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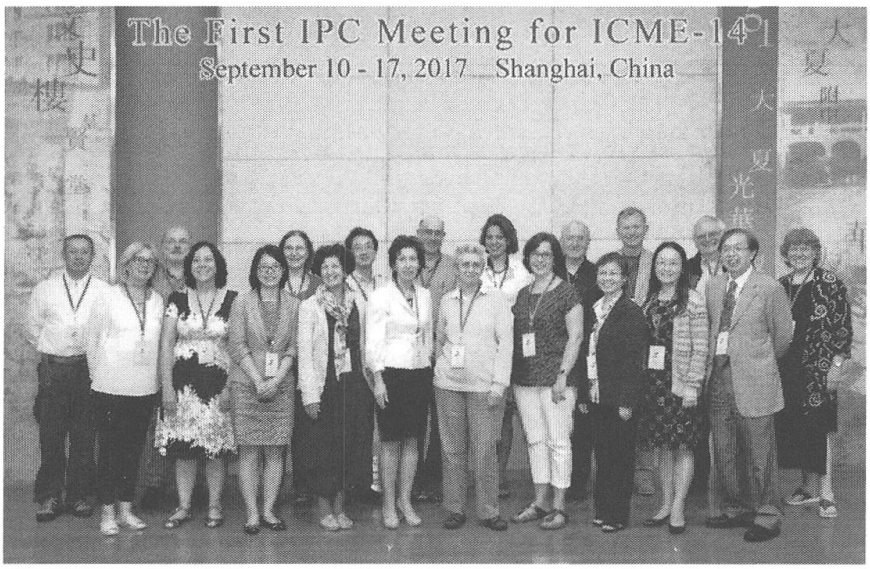
COMMISSION INTERNATIONALE DE L'ENSEIGNEMENT MATHÉMATIQUE

(THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION)

ICME 14 in 2020 in Shanghai*

The first International Program Committee meeting of ICME 14 was held in Shanghai, 11–17th September, 2017. Twenty-one IPC members participated in the meeting.



As a result of friendly but extensive discussions and negotiations during the meeting, the overall scientific structure of ICME 14 has been determined, speakers of Plenary Lectures and Invited Lectures are nominated, and themes and teams of Plenary Panels, survey teams as well as TSGs are proposed. Different from past ICMEs, it is decided that TSGs in ICME 14 are grouped into two classes, Class A and Class B, to be arranged into two different time slots, so that more TSGs could be accommodated and participants are more flexible in attending TSG activities. Details of

* With the courtesy of Binyan Xiu who published it first in the November 18 ICMI Newsletter.

the main academic activities of ICME 14 could be reached at http://icme14.org, the official website of ICME 14.

The first announcement of ICME 14 has been published on the official website of ICME 14, and could be downloaded at http://icme14.org/images/icme/announcemen/FirstAnnouncement.pdf. Important information, such as submissions of proposals and papers, registration and ICME 14 solidarity fund, has been provided in the announcement. Moreover, call for national presentations at ICME 14 is announced at the official website of ICME 14 of http://icme14.org/ and the ICMI website of https://www.mathunion.org/icmi/news-and-events/2018-08-01/call-national-presentations-icme-14-2020. Any intention to organize National Presentation in ICME-14 is warmly welcomed.

The IPC members will meet the second time in March 2019, in order to finalize the program and to discuss issues related to conference website system (including registration system, submission system and review system), proceedings, and venues etc.

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COMMISSION INTERNATIONALE DE L'ENSEIGNEMENT MATHÉMATIQUE

(THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION)

Discussion document twenty-fifth ICMI study *Teachers of mathematics working and learning in collaborative groups*

Co-chairs: Hilda Borko* and Despina Potari**

1. The need for the study

Collaboration implies a careful negotiation, joint decision-making, effective communication and learning in a venture that focuses on the promotion of professional dialogue (Boavida et al., 2002). 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 to bring educational innovation into the everyday practice of teaching. For example, just after the first ICME congress (1968) in Lyon, Freudenthal founded the Institute for the Development of Mathematical Education at Utrecht University and the IREM network (Institute of Research on Mathematics Teaching) was created in France. Both institutions were based on the collaboration of teachers from different educational levels (see Trouche, 2016). In mathematics education research, teacher collaboration is gaining increasing attention, particularly since the report on Lesson Study in Japan from the TIMSS classroom video study (Stigler et al., 1999). 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 (Schleicher, 2015). Indeed, Schleicher's OECD report includes a policy recommendation to "Encourage collaboration among teachers, either through professional development activities or classroom practices" (p. 56). It cites research indicating that collaborative professional development is related to a positive impact on teachers' instructional strategies; their self-esteem and self-efficacy; and student learning processes, motivation and outcomes.

