

TSG 29: The history of the teaching and the learning of mathematics

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Introduction, aims and focus

The invitation by the International Programme Committee to organise this TSG meant the impetus to establish for the first time an international network on this subject. The first step for the organising team was hence to elaborate a programmatic outline serving as common basis for its work. The following understanding was agreed upon:

“The history of the teaching and learning of mathematics is an interdisciplinary field of study. It constitutes a part of the history of mathematics, of the history of education and of sociology. The broad range of relevant topics includes the evolution of programs in a variety of countries, the status of mathematics as a teaching subject, the cultural and social role of mathematics, policy in teacher education, evolution of the profession of mathematics teachers, teachers’ associations, journals on mathematics education, and textbooks. The history of the teaching and learning of mathematics is still a relatively underdeveloped field, and most studies deal with national histories. There are only few studies on international and comparative issues. Mathematics learning and teaching is not exempt, however, from the present tendencies towards internationalisation and globalisation. As international studies on evaluation like TIMSS and its follow-up study PISA show it is very important to develop categories which permit to grasp national specificities as well as overall and global trends in the evolution of mathematics teaching. The work of TSG 29 should contribute to gather the researchers working in this field, establish common patterns in the history as well as revealing differences, and develop research programmes which enhance international perspectives.”

Since the field for TSG 29 is extraordinarily broad, given the range of topics, the number of states and cultures through history, and the different levels of school systems, the team decided that the focus will be on institutionalised forms of teaching and learning – in types of schools equivalent to primary and secondary levels. Higher education has been included in so far as it concerns mathematics teacher education.

The next step was to establish an international bibliography of publications in order to identify the main trends of present research and to know the persons active in related research. By common effort, it was possible to establish a significant bibliography of publications from an enormous number of countries. This first international bibliography constituted a main focus of the website of TSG 29. At the same time, this bibliography made it possible not only to identify the most active researchers in the field, but also to structure the field. Three dimensions have proved to constitute basic issues of research across countries:

1. Modernisations of mathematical curricula.
Focussing on transmission and/or socio-cultural reform movements.
2. Aspects of teaching practice.
Focusing on textbooks, methods, teacher training.



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3. Cultural, social and political functions of mathematics instruction.
Focusing on, for instance, practical/vocational versus formal/academic function.

The team decided to have no subdivisions of its sessions at the Congress in order to realise the intended joint discussion. Besides the final session, which was designed to present the state of the art as a synthesis of the contributions, nine presenters were invited for the three other sessions, each session being devoted to one of the three main dimensions of the field.

The invitees reacted with enthusiasm to the facilitation of communication offered by this TSG. In the end, two of them were unfortunately unable to attend the Congress due to lack of funds.

Two papers were accepted for presentation by distribution:

Taro Fujita (UK), *Keith Jones* (UK), *Shinya Yamamoto* (Japan): "The Role of Intuition in Geometry Education: Learning from the Teaching Practice in the Early 20th Century"

Marie Kubínová (The Czech Republic): "Teaching Mathematics in Czech Schools – Trying a Change"

The following papers were delivered during the sessions:

Session 1: Transition and modernisation of mathematics curricula.

Shinya Yamamoto (Japan): "The Process of Adapting a German Pedagogy for the Modern Mathematics Teaching in Japan".

The paper exemplifies the complex processes which transmitted concepts undergo in the recipient culture or country: The insistence of the German "Treutlein" on abolishing the strict separation between plane geometry and solid geometry was eventually reduced, in its Japanese reception, to a methodological reform in dealing exclusively with solid geometry.

Nikos Kastanis (together with *Iason Kastanis*) (Greece): "Transmissions of Mathematics into Greek Education, 1800-1840: From Individual Choices to Institutional Frames".

This paper studies the changes in the mathematical culture occurring during the transition of Greece from Ottoman rule – where there was no institutionalised schooling, the meagre elements of education being under the control of the Orthodox Church – to an independent state establishing an educational system of its own. Whereas in the former period isolated students studying abroad in Western Europe had brought back some elements of traditional elementary mathematics, without developing them further, though, the latter period was characterised by the transmission of more modern, up to date knowledge from France and Germany, and by developing mathematics on these bases within the new educational system.

