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ERME anniversary panel on the occasion of the 20th birthday of the European Society for Research in Mathematics Education

Konrad Krainer[1], Hanna Palmér[2], Barbara Jaworski[3], Susanne Prediger[4], Paolo Boero[5], Simon Modeste[6], Tommy Dreyfus[7], and Jana Žalská[8]
[1]University of Klagenfurt, Austria, konrad.krainer@aau.at; [2]Linnaeus University & Dalarna University, Sweden, hanna.palmer@lnu.se; [3]Loughborough University, UK, b.jaworski@lboro.ac.uk; [4]Technische Universität Dortmund, Germany, prediger@math.uni-dortmund.de; [5]Università di Genova, Italy, boero@dima.unige.it; [6]Université de Montpellier, France, simon.modeste@umontpellier.fr; [7]Tel Aviv University, Israel, tommyd@tauex.tau.ac.il; [8]Charles University in Prague, Czech Republic, zalska@hotmail.com

The general aim of the panel was to offer a reflection on the genesis and the contribution of the European Society for Research in Mathematics Education (ERME) to research in mathematics education, regarding its past, present and future. After a short introduction, the panel focused on three topics: The ERME society, presenting a historical and present view; YERME and YESS, highlighting history and current developments related to supporting young researchers; the ERME book, focusing on its evolution, spirit and results. Each topic started with an input by two panel members who also answered questions by participants of CERME 11 sent in advance or raised during the panel. The panel was concluded by the president and the two co-chairs of the panel.

Keywords: Europe, mathematics education, collaboration, cooperation, communication, quality, inclusion, promoting young researchers

1 Introduction (Hanna Palmer and Konrad Krainer)

An important step for establishing a European Society for Research in Mathematics Education (ERME) was done in a meeting in Osnabrück (Germany) from 2 to 4 May 1997. Representatives from 16 European countries met in Haus Ohrbeck (Figures 1 and 2). The aim was to establish a new society, ERME, that promotes communication, cooperation and collaboration in mathematics education research in Europe. It was also decided that ERME will launch periodical conferences (CERME). At CERME 1, again held in Osnabrück, from 27-30 August 1998 (coordinated by Elmar Cohors-Fresenborg and Inge Schwank), the foundation of ERME took place. In 1999, the three volumes of the first CERME proceedings were published (Schwank 1999a,b; Krainer, Goffree & Berger, 1999). In 2018, the ERME book (Dreyfus, Artigue, Potari, Prediger & Ruthven, 2018) appeared on the occasion of the 20th birthday of ERME. The ERME anniversary panel was held during CERME 11 in Utrecht (The Netherlands) in the Dom Church (Figure 3) on February 2019.

Figure 1 (E. Thoma): Haus Ohrbeck, Osnabrück

Figure 2 (private photo): Elmar Cohors-Fresenborg, Host

Figure 3 (free photo): Dom Church, Utrecht

In preparation for the panel, the community was asked to send questions about ERME research, questions about ERME itself (its role, its possible activities …) and to share memories on ERME (anecdotes, narratives, pictures …) by using twitter or mail (Figure 4). The aim with this was to make the panel as dynamic as possible with discussions between speakers, high-level scientific content mixed with narratives and anecdotes about CERME experiences.

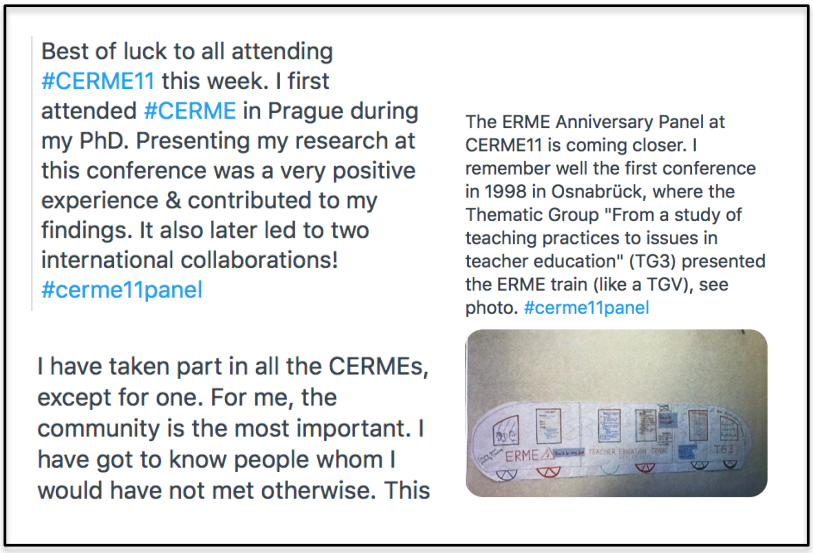

Figure 4 (H. Palmér): Examples of pre-sent tweets

Some of the anecdotes included memories from those who had participated at almost every CERME. During the introduction of the panel, those who had participated at the first CERME in Osnabrück, 1998, were asked to stand up and there were actually about 12 people. In many anecdotes, CERME was described as a conference where people met others and became friends and research colleagues. Through the years there has been a substantial number of research collaborations initiated at CERME. Many people first visited CERME during their PhD and valued the welcoming atmosphere with its dynamic mix of experienced researchers and newcomers.