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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. The work completed by the ICME-13 Survey Team on this theme is further evidence of the considerable international interest in research on teachers working and learning through collaboration (Jaworski et al., 2017; Robutti et al., 2016). 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. For example, Jaworski and colleagues reported that their research questions about learning outcomes were the most difficult to address. They did not have consistent clarity on the specific mathematics knowledge and pedagogy that were learned, the ways in which learning occurred, or the relationship between learning and collaboration. As they also noted, there were issues such as sustainability, scaling up, the role of digital technology in teachers' collaborative learning, working with teachers of different educational levels, and making teachers' voice more evident for which the survey showed that research is not extensive and further studies are needed.

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 characterized 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. Below we discuss some of these perspectives. This list is not meant to be exclusive; papers that address other theoretical and methodological perspectives are welcome.

Several theoretical perspectives have focused on the nature of the communities in which teachers collaborate. In studying teacher learning communities, one must be aware that the word "community" is polysemic (Crecci & Fiorentini, 2018), encompassing different meanings. Wenger's theory of communities of practice (Wenger, 1998) has been used to study the process of teacher collaboration, focusing on the negotiation of meaning, the formation of common goals and the building of a teaching identity (e.g. Goos & Bennison, 2008). Adaptations of this theory focused on teacher collaboration include communities of inquiry (Jaworski, 2006) where the teachers align critically to the practice of the community; that is, they do not accept this practice as it is but instead question some of its characteristics. An example of how this perspective has been used to study the impact of the collaboration between upper secondary mathematics teachers and academic researchers in a national project in Norway is reported in Goodchild (2014). The construct of "critical alignment" has been used to describe tensions that the teachers faced to adopt the inquiry teaching approach that the project promoted.

The idea of community also has been conceptualized using the perspective of Activity Theory where the activity and its object – for example, the teaching of mathematics and the learning of mathematics – have been achieved collaboratively through the mediation of tools and framed by the communities' rules and division of labor (Jaworski & Potari, 2009). In Activity Theory contradictions are central in the transformation of the activity (Engeström, 2001) and have been used as a way to study tensions emerging in the context of teacher collaboration and the process of overcoming them as an indication of professional learning (Stouraitis, Potari & Skott, 2017).

Professional learning in these perspectives has been seen as shifts of teachers' participation in a community of practice or as expansive learning in relation to the transformation of the teaching activity at the boundaries of different practices (Akkerman, & Bakker, 2011). Goos, Dole, and Makar (2007) use Valsiner's (1987) theory of zones and its application to mathematics teacher education by Goos (2005) to examine how the Zone of Proximal Development (ZPD), the Zone of Free Movement (ZFM) and the Zone of Promoted Action (ZPA) can be interrelated in the suggested professional development program and what interrelationships of these zones indicate for teachers' professional learning.

Some theoretical frameworks developed within mathematics education research allow us to investigate different aspects of teacher collaboration. For instance, the Documentational approach to didactics studies teacher collaboration in focusing on their interactions, as users as well as designers, with resources (Pepin et al., 2013). Based on the Anthropological theory of the didactic (Chevallard, 1985), some concepts have been elaborated to describe mathematics teachers working in collaboration in different settings. This theory characterizes mathematical knowledge and its teaching and learning in terms of didactic transposition and praxeologies. The concept of meta-didactical transposition (Arzarello et al., 2014; Robutti, 2018) takes into account the different dimensions of collaboration and the different actors involved. The concept of paradidactic

infrastructure (Miyakawa & Winsløw, 2017, Online First) characterizes the different settings for teacher collaboration inside and/or outside school.

