

History of Mathematics in Classroom Teaching --- Appetizer? Main Course? Or Dessert?
(From the Guest Editors)

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During the 10th *International Congress on Mathematical Education* (ICME 10) held in Copenhagen on 4-11 July 2004, several activities were devoted to the relations between the history of mathematics and the learning and teaching of mathematics. Among these activities Topic Study Group 17 (TSG 17), titled *The Role of the History of Mathematics in Mathematics Education*, was organized by A. El Idrissi (Morocco), S. Kaijser (Sweden), L. Radford (Canada), M-K. Siu (China, co-chair) and C. Tzanakis (Greece, co-chair). The four sessions in this group were attended by about 70 people from more than 20 countries and focused on *integrating the history of mathematics in the learning and teaching of mathematics*, in an effort to make clearer the meaning of a *historical dimension in mathematics education* and to deepen the understanding of its various aspects. The final programme consisted of 13 presentations with follow-up discussions among the participants. Relevant material on the presentations has been made available on the TSG 17 web page in the form of extended abstracts, full texts, related papers or links to other websites, so that prospective participants were able to download material of interest to them and study it in advance. This Special Issue of the *Mediterranean Journal for Research in Mathematics Education* is a collection of the edited and revised version of most of the papers presented in TSG 17.

The aim of TSG 17 is to provide a forum for participants to share their teaching ideas and classroom experience in connection with the history of mathematics, in the spirit of the 10th ICMI (*International Commission on Mathematical Instruction*) Study on the role of the history of mathematics in the learning and teaching of mathematics, which led to the publication in 2000 of *History in Mathematics Education: The ICMI Study*, edited by John Fauvel and Jan van Maanen, and to learn about work that has been done since then.

Introducing a *historical dimension in mathematics education* involves three different areas: *mathematics*, *history* and *didactics*. Implicit to the papers collected here is the key issue, *viz* to find and elaborate on a harmonious, balanced and effective interrelationship among these three scientific areas in a way that is enlightening and fruitful in mathematics education. The papers approach this key issue in different ways,

focusing on at least one of the following four points:

- (i) To consider in detail *epistemological issues* relevant to the relations between mathematics, history, mathematics education and other disciplines, which although long-standing, still remain at least partially unsettled

This is important in order to understand better to what extent introducing a historical dimension in mathematics education is possible, legitimate, or beneficial for the learner and the teacher. Three papers attempt to consider such issues. [Discussion on separate papers omitted]

- (ii) To enrich *teachers' education* at all levels, both by introducing courses in (particular aspects of) the history of mathematics and its relation to other disciplines, and by letting them become acquainted with historically inspired material that can be, or has been used in the classroom

In this way, teachers may hopefully begin to think of a historical dimension in teaching as a possible path for improving mathematics education at all levels, and may develop confidence and trust in this endeavour. [Discussion on separate papers omitted]

- (iii) To construct and develop appropriate relevant *didactical material*, which can either be used directly in the classroom or constitute resource material for mathematics teacher

Such material should aim to motivate and guide the teacher, improve the teaching approach, or understand better students' difficulties and their idiosyncratic ways in learning mathematics. The need for and importance of such material has been emphasized in the ICMI Study Volume referred to above (Chapter 7, pp.212-213). [Discussion on separate papers omitted]

- (iv) To present *particular examples* and the underlying rationale, as an illustration of how history may contribute to the improvement of mathematics teaching in one way or another --- by exciting the students' interest, enriching their view of mathematics, or deepening their awareness of what mathematics really is.

[Discussion on separate papers omitted]

In the course of discussion in TSG 17 it became clear that enough has been said on a "propagandistic" level, that rhetoric has served its purpose. The presentations were all about actual implementation of the conviction that history of mathematics can enhance the learning and teaching of mathematics. To provoke discussion, the use of history of mathematics in the classroom has been likened to an appetizer, a main course or

a dessert, which caters respectively to motivation, content or enrichment. It came out of the discussion that, unlike the gastronomic analogue, a more fitting way is not to regard the use of history of mathematics in the classroom as in such separate compartmentalized categories. In fact, it is even debatable whether the phrase “using history of mathematics” should be used! The word “integrating” may be better, and the word “permeating” is even better. It is important to note that the main emphasis should be placed on the part of learning and teaching of mathematics. This is not to devalue the worth of history of mathematics as a subject in itself. Far from that, history of mathematics is as worthwhile and as scholarly as any other serious academic pursuit. But the aim of this group lies with the role history of mathematics can play in mathematics education so that we stress the *historical dimension* in mathematics education. The gastronomic analogue is, however, not completely out of tune. As all great cooks love cooking but do not merely follow recipes, so should we love history of mathematics and teaching mathematics but do not merely follow recipes. We like to have more didactical material with a historical dimension available for sharing, but we do not merely wait for others to prepare such ready-made material as recipes to follow. More good cooks will generate more recipes and in turn more good cooks. More good teachers will produce more good didactical material and in turn more good teachers. In this connection it does well to mention here several helpful resources, which were mentioned during the discussion going on in TSG 17 :

- (i) activities of one of the oldest study group affiliated to ICMI, viz the *International Study Group on the Relations between the History and Pedagogy of Mathematics* (abbreviated as the HPM Group), with its website at <http://www.mathedu-jp.org/hpm/index.htm> or <http://www.clab.edc.uoc.gr/hpm/>;
- (ii) a new online magazine of the *Mathematical Association of America* called *Convergence* available at <http://convergence.mathdl.org>, edited by V. Katz and F. Swetz;
- (iii) a forthcoming publication in CD version from the *Mathematical Association of America* titled *Historical Modules for the Teaching and Learning of Mathematics*, edited by V. Katz and K.D. Michalowicz.

As a final remark, we would like to point out that, despite its importance, history of mathematics is not to be regarded as a panacea to all pedagogical issues in mathematics education, just as mathematics, though important, is not the only subject worth studying. It is the harmony of mathematics with other intellectual and cultural pursuits that makes the subject even more worth studying. In this wider context, history of mathematics has yet a more important role to play in providing a fuller education of a person.

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