Extrait du
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Unité de Recherche sur l'Enseignement des Mathématiques

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ICMI News 12 : October 2009

- Extra-muros -

Date de mise en ligne : lundi 4 janvier 2010

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Mathématiques

ICMI News 12 : October 2009

A Bimonthly Email Newsletter from the ICMI-International Commission on Mathematical Instruction

Editor : Jaime Carvalho e Silva, Dep. Matematica, Universidade de Coimbra, Portugal

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1. Editorial : ICMI Reflected in Russian Mathematical education

Education is a relatively slow changing system, experiments over it are costly and the results are usually controversial. So, observations, first-hand evaluations and open discussion of the decisions and outcomes in other countries are the way, effective and reliable enough, to make our own decisions. In this way we can see (and foresee) that there are many choices and not only one being right. I believe that this more then justifies the international cooperation in the field of mathematical education and explains why the International Commission on Mathematical Instruction lives energetic and productive life in its eleventh decade. We had more evidence for this in Sankt Petersburg this September. Besides a meeting of our EC there we had an international seminar at the Euler Institute where the issues of Russian national math education at pre-university level were discussed in the international perspective. Over the last decade Russian education, and, even more specifically, mathematical education is in the process of radical transformations. The transformations are induced by the authorities of the country and generated from inside.

The mostly discussed change in general education is the so called Single (or Unified) State Examination. Before XXI century the math exam (after 11-th grade) was organized as a set of 5 to 8 problems from simple to medium difficulty. These problems were traditionally of pure mathematical matter (solving equations, calculating of geometrical values of a configuration, etc.). At the same time entrance examinations were conducted also by every university with engineering or science programs. So, high school graduates were obliged to pass two exams, the second one was pretty tough at some universities. One of the negative trends in the examinations was the "narrowing" in the sense that the examination problems were becoming more and more specially designed 'exam-problems'. In the Single State Examination this trend was negatively combined with the exam structure : up to 30 problems, most of which were multiple-choice. The implementation was far from perfect and suffered from corruption of different kinds. The essential cause of it was the common interest of all participants to produce better examination marks. So, we started a 'counter-reform' of the Single Examination and succeeded ! The President of Russia established an ad hoc commission (where different groups participated). My position in the Commission was supported by the Rector of Moscow State University Prof. Sadovnichy. Eventually the changes were supported by President Medvedev and by the Ministry of Education and Science. Now, the exam of 2010 will be broader its basic part is understandable for everybody, it includes applications, etc. And the international context was important for us.

Another novelty in our country is the new Federal Standard for primary school. We included more visual discrete math, more counting, manipulation, and mathematical games, more connections and investigations. This is a result of our more then 20 years work in hundreds of schools in the country. I shared this vision in the ICMI events and the reaction was productive for us.

We believe that our experience can be valuable for other educational communities and appreciate any reaction and sharing experience from our colleagues in other countries.

In this article I would like to thank all the members of EC for activities so important for my country, for the pleasure of human communication and understanding, and also for the support of EC and our President Michèle Artigue. This resulted in the decision of UNESCO Director General Irina Bokova to designate me as a laureate of the 2009 UNESCO King Hamad Bin Isa Al-Khalifa Prize for the Use of Information and Communication Technologies in Education (http://portal.unesco.org/en/ev.php-URL_ID=46952&URL_DO=DO_TOPIC&URL_SECTION=201.html).

Alexei Semenov, Rector of Moscow Institute of Open Education, Member-at-large, ICMI-EC, alsemenov@umail.ru

2. International Congress of Mathematicians - 2010

India is to host the International Congress (ICM-2010) of the IMU-International Mathematical Union for the year 2010. The congress will take place in the city of Hyderabad during August 19-27.

Mathematics is the language of science and India is proud to have coined one of the most important words of its lexicon - "zero" - in the distant past ; and we have a long tradition of pursuit of mathematics. India joined the IMU soon after it was revived after the second world war. The Indian mathematical community feels greatly honoured that the IMU has accepted our bid to hold the ICM 2010 in India, thereby extending recognition to our efforts at promoting mathematics. We look forward to welcoming our colleagues from all over the world in Hyderabad, the venue of the Congress and expect to learn a great deal that is new. The Congress will be of great help to us to raise the level of public awareness about mathematics in our country.

India has been a professional destination for many mathematicians over the last 75 years and more. Many British academics had come to India to teach mathematics in our colleges during the colonial period. W H Young, the British analyst accepted a part-time chair, the Hardinge Professorship of Pure Mathematics in Calcutta University which he held from 1913 to 1917. Andre Weil spent two years at an Indian university as a professor during 1930 - 32.