After a short introduction, the panel focused on three topics: The ERME society, presenting a historical and present view; YERME and YESS, highlighting history and current developments related to supporting young researchers; the ERME book, focusing on its evolution, spirit and results. Answers to present questions were addressed in the pre-prepared presentations of the panel speakers and further questions were provided by the audience at the conference.

In the following, we elaborate on these three topics (for a summary of relevant data about ERME see also Section 10).

Figure 5 (personal photos): The first board members of ERME - Paolo Boero, Marianna Bosch, Elmar Cohors-Fresenborg, Jean-Philippe Drouhard, Konrad Krainer, Jarmila Novotná, João Pedro da Ponte, Leo Rogers and Julianna Szendrei (see details in Section 10)

2 The ERME society: A historical view (Barbara Jaworski)

Probably the first thing to say in the history of ERME is that ERME is an AMAZING success story! From early times to the present it has proved attractive to researchers throughout Europe and beyond and it has blossomed and grown.

The very first meeting in Osnabrück, in 1997, set the scene for what has followed, and the conceptualizations emerging from that meeting have been established and faithfully preserved while simultaneously developing in scale and extent.

In response to an open invitation by German colleagues, representatives from 16 European countries discussed what a European society might involve. We saw here democracy in action as the delegates from across Europe presented their ideas and debated possibilities. Clearly, we were focusing on research in Mathematics Education – our name would be ERME – European Society for Research in Mathematics Education. We wanted there to be a conference, every two years, and we wanted very strongly to support new researchers who should be the future of our society.

There was much debate about the nature of the conference. We already had a range of conferences in our community – particularly PME and ICME – the ERME conference should be different with a more European identity. We wanted a research conference, to be called CERME – Conference of ERME – to enable the sharing, understanding and working together of/on research in mathematics education: three principles emerged

- Communication with our colleagues throughout Europe
- Cooperation in and around research topics
- Collaboration in designing and doing research together

These principles quickly became known as "The Three Cs" and "The CERME Spirit": they were the foundation on which our community was based and on which our conference developed. The conference should enable participants really to *work* on areas of research, forming research groups, with a significant amount of time to communicate their research and develop cooperative and collaborative relationships. Also, ERME should provide a means of educating and supporting young researchers and research students – bringing young researchers centrally into the community.

In the early years of ERME, an ERME board was initiated to guide developments in ERME, and the conference, CERME, was introduced to take place every two years. For young researchers in ERME, the YERME group was initiated.

The first CERME took place appropriately in the same location as our founding meeting, in Haus Ohrbeck in Osnabrück (Germany). There were around 50 participants and just seven working groups – the groups would have 12 hours for their work over the days of the conference. It was a time of getting used to this new kind of conference environment.

At the beginning of this first conference, a well-known researcher asked "what are we going to do with 12 hours? How are we going to use all this time?" At the end of the conference, she said "I am amazed. The time just disappeared as we discussed our work and debated issues in research." It was clear that we were learning in practice about possibilities and ways of working; trying out ideas and developing (or rejecting) them in practice.

Thus, CERME was planned as a different kind of conference (from PME, ICME and others). It became a working conference with small working groups in research areas led by 'experts' in the field (at least 12 hours). It should be open and inclusive to all researchers in the field. It should have published proceedings of high scientific quality. There should be quality support for, and education of research students, with a dedicated day before each conference.

The importance placed on educating research students led to the provision of summer schools in years alternating with CERME. These were led by 'experts' in key research areas (The YESS – YERME Summer Schools) and should be open, inclusive and encouraging full participation.

Key words in planning and development were *Quality* and *Inclusion*. Principles of openness and inclusion permeated principles and practice. ALL researchers in mathematics education (from anywhere in the world) should be welcome participants – no barriers to inclusion. The working language would be English – but sincere attempts should be made to include other languages where necessary. There should be principles of high quality in scientific exchange and publication. Group leaders should ensure the highest quality of academic engagement and publication.

These principles led to issues and questions relating to practices in the working groups regarding quality and inclusion,

- Should ALL papers submitted to a group be accepted? Do principles of inclusion require this?
- What if papers are not of a sufficiently high standard? How can group leaders ensure that what is published is of the high quality we seek?

By the time of CERME 6 in Lyon, France, these issues had become central and potent. Thus, a small group from within the initiating team were tasked by the ERME board to do some research to establish the views of CERME participants. A survey was designed and conducted, and interviews were held with CERME participants. The results of this analysis exposed a wide range of views and highlighted the main issues (see Jaworski, da Ponte & Mariotti, 2011). Clearly the majority wanted to maintain both quality and inclusion, but practical suggestions were made as to how this could be possible. It became practice that most papers submitted for presentation would be accepted to include as many researchers as possible, but there would be additional reviews after the conference through which only papers of high quality would be selected for published proceedings. As CERME has grown in size beyond these early conferences, it has become necessary to review how quality and inclusion can continue to be maintained in practice.

