Mathematics. Mathematical thinking and process is one of the elements of mathematics SEA-BES CCRLS in Mathematics Framework for the 21st century. Thus, mathematics teachers have to be prepared for teaching and learning mathematics which support mathematical thinking. The SEAMEO QITEP in Mathematics running project consists of three stages; (1) introduction of robot programming to the trainers and staff, (2) the limit trial to teachers, and (3) the limit school trial. Even though the robot programming is potential to promote mathematical thinking; we still face some challenges.

9. Time: 16:02 – 16:14

Title of Paper:
AN ELECTRONIC ASSESSMENT WORKSHOP FOR 1ST & 2ND YEAR MATHEMATICS & STATISTICS COURSE LECTURERS FROM EAST AFRICAN UNIVERSITIES

Authors:
**James Musyoka**; Michael Obiero; David Stern; Danny Parsons

Institutions and Country/Region
Maseno University (Kenya); IDEMS International

Short abstract of the paper:
This paper describes an initiative by mathematics and statistics lecturers at universities in East Africa to use electronic assessment in their teaching. The collaboration started on the back of a workshop about using electronic assessment for first- and second-year mathematics and statistics courses. Among the many systems, the participants were keen to learn the computer aided assessment system, STACK, because of its ability to provide instant and detailed feedback. This feedback encourages learning, and giving good feedback was identified as one of the major challenges facing East African universities.

10. Time: 16:14 – 16:30

Discussion

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## **Session 2 (**19:30-21:00 Beijing time, July 14th)

Chair: Masami Isoda

1. Time: 19:30 – 19:34

Welcome and Introduction

2. Time: 19:34 – 19:47

Title of the Paper:

UNDERTANDING NARRATIVES: A PATHWAY TOWARDS RESOLVING ISSUES AND CHALLENGES IN INTERNATIONAL COOPERATION IN MATHEMATICS EDUCATION

Authors: **Ui Hock Cheah**[1]; Masami Isoda[2]
Institutions and Country/Region:
[1]Penang Math Platform (Malaysia); [2] CRICED, University of Tsukuba (Japan)

Short abstract of the paper:
The ecosystem of international cooperation in mathematics education embodies a community where agents from various institutions and organizations interact. The complexity in this ecosystem has given rise to many issues which is the result of globalization as well the possible different agendas of the agents and the institutions from donor and recipient countries. In order to initiate a pathway to resolve these issues, it is necessary that the narratives and the voices of the agents at all the various levels be heard. This would go towards providing solutions that are relevant, practical, just and sustainable to the community. The aim of this paper is to initiate a framework in order to understand and uncover the dispositions in these narratives. This initial framework focuses on the dispositions in the narratives towards the various aspects of knowledge and beliefs of the agents: Views of self towards authority, views of knowledge, views of knowledge production, and views of management.

3. Time: 19:47 – 20:00

Title of the Paper:

APEC LESSON STUDY PROJECT (2006-2018) FOR MATHEMATICS EDUCATION AND AI ERA CURRICULUM PROJECT (2019- )

Authors: **Masami Isoda**[1]; Maitree Inprasitha[2]; Roberto Araya[3]; Sofian Tajul Arus[4]

Institutions and Country/Region:
[1]University of Tsukuba (Japan); [2]Khon Kaen University (Thailand);
[3]University of Chile (Chile); [4]Ministry of Education (Malaysia)

Short abstract of the paper:

This paper attempts to discuss the issues on curriculum development, teacher education, and community development in the APEC Lesson Study Project (2006-2018) and AI Curriculum Project (2019-). The first stage of the Lesson Study Project (2006-2011) focused on the innovation for mathematics education. Challenges were the establishment of the lesson study community. Four strategies were implemented and resulted in commendable outcomes of network and publications to enable the sustainable extension of the project. The second stage of the Project (2012-2015) focused on Emergency preparedness Education as a part of STEM and SDGs (ESD) Education. The theme is to develop unknown teaching material for modeling in collaboration with science. Challenges were the extension of the community to incorporate science education. The third stage of the Project (2016-2018) focused on Cross Border Lesson Study, which connected different

economies' classroom by setting the tasks on the Energy Data Base in relation to SDGs and using Video Conference System. The challenges was a hidden variable in the Society. The Project InMside (2019-) is the succession project for AI.