R A Fisher spent several extended periods of time at the Indian Statistical Institute in Kolkata (ISI), his first visit dating back to 1937. ISI also hosted visits by Norber Wiener and A N Kolmogorov. Many other distinguished mathematicians, mainly probabilists from the erstwhile Soviet block visited ISI during the cold war years. In later years, after that institution set up branches in Delhi and Bangalore, also at the same time broadening its areas of research, it has had a string of visitors, many of them big names in mathematics.

The Tata Institute of Fundamental Research (TIFR), Mumbai, too had a regular stream of visitors almost from its inception in 1945, many of them spending extended periods of time in Mumbai. Carl Ludwig Siegel and Laurent Schwartz made several visits each of a duration of two months and more during the fifties and sixties. Armand Borel and David Mumford made several visits to TIFR during the sixties and seventies (and later). The visitors' list to TIFR includes several Fields Medalists and other renowned mathematicians. The International Colloquiua held once in every four years by TIFR have been an important forum for international exchange at the highest level.

To mention a few more distinguished visitors who spent extended periods of time in TIFR during the fifties and sixties : H Rademacher, H Mass, Eichler, J L Lions, K Yosida, B Malgrange, F Bruhat, J P Kahane, M Deuring, G de Rham, K Ito, G D Mostow, R Bott, R Langlands....... Many others have come on shorter visits mainly to participate in conferences : A Selberg, H Grauert, R Thom, A Grothendieck, M F Atiyah, L Hormander, J Milnor, I Pjatetskii-Shapiro, J P Serre, H Furstenberg, G A Margulis, D Kazdan .....These visits were of course of great help to us in building mathematics in the country.

Hyderabad the venue of the Congress is home to several IT companies and rivals Bangalore as an IT hub in the country. The city is well connected, with many airlines flying to and from it. It was founded in the 15th century and is steeped in history. It is also famous for its cuisine. India of course has a lot to offer by way of tourism catering to a wide range of interests : wild life, scenic splendour, historical monuments, art and music, great food and sports as well.

On behalf of the Indian mathematical community I would like to urge mathematicians from all over the world to participate in ICM 2010 and help us make it a great success. For more information : http://www.icm2010.org.in/

M.S. Raghunathan, Chairman of the organizing committee

3. New and recent NISS volumes

A NEW NISS VOLUME

I am pleased to inform you that the Study Volume resulting from the 17th ICMI Study has just appeared in the New ICMI Study Series (NISS) published by Springer :

- Celia Hoyles and Jean-Baptiste Lagrange (Eds.)
- "Mathematics Education and Technology - Rethinking the Terrain : The 17th ICMI Study."
- New ICMI Study Series, Vol. 13
- Springer, 2010, XIV, 494 p., 50 illus., Hardcover
- ISBN : 978-1-4419-0145-3
- Information about the book can be found on the NISS webpage, inside -Springer website : http://www.springeronline.com/series/6351

RECENT NISS VOLUMES

You are reminded that the Study Volumes resulting from the 15th and 16th ICMI Studies have appeared by the end of 2008, also in the NISS series :

— Ruhama Even and Deborah Loewenberg Ball (Eds.) "The Professional Education and Development of Teachers of Mathematics : The 15th ICMI Study." New ICMI Study Series, Vol. 11 Springer, 2009, XII, 280 p., Hardcover ISBN : 978-0-387-09600-1

— Edward J. Barbeau and Peter J. Taylor (Eds.) "Challenging Mathematics In and Beyond the Classroom : The 16th ICMI Study." New ICMI Study Series, Vol. 12 Springer, 2009, XIII, 337 p., 5 illus., Hardcover ISBN : 978-0-387-09602-5

ICMI DISCOUNT --- ONLINE ORDERING OF THE NISS VOLUME I USE THIS OPPORTUNITY TO REMIND YOU THAT MEMBERS OF THE ICMI COMMUNITY PURCHASING THE NISS BOOKS FOR PERSONAL USE ARE ENTITLED TO A 60% DISCOUNT ON THE HARDBOUND PRICE AND A 25% DISCOUNT ON THE SOFTBOUND PRICE.

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for instructions on how to obtain the ICMI discount. Bernard R. Hodgson, Secretary-General of ICMI, bhodgson@mat.ulaval.ca

4. MILLENNIUM YOUTH CAMP - International science camp for the young people

MILLENNIUM YOUTH CAMP - International science camp for the young people, HELSINKI, FINLAND 06-13.6.2010

The targets of the Camp are to network young people from all over the world together and with top Finnish scientists and Finnish business life and to increase the awareness of the Millennium Technology Prize. The participants will be 30 young students, 16 to 19-year-old, keen on natural sciences, mathematics and technology. The participants will be selected and thus invited on the grounds of their application. Please, find the application form on the websites. The Camp is free of charge, including also travelling, accommodation and dining.

Themes of the camp

Environmental science and technology (climate change, renewable natural resources, renewable energy, water), information and communication technology, and digitalization, applied mathematics.

