

ICMI Column

Hilda Borko (Stanford University) and Despina Potari (Kapodostrian University of Athens)

ICMI Study 25 – Teachers of Mathematics Working and Learning in Collaborative Groups

As announced in the EMS Newsletter 110, ICMI has launched its 25th ICMI study with co-chairs Hilda Borko (USA, hildab@stanford.edu) and Despina Potari (Greece, dpotari@math.uoa.gr) (the full IPC was given in the article in the EMS Newsletter 110).

The first meeting of the IPC took place in Berlin in February, and it produced the discussion document, of which a short abstract is given below.

The full-length version and all of the details in order to participate can be found online:

https://www.mathunion.org/fileadmin/ICMI/ICMI%20studies/ICMI%20Study%2025/190218%20ICMI-25_To%20Distribute_190304_edit.pdf



1. The need for the study

Collaboration implies careful negotiation, joint decision-making, effective communication and learning in a venture that focuses on the promotion of professional dialogue. Across education systems, and at all educational levels, mathematics teachers work and learn through various forms of collaboration. Such collaborative work of teachers has a long tradition in mathematics education as it is critical as a way of bringing educational innovation into the everyday practice of teaching.

This attention to teachers learning through collaboration is especially relevant as countries around the world strive to improve educational experiences for all children and to see these improvements reflected on international assessments such as PISA and TIMSS.

Efforts to understand what teachers do as they work in collaborative groups, and how these experiences lead to improvement in their expertise and teaching practice, has led to increasing interest in examining the different activities, processes, contexts and outcomes for teacher collaboration around the world.

However, the ICME-13 Survey also identified several gaps and limitations, not only in the existing research base but also in the coverage of relevant topics related to teacher collaboration.

These gaps and limitations highlight the need for the ICMI Study 25. We hope that this Study will help us to better understand and address these challenges in the study of the processes and outcomes of mathematics teacher collaboration.

2. Aims and rationale

The Study's theme of teachers working and learning in collaborative groups implies a focus on teachers as they work within teams, communities, schools and other educational institutions, teacher education classes, professional development courses, local or national networks – that is, in any formal or informal groupings. Teachers' collaborative work might also include people who support their learning and development such as teacher educators, coaches, mentors or university academics. Collaboration can extend over different periods of time, and take place in face-to-face settings or at a distance. The role of online platforms and technology-enabled social networks is an additional focus in supporting "virtual" collaboration.

We encourage reporting on promising forms of collaborative work among different groups of participants (e.g., teachers/researchers, teachers/curriculum designers, teachers from different disciplines) and collaboration that addresses different goals (e.g., design of tasks, lessons and curriculum materials; improvement of teaching; development of mathematical and pedagogical understanding). The Study will acknowledge that learning is mutual; that is, those who work collaboratively with teachers to develop their practice are also learning from these interactions.

The primary aims of the study are to report the state of the art in the area of mathematics teacher collaboration with respect to theory, research, practice and policy; and to suggest new directions of research that take into account contextual, cultural, national and political dimensions. Because there are different ways of understanding teacher collaboration and its characteristics, enablers and consequences, the Study will include multiple theoretical perspectives and methodological approaches. We encourage contributions that report research using a variety of methodological approaches including large-scale experimental and descriptive studies, case studies and research approaches characterised by iterative or cyclical processes such as design research and action research. We also solicit contributions from teachers as well as researchers, to ensure that teachers' voices are given prominence in accounts of their learning.

3. Themes and questions

The areas and questions that the Study will investigate are outlined below, organized into four themes. These areas are not independent, and some questions can reasonably be placed in more than one area.

A. Theoretical perspectives on studying mathematics teacher collaboration

A number of theoretical and methodological perspectives have been used to study teacher collaboration, illuminating the dynamics of teachers' collaborative working and the communities in which they work. Some of these perspectives are listed in the full discussion document.

These theoretical and methodological perspectives suggest several questions to be explored in this ICMI Study:

- How do the different theoretical perspectives or networks of theories enhance understanding of the processes of teacher collaboration?
- How do they enhance understanding of the outcomes of teacher collaboration?
- What is illuminated by the different perspectives and methodologies and what needs further investigation?
- What are promising research designs and data collection and analysis methods to study teacher collaboration?

B. Contexts, forms and outcomes of mathematics teacher collaboration

The assumption underlying this Study is that teachers *learn* through collaboration; however, it can be challenging to investigate and explain the *processes* through which this learning occurs and to gather evidence of *what* teachers learn. The goals of teacher collaboration are multi-faceted and might be related to the mathematics content, to the learning experience of students, to the development of mathematics teaching that promotes students' learning (e.g., to implement new curriculum materials), to the design of resources such as classroom and assessment tasks, to the creation of a community in which ongoing professional learning is supported, or even to day-to-day teaching (e.g. lesson preparation, team teaching). Similarly, the outcomes of the collaboration also vary. Outcomes related to teachers' and teacher educators' interactions are addressed in Theme C and those related to instructional materials are addressed in Theme D.

The Study will address the various forms of teacher collaboration, their outcomes related to teaching and learning, and the contexts in which they are offered.

- What models of teacher collaboration have been developed? What are the design features, goals, and outcomes of the different models?
- How effective are various models for promoting different outcomes?
- Which forms of collaboration are appropriate in different contexts?

- What are the affordances and limitations of each form of teacher collaboration?
- What are the benefits and the challenges that online teacher collaboration poses to the teachers?

