

ICMI and its influence in Latin America

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Some reflections on the ICMI, the IACME and the ICMEs.

I will discuss the impact of ICMI in Mathematics Education in Latin America, and how the ideas exposed in the ICMEs had an influence in the region. In particular, I will discuss the creation of the affiliated committee, the IACME/Interamerican Commission of Mathematics Education, and its relations with other regions of the World.

From the first International Congress of Mathematicians, in 1897, until the ICM in Oslo, Latin American participation have been minor. Even though, in the ICM 1908, in Rome, when CIEM/IMUK was created, Argentina joined it. In 1928, in Bologna, when CIEM/IMUK was reformulated, again Argentina was a member of it. I have noticed no relevant influences of the CIEM/IMUK in Latin America.

In the ICM 1950, in Cambridge, USA, there was a good number of participants from Latin America. In the assembly to inaugurate the new International Mathematics Union, delegates from Argentina, Brazil, Cuba, Mexico and Uruguay signed the Enabling Resolution. Later Peru joined the new IMU.

We infer, by the reports on the creation of the International Mathematical Union, that the Commission concerned with the teaching of Mathematics, created in Rome in 1908, did not have a clear definition of its status. In the 1952 General Assembly of IMU, it was decided to establish a commission concerned with the teaching of Mathematics and, in the 1954 General Assembly, it was formally decided that the official name of this commission would be International Commission on Mathematics Instruction/ICMI. It was decided that *L'Enseignement Mathématique* would continue to be the official organ of the new ICMI.¹ An Executive Committee was appointed, with Henri Fehr as Honorary President, Albert Châtelet President and Heinrich Behnke as Secretary, who became its President in 1955. It is reported that A. Sagastume and José Babini were delegates from Argentina. In the important Comparative Study of Mathematics Education, commissioned to ICMI

¹ The journal has been a major source for this paper:
<http://retro.seals.ch/digbib/fr/vollist?UID=enmat-001>

and involving sixteen countries, which was reported in 1958, no Latin America country participated.

In 1959 Marshal H. Stone became the President of ICMI. He announced the realization a meeting, in Bogotá, Colombia, in 1961, under the aegis of ICMI and with financial support of UNESCO, the OAS/Organization of American States and other organisms, to discuss problems in mathematics education which are common to all countries in the region. The Organizing Committee was formed by Marcelo Alonso (Cuba), José Babini (Argentina), Howard Fehr (United States) and Leopoldo Nachbin (Brazil). In this meeting, which became known as the First Interamerican Conference on Mathematics Education, was decided the creation of the Interamerican Committee on Mathematics Education/IACME or the Comité Interamericano de Educación Matemática/CIAEM.²

This was decisive for the insertion of Latin America in the international movement of mathematics education. Since then, eleven Interamerican Conferences on Mathematics Education have been held. It is important to notice that the First Interamerican Conference on Mathematics Education/IACME 1, in 1961, precedes, for 8 years, the First International Congress of Mathematics Education/ ICME 1. I will comment on the Interamerican Conferences later in this paper.

When Hans Freudenthal was President of ICMI, from 1967-1970, he championed the realization of a an International Congress on Mathematics Education, with the support of the French Government and the UNESCO, in Lyons, France, 1969. This was done entirely without any connection with the IMU. Although the President of the EC of IMU is an ex-officio member of ICMI, the EC had not been told of the creation by ICMI of the new journal *Educational Studies in Mathematics*, which seemed to compete with *L'Enseignement Mathématique*. A financial contract had been signed between ICMI and UNESCO without the IMU having been informed."³ Hans Freudentahl was the major speaker of IACME 3, in Bahia Blanca, Argentina, in 1972. Since then, I met Freudenthal in several opportunities, particularly in his capacity of the IMU

² Visit the site of the IACME/CIAEM, in Portuguese, Spanish and English: <http://www.furb.br/ciaem/>. The link Publications directs to the History of the IACME, written by Hugo Barrantes and Ángel Ruiz, both from Costa Rica.
<http://www.furb.br/ciaem/ing/index.htm>

³ Olli Lehto. *Mathematics Woithout Borders. A History of the International Mathematical Union*, Springer-Verlag, Berlin, 1998; p.259.