4. Time: 20:00 – 20:13

   Title of the Paper:

   IMPROVING QUALITY AND CAPACITY OF MATHEMATICS EDUCATION IN MALAWI THROUGH COLLABORATION – LESSONS FROM A COLLABORATION BETWEEN UNIVERSITY OF MALAWI AND UNIVERSITY OF STAVANGER

   Authors: **Arne Jakobsen**[1]; Mercy Kazima[2]

   Institutions (to school/department/research center) and Country/Region:
   [1]University of Stavanger (Norway); [2]University of Malawi (Malawi)

   Short abstract of the paper:
   This paper reports from a five-year collaborative project in mathematics education between the University of Stavanger, Norway, and the University of Malawi, Malawi. The purpose of the project was to increase quality and capacity of mathematics education in Malawi. Our findings show that while the project increased quality and capacity of mathematics in Malawi, it was also beneficial for the Norwegian partners, in particular in the research component. Some of the challenges in such a north-south collaboration are also discussed, especially that of understanding each other's cultural context.

5. Time: 20:13 – 20:26

   Discussion

6. Time: 20:26 – 20:39

   Title of Paper:

   INFORMAL INTERNATIONAL COLLABORATION AND ITS POTENTIALITIES: THE EXAMPLE OF GREMA

   Authors: **Bernadette Denys**[1]; Jannick Trunkenwald[2]

   Institutions and Country/Region:

   [1]GREMA, IREM of Paris, Paris Diderot University (France)
   [2]GREMA, IREM of Paris, French High School, (Algiers)

   Short abstract of the paper:

   This article deals with potentialities of contextualized international collaboration in mathematics education. Starting from reflections made at ICME10, we first consider the question of objectives. We then describe an example of a network for international collaboration, along with its genesis. We also describe interactions between GREMA (Groupe de Réflexion sur l'Enseignement des Mathématiques en Afrique), a group which is part of IREM (Institut de Recherche sur l'Enseignement des Mathématiques) at the University of Paris-Diderot, and institutions in the Congo concerned with mathematics

education. We conclude with some common ideas and principles that seem to underlie the various networking activities, in support of isolated initiatives.

7. Time: 20.39 – 20.52

   Title of Paper:

   CAPACITY DEVELOPMENT FOR MATHEMATICS TEACHING IN TANZANIA: A FOLLOW UP OF IMPACT ON PARTICIPANTS

   Authors:
   **Calvin Swai**[1]; Joyce Mgombelo[2]; Andrew Binde[1]; Florence Glanfield[3]; Elaine Simmt[3]

   Institutions and Country/Region:
   [1]University of Dodoma (Tanzania); [2]Brock University (Canada);
   [3]University of Alberta (Canada)

   Short abstract of the paper:
   Local actions for sustaining activities of an international mathematics education project are presented. Using data from in-depth interviews the authors outline a range of local actions that participants of the project undertook to improve the teaching of mathematics within and outside their local communities in Tanzania. The paper offers a discussion on how the actions sustain and expand activities of the development project.

8. Time: 20:52 – 21.00

   Discussion

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## Session 3 (21:30-23:00 Beijing time, July 17th)

Chair: Bernadette Denys

1. Time: 21:30 –21:43

   Title of Paper:

   How El Salvador Improved Student Learning Achievement in Mathematics? A Principle Methodology of JICA Toward Achieving SDGS 4

   Authors: **Norihiro Nishikata**

   Institution and Country/Region:
   Japan International Cooperation Agency (JICA) (Japan

