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An introduction to TWG27: The professional practices, preparation and support of mathematics teacher educators

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Focus of TWG27

TWG27 is dedicated to current research concerning mathematics teacher educators: their roles, their practices, the forms that their professionalization processes may take, the challenges they face, and more. In TWG27, the expression Mathematics Teacher Educators (henceforth: MTEs) is used as an umbrella term that can relate to the many different terms existing in the literature in reference to professionals who foster teacher learning (e.g., facilitators, teacher leaders, mentors, educators, teacher trainers, pedagogical instructors)¹. The opening of this group in CERME12 signified the importance ascribed to this topic as a separate body of research that is no longer a subtopic of studying teacher learning and professional development (PD) but stands on its own, recognizing the unique characteristics and challenges of MTEs. Moreover, the rapid accumulation of MTE research has been witnessed even in the short period between CERME12 and CERME13 (e.g., Amador, 2022; Gibbons et al., 2023; Schwarts et al., 2023; the Special Issue [Mathematics specialists and mathematics teacher leaders](#), published in *Investigations in Mathematics Learning*, 2023; the forthcoming Special Issue [Researching the expertise of mathematics teacher educators in initial teacher education settings](#), to be published in *Journal of Mathematics Teacher Education*). Thus, TWG27 aspires to become a “home” in CERME for the growing number of researchers who are active in advancing this emerging field.

The work of TWG27 during CERME13

Twenty-four participants attended TWG27, and 15 contributions (13 papers and 2 posters) were presented and discussed. Figure 1 shows the distribution of participants by countries, with about 75% coming from Europe, 21% from North and South America, and 4% from the Middle East. During the conference, the group met for 7 sessions. A similar structure was applied for most of the paper discussions: a short presentation and questions by the authors, a reaction by a pre-assigned discussant, 15-minute small-group discussions and finally, a whole-group discussion. We found that this model

¹ For coherence in the TWG27 work, it was suggested to use the terms *facilitators* and *educators* to denote MTEs who support the learning of practicing and prospective teachers, respectively. Most accepted papers followed this suggestion.

allowed for deep ideas to rise and enabled more participants' voices to be heard and considered. For the posters, a total of 30 minutes was allocated for presentation and discussion.

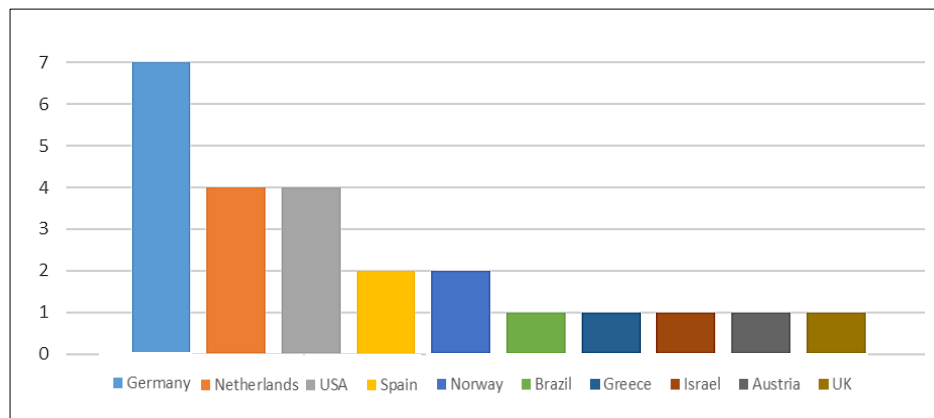


Figure 1: Distribution of TWG27 participants by countries (n=24)

The call for papers raised the following issues:

- (1) Theoretical and conceptual frameworks that can be used as lenses to research the role of MTEs;
- (2) Integrating generic and mathematical content-specific aspects within the work of MTEs;
- (3) Researching knowledge, beliefs, skills, identities and practices of MTEs;
- (4) Reflection as a learning mechanism for MTEs;
- (5) Role-modelling as a practice that MTEs may use, explicitly or implicitly; researching possible lack of coherence between MTEs' practices and the teaching practices they mean to support;
- (6) MTEs' role as bridging between theory and practice;
- (7) Preparing MTEs (including formal and informal qualifications), designing professional development for MTEs, tools and resources for supporting MTEs;
- (8) Scaling up programs for mathematics teachers: Building institutional capacity through focusing on facilitators, institutional factors that support or hinder the effectiveness of PD facilitators;
- (9) The influence of current global issues on the role and practices of MTEs;
- (10) Moving beyond small-scale, qualitative studies to more generalizable, larger-scale studies.

Of these issues, the most prevalent one was issue (3), with seven contributions looking mainly into practices, but also the beliefs of MTEs. Issue (7) was addressed by four contributions exploring the preparation and support of MTEs, and issue (9) was the focus of two papers discussing challenges of MTEs in helping mathematics teachers to raise global issues. Finally, one paper addressed issue (5), focusing on MTEs' conceptions and coherence between MTE and teacher practices (Rojas et al.), and another paper addressed issue (8), discussing how facilitators' capacity to scale up a program may be supported (Moeller et al.). Interestingly, while issue (1) – frameworks – was not directly addressed by papers, it was widely discussed within the group sessions at the conference. In addition, new issues were raised, for instance, adaptations performed by MTEs in various contexts, and challenges that diverse backgrounds of novice MTEs create for educators aiming to prepare and support new cohorts of MTEs. Due to space limitations, we present below brief accounts of only some of these issues.

