International Study Group on the Relations Between
the HISTORY and PEDAGOGY of MATHEMATICS
An Affiliate of the International Commission on
Mathematical Instruction

6th EUROPEAN SUMMER UNIVERSITY
ON THE HISTORY AND EPISTEMOLOGY IN MATHEMATICS EDUCATION

ESU-6

19-23 July 2010,
Vienna, Austria

FIRST ANNOUNCEMENT

The initiative of organizing a *Summer University* (SU) on the *History and Epistemology in Mathematics Education* belongs to the French Mathematics Education community, in the early 1980's. From those meetings emerged the organization of a SU on a European scale, as the *European Summer University* (ESU) *on the History and Epistemology in Mathematics Education*, starting in 1993. Since then, ESU was successfully organized in 1996, 1999, 2004 and 2007 in different places in Europe[1]. By now, it has been established into one of the main international activities of the HPM Group, which - from 2010 onwards - will be organized every four years, so that every two years there will take place at least one major international meeting of the Group; namely, ESU and the HPM Satellite Meeting of ICME.

1. Aim and focus of the ESU

The ESU mainly aims

- to provide a forum for presenting research in mathematics education and innovative teaching methods based on a historical, epistemological and cultural approach to mathematics and their teaching, with emphasis on actual implementation,
- to give the opportunity to mathematics teachers, educators and researchers to share their teaching ideas and classroom experience related to this perspective,
- in this way, to motivate further collaboration along these lines, among members of the mathematics education community in Europe and beyond, attempting to reveal the following aspects of mathematics:

- Mathematics should be conceived as a human intellectual enterprise with a long history, a vivid present and an as yet unforeseen future;
- Although its "polished" products form that part of mathematical knowledge that can be communicated, criticized (in order to be finally accepted or rejected) and serve as the basis for new work, the process of "doing mathematics" is equally important, especially from a didactical point of view;

[1] For a brief account of the history of ESU, see the Appendix here.

- Hence, the meaning of mathematical knowledge is determined, not only by the circumstances in which it becomes a deductively structured theory, but also by the procedure that originally led, or may lead to it and which is indispensable for its understanding. Therefore, learning mathematics includes the understanding of implicit motivations, the sense-making actions and the reflective processes, which are aimed at the construction of meaning; hence, teaching mathematics should include the opportunity given to students to "do mathematics";
- This conception of mathematics should be, not only the core of the teaching of mathematics, but also the image of mathematics spread to the outside world.

In this connection, putting emphasis on historical and epistemological issues constitutes a possible natural way for exposing mathematics in the making that may lead to a better understanding of specific parts of mathematics and to a deeper awareness of what mathematics as a whole really is. This is important for mathematics education, helping to realize that:

- Mathematics is the result of contributions from many different cultures;
- Mathematics has been in constant dialogue with other sciences, arts and technics;
- Mathematics has been a constant force of scientific, technical, artistic and social development;
- The philosophy of mathematics has evolved through the centuries;
- The teaching of mathematics has developed through the ages;

and in this way, to improve the learning of mathematics and stimulate students' interest to it;

This helps to improve mathematics education at all levels, at the same time, however, realizing that although mathematics is central to our modern society and a mathematically literate citizenry is essential to a country's vitality, it is not the sole subject worth studying. It is the harmony of mathematics with other intellectual and cultural pursuits that makes the subject interesting, meaningful and worthwhile. In this wider context, history and epistemology of mathematics have a yet more important role to play in providing a fuller education of the community.

This is most important, especially today that many countries are concerned about the level of mathematics their students learn and about their decreasing interest in mathematics at a time when the need for both technical skills and a wider education is rising.

2. Main themes of ESU-6

The ESU is neither a collection of intensive courses, nor a conference for researchers, but something in between. More specifically, it is a place where beginners, more experienced researchers and teachers present their teaching experience to the benefit of the participants and get a constructive feedback from them. It refers to all levels of education – from primary school, to tertiary education – including in-service teachers' training. For ESU-6 the focus is preferably on work and conclusions based on actual classroom experiments and/or produced teaching & learning materials. The programme and activities of ESU-6 are structured around the following *main themes*:

1. Theoretical and/or conceptual frameworks for integrating history in mathematics education;
2. History and epistemology implemented in mathematics education: classroom experiments & teaching materials, considered from either the cognitive or/and affective points of view; surveys of curricula and textbooks;
3. Original sources in the classroom, and their educational effects;
4. History and epistemology as tools for an interdisciplinary approach in the teaching and learning of mathematics and the sciences;
5. Cultures and mathematics;
6. Topics in the history of mathematics education;

In several of these themes emphasis is put on work and conclusions based on actual classroom

experiments and/or produced teaching & learning materials, but insightful theoretical ideas and/or historical analysis with visible didactical implications are also welcome.