Other theoretical perspectives have also focused on conceptions of teacher learning. Although coming from a different starting point, the themes and questions they illuminate overlap with those identified by theoretical perspectives on the nature of community. For example, a situative perspective posits that knowing and learning are situated in particular physical and social contexts; social in nature; and distributed across the individual, other persons, and tools (e.g., Greeno, 1997). Putnam and Borko (2000) identified three issues to consider when applying these themes to teacher learning: where to situate teachers' learning experiences, the nature of discourse communities for teacher learning, and the importance of tools in teachers' work. The practice-based theory of professional education introduced by Ball and Cohen (1999) also addresses several of these issues, and in addition considers the mechanisms underlying teacher learning. Ball and Cohen suggest that professional development programs should situate teacher learning in the types of practice they wish to encourage.

Teacher collaboration is studied with different methodological approaches, in connection with the underlying theoretical framework, both from within the collaborative group and from the outside. Designs and approaches used to study collaboration include case studies, action research, design-based research and others. Data sources can include participants' journals, narratives, questionnaires and surveys, interviews, and audio and video recordings of the collaborative activities or of the activities that the collaborative group carries out with other participants. There is no single way to document collaboration – the important issue is that data is thorough, systematic, reliable and authentic regarding the perspectives and practices of participants.

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. For example, within the context of Lesson Study, researchers have identified changes in teachers' beliefs or disposition for working and learning, their mathematics knowledge for teaching, and their teaching practice (Huang & Shimizu, 2016; Xu & Pedder, 2015). This theme focuses on outcomes related to teachers, teaching and students. Outcomes related to teachers' and teacher educators' interactions are addressed in Theme C and those related to instructional materials are addressed in Theme D.

Various forms of collaboration have been used to support mathematics teacher learning. One central form is Lesson Study, a highly structured practice-based approach, originated in Asia (Chen & Yang, 2013; Lewis & Tsuchida, 1998), that has spread globally (Huang et al., 2018). Variations of lesson study have been used in different national contexts, such as the United States (Murata et al., 2012), the United Kingdom (Dudley, 2015), Italy (Bartolini Bussi et al., 2017), Thailand (Inprasitha, 2011) and South Africa (Adler & Alshwaikh, 2019); and in pre-service as well as in-service teacher education (Rasmussen, 2016). Although there are some core elements common to all variations of lesson study, these enactments have different design features and have been associated with differences in teacher learning outcomes (Akiba et al., 2019). This is due, in part, to the different institutional, cultural and social environments in which they have been implemented (Mellone et al., 2019). The study of Miyakawa and Winsløw (2017, Online First) shows that even in Japan lesson study functions in different ways, depending on the institutional conditions and motives that the teachers have in the context of their practice.

There are several other types of professional learning opportunities for teachers in which collaborative work plays a central role. Learning study is a combination of lesson study and design research, initiated in Sweden and Hong Kong, driven by the theory of variation (Marton, 2015), where the goal for students' learning is more explicit and the way that this goal can be achieved is very clearly defined (Pang & Marton, 2003). In the context of professional development initiatives in Zimbabwe (Mtetwa, Chabongora, Ndemo & Maturure, 2015) teacher collaboration can be found in workshops where teachers meet on their own initiative to organize common instructional goals in designing curriculum and in networking, for example, between teacher associations and government authorities. The different professional development providers and the social demands in this country seem to pose different constraints to mathematics teachers and teacher educators than in other developed countries. Similarly, Cristovão and Fiorentini (2018) documented teachers' learnings through reviewing mathematical instructional task sequences developed by teachers and researchers within a collaborative community.

In professional learning communities the creation of a culture of collaboration and formation of common goals become central. Successful professional learning communities are characterized by a systematic process in which the group of teachers engage to explore mathematics learning and teaching (DuFour, 2004). In addition, teachers work collaboratively in numerous formal mathematics professional development programs and courses for mathematics teachers, which also vary in their design features, goals, and outcomes (Sztajn, Borko & Smith, 2017).