representative (1970-78) in the CTS/Committee on the Teaching of Science of ICSU/International Council of Scientific Unions. I was active in this Committee, as a proponent to the integration of Math and Science Education, a trend in the seventies which was promoted in Latin America, with the support of UNESCO and the OAS. Conversations with Freudenthal allowed me to identify the serious conflicts then present in Mathematical Education. It is important to register a project of IOWO to establish a very interesting and unique project for the Formation of Mathematics Teacher in Bolívia. This was a very interesting attempt to transfer a novel and somewhat controversial approach to Mathematics Education to the, then, most backward Mathematics Education program in Latin America. But the issue of knowledge transfer is not the purpose of this paper, although these conflicts had many consequences for Mathematics Education in Latin America.

From 1971 to 1974, Sir James Lighthill was the President of ICMI and ICME 2 took place in Exeter, England, in 1972. From 1975 to 1979, the President was S. Iyanaga and the Secretary was Y. Kawada. In the information for the period 1975-1978, presented by the Secretary Kawada, we learn of a presence of Latin America in the ICMI, with Luis A. Santaló, from Argentina, and Leopoldo Nachbin, from Brazil, listed as National Representatives. It is also reported that in the meeting of the Executive Committee of ICMI, in Vancouver, August 1974, a resolution for affiliation of IACME to ICMI was adopted.

The realization of ICME3, in Karlsruhe, FRG, under the Presidency of H. Kunle, was, in my perception, a landmark, particularly for the relations of Latin America with ICMI. Indeed, ICME 3 differs much from ICME 1 and ICME 2, in its structure and organization, in its priorities and in the selection of speakers. The important financing of the preparatory phase, with significant contributions of the Volkswagen Foundation and of UNESCO, made ICME 3 unique. The role of the IPC took a different character. It was required a broader composition of the IPC, in order to include a representative from Third World country. I see ICME 3 as very influential in shaping the scenario of Mathematics Education in Latin America and the influences of ICMI in the region.

Maybe because of my involvement with all of Latin America, as a consequence of OAS projects, and with Africa, due to my projects with UNESCO, or because of personal relation with Sir James Lighthill, S. Iyanaga and Y. Kawada, I was appointed as a member of the IPC. This favored a good presence of Mathematics Educators

from Latin America in the Congress and marks the beginning of a growing presence of delegations from Latin America in the ICMEs. And, by suggestion of E.G.Begle, I was invited to be in charge of the Survey Report B-3 on "Objectives and Goals of Mathematics Education (Why teach mathematics?)".

It would be repetitious to give data on number of participants and papers presented by Latin Americans in the various ICMEs, as well as the participation in many ICMI Studies. The number has been growing. It is only relevant to say that in this Centennial Symposium there are 14 participants coming from Latin America.

The Interamerican Conferences on Mathematics Education.

The First Interamerican Conference on Mathematics Education, held in Bogotá, Colombia, in 1961, and the creation of the Interamerican Committee on Mathematics Education/IACME were decisive for the insertion of Latin America in the international movement of mathematics education.

The main ideas advanced in the first conference were:

- The need to change the way of teaching Geometry in Secondary Schools: to teach Geometry from the perspective of Linear Algebra, forsaking Euclidean Geometry.
- The need to teach Mathematics, in general, through the study of the fundamental structures, with the purpose of underscoring their unity. In this area, the teaching of Modern Algebra became of paramount importance.
- The above goals could only be achieved if, at the same time, a well-organized plan was carried out that was oriented to the in-service training of teachers, thus preparing new mathematics teaching professionals with the ideas of the reform, as well as improving research in mathematics
- The above goals could not be achieved without a parallel plan, very well organized and aimed the training of professors who were currently teaching. The aim was to instill these ideas in new teachers of Math, and also to upgrade Mathematics research.