3. Activities during ESU 6

All activities should refer to the ESU 6 *main themes*. Its scientific program will be structured along these themes, consisting of a few *plenary lectures* & *panels*, as well as, parallel sessions of *oral presentations*, *short communications* and *posters*, for participants, who want to speak about their own experience, or research. A major part of the programme, however, consists of *workshops*.

- Normally there will be at most one *plenary lecture* per theme.
- In the *panels* the participants will work together, well in advance, so that, during the panel session, there is a real discussion among them and/or with the panel coordinator.
- *Workshops* consist in studying a specific subject and having a follow-up discussion. The role of the workshop organizer is to prepare, present and distribute the historical/epistemological or pedagogical/didactical material, which motivates and orients the exchange of ideas and the discussion among the participants. Participants read and work on the basis of this material (e.g. original historical texts, didactical material, students' worksheets etc). This means that there are many workshops in parallel, which will vary in duration (2 hours for workshops based on didactical – pedagogical material; 3 hours for workshops based on historical and/or epistemological material). It would be very good and stimulating if there were workshops, which elaborate on the general ideas presented in the plenary lectures.
- *Oral presentations* will normally be allocated a 30-minute time slot; 25 minutes for presentation and 5 minutes for discussion. It is an activity in the spirit of a conventional research conference.
- Finally, 10-minutes *short oral communications* and *poster presentations* (with an abstract of no more than 200 words to be included in the proceedings), as well as *exhibitions* of books and other didactical material will also be possible.

4. Target population

The major part of the participants is expected to be (elementary or secondary) schoolteachers, who may wish to gain new ideas on how they can integrate the history of mathematics into their teaching. However, there will be also university teachers and students, interested in the integration of the history and epistemology of mathematics into mathematics education, as well as, historians of mathematics, who may give a limited number of lectures and workshops to inform others about recent developments in their domain, and mathematicians with an interest in the relation between mathematics, its history and epistemology, and its role at present and in the past.

5. Time and place

The 6th ESU will take place from Monday 19 to Friday 23 July 2010 at the **Vienna University of Technology,** Vienna, Austria.

6. Official Languages

The official languages of ESU-6 are: English, German and French.

More specifically:

- All *plenary talks* and *panel discussions* will be in *English*.

- *Oral presentations* can be delivered in any of the official languages. However, for presentations not in English, presenters will be asked to use **two sets of transparencies**; one set in the language they are going to give their presentation and **one set in English**.

- It is preferable to organize *Workshops* in English. Nevertheless, workshops organizers who intend to organize their workshop in another language are encouraged to prepare copies in English of the material to be distributed to the participants (e.g. transparencies, worksheets etc). This will certainly increase participation, as well as, facilitate communication among participants.

7. Submission of proposals

31 October 2009: **deadline** for submitting **Abstracts** of proposals for all types of activities.

30 November 2009: Notification of acceptance or not of the submitted proposals.

Important: Please, use this *Application Form* and send it in electronic form to Evelyne Barbin, Chair of the ESU-6 :

evelyne.barbin@wanadoo.fr.

The members of the *Scientific Program Committee* (SPC) will review the submitted abstracts. At this stage, acceptance of a proposal means that the proposed activity will be included in the ESU-6 Scientific Programme. However, this does not imply that a full text based on this activity will automatically be included in the ESU-6 Proceedings, which are going to be published after the ESU. Full texts will be further reviewed by members of the SPC at the usual international standards. For more details, see *Proceedings,* §10 below.

8. The (international) *Scientific Program Committee* (SPC)

Evelyne Barbin, University of Nantes (France),
Manfred Kronfellner, Vienna University of Technology (Austria),
Constantinos Tzanakis, University of Crete (Greece),

Abraham Arcavi, Weizmann Institute of Science (Israel)
Renaud Chorlay, IREM, Université Paris 7 (France)
Carlos Coreia de Sa, University of Porto (Portugal)
Ubiratan d' Ambrosio, Campinas University, Sao Paolo, (Brazil)
Abdellah El Idrissi, Ecole Normale Supérieure, Marrakech (Morocco)
Gail FitzSimons, Monash University, Victoria (Australia)
Florence Fasanelli, American Association for the Advancement of Science, USA
Fulvia Furinghetti, University of Genoa (Italy)
Wann-Sheng Horng, National Taiwan Normal University (Taiwan)
Masami Isoda, University of Tsukuba (Japan)
Niels Jahnke, Universität Duisburg-Essen (Germany)
Uffe Jankvist, Roskilde University, (Denmark)
Sten Kaisjer, University of Uppsala (Sweden)
Victor Katz, University of the District of Columbia, Washington, DC (USA)
Ewa Lakoma, Military University of Technology, Warsaw (Poland)
Snezana Lawrence, Simon Langton Grammar School for Boys (UK)
David Pengelley, New Mexico State University (USA)
Luis Radford, Université Laurentienne Sudbury, Ontario (Canada)
Leo Rogers, University of Roehampton (UK)
Tatiana Roque, Universidade Federal do Rio de Janeiro (Brasil)
Gert Schubring, University of Bielefeld (Germany)
Man-Keung Siu, University of Hong Kong (China)
Bjorn Smestad, Oslo University College, Norway
Robert Stein, California State University (USA)