   Short abstract of the paper:
   The Ministry of Education of El Salvador has implemented the Project for the Improvement of Mathematics Teaching in Primary and Secondary Education ; ESMATE, El Salvador Mathematics, (hereinafter called “ESMATE”) in coordination with JICA’ Technical Cooperation from 2015 to 2019. The strategy of project for improving learning achievement

in mathematics from first to eleventh grade consisted of three major components; (1) learning and teaching materials' development and their distribution on a nationwide scale, (2) quality assistance for learners and (3) an attempt to increase engaged learning time. The preliminary result of randomized controlled trial conducted in 2018 shows that the project impact on second grade students' math test score was 0.5 standard deviation (sd.), and 0.17 sd. on seventh grade student[1] (Maruyama, 2019)

2. Time: 21:43 – 21:56

   Title of the Paper:

   THE DEVELOPMENT OF MATHEMATICS TEXTBOOKS IN MYANMAR:
   -UNDER THE CREATE PROJECT –

   Authors: **Takashi Itoh[1];** Isamu Imahori[2]; Koji Takahashi[2]

   Institutions and Country/Region
   [1]Gunma University (Japan)
   [2]PADECO Co., Ltd. (Japan)

   Short abstract of the paper:
   The CREATE project has been implemented by the Japan International Cooperation Agency (JICA) since 2014, aiming at improving the primary education of Myanmar. While the project activities include developing the math curriculum and textbooks, this note explains how the new mathematics curriculum and textbooks have been designed and what changes have made in the primary mathematics education of Myanmar.

3. Time: 21:56 – 22:09

   Title of Paper:
   IMPACT OF APEC LESSON STUDY PROJECT (2006-2018) IN CHILE

   Authors: **Raimundo Olfos;** Soledad Estrella

   Institutions and Country/Region:
   Pontifical Catholic University of Valparaíso. Institute of Mathematics (Chile)

   Short abstract of the paper:
   The APEC Lesson Study Project was an opportunity to renew the teaching of Mathematics in Elementary Education. At first, as same contents of elementary math curriculum were redesigned according to international trends, teacher training changed same emphasis. APEC Lesson Study Project offers the opportunity to reflect how teachers teach mathematics and to understand what can be improved. Universities that prepare teachers by their own principles were interchanging their curriculum and they were changed in coherence as Asian countries, as it was understood through the APEC LESSON STUDY PROJECT. Actually, Lesson Study activities and Open lesson are accepted and promoting by teachers and authorities. Textbooks provided to the students in six first levels integrated ideas that were introduced in Chile by APEC LESSON STUDY PROJECT the last 10 years.

4. Time: 22:09 – 22:22

   Title of Paper:
   GUATEMATICS IN ACTION. A SERVICE LEARNING PROJECT FOR MATHEMATICS EDUCATION BETWEEN SPANISH PRESERVICE TEACHERS AND TEACHERS FROM RURAL SCHOOLS IN GUATEMALA

   Authors: **Elsa Santaolalla Pascual;** Belén M. Urosa Sanz; Olga Martín Carrasquilla

   Institutions (to school/department/research center) and Country/Region:
   Universidad Pontificia Comillas (Spain)

   Short abstract of the paper:

   The subject of Mathematics Education in Teacher Education has served as a framework for designing an International Cooperation Project between Spain and Guatemala. Each year, the Spanish preservice teachers prepare a Training Plan for strengthening education and teaching amongst Guatemalan in-service teachers in different Primary Education mathematics content. This project, which is based on the Service Learning methodology, has established a stable and solid relationship and laid the foundations for what has made it a model to be replicated. In the three years since the project started, it has benefited 82 Spanish preservice teachers, 217 teachers from public schools in western Guatemala, and 5,424 Primary School children from mainly rural and indigenous population areas. In order to analyze the effectiveness of the project, a study has been carried out with data from the first year. The statistically significant results for the study's variables highlight that the two groups of teachers involved in this project have seen adequate development in their teaching self-efficacy, consistent with the use and design of teaching materials for teaching mathematics.

5. Time: 22:22 – 22:39

   Discussion

6. Time: 22:39 – 23:00

   Wrap-up of TSG 61: The way forward

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