It is important to notice the European influence. There were 13 plenary talks:

1. Mathematics and Our Technological Society, Alberto González, Argentina.
2. Modern Applications of Mathematics, Enrique Cansado, Chile.
3. Reform of the Teaching of Geometry, Howard Fehr, USA.
4. The Formation of Mathematics Teachers, Luis Santaló, Argentina.
5. The Formation of Mathematics Teachers, Omar Catunda, Brazil.
6. Mathematics Education in Latin America, Round Table moderated by Rafael Laguardia, Uruguay.
7. The New Mathematics and its Teaching, Gustave Choquet, France.
8. Some Tendencies in Modern Mathematics, Marshall Stone, USA.
9. Some Ideas about Teaching University Mathematics, Guillermo Torres, Mexico.
10. New Ideas in Teaching Math in US "Colleges", E.J. McShane, USA.
11. The Mathematics Program in Swiss Secondary Schools, Laurent Pauli, Switzerland.
12. The Mathematics Program in Denmark, Sven Bundgaard, Denmark.

The tone was Modern Mathematics and the influence of N. Bourbaki. Contents was a dominating issue. This characteristics will prevail in the coming conferences: 2nd IACME, in Lima, Peru, in 1966; 3rd IACME in Bahia Blanca, Argentina, in 1972; 4th IACME, in Caracas, Venezuela, in 1975.

Invited speakers in Caracas were from

- Belgium (Paul Dedecker, Willy Servais);
- Brazil (Ubiratan D'Ambrosio, Luiz Roberto Dante);
- Chile (Jaime Michelow);
- Colombia (Jairo Charris, Mary Falk, Ricardo Losada, Hernando Mateus, Carlos Vasco,);
- France (Colette Andrieu-Bui, Bui-Trong-Lieu, Jean Dieudonné, Artibano Micali);

- Italy (Emma Castelnuovo);
- Mexico (Carlos Imaz);
- USA (Howard Fehr, Glenadine Gibb);
- Venezuela (Jose Andonegui, Tania Calderón, Daniel Crespín, J. Jiménez, Eduardo Lima, Maurício Orellana, Héctor Pantoja, Saulo Rada, José Sarabia, Ennodio Torres).

There was a good support from the agency of *Coopération Française*. It is also clear, from the choice of participants, an influence of the CIEAEM / *Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques* in Latin American Mathematics Education of that time, more than the influence of ICMI.

The Caracas recommendations show this:

- Create research centers in each Latin American country.
- Create specific programs for teaching mathematics in the last years of secondary school.
- A specific program was not proposed, but each country should determine its own program based on its own possibilities. Some topics were recommended: real functions, linear algebra, computing, elements of infinitesimal calculus, probability and statistics.
- Organize science fairs and Olympiads.
- Improve mathematics teaching by using new technologies, collaboration with higher level mathematicians, etc.
- Improve the preparation and professional development of teachers.

I see a change of influences beginning with the Fifth Interamerican Conference on Mathematics Education, held in Campinas, Brazil, in 1979. This conference represented an innovation, both in structure and in the choice of themes. It was very much influenced by my experience in being in the IPC of ICME 3, in Karlsruhe. It, somewhat, moved away from the influence of Marshall Stone. The Program was organized around only three plenary talks and four plenary panels and the invitees reflect what was regarded as important research directions for Mathematics Education.

The three plenary talks were:

- Hassler Whitney (President of ICMI): Learning Mathematics for Family Life.
- Leopoldo Nachbin (Brazil): Talent, Creativity and Expression.

- Emilio Lluís (Mexico): Geometry in Teaching.

The four panels were:

Panel A: *The Situation in Geometry Teaching given the New Tendencies in Mathematics Education.*

Moderator: José Velázquez;

Luis Dante (Brazil), *The Mosaic Method of Teaching Geometry;*

José Pascual Ibarra (Spain), *The Educational System in Spain and the Role of Elementary Geometry in General Education;*

Luis Santaló (Argentina), *Causes and Effects of Current Tendencies in Teaching Geometry;*

Oscar Valdivia (Peru), *Teaching Geometry via Transformations.*

In this panel, it was interesting the critique to presenting Geometry to young students from a purely axiomatic point of view.

Panel B: *The Impact of Computers on Mathematics Education.*

Moderator: José von Lucken (Paraguay);

Francisco Figeac (El Salvador), *Calculus Oriented by Computing;*

Jaime Michelow (Chile), *The Impact of Calculators and Computers on Mathematics Education;*

José A. Valente (Brazil), *The Presence of Computers in Mathematics Teaching and Learning as an Extension of the Experience of Children.*

The presentations painted a bright future for the use of both computers and pocket calculators, permitting doing things in class that, up to then, had been impossible.