Figure 6 (personal photos): The presidents of ERME - Jean-Philippe Drouhard, Paolo Boero, Barbara Jaworski, Ferdinando Arzarello, Viviane Durand Guerrier and Susanne Prediger (see details in Section 10)

3 The ERME society: A present view (Susanne Prediger)

20 years after the founding of ERME, we can be very happy that ERME has succeeded in establishing the three C's:

- *Communication* is consequently established in the Thematic Working Groups due to the great work of the TWG leaders and co-leaders. Even in a conference with 26 TWGs (and 8 subgroups), communication was guaranteed by the rule of "30 minutes per contribution". Additionally, we extended the opportunities for communication by ERME Topic Conferences (ETC, see Section 10), six of them have already taken place.
- *Collaboration* was initiated and is evidenced by many joint publications among ERME members (see overview in Dreyfus et al., 2018). However, we feel that collaboration can still be fostered more.
- also *Cooperation* takes place in more stable contexts, for example in joint research and PD projects (funded by EU Horizon 2020 or Erasmus or bilateral foundations such as the German-Israeli foundation). For further deepening also the institutionalized cooperation across European countries, initiating collaboration and following it up is crucial, for the future.

Within the last twenty years, the ERME policy of inclusion and quality has successfully been installed, especially the TWG leaders and co-leaders do an enormous job in enhancing quality. During these years, inclusion has been interpreted as allowing all interested people to participate. However, ERME has not yet achieved to include all European countries, as we still have regional unbalances and emerging communities which are not yet present at the conference.

At the same time, CERME has experienced a massive growth, from 550 participants in 2013 to more than 900 in 2019 (see Figure 7). This success shows that the founders' choice to design CERME as a „thematic working space" (with the possibility of improving submitted texts before and after the conference) is very appreciated, not only in Europe, but also within the world community of mathematics educators. Among the 900 participants at CERME 11, 150 came from other continents. Thus, the founders' idea of offering CCC opportunities to researchers has been successfully spread to other continents, with the possibility of enriching exchanges. On the one hand, we can celebrate this as a huge success that more and more researchers from all over the world are interested in participating in the conference. However, *CERME's success is ERME's challenge,* as the growth of the conferences endangers both, quality and inclusion. That is why the ERME board has taken the decision that eternal growth is not desirable, and 900 participants is the maximum we can take. For the next conference, the ERME board and the IPC will develop new review procedures for selecting papers.

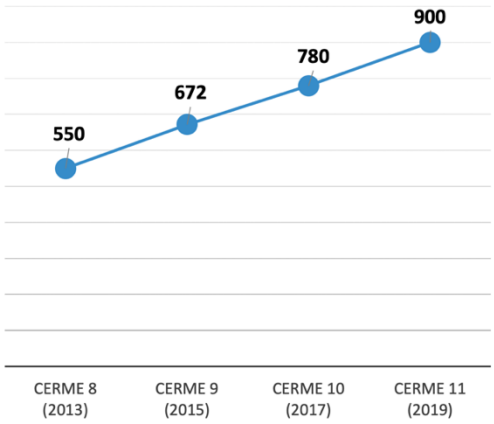

Figure 7: Increasing number of participants for the last conferences

This new situation requires a new interpretation of inclusion in the ERME policy: We must overcome a mainly *quantitative* interpretation of inclusion (as allowing every interested person to participate). Instead, the future inclusion strategies will focus on the heterogeneity of participants and develop approaches for supporting underrepresented groups for finding new balances

- between novices and experts
- between countries
- between well-established communities and newly emerging communities.

At the same time, we will enhance the interpretation of quality: In the future we will not only work on quality of individual contributions, but also on enhancing the three C's. Especially, we will search for new ways of supporting collaboration and cooperation across countries and research groups.

4 YERME and YESS: A historical view (Paolo Boero)

> YESS 1 at Klagenfurt in 2002 was my first international experience in math education, I have visited it as postdoc and immediately found my international family.

Figure 8 (H. Palmér): Example of pre-sent tweet

This spontaneous contribution to our panel from an ERME member well represents the "YESS spirit" and its aims, and more generally the orientation of all the ERME initiatives (YESS, YERME, the YERME day) addressed to people who enter the domain of research in mathematics education.

From the very beginning, one of the main ERME goals was to create a community of young researchers, who might grow up as EUROPEAN researchers in the WORLD context, each of them bringing the richness of her cultural, educational and research traditions, to be acknowledged as relevant contributions by the colleagues, each of them being willing (and able!) to Communicate, Collaborate and Cooperate with the other EUROPEAN and WORLD researchers. This goal was coherent with the general perspective, according to which ERME was founded (the "CCC spirit"). At CERME 2 in Mariánské Lázně, a meeting of young researchers was initiated where 22 of them

(mostly PhD students) and six senior researchers met in order to discuss young researchers' recent situation and to allocate suggestions to improve the situation. Finally, the young researchers were invited to meet as a group during the conference and to formulate their ideas and needs. A subgroup (Michele Cerulli, Petra Frantova and Jukka Törnroos, supported by Konrad Krainer) met, negotiated essential basic points and finally presented them at a plenary discussion at the end of the conference. For example, it was fixed that the group of young researchers was named YERME, that it will have three contact persons and will produce a contact list. It was recommended that, in the future, CERMEs could have a young researchers' day; in addition, a summer school (with workshops and feedback sessions) was proposed. In both cases, young researchers offered to be active in programme committees. Based on these suggestions, the ERME board started to design a summer school for young researchers (later named YESS) to be held every two years (starting 2002) and to start each CERME with a YERME day (starting 2005, formally decided 2003 at CERME 3).

