

Topic Study Group 55

The History of the Teaching and Learning of Mathematics

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ABSTRACT This note describes the work of TSG-55, indicating its main organizational stages and the number of reports presented. Brief descriptions of the topics of the presented reports are provided. These may be grouped into several categories: reports devoted to reforms; reports investigating the work of various mathematics educators; reports discussing the history of specific subjects in courses, textbooks, or other handbooks; periodicals, connected with mathematics education; and so on. Lastly, certain conclusions are drawn about the current state of this academic field.

Keywords: History of mathematics education; Reforms; Mathematical journals.

1. Introduction

The Topic Study Group on the history of the teaching and learning of mathematics was formed in 2004 at ICME-10. Since then, this group has worked at all International Congresses. At the Congress of 2021, this group was also active, although the pandemic made it necessary to introduce certain changes into its work. As usual, all submitted proposals were reviewed and evaluated (in this connection, we must note the role of Wagner Rodrigues Valente from Brazil, who was initially chair of the group, but later resigned from participating in its work for personal reasons). At the final stage, when it became clear that the Congress would mainly take place online, all participants were invited to prepare video presentations, which were made available on a specially created website. This made it possible, for example, to become acquainted with presentations that could not be attended due to time differences.

At the Congress itself, three sessions were held, as planned, chaired by Alexander Karp (USA/Russia) and Naomichi Makinae (Japan). In all, eighteen reports were presented; in addition, there was one poster presentation related to the work of the group (Tab. 1 on the next page). Representatives from Belgium, Brazil, China (including Chinese Taipei), Croatia, Japan, Nepal, Poland, Russia, Spain and the United States took part.

All participants were also invited to take part in preparing a collection of papers based on the materials of the presentations — the expanded papers were envisioned, substantially greater in size than could be presented at the Congress, but thematically connected with these presentations. From the submitted papers, the best was selected,

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Tab. 1. The list of papers and posters presented

Paper and author(s)
Session 1
[1] Pafnuty Chebyshev as a mathematics educator. <i>Vasily Busev and Alexander Karp</i> (USA).
[2] Frédérique Papy-Lenger, the mother of modern mathematics in Belgium. <i>Dirk De Bock</i> (Belgium).
[3] The history of mathematics education of Tatar Nation. <i>Ildar Safuanov</i> (Russia).
[4] Mathematics and mathematics education in the 18 th century Spanish Journal “Semanario De Salamanca”. <i>Maria Jose Madrid, Carmen Leon-Mantero, and Alexander Maz-Machado</i> (Spain).
[5] Gnomonics in mathematics secondary school education on the territories of Poland in the 17 th – 20 th century. <i>Karolina Karpinska</i> (Poland).
[6] The beginning of modern mathematics in Spanish primary education. A look through textbooks and curriculum. <i>Antonio M, Oller-Marcen</i> (Spain).
[7] Approach of an Early-1940s Japanese secondary mathematics textbook to teaching the fundamental theorem of Calculus. <i>Shinnosuke Narita, Naomichi Makinae, and Kei Kataoka</i> (Japan).
Session 2
[8] Arithmetic textbooks in Croatia in the premodern period. <i>Maja Cindric</i> (Croatia).
[9] Missing arithmetic methods: “On the rules for the mixing of analogous things”. <i>Bernardo Gomez-Alfonso and Maria Santagueda-Villanueva</i> (Spain).
[10] The calculation in the first commercialized Decroly’s games. <i>Pilar Olivares-Carrillo and Dolores Carrillo-Gallego</i> (Spain).
[11] Mathematical activities focusing on Japanese elementary arithmetic and secondary mathematics textbooks in the early 1940s. <i>Yoshihisa Tanaka, Eiji Sato, and Nobuaki Tanaka</i> (Japan).
[12] Development history and course setting of mathematics department in early universities in Sichuan Province in modern times (1896–1937). <i>Hong Zhang</i> (China).
[13] A probe into compiling mathematics textbooks by Christian Missionaries in late Qing dynasty. <i>Jun Wei Li</i> (China).
Session 3
[14] Building an American mathematical community from the Ground Up: Artemas Martin and the mathematical visitor. <i>Sian E. Zelbo</i> (USA).
[15] The discarding of the rule of three in the 1960s: changes in elementary education in France and Brazil. <i>Elisabete Zardo Burigo</i> (Brazil).
[16] Mathematics education for young woman during progressive era: historical overview. <i>Yana Shvartsberg</i> (USA).
[17] David Eugene Smith (1860–1944) and his work on mathematics education. <i>Alexei Volkov</i> (Chinese Taipei) and <i>Viktor Freiman</i> (Canada).
[18] College entrance exams in mathematics in Russia before the second world war: development, role, objectives. <i>Alexander Karp</i> (USA).
Poster Session
[19] Historical development of mathematics education in Nepal. <i>Ramesh Prasa Awasthi</i> (Nepal).

and consequently a collection was prepared, which was submitted to Springer Publishing (Karp, in print).