Jan van Maanen, Freudenthal Institute, University of Utrecht (The Netherlands),
Chris Weeks, Downeycroft, Virginstow Beaworthy, UK

The *Local Organizing Committee* (LOC)
Anita Dorfmayr, University of Vienna,
Elisabeth Hofmann, Vienna University of Technology
Manfred Kronfellner, Vienna University of Technology (chair)
Gerhard Lindbichler, Haus der Mathematik,Vienna
Ingrid Schirmer, bifie

9. The web site

Making known the ESU in various countries (in Europe and beyond) is a major task to be realized by the SPC. To this end, a web site will be operating shortly at **http://www.algebra.tuwien.ac.at/esu6** This is going to be a very efficient tool to make known the ESU worldwide, to allow for online registration etc.

10. Proceedings

Publishing the Proceedings of the ESU is also a major task. In fact, Proceedings of the previous ESU have become standard references in this area (cf. the Appendix).

The Proceedings will be published **after** ESU-6, so that authors are given the opportunity to enrich their text as a result of the feedback they will gain during this European Summer University.

Each submitted full text for a workshop, or an oral presentation will be reviewed by one or two members of the SPC at the usual international standards.

More details on the deadline for submitting full texts, their size, the format guidelines and the expected date by which the proceedings will be available and sent to all registered participants, will be announced in due course from the ESU-6 and HPM websites
http://www.algebra.tuwien.ac.at/esu6
http://www.clab.edc.uoc.gr/hpm/
respectively.

11. More information – contact

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***APPENDIX*: Some information on the**

European Summer Universities on the History and Epistemology in Mathematics Education

Brief history and statistics of the previous ESU

The initiative of organizing a *Summer Univeristy* (SU) on the *History and Epistemology in Mathematics Education* belongs to the French Mathematics Education community IREM in the early 1980's. It was the French IREMs (*Institut de Recherche sur l' Enseignement des Mathématiques*) that organized the first interdisciplinary SU on the History of Mathematics in 1984 in Le Mans, France. It was followed by other SU in France (1986 in Toulouse, 1988 in La Rochelle, and 1990 in Lille). The next one was organized in 1993 on a European scale, and was called the 1st *European Summer University* (ESU) *on the History and Epistemology in Mathematics Education*, (a name coined since then), but many participants in it and in the subsequent ESU came outside Europe.

The previous ESU took place in July,

- 1993, Montpellier, France
- 1996, Braga, Portugal (conjointly with the *HPM* Satellite meeting of ICME 8)
- 1999, Louvain-la-Neuve & Leuven, Belgium
- 2004, Uppsala, Sweden (conjointly with the HPM Satellite meeting of ICME 10)
- 2007, Prague, Czech Republic

ESU	Duration	No of participants	Number of talks, workshops etc
1st Montpellier France	19-23/7/1993, 5 working days	254 from 29 countries (17 European)	5PL, 2PN, 48WS, 37T
2nd Braga, Portugal	24-30/7/1996, 5 working days+one morning session	548 from 33 countries (14 European)	1PL, 28IL, 4PN, 33WS, 71T
3rd Louvain-la-Neuve /Leuven, Belgium	15-21/7/1999, 6 working days	159 from 22 countries (16 European)	6PL, 2PN, 37WS, 35T
4th Uppsala, Sweden	12-17/7/2004, 4 working days+ two half days (morning sessions only)	120 from 32 countries (15 European)	6PL, 2PN, 9WS, 59T
5th Prague, Czech Republic	19-24/7/2007, 4 working days+ two half days (morning sessions only)	192 from 32 countries (18 European)	6PL, 2PN, 19 2-hour WS, 25 3-hour WS, 44T, 26SC

PL=Plenary lecture
PN= Panel discussion
WS=Workshop
T= Talk/ oral presentation
SC= short communication
IL=Introductory Lecture

Remarks:

(a) In the 2nd ESU there was only one *plenary lecture*, but many *introductory lectures*, which run in parallel and which were addressed to schoolteachers, providing an introduction to the topics elaborated in the workshops.