YESS 1 and its design

The first summer school was planned in a meeting held in Klagenfurt in June, 2001 (see reports by Borromeo Ferri, Roth & Reinhold, 2002; Krainer, 2003). Two representatives of YERME were there, together with three members of the ERME board and three members of the University of Klagenfurt (which offered to host the first summer school). The design of the summer school was based on the following guidelines:

- The Working Group (WG) structure as the main feature of the summer school, and the request to all WG participants to prepare a written contribution related to the advancement of their research projects. These choices were coherent with the original planning of CERME, based on thematic WGs. A common theme would have allowed WG participants to better share experiences, readings, method and content choices. The request of a 4-6 pages summary on the personal stage of PhD studies (be it initial, or near to the conclusion, or even post-doc) was conceived with three aims: To favor a personal balance of the acquisitions and the needs, in the perspective of sharing them with the other participants; to let participants know in advance the interests and research orientations of the other WG members; to let the expert in charge of the WG prepare suggestions, references, etc. for each member, and plan the WG sessions, in order to tackle common or near problems/topics in each session.
- The role of the "expert" in each WG: Strong expertise in research and in the supervising of newcomers in the field was necessary. But it was not sufficient. An expert had not to be conceived as PhD super-supervisor! She had to play another, complex role: To provide the newcomers in the field with the opportunity of communicating their projects, preliminary results, needs in a CCC climate; to favor productive exchanges between participants; to provide them with "method" and "content" helps and suggestions (according to her research experience); to ensure a pluralistic vision on theoretical and method choices.

YESS, YERME and the YERME day

The interactions between experts, organizers and students in YESS 1 (2002) allowed the ERME board to better focus (and take precise decisions) on two kinds of needs, that had already been considered in more generic terms in the previous years:

- There was a challenge to create and prepare discussion spaces, within YESS and in the occasion of ERME conferences, where participants with interests in different areas of mathematics education could meet together and with experts to deal with topics related to the level of advancement of their PhD studies (e.g. how to choose and read a research paper? How to choose and formulate a research problem and the related research questions? What about the theoretical framework? How to choose a research methodology to deal with the research questions? How to write a research paper? Etc). This need brought to plan in advance Discussion Group sessions within YESS (in order to share the task of better coordinating and supporting them among the experts and the more experienced members of the programme committee); and to implement the idea of the YERME day (it was finally decided that it should consist of two half days of work for young participants in CERME, before the starting of CERME). The first official initiative involving young researchers took place in CERME 3 (2003) as a YERME meeting within the conference; the name YERME day was adopted for the two half days that preceded CERME 4 (2005) and all the subsequent CERMEs. In the two cases (YESS Discussion Groups and YERME day before CERME), the aim is to provide participants with occasions for dealing in depth, with the support of experts, on subjects (like those listed above, gradually made more precise and specific in the programme of subsequent summer schools) of common interest in each stage of the development of PhD studies and research projects. New formats will be found for the future, for example, the ERME Topic Conferences (ETC) can be opened with a YERME day, for discussing individual projects or a survey of the topic at stake, available before an ETC, as an introduction to the conference.
- There was a constant work on further developing YERME, with its autonomy, its tasks related to YESS and the YERME day, and also to CCC specificity for young researchers and to career needs (e.g. information on research jobs opportunities). During YESS, two time slots are dedicated to special Discussion Groups organized and led by the YERME representatives within the programme committee. The discussions concern the participants' challenges as PhD students, as participants in YESS, and their perspectives as regards the post-doc employments. During the YERME day, a special event is the plenary speech of a young researcher who recently entered a research career. She presents an account of the problems met by her during her PhD studies, of how she tackled them, and of how she succeeded in finding an employment opportunity after her PhD.
- At CERME 7 (2011), the ERME general assembly decided to strengthen the YERME voice in the ERME policy making. The ERME byelaws were modified to include two YERME representatives for four years, each from CERME 8 (2013) on.

Conclusion

The increased number of applicants to YESS (from 47, almost all from Europe, in the case of YESS 1, to more than 110, including those from America, Africa and Asia in the case of YESS 5, to 136 in the case of YESS 9 – always with candidates from other continents) encouraged the organizers to maintain and strengthen the original features of YESS. The number of WGs was increased from five in YESS 1 to six; the accepted participants have been 72 in the last editions, and will be 84 in YESS 10. In particular, participation of students from other continents is considered as an added value for

YESS (the same as for ERME!). Indeed the participation of young researchers from other research traditions, and with different cultural needs, was, is and will be an occasion for putting into practice the original reason for the existence of ERME (and YESS as well): A community of researchers, based on the positive evaluation of the rich European diversity, and coherently open to the constructive dialogue with other diversities in the CCC spirit.