Panel C: *Nontraditional Teaching Methods and Their Influence in Mathematics Education.*

Moderator: Bernardo Morales (Guatemala);

Enrique Góngora (Costa Rica), *Why a System of Distance Education?;*

Saulo Rada (Venezuela), *Non-Traditional Methods of Teaching Mathematics in Venezuela;*

Oswaldo Sangiorgi (Brazil), Non-Traditional Methods of Teaching Mathematics and Their Effect on Mathematics Education;

Bryan Wilson (UK), The Open University in the United Kingdom and its Effect on Mathematics Education.

The presentations were, basically, experiences in distance education, stressing the need of adequate methodology for this new approach to education.

Panel D: *New Tendencies in Learning and Evaluation of Mathematics.*

Moderator: Eduardo Luna (Dominican Republic);

Guy Brouseau (France), Evaluation and Learning Theory in School Situations;

Ricardo Losada (Colombia), New Tendencies in the Evaluation and Learning of Mathematics;

Geraldina Porto (Brazil), New Tendencies in Learning and Evaluation of Mathematics, a Multidisciplinary Approach;

Friederich Zech (Germany), New Tendencies in the Didactics of Mathematics.

The presentations of this panel were in agreement in considering mathematics teaching as a distinct discipline with its own subject matter. There was a critique of the way the reform of mathematics teaching was carried out in the 60s, and the panelists expressed ideas of a methodology nature. They also stressed the importance of research in the teaching (didactics) of mathematics

I see the Fifth Interamerican Conference on Mathematics Education as a turning point in Mathematics Education in Latin America, not only by giving a predominant role to educators from Latin America, but by proposing innovation, discussion the modern trends in education which beginning to be considered as central in Mathematics Education.

The situation now.

It is beyond the objectives of this talk to give an overall picture of the state of research in Mathematics Education in Latin America.

The increasing presence of Mathematics Educators from Latin America in ICMI activities becomes very clear if we go to the

list of participants of the International Congresses of Mathematics Education. We see an increasing number of delegates, particularly after ICME 8, in Seville, in 1996. The list of invitees to make presentations and to organize sessions is reveals the areas being studied in Latin America. The participation of Mathematics Educators from Latin America in the ICMI Studies is noticeable.

The number of international research journals published in several countries, national and regional associations and events of international repercussion are evidence of the growth of the area. The creation of regional meetings, such as the RELME / *Reunión Latinoamericana de Matemática Educativa*, under the responsibility of the *Comité Latinoamericano de Matemática Educativa/CLAME* and the *Reunión de Didáctica de la Matemática del Cono Sur*, as well as several series of international conferences organized by specific universities in Latin America, reveal the vitality of research in the area.

It must be mentioned the recognition of Iberic ties, which resulted in the creation of a series of conferences, the *CIBEM/Conferencias Iberoamericanas de Educación Matemática*. The creation of the FISEM / *Federación Iberoamericana de Sociedades de Educación Matemática*.⁴ Regrettably, internal rivalries, which have consequences for rivalries in the regional organizations, still prevail.

Mathematics Educators from Latin America have been very active in the International Study Group on the Relations Between History and Pedagogy of Mathematics/HPM and the International Study Group on the Psychology of Mathematics Education/PME since their creation, in 1976. Also, The International Organization of Women in Mathematics Education/IOWME, The World Federation of National Mathematics Competitions/WFNMC and The International Study Group for Mathematical Modeling and Applications/ICTMA, have a relevant presence of Mathematics Educators from Latin America. Two groups, not formally affiliated with ICMI, but which originated from ICMI, specifically the Mathematics Education and Society International Study Group/MES and the International Study Group on Ethnomathematics/ISGEm.

There is still much to be done. We hope that the realization of ICME 11 in Monterrey, Mexico, July 2008, will have a great impact in the development of Mathematics Education in Latin America. It will bring together delegations from all the countries of the

⁴ Visit the site <http://www.fisem.org>

regions and I hope this will be an opportunity to eliminate rivalries and reinforce our efforts towards international cooperation.