Organizers

National LUMA Centre, Technology Academy Foundation, Ministry of Education and The Centre for School Clubs, in cooperation with e.g. Ministry for Foreign Affairs of Finland, National Board of Education, University of Helsinki, Helsinki University of Technology, Finnish Industry and many other organizations.

More information and the application form on the webpage of Technology Academy Foundation : http://www.technologyacademy.fi/millennium-youth-camp-fi.html Juha Oikkonen, Juha.Oikkonen@helsinki.fi

5. Proceedings of the Symposium Celebrating the Centennial of the ICMI

ISTITVTO DELLA ENCICLOPEDIA ITALIANA FONDATA DA GIOVANNI TRECCANI

The First Century of the International Commission on Mathematical Instruction (1908-2008). Reflecting and Shaping the World of Mathematics Education

Edited by M. Menghini, F. Furinghetti, L. Giacardi, F. Arzarello

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- EILEEN F. DONOGHUE - The inception of ICMI : David Eugene Smith and the founding of ICTM ; ALAN BISHOP - The past four decades : consolidation and diversification ; DEREK HOLTON - The process of an ICMI Study : The teaching and learning of mathematics at university level ; FREDERICK K.S. LEUNG - The significance of the ICMI Study on mathematics education in East Asia and the West ; UBIRATAN D'AMBROSIO - ICMI and its influence in Latin America ; JILL ADLER - The development of AFRICME ; CLAUDI ALSINA - What is the impact of hosting an ICME for the organizing country ? - The case of ICME8 in Spain ; LIM-TEO SUAT KHOH - ICMI Activities in East and Southeast Asia : Thirty years of academic discourse and deliberations

Working Groups - Reports

- BILL BARTON & FREDERIC GOURDEAU : Disciplinary mathematics and school mathematics ; DEBORAH BALL & BARBRO GREVHOLM : The professional formation of teachers ; HILARY POVEY & ROBYN ZEEVENBERGEN : Mathematics education and society ; MARCELO BORBA & MARIOLINA BARTOLINI BUSSI : Resources and technology throughout the history of ICMI ; GILAH LEDER & LUIS RADFORD : Mathematics education : An ICMI perspective.

ORDERING THE VOLUME

- The proceedings of the Symposium held on the occasion of the Centennial of ICMI in Rome, from March 5th to March 8th, 2008, are now being published. The price of the volume comes to 60 Euros (about 90 USD) shipping fees included.

Participants of ICME's and of conferences of the affiliated groups of ICMI, in the period 2004 - 2008, may enjoy a special 33 % reduction. To receive the volume, we ask that you send in the following request :

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By fax :   +39 06 68982294 For all other information, please use the above addresses. The request form is also available at the Symposium's website : http://www.unige.ch/math/EnsMath/Rome2008

6. New international journal

We are pleased to announce the launch of the first issue of the International Journal for Studies in Mathematics Education. The International Journal for Studies in Mathematics Education (JIEEM) aims to stimulate reflection on mathematics education at all levels : to generate productive discussion ; to encourage enquiry and research ; to promote criticism and evaluation of ideas and procedures current in the field.

It is intended for the mathematics educator who is aware that the learning and teaching of mathematics are complex enterprises about which much remains to be revealed and understood. It reflects both the variety of research concerns within the field and the range of methods used to study them. We accept for submission articles in Portuguese, English, French and Spanish.

The journal emphasizes high-level articles that go beyond local or national interest.

This journal is a semi-annual and peer-reviewed professional academic research journal.

The first number is on line at http://periodicos.uniban.br/index.php/JIEEM/index

Editors,
- Janete Bolite Frant jfrant@uniban.br
- Alessandro Ribeiro alessandro.ribeiro@uniban.br

7. Calendar of Events of Interest to the ICMI Community

The 15th International Seminar of Mathematics Education on Talented Children and Creativity Development Woosuk Univ., Samrye, Korea, February 19-20, 2010 http://society.kisti.re.kr/ ksmed/ foreign participants, contact Prof. Young H. Choe <ksme_ser_d@yahoo.co.kr>

Thirteenth Conference on Research in Undergraduate Mathematics Education Marriott Raleigh City Center - Raleigh, North Carolina, USA, February 25-28, 2010 http://rume.org/crume2010/

International Consortium for Research in Science and Mathematics Education - 2010 Consultation BlueBay Los Angeles Locos Hotel, La Manzanilla, Mexico, March 9-12, 2010 http://ehe.osu.edu/groups/icrsme/

Educational Interfaces between Mathematics and Industry (EIMI) Lisboa, Portugal, April 19-23, 2010 http://eimi.mathdir.org/