(b) The 2nd and 4th ESU have been organized conjointly with the *HPM* Satellite Meeting of the corresponding ICME (ICME 8 and ICME 10, respectively)

(c) In most ESU, more than half of the participants were local people: Portuguese in the 2nd ESU (310); French in the 1st ESU (134). In the 3rd ESU about 40% were Belgians (64). Thus, in general, there was a strong participation from local people, mainly primary and secondary schoolteachers.

(d) In general, a key element of the program was the great number of workshops, which gave the

opportunity to presenters to explain their ideas, teaching practice, share their experience with participants and distribute relevant material. The workshops were of variable duration usually, from 1 to 3 hours. In the 5th ESU workshops were distinguished to 2-hour workshop based on didactical – pedagogical material and 3-hour workshops based on historical and/or epistemological material

(e) Non-local participants came from many countries, either European, or from other continents, although with a few exceptions, only a small number from each country (usually less than 5, or 6).

Themes of the previous ESU

The activities and the program of each ESU were structured around some *main themes*, which were the following:

1st ESU Montpellier, France, 19-23/7/1993

-The historical construction of mathematical knowledge
-Introducing a historical perspective into the teaching of mathematics
-The relationship between mathematics education and culture
-Epistemology and its relationship to didactics and pedagogy
-History of mathematics in initial teacher training and in-service courses
-Mediterranean mathematics
-Ethnomathematics

2nd ESU Braga, Portugal, 24-30/7/1996

Main themes:
-Mathematical cultures all over the world
-Mathematics as a science
-Mathematics, arts and technics
Special topics:
-History of mathematics education
-Epistemological obstacles
-Views on Mathematics
-Mathematics for all
-Mathematical proof in history

3rd ESU Louvain-la-Neuve /Leuven, Belgium, 15-21/7/1999

There were not any main themes specified a priori. However, themes proposed in due course included
Mathematical journals in Europe and their use in education
-The historical construction of mathematical knowledge
-The relation between mathematics and science in history; its in education
-Relations between mathematics and music up to Euler's era; their use in education
-History of mathematics education
-Mathematicians in the Low Countries
-About the 19th century geometry: the Belgian theorems; what may be the insights for the education?

4th ESU Uppsala, Sweeden 12-17/7/2004

-The history of mathematics
-Integrating the history of mathematics into the teaching of mathematics
-The role of the history of mathematics in teacher's training
-The common history of mathematics, science and technology
-Mathematics and different cultures
-The philosophy of mathematics

5th ESU Prague, Czech Republic, 19-24/7/2007

-History and Epistemology as tools for an interdisciplinary approach in the teaching and learning of Mathematics and the Sciences
-Introducing a historical dimension in the teaching and learning of Mathematics
-History and Epistemology in Mathematics teachers' education
-Cultures and Mathematics
-History of Mathematics Education in Europe
-Mathematics in Central Europe

Proceedings

An important aspect of the ESU has been the publication of its Proceedings. In the 2nd and 4th ESU the Proceedings became available in advance and were distributed to the participants on the spot.

1st ESU: *Actes de la première Université d' Été Européenne sur l' Histoire et Épistémologie dans l' Éducation Mathématique*, F. Lalande, F. Jaboeuf, and Y. Nouazé (editors), IREM de Montpellier, Université Montpellier II, Montpelier, France, 1995 (598 pages in one volume).

2nd ESU: *Proceedings of the 2nd European Summer University on the History and Epistemology in Mathematics Education and the ICME 8 Satellite Meeting of HPM*, M.J. Lagarto, A. Viera & E. Veloso (eds), Portuguese Association of the Teachers of Mathematics & Department of Mathematics, University of Minho, Braga, Portugal, 1996 (813 pages in two volumes).

3rd ESU: *Proceedings of the 3rd European Summer University on the History and Epistemology in Mathematics Education*, P. Radelet-de-Grave & C. Brichard (editors), Université Catholique de Louvain, Leuven and Louvain-la-Neuve, Belgium, 2001 (944 pages in two volumes).

4th ESU: *Proceedings of the HPM 2004: History and Pedagogy of Mathematics ICME 10 Satellite Meeting and 4th European Summer University on the History and Epistemology in Mathematics Education*, F. Furinghetti, S. Kaijer & A. Vretblad (editors), Uppsala University, Uppsala, Sweden, 2004 (482 pages in one volume); revised edition F. Furinghetti, S. Kaijser & C. Tzanakis (editors), University of Crete, Greece, 2006, ISBN 960-88712-8-X (678 pages in one volume).

5th ESU: *History and Epistemology in Mathematics Education: Proceedings of the Fifth European Summer University (ESU 5)*, E. Barbin, N. Stehlikova, C. Tzanakis (editors), Vydavatelsky servis, Plzeň, Prague, Czech Republic, 2008, ISBN 978-80-86843-19-3 (902 pages in one volume).