Figure 9 (personal photos): Some mentors of YERME - Paolo Boero, Konrad Krainer, Dina Tirosh, João Pedro da Ponte and Viviane Durand-Guerrier

5 YERME and YESS: A young researcher's view (Simon Modeste)

As a young researcher and a participant in CERME, YERME and YESS events, I would like to describe my trajectory, as a testimony for this panel and illustrating the previous section.

My first contact with ERME and the YERME group was in CERME 7 in 2011. I was in the topic group on "Proof and argumentation". Looking at the "famous" names in the participants of the group (Paolo Boero was one of them), I was quite intimidated. I think this is the case for many young researchers before their first CERME. Fortunately, I had the opportunity to participate in the YERME day. This day, before the conference, is very important for newcomers. It allows young researchers to meet together, as a small group, to discuss, start knowing each other, share experiences and benefit from experts' workshops. Paolo Boero was one of the experts (for many generations of young researchers, Paolo is associated to YERME activities) and I attended his "famous" workshop on writing articles, where he makes you analyse and criticize one of his first articles. This is YERME spirit, and contributes to make you more comfortable as a young researcher in the community. Another important thing is that YERME day is oriented towards stimulating communication (in particular regarding the language issue for non-native English speakers). After the YERME day, you can join the conference and the working groups with much less stress. You meet known faces from the YERME day during the conference and can share experiences from the various groups. You have the feeling that you are part of the group of the European young researchers in mathematics education.

In 2012, I participated in YESS 6 in Faro (Portugal). It was six months before my PhD defence, and my dissertation was not written yet. I was very stressed, and meeting with other young researchers, benefiting from the pieces of advice from the expert of my workgroup, sharing experiences during the Discussion Groups have been very comforting and motivating. And I went back to work on my PhD with more energy.

Participating in YESS is sharing a week with young researchers and experts from ERME, where you feel like cut off from the rest of the world, focused on scientific activities. This is very pleasant and it is a luxury in a young researcher's life. The truth is that I don't know any event for young researchers which would be equivalent to YESS.

I also want to write briefly about the network of YERME. It is through this network that I was aware of post-doc positions and got the opportunity to be a post-doc researcher in another country. This permitted me to discover another school system, and another research culture. It brought me an international experience. I think that this is exactly the kind of opportunities that YERME wants to foster, by promoting international collaborations.

In 2018, I had the possibility to contribute to YERME activities, by organizing YESS 9. I was very proud to organize it after my rich experience from YESS 6. In collaboration with the ERME board and the scientific committee, I tried to base on this experience as a young researcher in the ERME community, to implement an organization that stimulates the interactions between young researchers. During the summer school, I have seen the group bonded, and the YERME community has strengthened during the week.

At YESS 9 in Montpellier, we had 136 applications for 72 places (6 working groups of 12), experts from different parts of Europe. The participants came from many countries in the world, representing all continents (of course, the majority from Europe). Figure 10 shows the whole group of participants at YESS 9.

Figure 10 (S. Modeste): Participants of YESS 9, Montpellier

Finally, I would like to summarize some important aspects of YESS, YERME and YERME day, and to add some new information (http://www.mathematik.uni-dortmund.de/~erme/). Essentially, YERME activities comprise two main events, each recurring every two years: The YERME day, and the YERME summer school (YESS). Each YESS has a programme committee, which consists of a scientific coordinator, two ERME Board representatives, three YERME representatives, two representatives from local organizers. Up to now, ERME has organized 9 YESS, the tenth is already fixed (see Section 10). Other YERME activities comprise participation in the ERME board and communication about YERME and relevant activities for young researchers. Two young researchers have seats in the board of ERME to represent the interest of YERME. Recently, these members are Dorota Lembrér, Norway (term ends in 2023) and Andrea Maffia, Italy (term ends in 2021). YERME is active on social media, in particular Facebook and Twitter. The official Facebook page for YERME is: https://www.facebook.com/YoungResearchersERME, a Twitter account with the same information can be found at https://twitter.com/YERMEeurope.

6 ERME book: Evolution, spirit and results (Tommy Dreyfus)

Upon the initiative of João Pedro da Ponte, the ERME board and its president Viviane Durand-Guerrier (Figure 11) decided that ERME should, on the occasion of its 20th anniversary, publish a book presenting ERME to mathematics educators world-wide.

Figure 11 (personal photos): The initiators - João Pedro da Ponte, Viviane Durand-Guerrier and the 2015 Board

The board named Tommy Dreyfus, Michèle Artigue, Despina Potari, Susanne Prediger and Kenneth Ruthven as editors (Figure 12), with Tommy as coordinating editor and Susanne as liaison person to the ERME board.

Figure 12 (personal photos): The editors - Tommy Dreyfus, Michèle Artigue, Despina Potari, Susanne Prediger and Kenneth Ruthven

The editors met in September 2015, and decided that the aim of the book shall be to present the most important directions, developments and trends of European Research in Mathematics Education in a highly readable text. Hence the book shall report on the main lines of development in ERME in the course of the past 20 years, showing the spirit of communication, cooperation, collaboration in the process;

- showcase past and current European research for audiences inside and outside Europe;
- and establish shared understandings in which to ground future European research in mathematics education.

