

Topic Study Group 61

International Cooperation in Mathematics Education

Ui Hock Cheah¹, Masami Isoda², Arne Jakobsen³, Bernadette Denys⁴ and Jiwei Han⁵

1. Description of TSG-61

From the perspective of international cooperation, mathematics has always been viewed as an essential literacy which is necessary to address the concerns of globalization. High quality mathematics education has thus become a priority of the reform agenda to achieve the United Nations Sustainable Development Goals (SDGs) (United Nations, 2015). While it is a common goal to progress and improve the status of mathematics education, this aspiration is not easily attained for many countries. As a result, there is a demand for countries and agencies to support and collaborate with each other in international cooperation projects. This demand often provides the rationale for mathematics education to be included in various international education cooperation efforts which go beyond merely adopting successful practices of high achieving countries, to seek appropriate technologies and methods to advance mathematics education. Mathematics educators, teachers, government officials and consultants participate at various levels of international education cooperation, namely, (1) International, (2) Governmental, (3) Institutional, and (4) Personal. Projects also vary in scope from nationwide to provincial and school levels to cater for the demands of both mainstream and marginalized groups. Various aims and purposes of international cooperation in mathematics have been noted: (a) Curricular development which encompasses curriculum reviews, textbook resource development, as well as the enhancement of meaningful teaching and assessment approaches, (b) Professional development at in-service and pre-service levels, and (c) Creating communities to enhance mathematics education. While international education cooperation has been ongoing, there remain many issues and challenges to be overcome (Atweh et al., 2008). Emerging trends in response to these concerns include:

- Renewed emphasis on pre-primary and basic education up to the secondary level.
- Reaching out to special groups, for e.g., disabled, poor and gender groups.
- Re-establishment of higher education as an agenda.
- Emphasis on assessment for accountability.

¹Penang Maths Platform, Malaysia. E-mail: uhcrecsam1@gmail.com

²University of Tsukuba, Japan. E-mail: isoda@criced.tsukuba.ac.jp

³University of Stavanger, Norway. E-mail: arne.jakobsen@uis.no

⁴Paris Diderot University, France. E-mail: bernadette.denys@univ-paris-diderot.fr

⁵Northeast Normal University, China. E-mail: hanjw617@nenu.edu.cn

- Inclusive involvement and expanding the roles of new partners, donor countries, and agencies, and non-governmental organizations.

The discussions in this group were guided, though not exclusively by the following questions:

1. What were the roles of the cooperating agents in the projects?
2. What were the challenges, and the subsequent methods/solutions/strategies and good practices used to overcome these challenges?
3. What were the views of the various cooperating agents in overcoming these challenges? How were differing views about teaching and learning mathematics resolved?
4. How did the project impact on the quality of teaching and learning mathematics?
5. How did the project plan for sustainability and expansion?

2. Paper Presentations

The papers submitted to TSG-61 were reviewed and a total of 16 papers were selected and presented over 300 minutes, in 3 sessions (Tab. 1, on the next page). All the papers were presented using the online mode. At the end of each session, there was a time for question-and-answers which resulted in fruitful discussions on the papers that were presented.

3. Conclusion

ICME-14 marks the first time the topic of international cooperation has been included as a TSG at the ICME. The papers presented in TSG-61 provided informative glimpses and insights into the current state of practice in international cooperation. The papers presented covered four main areas of international cooperation: Curricular development, professional development, developing communities of practice, and improving environment related to mathematics education. The methods in international cooperation that were reported in the papers included the following strategies: The adoption and adaptation of good practice, capacity building of key personnel/faculties, developing and incorporating local ideas, multilateral dialogue among agents to develop strategic approaches, development of new study programs and certification courses, and the development of curriculum and textbooks.

3.1. Areas for future research and discussion in international cooperation

At the concluding session of TSG-61, three suggestions were highlighted for future research and discussion:

- 1) Papers in TSG-61 described the success stories in International Cooperation. Issues and challenges are not often discussed. For future projects, reports should also discuss what we can learn from the inadequacies and shortcomings of the projects.

