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Mathématiques

ICMI News 11 : August 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 : Continuing Professional Development and Effective integration of Digital Technologies in Teaching and Learning Mathematics : Two Challenges for ICMI

I will take the opportunity in writing this editorial of focussing on two major concerns in mathematics education, both of which have been the subjects of recent ICMI Studies and both of which are central to my own professional life. The first is the professional development of teachers of mathematics, and the second the use of digital technologies in mathematics teaching and learning.

The Continuing Professional Development (CPD) of Teachers of Mathematics CPD was the subject of 15th ICMI Study 'The Professional Education and Development of Teachers of Mathematics'. The book has appeared in 2008 as Vol 11 in the New ICMI Study Series. It was edited by Ruhama Even, and Deborah Loewenberg Ball, who were co-chairs of the Study. The premise of this ICMI Study is that teachers are key to students' opportunities to learn mathematics, and what teachers of mathematics know, care about, and do is a product of their experiences and socialisation, together with the impact of their professional education. The book shows how preparing and maintaining a high-quality, professional teaching force that can teach mathematics effectively and prepare youth for a future of social responsibility is a worldwide challenge.

Issues around CPD for teachers of mathematics the Study volume argues offer 'a cross-cultural conversation' about mathematics teacher education with 'attention given to research, theory, practice and policy'. Clearly there are differences between countries as to how the challenge of mathematics-specific CPD is faced. Is CPD regarded as important ? A crucial tension, I would argue is that there is (and cannot be) an exact way of measuring the 'effects of CPD' on learners' achievement in and engagement with mathematics. This means that in the face of financial constraints, CPD is often the first to suffer. Yet we know that it is important to value our mathematics teachers and to ensure they are given the support they need to enhance their professional expertise - for themselves. CPD is not something 'to be done to teachers'. But how best can this be achieved given time (as well as funding) constraints ? How can CPD be informed by the best research in mathematics education while remaining relevant to practice with its day-to-day pressures ? How can the case for mathematics-specific CPD be made effectively to policy -makers and politicians ? The National Centre for Excellence in the Teaching of Mathematics (NCETM), www.ncetm.org.uk, was set up in England by the UK Government in 2006 to face up to these challenges. I have been its Director since 2007. The National Centre oversees mathematics-specific CPD provision at a strategic level nationally across all phases of education, and coordinates its operation nationally. It is the first time such a national infrastructure has been put in place in England. The NCETM takes as its starting point the premise that effective CPD has three interrelated

strands :

- broadening and deepening mathematics content knowledge ;
- developing mathematics-specific pedagogy, which includes appreciating how learners engage with mathematics and likely obstacles to progression ; and,
- embedding effective mathematics pedagogy in practice.

Thus, the key aims of the NCETM are :

- to stimulate demand for mathematics-specific CPD contributing to strengthening the mathematical knowledge of teachers and improving school and college performance in mathematics
- to lead and improve the coordination, accessibility and availability of mathematics-specific CPD
- to enable all teachers of mathematics to identify and access high-quality CPD that will best meet their needs and aspirations.

The National Centre has a virtual presence through its online web portal (www.ncetm.org.uk) and an on-the-ground presence through a network of Regional Coordinators (RCs) and teacher associates that cover all of England. They encourage teachers of mathematics to engage in collaborative teacher enquiry, to identify opportunities for high-quality professional development and to share examples of excellence across the region. This effort includes supporting the spread of dynamic networks in which teachers take the lead in developing their own communities -virtual and actual - thus both spreading ideas further and providing another and different type of CPD for teacher-leaders. Many of these networks are catalysed by the NCETM Teacher Enquiry Funded projects in which teachers are given some funds to work together on a shared problem, usually with some outside support. The National Centre works with a range of partners to promote CPD opportunities that are cumulative and sustained over the career of a teacher. Higher Education Institutions (HEIs), are important among these as they are already offering CPD opportunities for teachers and can provide expertise in mathematics and mathematics education, as well as bring new perspectives on the subject and on effective pedagogies. National and regional events play an important part in the NCETM's work, but its unique offer is of course its web portal, a cutting-edge, online resource that allows the NCETM to reach those teachers that other more low-tech conventional means cannot reach. The portal signposts a wealth of excellent resources and is a dynamic means of sharing strategies for teaching mathematics through online networks and communities. Teachers of mathematics can also monitor their own learning chart their individual CPD progress through Self Evaluation tools and their Personal Learning Space (PLS).