Since the scientific interaction in ERME happens in the TWGs, a book structure was designed with an introduction by the presidents of ERME, 18 core chapters reflecting the work of the TWGs, and commentaries by two eminent scholars from outside Europe, Marcelo Borba and Norma Presmeg (Figure 13).

Figure 13 (personal photos): The commentary chapter authors - Marcelo Borba and Norma Presmeg

The editors chose a writing team for each chapter from among the leaders of the relevant TWGs – overall more than 60 authors contributed. It is notable that every single person who was asked accepted to contribute, and that the writing teams were very responsive to our editorial suggestions. They were also exemplary in keeping the schedule; this was especially crucial toward CERME 10, where the chapters were discussed in the relevant TWGs, so that the process of writing the book was a paradigmatic case of CCC.

The work on the book, and the commentary chapters in particular, raised some general comments and questions about ERME and research within ERME. A few of them will be raised here.

Borba, in his commentary, describes the dynamics of the creation, life and, in some cases disappearance of TWGs in ERME as a response to crises, for example crises in algebra learning and teaching, the integration of technology in classroom, or the low presence of modeling in school mathematics. He observed that some themes like the philosophy of mathematics education, distance education, and assessment were not or under-represented at CERMEs. While in the case of distance education, this may be due to the geographical nature of Europe, and in the case of assessment a TWG has recently been created, there does not seem to be an obvious reason for the absence of the philosophy of mathematics education.

A striking and possibly typically European phenomenon is that all 18 core chapters relate to theories or models. This begs the question whether the theoretical work of each TWG feeds back to the crisis Borba sees at the origin of the TWG? And it has led Presmeg to ask, in her commentary, whether ERME makes an effort to link the work of different TWGs, and whether theories can possibly serve to link the work of different TWGs, for example if one TWG attempts to understand what other TWGs mean by theory.

Presmeg also noted that the CCC spirit may support such links: Theories are designed in a specific context; they express particular world-views. A common research agenda, on the other hand, implies spelling out research paradigms, theories and methodologies, and therefore requires one to suspend or step outside of one's "natural" attitude (or habits). Work in ERME thus led researchers to use different theories as complementary lenses that provide alternative views of the same phenomenon. But it led far beyond this: A paradigmatic case of CCC with respect to theories was realized within ERME: The theory TWG was initiated at CERME 5; at a serendipitous meeting on the last day of the conference, a group of members of this TWG decided to further explore the issue of connections between theories – a case of *communication*. That group has then *cooperated* over 8 years, at CERME conferences and elsewhere; they developed *collaboration* on four case studies of links between theories, links of different kinds and strengths; and a book resulted from their efforts (Bikner-Ahsbahs & Prediger, 2015). This book would have fit very well into a book series under ERME's auspices.

Finally, is ERME international? And in what ways does ERME offer a distinctly "European" perspective on research in mathematics education? While there is no definitive answer to this, international participation at CERME grows from conference to conference; on the other hand, some specifically European aspects of work within ERME have been pointed out in the previous paragraphs; in particular, research traditions that have grown nationally have undergone a process of networking. ERME presents a healthy tension between national, European and international contributions.

The ERME book titled Developing Research in Mathematics Education: Twenty Years of Communication, Cooperation and Collaboration in Europe (Figure 14) appeared with Routledge (a division of Taylor and Francis) in 2018, on ERME's 20th anniversary. In parallel to the creation of the book, the ERME board has decided to launch an ERME book series (e.g. including volumes initiated by researchers at ERME topic conferences). Hence, the "ERME book" has become the inaugural volume of the ERME book series.

Figure 14: The ERME book

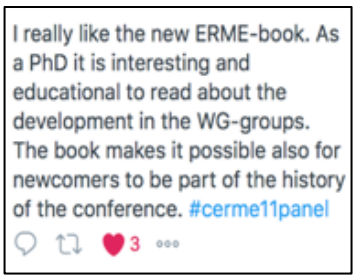

Figure 15 (H. Palmér): Example of pre-sent tweet

The editors hope that the book shows readers from Europe and beyond how research in ERME has developed, that book chapters are useful to introduce young researchers to areas active in ERME, that the ways in which ERME promotes research through CCC emerge, and that the book will serve as a close companion to each ERME member in their research. The tweet in Figure 15 is a small indication that these hopes are at least to some extent realistic.

7 ERME book: A young researcher's view (Jana Žalská)

The ERME book "Developing research in mathematics education" will serve as an enriching volume to any researcher in the field of mathematics education. As a young researcher and a participant in CERME, YERME and YESS events, I appreciated especially its value in providing the valuable sense of context (historical, geographical and cultural), and of the organic and dynamic aspects of the field's epistemic development.

Making sense of the context

The introductory chapter of the book helps to situate ERME's endeavors in research, introducing the roots and development of ERME, and explaining not only its guiding values and principles but also the rationale behind them.

Secondly, the core chapters provide overviews on specific areas of research, so they might establish a context for a research question we may pursue. The texts often refer to the geographical (national) context of particular research developments in specific areas of mathematics education, use and developments of concepts and theoretical frameworks etc.