Tab. 1. The list of papers presented

| Paper and author(s) | |
|----------------------------|---|
| Session 1 | |
| [1] | Adapting lesson study in Thailand through international cooperation. Maitree Inprasitha (Thailand) and Masami Isoda (Japan). |
| [2] | An experience in developing the regional mathematics curriculum standards. Kim Hong Teh (Malaysia) and Masami Isoda (Japan). |
| [3] | Fostering global citizenship in mathematics classrooms. Russasmita Sri Padmi (Indonesia) and Gabriel Matney (USA). |
| [4] | Development of the national mathematics textbook in primary schools in Papua New Guinea. Ileen Palan , Steven Tandale , Gandhi Lavaki (Papua New Guinea), and Masami Isoda , Satoshi Kusaka , and Akinori Ito (Japan). |
| [5] | The challenges of improving mathematics education through translated textbook. Lambas (Indonesia), Masami Isoda (Japan), and Wahyudi (Indonesia) |
| [6] | Developing mathematical thinking through robot programming. Wahid Yunianto , Uki Rahmawati (Indonesia), and Masami Isoda (Japan). |
| [7] | An electronic assessment workshop for 1st & 2nd year mathematics & statistics course lecturers from East African universities. James Musyoka and Michael Obiero (Kenya), and David Stern and Danny Parsons (UK) |
| Session 2 | |
| [8] | Understanding narratives: A pathway towards resolving issues and challenges in international cooperation in mathematics education. Ui Hock Cheah (Malaysia) and Masami Isoda (Japan). |
| [9] | APEC lesson study project (2006–2018) for mathematics education and AI era curriculum project (2019–). Masami Isoda (Japan), Maitree Inprasitha (Thailand), Roberto Araya (Chile), and Sofian Tajul Arus (Malaysia). |
| [10] | Improving quality and capacity of mathematics education in Malawi through collaboration — lessons from a collaboration between University of Malawi and University of Stavanger. Arne Jakobsen (Norway) and Mercy Kazima (Malawi). |
| [11] | Informal international collaboration and its potentialities: The example of GREMA. Bernadette Denys (France) and Jannick Trunkenwald (Algeria). |
| [12] | Capacity development for mathematics teaching in Tanzania: A follow up of impact on participants. Calvin Swai (Tanzania), Joyce Mgombelo (Canada), Andrew Binde (Tanzania), Florence Glanfield , and Elaine Simmt (Canada). |
| Session 3 | |
| [13] | How El Salvador improved student learning achievement in mathematics: A principle methodology of JICA toward achieving SDGs 4. Norihiro Nishikata (Japan). |
| [14] | The development of mathematics textbooks in Myanmar: Under the CREATE project. Takashi Itoh , Isamu Imahori , and Koji Takahashi (Japan). |
| [15] | Impact of APEC lesson study project (2006–2018) in Chile. Raimundo Olfos and Soledad Estrella (Chile). |
| [16] | GUATEMATICS in action. A service learning project for mathematics education between Spanish preservice teachers and teachers from rural schools in Guatemala. Elsa Santaolalla Pascual , Belén M. Urosa Sanz , and Olga Martín Carrasquilla (Spain). |

- 2) International cooperation should also report what we can learn from different cultures. Knowledge flows both ways. For example, what are the differences in mathematics language, terminologies and concepts that are related to culture? What pedagogical strategies have emerged from local cultures?
- 3) What can we do about the outcomes of international cooperation?

References

- B. Atweh, P. Boero, M. Jurdak, B. Nebres, and P. Valero (2008). International Cooperation in mathematics education: A discussion paper. In M. Niss (Ed.), *ICME-10 proceedings* (pp. 443–447). Roskilde University.
- United Nations (2015). *Resolution adopted by the General Assembly on 25 September 2015. Transforming our world: the 2030 Agenda for Sustainable Development*. United Nations.

Preprint