Teachers' engagement with the NCETM has grown hugely and we have outstripped every target set us by the Government, with over 25000 users of the portal. In particular the use of the Personal Learning Space (including the Self Evaluation Tools) has been remarkably successful in engaging teachers : before April 2009 there was an average of 11,000 interactions per month, June 2009 there were 247,000 interactions per month ! There is still much to do however and many challenges to face before CPD for all teachers of mathematics in England is recognised as key by all, including politicians and policy makers, and is universally demanded. The National Centre continues to seek to engage more teachers and senior leaders in all sectors and to find further ways to work with partners to help grow all aspects of provision.

The use of digital technologies in mathematics teaching and learning

One focus of the NCETM's effort has been the promotion of the use of ICT (information and communication technologies) in the teaching and learning of mathematics alongside as a medium for enhancing teacher professional learning. We held a national one-day event on 'The Potential of ICT in Mathematics Teaching and Learning' at which we showcased the work of teachers using ICT in their mathematics teaching. We are actively working to promote and support networks of teachers working together on mathematics with different software. This is indeed challenging

with complex issues to be faced related to teaching and learning, diversity and equity, many of which were discussed in ICMI Study 17. 'Mathematics Education and Technology : Rethinking the Terrain' with myself and Jean-Baptiste Lagrange as co-chairs. The Study Volume is to be published Dec 2009. The volume also addresses issues such as design of learning environments and curricula using digital technologies, learning and assessing mathematics with and through digital technologies and the emerging challenge of connectivity and virtual networks for learning, The volume comes out over twenty years after the first ICMI study on technology. The scenery of digital technology in mathematics education has radically changed and will continue to change. We look forward to still more dramatic changes that enhance engagement in our subject.

Celia Hoyles, Member-at-large, ICMI-EC, University of London, c.hoyles@ioe.ac.uk

2. A XXIst century Felix Klein's follow up workshop

Didactics of Mathematics as a Mathematical Discipline (a XXIst century Felix Klein's follow up) An international workshop, Funchal (Madeira), Portugal, October 1-4, 2009 http://glocos.org/index.php/dm-md/

A century ago Felix Klein's lectures on mathematics for secondary teachers were first published : "Elementarmathematik vom höheren Standpunkte aus" (1908). This comprehensive view challenged both teachers and mathematicians to consider the relationship between mathematics as a school subject, and mathematics as a scientific discipline. This last 100 years have witnessed many changes in mathematics that provoked major changes and challenges for school mathematics. The role of mathematics in the education of scientists, economists and engineers seems to have achieved unprecedented societal unanimity.

Can we analyse the new challenges for mathematics in the XXIst century ? Can we devise a XXIst century book that will be "read with pleasure and profit alike by the scholar, the student, and the teacher" (AMS Book Reviews 1940) taking into account all the dimensions Klein stressed : intuitive, genetic, applications ? This workshop will include around 20 invited speakers will present their views in 30m lectures, followed by discussions ; there will be a slot for some other presentations selected by the organizing committee from the proposals received (20m presentations). The deadline for proposals is September 9. Please register at the website http://glocos.org/index.php/dm-md/

Some of the talks at the workshop will be :

"Mathematics as a school subject in the XXI century : trends, promises and dilemmas". Abraham Arcavi "Functions and Analysis : Elements of reflection within the perspective of the Felix Klein project" Michèle Artigue

"Felix Klein's vision on the relation : Between abyss and hysteresis" Gert Schubring