ICOTS8 : 8th International Conference on Teaching Statistics Data and context in statistics education : towards an evidence-based society Ljubljana, Slovenia, July 11-16, 2010 http://icots8.org

5th International Conference on Origami in Science, Mathematics and Education Singapore Management University, Singapore, July 13-17, 2010 org : Eileen Tan (origamiwolf@gmail.com), Patsy Wang-Iverson (pwangiverson@gmail.com)

ESU-6 - 6th EUROPEAN SUMMER UNIVERSITY ON THE HISTORY AND EPISTEMOLOGY IN MATHEMATICS EDUCATION Vienna, Austria, July 19-23, 2010 http://www.algebra.tuwien.ac.at/kronfellner/esu6/

EARCOME5 - The Fifth East Asia Regional Conference on Mathematics Education Tokyo, Japan, August 18-22, 2010 http://www.earcome5.jp/

YESS-5 - FIFTH YERME SUMMER SCHOOL Palermo, Italy, August 18-25, 2010 http://math.unipa.it/ grim/YESS-5/Home_YESS-5.html

International Congress of Mathematicians (ICM) Hyderabad, India, August 19-27, 2010 http://www.icm2010.org.in/

epiSTEME - 4 : Fourth international conference to review research on Science, TEchnology and Mathematics Education Homi Bhabha Centre for Science Education (TIFR), Mumbai, India, January 5-9, 2011 http://www.hbcse.tifr.res.in/episteme4

CERME 2011 - Conference of the European Society for Research in Mathematics Rzeszow, Poland, February 9-13, 2011

ICTMT10 - 10th International Conference on Technology in Mathematics Teaching University of Portsmouth, July 5-8, 2011 http://www.ictmt10.org/

8. ICMI encounters : Heinrich Bauersfeld by Paul Cobb

Heinrich Bauersfeld

In 1986, I was invited to attend and make a presentation at the Gordon Research Conference on Cybernetics. The Conference was held at a small college in New Hampshire during the summer when the students were absent. All participants were required to share a room and to eat together in a common dinning room in order to foster sustained dialogue. As a beginning researcher who had completed his doctorate three years previously, I was both surprised and intimidated to find that I was assigned to share a room with Heinrich Bauersfeld. I knew Bauersfeld by reputation as a primary intellectual leader of mathematics education as an emerging field of research. I had also read several of his papers and had been impressed by the depth of his thinking, particularly the distinction he drew between the intended curriculum, the implemented curriculum, and the attained curriculum.

Heinrich exercised his considerable natural charm to put my initial concerns to rest. In doing so, he engaged me in discussions of a wide range of topics that included baroque music and fourteenth century European art as well as issues in mathematics education. I was appreciative of his generosity of spirit and fascinated by the scope of his knowledge about a seemingly endless range of issues. During these conversations, I first learned about the analyses that Heinrich and his colleagues Gotz Krummheuer and Jorg Voigt were conducting of mathematics classrooms from a strong social perspective. At that time, mathematics education research in the US typically drew almost exclusively on cognitive and developmental psychology as a source of theoretical ideas. Viewed against this background, the work that Heinrich and his associates were conducting was path breaking.

This encounter played an important role in my development as a mathematics education researcher. Shortly after the Conference, Heinrich sent me one of his papers that had been published in Educational Studies in Mathematics in 1980 titled "Hidden Dimensions in the So-called Reality of a Mathematics Classroom". In this paper, he described and illustrated an approach for analyzing classroom interaction patterns in terms of the largely implicit obligations that the teacher and students attempt to fulfill in particular situations, and the expectations that they have for each other's activity. It was readily apparent this approach had (and continues to have) considerable explanatory power. As a consequence, my colleagues Erna Yackel, Terry Wood, and I worked to develop a social perspective on the classrooms in which we were conducting teaching experiments by building directly on the theoretical constructs that Heinrich had developed.

The ongoing exchange between our two research groups eventually led to a three-year collaboration that was funded by the Spencer Foundation. The explicit goal of this collaboration was to formulate an approach for integrating social and cognitive perspectives on mathematical learning. To this end, we met for a week approximately every nine months to try and hammer out theoretical constructs. The discussions during these meetings typically continued for several hours and proved to be both provocative and stimulating. We eventually concluded that it was not possible to develop a single, overarching set of constructs and instead attempted to achieve the more modest goal of developing a way of coordinating social and cognitive perspectives on mathematical learning. This collaboration resulted in a book that Heinrich and I co-edited that was published in 1995 and was titled "Emergence of Mathematical Meaning : Interaction in Classroom Cultures." The collaboration was particularly valuable to my colleagues and I as it gave us access to ideas of symbolic interactionism and ethnomethodology. These ideas proved to be foundational in orienting the studies we subsequently conducted.

Paul Cobb, paul.cobb@vanderbilt.edu

9. SUBSCRIBING TO ICMI News

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