Many of these forms of mathematics teacher collaboration are offered traditionally in face-to-face settings, although online mathematics teacher collaborative approaches have become more and more popular (Community for Advancing Discovery Research in Education, 2017). Some are offered by university researchers, others by private vendors or by professional development leaders within schools or school systems. 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. Robutti et al. (2016) highlighted the value of diversity of roles amongst group members: For example, university academics' perspectives help teachers and others to see and interpret local practices in new ways (Redmond, Brown & Sheehy, 2011). Olsen and Kirtley (2005) reported that "interaction between high school teachers and elementary teachers with their different expertise was critical" (p. 31). Within teacher collaborative groups, the participating teachers may assume different roles (van Es, 2009). Also, in many collaborations, the roles of participants shift over time (Jaworski, 2006).

In collaborative interactions, the learning of all participants is important. For instance, Cooper studied the mutual learning of mathematicians and primary mathematics teachers in a professional development program (Cooper, 2018; Cooper, & Karsenty, 2018). Bleiler (2015) focused on the process of collaboration between a mathematician and a mathematics educator and indicated that the collaboration resulted in professional development by both participants.

The nature of roles that people play can vary in different countries and cultural contexts. For example, in lesson study, the role of the "knowledgeable other" varies across and within cultural contexts (e.g., Adler & Alshwaikh, 2019; Gu & Gu, 2016; Lewis, 2016; Takahashi, 2014). In some places, established relations between policy makers, researchers, facilitators and teachers can support the process of collaboration (e.g., Bobis, 2009; Higgins & Parsons, 2009), while in other places this might not be the case (e.g., Santagata et al., 2011). Since unsuccessful collaborations are not frequently reported in the literature, we encourage submissions that explore less successful cases and analyse the challenges they face.

A variety of research-informed approaches for supporting teachers to work collaboratively and also for developing teachers as leaders have emerged around the world. In these studies, the role of the facilitator and the nature of interactions between the facilitator and the teachers are important topics to explore (van Es et al., 2014).

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. This and other facilitating challenges are often reported in the research. It is also agreed upon that a critical component of a sustainable and scalable model of collaboration is the preparation of facilitators who can adapt the model to various contexts while maintaining integrity to its original goals and agenda (**?**). The non-trivial move from being a good mathematics teacher to becoming a successful facilitator is increasingly studied in recent years (e.g., Borko et al., 2015; Even, 2008; Kuzle et al., 2015). However, empirical studies on the professionalization process that facilitators undergo are still relatively scarce. Specifically, facilitators may hold multiple identities (Gee, 2000) regarding their role in the collaboration; for instance, lead teachers may experience dual identities, as teachers and as facilitators. This has not been sufficiently reported in the literature, and we particularly encourage contributions to this theme by lead teachers.

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" (Adler, 2000). 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.

1. Resources *for* teacher collaboration Drawing from activity theory (Wertsch, 1981), Grossman, Smagorinsky and Valencia (1999, p. 14) make a distinction between conceptual tools and practical tools. Conceptual tools are "principles, frameworks, and ideas about teaching [and] learning ... that teachers use as heuristics to guide decisions about teaching and learning". Practical tools – classroom practices, strategies, and resources such as daily and unit plans, textbooks, and instructional materials – in contrast, "do not serve as broad conceptions to guide an array of decisions but, instead, have more local and immediate utility". A variety of conceptual and practical tools have been used to support mathematics teacher collaboration: for example, frameworks of student mathematical thinking (Carpenter et al., 2014) or teacher noticing (Jacobs, Lamb & Philipp, 2010) in the case of conceptual tools; mathematical tasks (Kaur, 2011), students' mathematical work (Brodie, 2014; Kazemi & Franke, 2004), videos of mathematics learning and teaching (Jacobs, Borko & Koellner, 2009; Karsenty & Arcavi, 2017) or animated representations of teaching (Chieu, Herbst & Weiss, 2011) in the case of practical tools.

There is also a wide range of "new" tools, arising in the digital era that have the potential to resource collaboration between teachers. For example, researchers have studied spontaneous and supported teacher collaboration in MOOCs (Panero et al., 2017; Taranto et al., 2017) and the use of digital curricular resources in teacher education (Pepin et al., 2017). These resources also include software packages that support the annotation of video records of lessons as a means of stimulating collaborative reflection (e.g., Angles®, fulcrumtech.com; Interact®, mangold-international.com), and portable devices such as mobile phones and tablets that facilitate social networking on dedicated platforms.

