



Introduction to the papers and posters of TWG12: History in Mathematics Education

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CERME 12: Thematic Working Group 12

History in Mathematics Education

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Introduction

History of mathematics *in* mathematics education, and history *of* mathematics education continue to receive much attention. Although empirical research and coherent theoretical/conceptual frameworks within this area have emerged relatively recently, there exists an increasing interest in these lines of work. The purpose of this CERME TWG is to provide a forum to approach mathematics education in connection with history and epistemology.

TWG12 welcomes both empirical and theoretical research papers, and posters proposals related to one or more of the following issues – although any paper or poster of relevance to the overall focus of the group is taken into consideration. All educational levels can be considered, from early-age mathematics to tertiary education and teacher training:

1. *Design of teaching/learning materials using the history of mathematics, preferably with conclusions based on empirical data.*
2. *Research on the existing uses of history or epistemology in curricula, textbooks, or classroom practice.*
3. *Research on the history of mathematics education, on local, national or international level.*
4. *Connections between mathematics education, history of mathematics, and history of mathematics education: Theoretical and methodological issues.*

Even though the inception of this TWG is fairly recent – it started in CERME6 (2009) – it has deeper institutional roots within the mathematics education research community. The *History and Pedagogy of Mathematics* (HPM) study-group (<http://www.clab.edc.uoc.gr/hpm/about%20HPM.htm>) was created at the 1972 ICME conference; it has been organizing satellite conferences to the ICME meetings since 1984, and has several active regional branches (HPM-Americas, European Summer Universities).

In CERME12, TWG12 accepted 13 papers and 1 poster. One paper was withdrawn due to financial problems, one participant could not present because of illness. The Covid pandemic was the reason that CERME12 was delayed until 2022, however, even in 2022 all sessions were on-line. Thanks to the excellent virtual platform created by the Free University of Bolzano and the effort and enthusiasm

of the organization and participants, TWG12 was again a success, though with participants from a more restricted range of countries than in previous years

Before going into any details, it should be stressed that TWG12 has four general but distinctive features which give these meetings their specific flavour. Firstly, its topic lies at the intersection of different fields of research – mathematics education research and history of mathematics – which requires versatility and methodological vigilance (Fried, 2001; Chorlay & Hosson, 2016). Secondly, the strength of the historical and the HPM community varies greatly among countries, and these meetings play a crucial role for researchers working in relative isolation, and with difficult access to resources in the field. Thirdly, the scope of TWG covers both history in mathematics education and history of mathematics education, which are two significantly different research topics (TSG 27 and 55 in ICME14); connecting the two lines of investigations is a constant challenge. Fourthly, since the topic of TWG12 is neither specific to one level of the educational system (from primary education to teacher-training) nor to any single mathematical topic (be it fraction concepts, algebra, proof, etc.), the work in TWG12 intersects that of most other TWGs. It should be noted that, as in former editions of CERME, there was little intersection with what was covered in TWG8 (Affects and the teaching and learning of mathematics), TWG10 (Diversity and mathematics education), in spite of the fact that it is not uncommon for outsiders of the HPM research community – among which most policy-makers and curriculum-designers – to ascribe such goals to the historical perspective in teaching.

These four features make these meetings not only useful but also challenging and exciting. As the final discussion made clear, the general feeling among the participants was that one of the main outcomes of this meeting is that we actually learned a lot from the one another, both from their papers and from the lively discussions.

Some significant features of the 2022 conference

From an organizational viewpoint, due to the relatively small number of contributions, the TWG12 team decided to offer three work formats for the sessions. In addition to the two traditional formats – oral presentations of a paper (talk) and discussions of topics of general interest – we also organized two 1h30-hour workshop sessions (with two parallel presentations each). A distinctive feature of TWG12 is that it potentially covers all mathematical topics, all historical periods, and many different research perspectives (history of education, historical roots of a given concept or practice, analysis of teaching resources and curricula, task design, analysis of teaching practices, training design etc.), usually making it difficult for the participants to make the most of short oral presentations and 8-page papers. The workshop format enabled some of the participants to actually share some material, and discuss both research questions and methodological issues. Out of the 13 contributions four were found particularly suitable to be presented in a workshop: two contributions on history *of* mathematics education (Hamann & Schmidt-Thieme, Goemans & De Bock) and two on history *in* mathematics education, either at the secondary level (Spies & Junker) or in teacher education (Arnal-Bailera, Beltrán-Pellicer & Oller-Marcén). The participants of TWG12 agreed that the new format was enjoyable and should be kept for upcoming CERME conferences, whenever possible.

As to content, there was a general balance between the two main lines of investigation: 6 papers on the history of mathematics education, and 7 papers on history in mathematics education. Let us highlight a few features of the Bolzano edition of CERME, without aiming for a thorough survey.

As far as history of mathematics education is concerned, a significant share of the papers bore on the New Maths movement in Europe, thereby shedding light on this complex historical phenomenon from a variety of perspectives: connections with advanced mathematics (in terms of content and of interactions among different social groups and stakeholders); controversies at the time of the reform and long-term effects (if any); impact on curricula, teaching resources, and actual teaching practices; specifics of different countries (Belgium, Nordic countries) and of different segments of the education system (e.g., vocational training).

As far as history in mathematics education is concerned, the “traditional” line of work on task design was represented by several papers (Surroca, Spies, Oswald). In spite of differences in terms of mathematical contents and segments of the educational system at stake (from primary to tertiary education), these papers illustrate how the HPM perspective requires that researchers combine inputs from two different fields of research, mathematics education and history of mathematics. They also showcase a practice which lies at the heart of the HPM perspective: the use of original historical sources in the classroom (Chorlay, 2016).

Over the last decade, teachers have become a central topic of interest for researchers working in the HPM community, with inputs from many theoretical frameworks. Teacher education was the main focus of the papers presented in CERME 12, with analyses making use of a variety of theoretical constructs and frameworks from mathematics education: the “four S”-model (van den Bogaart), Zhang’s the ADTRE model, and Godino’s “epistemic configurations” (in the paper of Oller-Marcén et al.). By contrast, the analysis of “ordinary” teaching practices in primary or secondary education is still an emerging topic, with one paper in CERME 12 (Chorlay), with theoretical inputs from the Documentational Approach to Didactics (Gueudet, Pepin, Trouche) and the Didactic and Ergonomic Double Approach (Robert, Rogalski, Vandebrouck).

Challenges for the future

The number of papers and posters presented in TWG12 was modest, and half of the participants of this edition of TWG12 were first-timers. This reflects the fact that, in spite of the fact that the HPM community has a stable international basis and ramifications in many countries, it remains somewhat marginal within the mathematics education community. Some of the reasons accounting for this situation are structural and beyond the scope of our actions, such as the modest role of history of mathematics in curricula, and the necessity for researchers in this field to be knowledgeable in two different areas (history and mathematics education). However, the importance of the inclusion of history of mathematics in teacher training seems to be gaining more recognition in many countries, thus providing opportunities to further and disseminate research. Also, the fact that research carried out from an HPM perspective touches on virtually all mathematics education topics should pave the way for exchanges and collaboration. While this is true at a theoretical level, it remains a challenge to strengthen and stabilize these connections. In the spirit of CERME’s three Cs (Communication – Cooperation – Collaboration), it is one of the aims of TWG12 to reach out and generate fruitful interactions.

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