ERME Column

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ERME Thematic Working Groups

The European Society for Research in Mathematics Education (ERME) holds a biennial conference (CERME), where research is presented and discussed in Thematic Working Groups (TWGs). We continue here the initiative (which began in the September 2017 issue) of introducing the working groups, 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's Thematic Working Group 12 – History in Mathematics Education
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Even though the inception of this TWG is recent (CERME6, 2009), it has deep institutional roots within the mathematics education research community. Indeed, the *History and Pedagogy of Mathematics* study group (HPM [1]) was founded at the 1972 ICME conference; it has been organising satellite conferences of the ICME meetings since 1984 and has several active regional branches (e.g. HPM-Americas and European Summer Universities). At CERME10 (2017), 16 papers and two

posters were presented in TWG12, covering a large range of European countries (from Ireland to Russia) and beyond (Brazil, Mexico and the U.S.). A survey has shown that this TWG has attracted newcomers to the CERME community from the HPM community, since nine participants were CERME first-timers yet only two had never attended an HPM-related event. The strength of the historical and HPM communities varies greatly among countries and these meetings play a crucial role for researchers working in relative isolation.

The work carried out in TWG12 lies at the intersection of two different fields of academic research: mathematics education and history of mathematics, a specific situation which calls for versatility and methodological vigilance [2]. The historical approach enables researchers to consider mathematics not only as a collection of facts and methods but as a multifaceted human endeavour. At the interface between the two fields, TWG12 meetings allow the dissemination of recent results and renewed perspectives from historical research, including: empirical and theoretical investigations into the variety of science-makers, the nature of the work collectives and the epistemological cultures shaping the engagement with mathematics; studies on the forms and the meaning of algorithmic and diagrammatic thinking; studies on the role of examples, numerical tables and problems, either in themselves or as organised collections. The underlying rationale is not that of a parallelism between historical "development" and cognitive development of the learner but that – on a par with mathematical knowledge – historical knowledge provides relevant tools and insights for all facets of didactical research. This was reflected in the papers presented at CERME10, with an emphasis on argumentation in numerical and algebraic contexts. It should be noted that there was little intersection with what was covered in TWG8 (Affects and mathematical thinking) and TWG10 (Diversity and mathematics education), in spite of the fact that it is not uncommon for outsiders to the HPM research community – including policymakers and curriculum-designers – to ascribe such pedagogical goals to the historical perspective in teaching.

For a few years now, research perspectives on the design of tasks using historical documents – either in the classroom or in teacher-training – have evolved significantly. Even though there is still room for new insights into the "why" question and for accounts of small-scale design-processes, the emphasis has shifted to place greater attention on the "how" question [3], on the theoretical analysis of the nature of the expected educational effects and on the importance of empirical studies into actual effects. As far as higher education is concerned, the latest developments of the TRIUMPHS [4] project were discussed at CERME10. This five-year project, funded by the National Science Foundation in the U.S., will create 25 full-length Primary Source Projects (PSPs) and 30 one-day "mini-PSPs", allowing students to study "from the masters" (such as Euler, Cauchy and Cantor). The project includes an extensive "research with evaluation" study, which will enable both formative and summative evaluation of the project activities. By the end of the project, it is expected that some 50 instructors and over 1000 students will have participated.

Two other promising research topics were discussed at the conference. One covers the "how" question, prompting us to carry out empirical investigations into the actual practices of "ordinary" teachers attempting to integrate historical elements in the classroom. The other highlights the potential of studies combining history of mathematics education and history of didactical theories for the networking of theories in mathematics education.

References

[1] http://www.clab.edc.uoc.gr/HPM/.
[2] Chorlay, R, de Hosson, C. (2016). History of Science, Epistemology and Mathematics Education Research. In B. Hodgson, A. Kuzniak, J.-B. Lagrange (Eds.) *The Didactics of Mathematics: Approaches and Issues* (pp. 155–189). Springer International Publishing, Switzerland.
[3] Jankvist, U. (2009) A categorization of the 'whys' and 'hows' of using history in mathematics education. *Educational Studies in Mathematics* 71(3):235–263.
[4] Transforming Instruction in Undergraduate Mathematics via Primary Historical Sources, http://webpages.ursinus.edu/nscoville/TRIUMPHS.html.

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Jason Cooper is a research fellow at the University of Haifa's Faculty of Education. He is also a researcher at the Weizmann Institute's Department of Science Teaching. His research concerns various aspects of teacher knowledge, including roles of advanced mathematical knowledge in teaching and contributions of research mathematicians to the professional development of teachers. He has been a member of the ERME board since 2015.