A brief summary of selected issues

MTEs' practices and beliefs

Several papers reported on studies that investigate various MTEs' practices: (a) planning practices of PD activities, taking into account unpacking the PD goals for ensuring a clear alignment between goals and activities (Sahin-Gür & Prediger); (b) practices, routines and facilitation moves that support conversations and collective discussions among teachers in a PD, by focusing interactions on connections between students, mathematics and teaching (Gibbons & Nieman), or by creating learning opportunities and challenging teachers through questions (Ferreira et al.); and (c) feedback practices of MTEs in relation to teachers' written observations of their students' mathematical work (Sundtjønn & Kjensli). The poster by Rojas and Pascual described an instrument to assess MTEs' beliefs about initial teacher education, linking them to different MTEs' profiles and trajectories.

Resources for preparing and supporting MTEs

The contributions focusing on preparing and supporting MTEs illustrated the diversity of roles subsumed under the umbrella of MTEs and the different contexts in which these professionals work: facilitators of teacher PD (Bardy et al.), coaches working with individual teachers (Jarry-Shore et al.), and teacher educators for prospective teachers (PTs) (Keijzer & Veldhuis; Vellekoop et al.). Despite this variety, the authors offer similar arguments for the importance of preparing and supporting MTEs. As both Bardy et al. and Jarry-Shore et al. note, although MTEs are often former (or still practicing) accomplished teachers, teaching experience alone does not adequately prepare them for the role of MTE. The four contributions described different approaches to preparing and supporting MTEs: Bardy et al., as well as Keijzer and Veldhuis, conducted design research on their own formal programs, yet the former offered a facilitator PD program to MTEs *before* they conducted their own PD, while the latter initiated a program for MTEs *in parallel* to their work with preservice teachers. Jarry-Shore et al. studied a program in which a meta-coach worked side-by-side with coaches while they were coaching mathematics teachers. Vellekoop et al. developed a card game played by a PT and three supervisors in different roles, based on lessons the PT was teaching. Perhaps not surprisingly, given the diversity of approaches, the four projects focused on different aspects of MTEs' knowledge and practices, including reflection on the classroom level and PD level (Bardy et al.), use of data to bring up specific topics during coaching (Jarry-Shore et al.), mathematical knowledge for teaching (Keijzer & Veldhuis), and pedagogical reasoning (Vellekoop et al.). All authors reported some positive impacts of the programs and identified topics for future research.

Challenges faced by MTEs in relation to global issues

A small but growing area of research into the roles and practices of MTEs concerns what MTEs do in relation to addressing questions of global challenges such as climate change. One framing, used by Bogiatzi and Triantafillou, centers on the use of "Environmental Socio-scientific issues (EnvSSIs)", i.e., issues involving some mathematical or scientific modelling and reflection on the model and its implications for the living world. Bogiatzi and Triantafillou, as part of the European Project [ENSITE](#), found a common pattern of four actions used by a MTE with undergraduates: introducing an EnvSSI and discussing its significance; suggesting a mathematical problem relating to the EnvSSI and working on it together; asking PTs to identify social aspects of the problem; and asking PTs for ideas

about implementing the EnvSSI in the classroom. Coles interviewed nine MTEs based in England; they were unanimous about the importance of raising issues of climate change with PTs. However, there were stark differences in terms of the extent to which MTEs enacted such beliefs. Barriers experienced by MTEs included the lack of space in both the school curriculum and national assessment regime. Exploring what MTEs can do to raise wider socio-ecological questions and the impact of this on PTs (and their teaching) is an important direction for further research, and we hope this theme of work will continue to be presented at CERME.

Contextual adaptations performed by MTEs

Addressing the local context where a PD program is implemented often necessitates some adaptations. The issue of how MTEs perform such adaptations was intensively discussed in this meeting, particularly following the presentation of two papers (Shure et al.; Wensing et al.). The context of both papers was the PD program *Mastering Math* in Germany, with Shure et al. considering adaptations of PD material – especially selected PD activities – around the content of conceptual understanding of division, while Wensing et al. related to conceptual understanding of multiplication. The analyses presented in these papers show different adaptations made by MTEs, such as omitting, resorting, changing, and creating new PD activities, which result in various consequences (e.g., the newly created PD activity on dividing natural numbers changed the mathematical core of the PD). MTEs justified their adaptations in relation to their own trajectories, for example, their learning processes during PD preparation, their teaching experiences or their own learning resources. It was suggested that since adaptations of PD activities, coupled with underlying justifications, can influence the design of the PD as well as the learning of teachers, it is important to explicitly discuss the content, purposes, and aims of different PD activities and implications of possible adaptations with (prospective) MTEs.

Summarizing words

Our TWG focuses on the crucial role of MTEs. At CERME 13 we explored their practices and beliefs, we discussed their preparation and support, and we considered their challenges and responsibilities. Within our working group, we aimed to foster insightful discussions, to share our expertise, and to formulate open questions for future research. By doing so, we hope to support this growing field of research, and we are looking forward to the development of this TWG in upcoming CERMEs.

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