



Topic Study Group 5.4: The role of the history of mathematics in mathematics education

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Team details

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Overview

This Topic Study Group, TSG 5.4 comes after the meaningful advance of research and the dialogues between history of mathematics and mathematics education in different parts of the world from many perspectives. It builds on the relationship between these two important fields of knowledge.

It aims to provide a forum for participants to share their research interests and results, as well as their teaching ideas, published materials and classroom experience in connection with the integration of the history of mathematics in mathematics education.

Theoretical background





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Mathematics is a human intellectual enterprise with a long history and a vivid present, so that both scholars and teachers have tried to make fruitful historical links. Mathematical knowledge is determined not only by the circumstances in which it was formalised, but also by the procedures that originally led or may lead to it, and which are indispensable for understanding processes of change in mathematics. Therefore, learning mathematics should include not only the “polished products” of mathematical activity but also the understanding of (implicit) motivations, the sense-making actions, and the reflective processes of mathematicians, historically important for the construction of meaning. Similarly, teaching mathematics should include opportunities for students to “experience mathematics in the making.” That is, although the “polished products” of mathematics form that part of mathematical knowledge that is communicated, critiqued (in order to be accepted or rejected), and serve as the basis for new work, the process of producing mathematical knowledge is equally important, especially from a didactical point of view. This perception of mathematics should be central in the teaching of mathematics, and the image of mathematics communicated to the outside world.

From a more fundamental viewpoint, history of mathematics can be seen as a resource for mathematics education research, whether to better understand the “raison d’être” and conceptual difficulties associated with specific notions, or to shed light on the rules of the mathematical game. The dialogue between two different research fields – mathematics education research and history of mathematics – has played a significant role for standard theoretical constructs in mathematics education research, and should be furthered.

Relevance

Connecting with the history of mathematics can improve mathematics education at all levels. While mathematics is central to our modern society and although a mathematically literate citizenry is essential to a country’s vitality, this TSG will foster an appreciation that historical and epistemological issues of mathematics are also worth studying.

In this wider context, history and epistemology of mathematics have a yet more important role to play in providing a more robust education of the community. This is most important, and especially today where many countries are concerned about the level of mathematics that their students are attaining and about students’ decreasing interest in mathematics at a time when the need for both technical skills and a broader education is rising.





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Areas of interest

The program of TSG 5.4 will be structured around the following main themes:

1. Theoretical and/or conceptual frameworks – in particular from general mathematics education research – for integrating history in mathematics education;
2. Connections between mathematics education research and history of mathematics, construed as distinct but mutually enlightening research fields;
3. Empirical research in history and epistemology implemented in mathematics education: Classroom experiments and teaching materials, considered from various perspectives; e.g., cognitive, didactical, pedagogical, affective, etc.;
4. Analyses of the history of mathematics as it appears in curricula, textbooks or online resources;
5. The role of original sources in the classroom, and their educational effects;
6. The use of digital technologies to support a role for the history of mathematics in the teaching and learning of mathematics;
7. History and epistemology as tools for an interdisciplinary approach in the teaching and learning of mathematics and the sciences by unfolding their productive interrelations; and
8. Mechanisms studied to fruitfully connect cultures and mathematics.

Every effort will be made to allow researchers to present their work and get fruitful feedback from the discussion, while stimulating the interest of newcomers to this field, including classroom teachers, by giving them the opportunity to get a broad overview on the state-of-the-art in this area.

Of course, the discussion within the TSG refers to all levels of education – from primary school to tertiary education, including in-service teacher education – preferably on work and conclusions based on actual classroom experiments and/or the development and use of teaching and learning materials. Discussion will allow participants to share perspectives and experiences to jointly address some of the key issues associated with productive partnerships between the history of mathematics and mathematics education, as well as bridging some of the theory and practice gaps observed in the past.

How to make a submission to this Topic Study Group

Submissions for Topic Study Group Papers and proposals for Posters open 28 April 2023 via the official ICME-15 website, icme15.org. The website also contains a timeline of dates for the activity of the Topic Study Groups in the lead up to the Congress.





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For questions about this TSG, please contact the Co-Chairs using the email addresses provided.