Thirdly, reading about comparable contexts gives us a notion of our own local (e.g., national) context, even when not specifically mentioned through the chapters. It may be an essential contribution to understanding, identifying and describing our own local educational and research context in a similar way.

All of the above contextual notions are vital in determining the direction we envision in participating in the research endeavors within ERME. At the same time, the two commentary chapters bring the activities and principles of ERME under a broader lens, that is to say, zooming out on the bigger picture and reminding us of its current limits and shape.

Organic growth and inclusiveness

The sense of organic growth of the body of knowledge in the community permeates each of the book's content chapters. Finally, Chapter 20 reassures us that striving for "unity in diversity" (Dreyfus et al., 2018, p. 285) is attainable through such an endeavor. For me as a young researcher, this means encouragement in the belief that my own research matters, and the confidence that I, too, am part of this process.

Finally, this book has succeeded in making a significant step toward molding further an identity of a unique community. The book's strong emphasis on reflection and the process of convergent thinking is a tremendous effort of this community to understand itself as much as to understand its subject of research.

8 Conclusion and further directions (Susanne Prediger)

The discussion was insightful and provided hints to promising future activities of ERME in all areas of work, initiating communication, collaboration and cooperation, promoting young researchers, strengthening the visibility of European mathematics education research and increasing inclusion by supporting underrepresented countries. We will think about

- how to keep all the good tradtions that were praise by so many members
- how to enhance the CERME programme structure for initiating collaboration
- how to strengthen the three C's between conferences
- how to engage young researchers in the work of the TWGs and to
- elaborate our contacts to mathematicians
- especially, we will explore how to support mathematicians to enter the field of mathematics education research.

Future directions might be as listed in Figure 16.

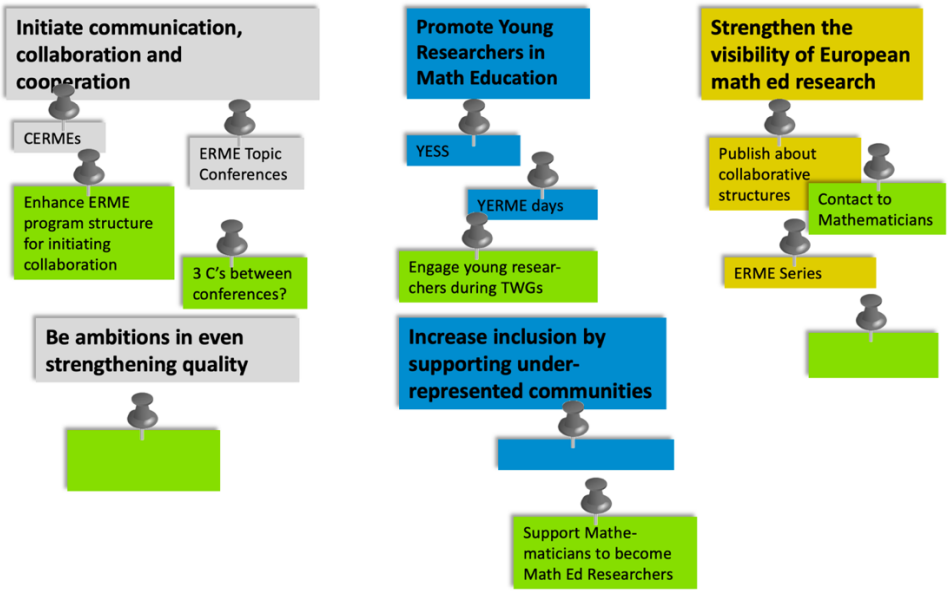

Figure 16: Future directions for ERME work (S. Prediger's final slide from the panel)

9 Resume (Hanna Palmér and Konrad Krainer)

The panel was ended as it started, by concluding that ERME, CERME and YERME are AMAZING success stories. Through these events the community share, work on and develop research in mathematics education. Thus, the initial three C's have been kept,

- Communication *with our colleagues throughout Europe, but also beyond*
- Cooperation *in and around research topics*
- Collaboration *in designing and doing research together*

This fantastic history is presented in all CERME proceedings and also in the ERME book. During the panel a new C was introduced – Challenge. The challenges raised were connected to inclusion, quality, regional unbalances, emerging communities and, maybe also the initiative to use twitter to increase the dynamics of the panel. However, it was concluded that challenges only become obstacles if we bow to them.

The success of ERME, YERME, CERME and its publications has many fathers, mothers, sisters, brothers, friends, etc. A whole network of engaged people and organizations is needed.

The most important people are the participants, YOU! In addition, we need people who take responsibility for working groups, thematic conferences or a CERME itself. Without group leaders, subgroup leaders, IPCs and LOCs, a society cannot live. The young people will shape the future, all others need to take actions that they can do that! Without a strong YERME, we don't will have a good future. A society needs relevant others, like our home institutions like universities, and sponsors etc.; but we need institutional friends like ICMI, PME and other organizations. This means to enact the CCC spirit not only on the individual level, but also on an organizational level.

And of course, we need people who take responsibility for the whole, for ERME as a scientific society. The board has both, the task to live our goals, but also to further develop it, in continuous negotiation with its members.

