

ERME Column

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ERME Thematic Working Groups

The European Society for Research in Mathematics Education (ERME) holds a bi-yearly conference (CERME), in which research is presented and discussed in Working Groups (TWG). We continue the initiative of introducing the working groups, which we began in the September 2017 issue, focusing on ways in which European research in the field of mathematics education may be interesting or relevant for research mathematicians. Our aim is to extend the ERME community with new participants, who may benefit from hearing about research methods and findings and who may contribute to future CERMEs.

Introducing CERME Thematic Working Group 18 – Mathematics Teacher Education and Professional Development

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Thematic Working Group rationale

The study of mathematics teacher education and professional development has been a central focus of research over recent decades. In previous ERME conferences, various research activities regarding this topic have been presented and discussed. Within this Thematic Working Group (TWG) the focus lies on mathematics teacher education (both pre-service and in-service), professional development and growth. Moreover, models and programmes of professional development, as well as their respective contents, methods and impact have been described and analysed. Research increasingly focuses not only on the participating teachers, but also on the roles of teacher educators and academic researchers. These two roles are often fulfilled by one and the same person. The research community is attempting to develop theoretical and methodological frameworks to both describe and explain the complex topic of mathematics teacher education and professional development.

ERME conferences aim to promote communication, cooperation and collaboration in research on mathematics education, to learn about research and interests in different countries and to create opportunities for international cooperation between researchers in collaborative projects. In keeping with these aims, the TWG offers a communicative, collegial and critical forum for the discussion of the above-mentioned issues, which allows for diverse perspectives and theoretical approaches, and which contributes to the development of our knowledge and understanding as researchers, educators and practitioners.

TWG History

Research of mathematics teacher education and professional development has been an integral part of ERME

conferences from the very beginning. In CERME 1 (1998 in Osnabrück, Germany), a working group named “From a Study of Teaching Practices to Issues in Teacher Education” was established. Due to this initial working group’s success and participants’ interest, this topic was also provided in the following ERME conferences. From CERME 2 until CERME 8, such a TWG was part of the conferences’ respective scientific programmes. The number of both participating researchers and presented papers grew from conference to conference. For example, in CERME 4 (2005 in St. Feliu, Spain), 21 papers were presented in this TWG; in CERME 8 (2013 in Antalya, Turkey), 45 papers were presented. These increasing numbers indicated the respective topics’ increasing relevance; yet this also raised the challenge of offering a communicative forum for an increasing number of TWG participants. At CERME 9 (2015 in Prague, Czech Republic), 75 papers were accepted for presentation in this TWG. This huge number led to the conference IPC’s decision to split the TWG into three new sub-groups. One of them was called “mathematics teacher education and professional development”, which was provided in CERMEs 9, 10 and 11. However, there was still an ongoing increase in the number of participants and papers. This led to the decision in CERME 11 (2019 in Utrecht, the Netherlands) to split this TWG yet again into two sub-groups: TWG18a (with a particular focus on teachers and teacher educators) and TWG18b (with a particular focus on professional development settings).

TWG topics

The following section provides several exemplary key questions and issues which emerged in TWG “mathematics teacher education and professional development” during the 2019 ERME conference. These topics relate in particular to pre-service teacher education, professional development programmes, in-service teacher classroom practice and collaboration.

Concerning pre-service teacher education, one central question is what pre-service teachers can learn from theory. Here, the role of mathematical concepts and theories is of particular relevance. The relationship between the mathematics that a teacher has to teach at school and the mathematics a teacher has to learn at university is far from being self-evident or clear. Research on this relationship offers fruitful opportunities for cooperation between research mathematicians and teacher educators. Another question is how to challenge previous experiences of teaching and learning mathematics that pre-service teachers bring with them when entering the teaching profession. For example, how can teachers be supported in being exploratory and inquiry-based in both their teaching and learning?

With regard to professional development programmes, the core questions are: How does one research the impact of professional development? Is there any chain of effects? How can impact and effect be conceptualised? How can impact be sustained over time? With regard to teacher educators, several central questions are moving into focus: How do educators' theoretical perspectives change over time? Which assumptions are taken for granted about how mathematics should be taught? What are possible implications for the professional development of mathematicians as lecturers in professional development programmes? Moreover, there are various reflections about whether and how the philosophy of mathematics and the philosophy of mathematics education coincide; e.g., How can dual roles as both teacher educator and researcher be managed? How can research done by mathematics specialists and teacher education specialists infuse and support each other?

Concerning in-service teacher classroom practice, the issue of incorporating inquiry into learning mathematics is central. Yet, many different notions of inquiry are being used. What are efficient strategies for implementing inquiry approaches in mathematics lessons? Furthermore, there is the need to explicitly connect inquiry with particular mathematical content. What mathematical knowledge do teachers need for inquiry approaches in mathematics lessons to be effective? What contributes to teachers' confidence in teaching mathematics (particularly with an inquiry-based approach)? What contributes to students' confidence in doing mathematics in the classroom? Also here, close cooperation between the scientific communities of mathematics and teacher education seems highly promising. Yet another issue is the combination of inquiry topics that are shared between different subjects (e.g. mathematics and science), such as problem solving or modelling.

Professional development of teachers takes place in various kinds of collaborative settings. One emerging line of research investigates what kinds of settings are conducive to combining collegial work with individual growth. A different line of research focuses on the collaboration of academics and teachers in professional development. The roles and (a)symmetries of these parties, when engaging in professional development and in research, are crucial. In particular, the roles of educational researchers (often acting as teacher educators) and of expert mathematicians are in the main focus. What motivates mathematicians and mathematics teacher educators to be involved in collaborative projects? What are the consequences for the respective contents and methods? Joint research activities by research mathematicians and teacher educators show great promise in bringing these issues forward.

TWG Future

In the upcoming ERME conference (2021 in Bolzano, Italy), even more TWGs concerning these topics will be established: besides a TWG on “mathematics teacher education and professional development” it is planned to also provide TWGs concerning “mathematics teaching

and teacher practice(s)”, “mathematics teacher knowledge, beliefs and identity” and “the professional practices, preparation and support of mathematics teacher educators”. This wide range of topics and TWGs demonstrates the growing interest and relevance of these topics within the scientific community. In particular, it creates opportunities for researchers in the fields of mathematics and mathematics education to cooperate and learn from each other in fruitful ways. Both mathematicians and teacher educators are invited to actively participate in the next ERME conference in 2021, to present their research and to further develop our scientific communities' knowledge about the relationship between mathematics and teacher education.



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Jason Cooper's photo and CV can be found in previous Newsletter issues.