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# ORIGINAL SOURCES IN THE MATHEMATICS CLASSROOM

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## ABSTRACT

This discussion group seeks to bring together individuals who are interested in the use of original sources in the mathematics classroom, from the perspective of a classroom teacher or a mathematics education researcher, for a discussion of issues and concerns related to their educational potential and effects. Each of the two sessions will focus on a different theme related to the use of original sources in the mathematics classroom. The two sessions will be structured around a common framework but sufficiently independent of each other to allow interested individuals to participate in the second session, even if they did not participate in the first session. Both novice and more experienced users of original sources are strongly encouraged to participate in both sessions.

## 1 Overview: The value of an explicit-reflective framework

This discussion group will explore issues related to the use of original sources in mathematics classrooms as a means to create inquiry based learning experiences that invite students into (parts of) some (past) mathematicians' "work bench," as a means of allowing them to engage in learning processes that to some extent mimic what mathematicians do when they produce new mathematical knowledge. We will consider in particular the importance of (a) making the educational ambitions and learning objectives of such experiences *explicit* and (b) designing activities that promote student *reflection* on their learning experiences. The notion of an explicit-reflective framework<sup>1</sup> will thus serve as an organizing theme for a discussion of different strategies for using original sources with students as a means to teach them mathematics, to enhance their understanding of the nature of mathematics, to develop their historical awareness or to achieve more general educational goals. We will also consider the ways in which such a framework opens up the possibility of establishing complex learning environments and situations that may address combinations of these learning goals.<sup>2</sup> As part of this discussion, we will address the questions of "what, how, and why" regarding the potential roles, uses and benefits of integrating original sources into mathematics education, but with an emphasis on actual classroom teaching practices (versus an investigation of the general arguments for using original sources and integrating history into mathematics education<sup>3</sup>). Additionally, we will consider the value of basing the development of explicit-reflective frameworks for using original sources in mathematics classrooms on a theoretical

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<sup>1</sup> We have borrowed this notion from Abd-El-Khalick's and Lederman's (2000) work in science education. See Kjeldsen (2014) for an exploration of the framework within an existing practice of mathematics education

<sup>2</sup> See Barnett, Penglsey and Lodder (2014) for concrete illustrations of such learning environments.

<sup>3</sup> For this we refer to Tzanakis et al. (2002), see also the survey paper by Jankvist (2011).

foundation drawn from the research areas of history and philosophy of mathematics and the teaching and learning of mathematics.

## **2 Session 1: Educational Potential of Original Sources**

The theme of the first session is the educational potential of original sources and the notion of explicit-reflective frameworks. Questions related to this theme that will be discussed include:

- Why are we as mathematics teachers and/or researchers interested in using original sources with students? What are potential gains for students? For instructors?
- How are original sources being used in math teaching, by whom, for what purpose?
- Based on different pedagogical goals and learning objectives, what type of original source readings and reflective challenges for students are most appropriate?

## **3 Session 2: Resources and Research Needed to Support Classroom Use**

The second session will focus on what is needed in terms of classroom resources and educational research to support the use of original sources in the classroom in order to promote their full potential for students. Questions related to this theme include:

- What do we know about the effect of learning mathematics from original sources? What would we like to know? How could we find that out?
- What resources exist/are needed to assist instructors in using original sources?
- Can we develop general principles for source selection and guides for creating explicit-reflective learning environments?

## **4 Overall structure of discussion sessions**

Each session will begin with a brief introduction to that session's overall theme to set the scene for the session. Participants will then work together in smaller groups for 20-25 minutes, guided by discussion worksheets to be provided by the organizers, to examine issues related to that session's theme. A plenum discussion that brings all participants back together in order to exchange and synthesize ideas generated by the various groups will round out each session. Possible opportunities for and interests in forming future working groups will be explored and facilitated in each plenum discussion.

The two sessions will be sufficiently independent of each other to allow interested individuals to participate in the second session, even if they did not participate in the first session. Both novice and more experienced users of original sources are strongly encouraged to participate in both sessions.

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