Kristin Bjarnadóttir (Iceland): "From Isolation and Stagnation to 'Modern' Mathematics – A Reform or Confusion?"

This paper studies the transmission to Iceland of the movement which is nowadays usually referred to, often negatively, as the modern mathematics movement. Given the

considerable time lag in the development of the school system and of higher education in Iceland, the introduction of “modern mathematics” coincided with a general social and educational change, developing for the first time a culture of mathematics education in Iceland.

Session 2: Teaching practice, textbooks, teacher education

Eileen Donoghue (USA): “The Education of Mathematics Teachers in the United States: David Eugene Smith, An Early Twentieth Century Pioneer”

The paper studies the development of preparing mathematics teachers for secondary schools in the United States since the 1890s, and in particular the model program established by David Eugene Smith, initially at Michigan State Normal School and, subsequently, at Teachers College, Columbia University. Smith’s teacher education program is discussed and compared to a contemporary, but distinct program at the University of Chicago. It also considers how Smith influenced teacher education through his extensive international links, and his role as a prolific textbook author.

Harm J. Smid (The Netherlands): “Between the Market and the State: The Emergence of Mathematics Instruction and of its Teachers as a Result of State Initiative and of Pressure by the Market”

In 1815 and in 1826 the Dutch government undertook some measures for teaching mathematics in the so-called “Latin schools”, and during the first half of the 19th century, mathematics became an important part of the entrance exams for military and engineering academies. But the real break-through in the Latin schools occurred between 1840-1845, when these were forced to modernize their programs and organization due to the heavy competition by the so-called “French schools”, which were private schools with a much more modern program. The result was that when the state in 1863 at last introduced a Dutch version of the German *Realschule*, the mathematics curriculum, textbooks and teaching staff were easily available.

Session 3: Cultural, social and political functions of mathematics instruction

Livia Giacardi (Italy): “From Euclid as Textbook to the Gentile Reform: Problems, Methods, and Debates in Mathematics Teaching in Italy 1859 to 1923”

This paper provides an excellent case for studying the third dimension, identified above, where the relations between the various agents and instances are made clear and explicit – those between mathematicians, mathematics teachers, cultural traditions and their impact on school structure, and political movements and decisions. The salient feature of the Italian case is the split between various groups within the mathematical community.

Alexander Karp (Russia): “‘Universal Responsiveness’ or ‘Splendid Isolation’? Episodes from the History of Mathematics Education in Russia”

Given the state of general underdevelopment of the teaching of mathematics and the sciences in Russia in the past, the energetic introduction of an educational system by Tsar Peter the Great meant a decisive modernisation of the country. For a long time, its evolution relied on the transmission of foreign science, and it took a long time until a significant national production in science began to take off. While the country was,



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for a long time, open and receptive to the transmission of mathematics, an isolationist stance gained momentum since the second half of the nineteenth century.

Mahdi Abdeljaouad (Tunisia): “Issues about the status of mathematics teaching in Arab countries – elements of its history and some case studies”.

This contribution was distributed on the TSG’s website. It presents the first synthesis of an extensive research on the history of mathematics teaching in the Arab civilisation. By its methodologically guided research, it deals with the fact that although mathematics experienced important developments in the classical Arab period, mathematics teaching seldom obtained more than a marginal status.

Session 4: Synthesis

In the final session, the Organising Team presented a synthesis, which evaluated the contributions to the three dimensions and developed methodological categories derived from the key issue of unravelling the function of mathematics teaching within the respective system and its context, across the various national histories, and presented characteristic specific features of the historical development.

In the subsequent general discussion, a high degree of consensus about the goals of the TSG and about the envisaged research approaches became evident. The success of the TSG, also expressed by the considerable number of participants, was also confirmed by the participants urging to continue this work.

In fact, a network of people interested in promoting research on this topic was established. This group will organise future activities and involve more scholars.

A first important outcome of this ongoing work will be the publication of the Proceedings of TSG 29.

This report was written by Gert Schubring and Yasuhiro Sekiguchi. They are happy to be contacted at gert.schubring@uni-bielefeld.de and ysekigch@yamaguchi-u.ac.jp, respectively, for further information on the work of this TSG.



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