2. On the Topics of the Presentations

Below, an attempt will be made briefly to describe the topics of the presentations.

As is usual at conferences on the history of mathematics education, considerable attention was devoted to reforms. Oller-Marcén^[6] spoke about the first moments of the introduction of the reform movement in Spain in 1965 and the new features that appeared in elementary school textbooks in Spain. Búrigo^[15] also spoke about elementary schools: she compared how the same topic — the rule of three — was studied in Brazil and in France during the 1960s, and what changes occurred in how it was studied. Narita et al.^[7] — spoke about a far less well-known reform that was conducted in Japan during the 1940s and involved a radical transformation in how calculus was studied.

In effect, the period of reforms also provided the subject for De Bock's paper^[2], which was, however, devoted not so much to the topics studied during this period, as to a figure active during it. This paper discussed the work of Frédérique Papy-Lenger, who was extremely important particularly during the late 1950s–1960s. The paper by Volkov and Freiman^[17] was devoted to the early work of a reformer from another era, David Eugene Smith, or more precisely, to his reception of the achievements of German methodological thought and his related early publications. An even earlier period was the subject of the paper by Busev and Karp^[1]. This paper relied on recently published materials to discuss the work of the outstanding mathematician Pafnuty Chebyshev in mathematics education.

The history of the teaching of one or another section of the school course in mathematics was investigated in several other papers, as has already been mentioned. Gómez-Alfonso and Santágueda-Villanueva^[9] spoke about mixture problems in arithmetic in ancient textbooks. Karpińska (Poland)^[5] described how students were taught to tell time by using a sundial, which constituted an important part of the course in mathematics at Polish schools for centuries.

Not a little attention, of course, was devoted to a field that has traditionally attracted researchers' attention: textbooks and other means of instruction. Cindrić^[8] discussed the first textbooks in arithmetic used in what is today Croatia during the eighteenth century. Li's presentation^[13] was devoted to textbooks written for China by Christian missionaries during the late Qing Dynasty period. Tanaka et al.^[11] presented to listeners' attention their analysis of certain mathematical activities and associated instruction materials used in the teaching process in Japan during the 1940s. The paper by Olivares-Carrillo and Carrillo-Gallego (Spain)^[10] was devoted to games developed by Ovide Decroly and their adoption in Spain.

In the last decade, it has become popular to study journals that are in one way or another connected with mathematics education. Two presentations were devoted to this topic. Madrid et al.^[4] analyzed the eighteenth-century Spanish journal *Semanario de Salamanca*, which devoted considerable attention to mathematics. Zelbo^[14] investigated an American mathematics journal, *The Mathematical Visitor*, which was published regularly from 1878 to 1881.

Shvartsberg's presentation^[16] contained an analysis of the development of mathematics education for women in the United States between the 1890s and the 1930s, when very many changes occurred both in ordinary life and in education.

Zhang^[12] devoted her presentation to almost the same period — 1896–1937 — but focusing on Chinese higher education and its modernization during these years.

Karp's presentation^[18] was devoted to entrance exams to higher educational institutions in Russia before 1917.

Lastly, Safuanov^[3] delivered an overview of the history of mathematics education in Tatarstan, while Awasthi^[19] provided a poster presentation on the history of mathematics education in Nepal.

3. Certain Observations and Conclusions

Summing up the outcomes of the work of the Topic Study Group, we might say that we are witnessing the accumulation of new studies that are based on topics and interests that have already become traditional (Karp and Furinghetti, 2016; Karp and Schubring, 2014). The history of mathematics education as an academic discipline is certainly over a hundred years old — even if we date its beginnings to the appearance of the first doctoral dissertations in the United States (for example, Stamper, 1906), although historical studies in mathematics education had already existed in Europe long before that (Schubring, 2014). Nonetheless, it may be said that the social history of mathematics education, which examines what has occurred in mathematics education as part of a broader social process, is still only at the beginning of its development. The tendency to connect what happened in classrooms or during preparation for class with what was happening in the world can be observed in many, although still not all, studies.

It may be said that many periods, processes, and directions still remain uninvestigated, and in addition that even many extant studies remain unknown and inaccessible to an international audience, if only due to a language barrier. The opportunities this state of affairs offers to researchers are all the greater. Currently, we are in a period of collecting materials about what has not been investigated previously, and thereby making use of new sources and developing new approaches to analysis.

The Congress and other international initiatives make it possible to find out about kindred studies being conducted in different countries. One would like to hope that the work of the TSG, as well as the publication of a volume on the basis of its outcomes, will help historians of mathematics education, enriching them with new facts and new ideas.

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