A further resource for teacher collaboration comprises professional, institutional or governmental support for forming teacher associations or school clusters, which may lead to creation of larger regional or national networks of teachers. This resource will be explored across contexts (curricular, cultural and social), in which teacher collaboration can be supported and/or constrained in different ways.

Considering resources for teacher collaboration raises issues of quality (for example, the affordances/potential of a given resource for fostering teacher collaboration) and equity (for example, the missing resources for supporting teacher collaboration in a given context).

2. Resources *from* teacher collaboration Resources as outcomes of teacher collaboration are addressed in Theme D as concrete evidence of building a community in the sense of Wenger (1998): developing teacher collaboration and developing a shared set of resources go together (Gueudet & Trouche, 2012). For example, the intertwined relationship between the process

of collaboration and the development of resources is illustrated in lesson study. It is reinforced in the digital era, with its new means for collaborative design: teacher collaboration may lead to the development of large repositories of resources, as in the case of the French association Sésamath (Gueudet et al., 2016), designing a complex set of resources, including textbooks, software, and a platform for teacher collaboration.

This resource approach to teacher collaboration raises a number of issues, such as the effects of interactions between the teachers' individual resources and the resources emerging from teacher collaboration; the interactions between different sets of resources coming from different collectives (Akkerman et al., 2011; Kynigos et al., 2015; Robutti et al., 2019); and the coherence and quality of resources resulting from teacher collaboration Gueudet et al. (2016).

Resources for and from teacher collaboration can be considered as two ingredients of continuous processes: adopting a resource leads always 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 what 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

ICMI Study 25 is planned to provide a platform for teachers, researchers, teacher educators and policy makers around the world to share theoretical perspective, research, policy, and professional experiences related to mathematics teacher collaboration in small and large scale settings. The Study is built around an International Study Conference and directed towards the preparation of a published volume. The conference will encourage collective work on significant issues related to the topic of teacher collaboration that will form parts of the study volume.

The Study Conference will be organized around working groups based on the four themes described in Section 3. These groups will meet in parallel during the conference. It is the work of these groups that is captured as chapters in the ICMI Study 25 volume.

4.1. Location and dates. The Study Conference will take place in the Institute of Education of the University of Lisbon from 3rd to 7th of February 2020, with a reception on the evening of Monday the 3rd of February.

4.2. Participation. Participation in the Study Conference will be by invitation only, for one author of each submitted contribution that is accepted. Proposed papers will be reviewed and a selection will be made on the basis of their quality, their potential to contribute to the

advancement of the Study, their links to the themes described in the Discussion Document, and their contribution to a diversity of perspectives. The number of the invited participants will be limited to approximately 100 delegates.

Unfortunately, an invitation to participate in the conference does not imply financial support from the organizers, so the participants should plan to finance their own attendance. Some partial support to enable participation from non-affluent countries can be offered, however we anticipate that only a few such grants will be available.

4.3. Outcomes of the ICMI Study 25 conference. The accepted papers will be published in an electronic volume of conference proceedings that will first be available on the conference website and later on the ICMI website. The proceedings will have an ISBN number, which can be cited as a refereed publication.

An ICMI Study 25 volume will also 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. The International Programme Committee (IPC) will be responsible for editing this volume. It is expected that the Study volume will be structured around the themes included in the Discussion Document, as they are developed further during the Study Conference. Therefore, the chapters will integrate the outcomes of the working groups of the conference, as well as contributions from the plenary addresses and panels. Options for authorship of the chapters in a Study volume are outlined in the Study guidelines (`https://www.mathunion.org/icmi/publications/icmi-studies/guidelines-conducting-icmi-study`). Authorship of the working group chapters of this Study volume will be decided in the context of the groups.

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.

5.1. Submission. 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 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.

5.2. Conference Presentations and Proceedings. Verbal presentations at the conference will be brief, at most 5 minutes, with the expectation that participants will have read the papers in advance. Presenters will focus on posing questions and issues raised by their paper and its relation to other papers presented in the working group. As explained above, accepted papers will be published in online proceedings. Accepted papers will also form the basis for discussions in the working groups at the Study Conference and, eventually, for the chapters in the ICMI Study 25 volume.

5.3. 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`

6. Members of the international program committee (IPC)

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First meeting of the IPC in Berlin 11–14 February 2019

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