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Introduction to the papers of TWG12: 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. However, empirical research and coherent theoretical/conceptual frameworks within this area have emerged relatively recently. 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 poster proposals related to one or more of the following issues:

1. Design and/or assessment of teaching/learning materials using the history of mathematics, preferably with conclusions based on empirical data; all levels can be considered, from early-age mathematics to tertiary education and teacher training.
2. Surveys on the existing uses of history or epistemology in curricula, textbooks, and/or classrooms in primary, secondary or tertiary levels, and in teacher training;
3. History of mathematics education;
4. Relationships between, on the one hand frameworks for and empirical studies on history in mathematics education and, on the other hand, theories, frameworks and studies in other parts of mathematics education research.

Even though the inception of this TWG is fairly recent – it started in CERME6 (2009) – it has deeper institutional roots within the maths education research community. Indeed, the *HPM* study-group (*History and Pedagogy of Mathematics*) 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 CERME11, 13 papers and 3 posters were presented in TWG12, with participants coming from a large range of European countries and beyond (Brazil, Tunisia). The topics covered by TWG12 were also reflected in Kathy Clark's plenary address on *History and pedagogy of mathematics in mathematics education: History of the field, the potential of current examples, and directions for the future*.

Before going into any details, it should be stressed that this TWG 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 – maths 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 24 and 25 in ICME13); 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, for this edition, there was little intersection with what was covered in TWG8 (Affects and the teaching and learning of mathematics), TWG10 (Diversity and maths 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 made this meeting 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 2019 conference

A large share of the papers bore on teacher training, either for prospective or in-service maths teachers. Two case studies, one presented by Barreras and Oller-Marcén, and one by Bernardes and Bruna-Correa, showed how confronting teachers with mathematical documents from the past can be a tool both for research into teachers' content knowledge, and for the professional development of teachers. From another perspective, van den Bogaart and Schorcht focused on teachers' beliefs, either when studying some history of maths as part as their per-service training, or when assessing the didactical potential of classroom activities with some historical content.

By contrast, few papers were dedicated to what has long been a central line of research in the HPM community, namely the use of historical documents in the classroom. However, these few papers point to fresh research directions. For instance, the poster of Olsen and Thomsen aimed to connect the studies on history of maths in the classroom with those on the use of ICT. Chorlay's paper bore on primary school mathematics and argumentation, thus illustrating the new approach in the French IREM community, with its greater emphasis on the actual teaching effects of experimental sessions and its rather new involvement with pre-secondary mathematics. This new approach led to the publication of a textbook (Moyon & Tournès, 2018), which was awarded the 2019 prize for best science teaching resource by the Paris Academy of science.

On a par with teacher-training, a significant share of the papers bore on the history of mathematical education; a fact which bears witness to the vitality of this research field at the international level. We are pleased that TWG12 of CERME provides opportunities for researchers working in different fields – mathematics education research, history of mathematics, and history of mathematics education – to interact fruitfully. The papers on topics from history of maths education presented in this CERME conference gave food for thought for mathematics education researchers working on textbooks (Hatami and Pejlare), resources for teaching and the professional development of teachers

(Krüger), testing and assessing (Smestad & Fossum). Several papers (Zwaneveld & De Bock, Weiss & Känders) bore on fairly recent historical developments, thus shedding a new (and occasionally critical) light on current trends. History of education was complemented with inputs from sociology in Hamann's work, in order to sketch a general model for education reform.

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