Having observed the development of ERME from the very beginning, we feel that we can hopefully look into the future! All of you have contributed to the success!

10 Some relevant data about the ERME society (Konrad Krainer and Susanne Prediger)

A variety of background information about ERME can be found at http://www.mathematik.uni-dortmund.de/~erme/ (ERME, 2019). In the following, some relevant data are presented:

ERME conferences (for proceedings see ERME website)

- CERME 1 in Osnabrück, Germany (1998)
- CERME 2 in Mariánské Lázně, Czech Republic (2001)
- CERME 3 in Bellaria, Italy (2003)
- CERME 4 in Sant Feliu de Guíxols, Spain (2005)
- CERME 5 in Larnaca, Cyprus (2007)
- CERME 6 in Lyon, France (2009)
- CERME 7 in Rzeszow, Poland (2011)
- CERME 8 in Antalya, Turkey (2013)
- CERME 9 in Prague, Czech Republic (2015)
- CERME 10 in Dublin, Ireland (2017)
- CERME 11 in Utrecht, The Netherlands (2019)
- CERME 12 will take place in Bolzano, Italy (2021)

YERME summer schools

- YESS 1 in Klagenfurt, Austria (2002)
- YESS 2 in Poděbrady, Czech Republic (2004)
- YESS 3 in Jyväskylä, Finland (2006)
- YESS 4 in Trabzon, Turkey (2008)
- YESS 5 in Palermo, Italy (2010)
- YESS 6 in Faro, Portugal (2012)
- YESS 7 in Kassel, Germany (2014)
- YESS 8 in Poděbrady, Czech Republic (2016)
- YESS 9 in Montpellier, France (2018)
- YESS 10 on Rhodos, Greece (2020)

ERME topic conferences

- ETC 1 on Anthropological Theory of the Didactic in Castro-Urdiales, Spain (2016)
- ETC 2 on University Mathematics Education in Montpellier, France (2016)
- ETC 3 on Mathematics Teacher Education in Berlin, Germany (2016)
- ETC 4 on Mathematics and Language in Dresden, Germany (2018)
- ETC 5 on Mathematics Education in the Digital Age in Copenhagen, Denmark (2018)
- ETC 6 on University Mathematics Education in Kristiansand, Norway (2018)
- ETC 7 on Language in the Mathematics Classroom in Montpellier, France (2020)
- ETC 8 on University Mathematics in Bizerte, Tunisia (2020)
- ETC 9 on Arithmetic and Number systems in Leeds, United Kingdom (2020)
- ETC 10 on Mathematics Education in the Digital Age in Linz, Austria (2020)

ERME book series

- Volume 1: Dreyfus, Tommy, Artigue, Michèle, Potari, Despina, Prediger, Susanne & Ruthven, Kenneth (Eds.). (2018). Developing Research in Mathematics Education: Twenty Years of Communication, Cooperation and Collaboration in Europe. London: Routledge.
- Volume 2: Bosch, Marianna, Chevallard, Yves, García, Francisco Javier & Monaghan, John (Eds.). (2020). Working with the Anthropological Theory of the Didactic in Mathematics Education: A Comprehensive Casebook. London: Routledge.
- Volume 3: Zehetmeier, Stefan, Ribeiro, Miguel & Potari, Despina (Eds., in prep.). Mathematics Teaching, Resources and Teacher Professional Development. London: Routledge.
- Volume 4: Durand-Guerrier, Viviane, Hochmuth, Reinhard, Nardi, Elena & Winsløw, Carl (Eds., in prep.): Research and Development on University Mathematics Education (preliminary title). London: Routledge.
- Volume 5: Planas, Nuria, Schütte, Marcus & Morgan, Candia (Eds., in prep.): Classroom Research on Mathematics and Language. London: Routledge.
- Volume 6: Clark-Wilson, Alison, Donevska-Todorova, Ana, Fagiano, Eleonora, Trgalova, Jana & Weigand, Hans-Georg (Eds., in prep.): Mathematics Education in the Digital Age: Learning, Practice and Theory. London: Routledge.

The ERME book series editors are Viviane Durand Guerrier, Konrad Krainer, Susanne Prediger and Nad'a Vondrova.

The first ERME board members

- 1998-2005 Paolo Boero (Italy)
- 1998-2005 Marianna Bosch (Spain)
- 1998-2005 Elmar Cohors-Fresenborg (Germany)
- 1998-2001 Jean-Philippe Drouhard (France)
- 1998-2003 Konrad Krainer (Austria)
- 1998-2003 Jarmila Novotná (Czech Republic)
- 1998-2001 João Pedro da Ponte (Portugal)
- 1998-2001 Leo Rogers (United Kingdom)
- 1998-2003 Julianna Szendrei (Hungary)

ERME presidents

- 1997-2001 Jean-Philippe Drouhard (France)
- 2001-2005 Paolo Boero (Italy)
- 2005-2009 Barbara Jaworski (United Kingdom)
- 2009-2013 Ferdinando Arzarello (Italy)
- 2013-2017 Viviane Durand Guerrier (France)
- since 2017 Susanne Prediger (Germany)

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