C. Roles, identities and interactions of various participants in mathematics teacher collaboration (e.g., lead teachers, facilitators, mathematicians, researchers, policy makers)

Collaborative groups can include different "actors", such as teachers, facilitators, mathematicians, researchers, administrators, policy makers or other professionals, in various combinations. These participants can assume a variety of roles in collaborative activities, including learners, leaders, designers, researchers and more. The literature indicates that different roles can support productive interactions.

In collaborative interactions, the learning of *all* participants is important. The nature of roles that people play can vary in different countries and cultural contexts. A variety of research-informed approaches for supporting teachers to work collaboratively and also for developing teachers as leaders have emerged around the world. Challenges faced by those taking on the role of facilitating teacher collaborations can include, on the one hand, supporting teachers to develop their teaching and, on the other hand, valuing and promoting their own goals and perspectives.

We invite contributions focusing on these issues, as reflected in the following questions:

- What is the role of lead teachers, facilitators, mentors and teacher educators in supporting teacher collaboration?
- How are different roles and identities shaped and developed among various "actors" (teachers, leaders, mathematicians, researchers, etc.) within a collaborative group? How do lead teachers negotiate their dual roles and identities as both teachers and facilitators of peer-collaboration?
- What are characteristics of a good facilitator of teacher collaboration? How can these facilitators be prepared and supported?
- How can different stakeholders impact teacher collaboration?
- What types of learning environments enhance or hinder mutual learning of teachers and other participants in collaborative interactions?

D. Tools and resources used/designed for teacher collaboration and resulting from teacher collaboration

This theme focuses on the role of tools and resources in facilitating and supporting teacher collaboration. Tools, as well as resources, are understood in a broad sense "that goes beyond the material objects, to include human and cultural resources". Taking into account their diversity, we are interested here in tools and resources with respect to teachers' collaboration: tools and resources

for teacher collaboration and tools and resources *from* teacher collaboration

Resources *for* and *from* teacher collaboration can be considered as two ingredients of continuous processes: *adopting* a resource always leads to *adapting* it, and that is more the case in the context of teacher collaboration. Using and designing are then to be considered as two intertwined processes. Taking into account this dialectical point of view, the Study will investigate the roles of resources in facilitating teachers' collaboration, and how those roles differ in different contexts. It will focus on the following questions:

- What resources are available to support teacher collaboration? With what effects, both on the collaboration and on the resources themselves?
- What resources are missing for supporting teacher collaboration? How and to what extent can teachers overcome these missing resources?
- To what extent and under which conditions do digital environments (e.g., mobile devices, platforms, applications) constitute opportunities for teacher collaboration? How have these resources been used to support teacher collaboration?
- Which resources can be used (and how) to sustain and scale up collaboration over time?
- How are teachers engaged in the design of resources in collaboration? What are the outcomes of these collaborations?

4. The Study Conference

The Study Conference will take place in the Institute of Education of the University of Lisbon from the 3rd to the 7th of February 2020, with a reception on the evening of Monday the 3rd of February. Participation in the Study Conference will be by invitation only, for one author of each submitted contribution that is accepted.

The accepted papers will be published in an electronic volume of conference and finally an ICMI Study 25 volume will be developed on the basis of the papers and the discussion in the working groups. This volume will be published by Springer as part of the new ICMI Study Series.

5. Call for contributions

The IPC for ICMI Study 25 invites submissions of several types including: reports of research studies, syntheses and meta-analyses of empirical studies, discussions of theoretical and methodological issues and examinations of the ways that teacher collaboration has taken place in local or national contexts. Studies from different cultural, political, and educational contexts and submissions by researchers, teachers and policy makers are encouraged so that mathematics teacher collaboration can be addressed in its complexity.

The papers should be clearly related to the themes that are discussed in Section 3 and address the questions associated with the themes. Authors must select one of the themes to which their paper will be submitted.

The papers should be submitted through the ICMI Study 25 online system. A template for submission of papers is available on the Study website (see below).

Papers must be a maximum of 8 pages and not have been submitted or published elsewhere. The working title of the paper must contain the author(s) name(s) and the theme letter to which it is submitted, for example: JamesThemeB.

Deadlines

30th of June, 2019: Submissions must be made online through the ICMI Study website no later than the 30th of June but earlier if possible

30th of September, 2019: Decisions from the reviewing process will be sent to the corresponding author by the 30th of September.

Information about registration, costs and details of accommodation may be found on the ICMI Study 25 website: icmistudy25.ie.ulisboa.pt



Hilda Borko [hildab@stanford.edu] is a professor of education in the Graduate School of Education at Stanford University and a member of the National Academy of Education. Her research explores teachers' instructional practices, the process of learning to teach, the impact of teacher profes-

sional development programs on teachers and students, and educational research-practice partnerships. Her publications include articles in Journal of Mathematical Behavior, ZDM Mathematics Education, Science Education, Journal of Research in Science Teaching, Educational Researcher, American Educational Research Journal and other journals and edited volumes.



Despina Potari [dpotari@math.uoa.gr] is a professor of mathematics education at the Mathematics Department of the National and Kapodostrian University of Athens. She has been visiting professor in different universities in Europe and US and is currently at Linnaeus University in Sweden. Her re-

search interest is mainly on the development of mathematics teaching and learning and teacher development and in particular on the role of different contexts and tools in the classroom setting as well on mathematics teacher collaboration. She has published in international research journals, conference proceedings and book chapters. She is an editor-in-chief of the Journal of Mathematics Teacher Education, a member of editorial boards and teams and a reviewer for international journals and conferences.