"Algorithmic thinking in mathematics" Manuel Silva

"Exploring and investigating mathematics : A key element in the activity of mathematicians, students and teachers" João Pedro Mendes da Ponte "Some considerations about the advances of Mathematics in 20th century and the possible implications to modernize the school curriculum" Yuriko Baldin

"A Clifford perspective on Klein's Geometry". Sebastià Xambó

The workshop is organized by CIM-Centro Internacional de Matemática and announcements can be found in

http://www.cim.pt/ ?q=events and a short note about the workshop can be found in the CIM Bulletin :
http://www.cim.pt/files/publications/b26.pdf

Jaime Carvalho e Silva, Member-at-large, ICMI-EC, Organizing Committee, jaimecs@mat.uc.pt

3. Deadline Extended : ICMI / ICIAM STUDY

JOINT ICMI / ICIAM STUDY Educational Interfaces between Mathematics and Industry (EIMI)

The deadline for submitting contributions to the Study has been extended until OCTOBER 15. Instructions on submission of contributions and general information on the Study, organised by the International Commission on Mathematical Instruction (ICMI) and the International Council for Industrial and Applied Mathematics (ICIAM), can be found on the study website : http://eimi.mathdir.org/ The Study Conference will be held in Lisbon on April 19-23, 2010. Bernard R. Hodgson, Secretary-General of ICMI, bhodgson@mat.ulaval.ca

4. EARCOME5 : First Announcement

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

IN SEARCH OF EXCELLENCE IN MATHEMATICS EDUCATION Organizer : Japan Society of Mathematical Education (JSME) Co-organizers : The Association of Mathematics Instruction Mathematical Society of Japan Mathematical Education Society of Japan ICMI-International Commission on Mathematical Instruction Conference Theme The theme of conference is "In search of excellence of mathematics education". Countries in East Asia are well-known for their high achievement in international comparisons in mathematics. Exploring the factors behind this excellence, such as curriculum, teachers, and teaching-learning processes among others, is of special interest to researchers and practitioners not only in this region but also around the world.

Scientific Programs The program of the conference includes several activities : Plenary Lectures, Round Table Discussions, Regular Lectures, Paper Presentations, Posters, Workshops, and Observation of Mathematics Lessons (Lesson Study). The official language of the conference is English. Call for Papers We hope that all participants will contribute actively to the conference by sharing their experiences and views in the various sessions. Moreover, you are encouraged to send a proposal for an oral presentation of your paper.

Submission of the Proposal

Intending participants are invited to present individual papers either in parallel paper sessions or in poster exhibitions. Proposals should be sent by email as Microsoft Word attachment to earcome5@sme.or.jp BEFORE JANUARY 15, 2010, including the following :

- Title, authors' names, affiliations, postal address, fax, telephone numbers and email address
- Aim and the main idea of the reported study, methodology and the expected conclusions (in 500 words)
- Related essential references The proposal should be submitted as a single file in Microsoft Word format saved as ".doc" or ".rtf" using Times New Roman 11-point font size and single-spacing. To avoid confusion or loss of proposals, please name your file as follows : EARCOME5__country.doc. For example : EARCOME5_S.Shimizu_JP.doc. Important Dates JANUARY 15, 2010 : Deadline for the Submission of a proposal MARCH 15, 2010 : Notification of Acceptance : MAY 31, 2010 : Submission of Final Paper

Venue National Olympics Memorial Youth Center, Tokyo Address : 3-1, Yoyogi Kamizono-cho, Shibuya-ku, Tokyo, 151-0052 TEL. +81-3-3469-2525 http://nyc.niye.go.jp/e/

Registration Before MAY 31, 2010 18,000 JPY After JUNE 1, 2010 20,000 JPY Accommodation There are many HOTELS in the Tokyo area. A limited numbers of rooms are available at the National Olympics Memorial Youth Center at lower cost.

Committees International Program Committee Shizumi Shimizu, Chair of IPC, Frederick K.S. Leung (Hong Kong), ICMI-ECÅCToshiakira Fujii (Japan), Maitree Inprasitha (Thailand), Berinderjeet Kaur (Singapore), Shiqi Li (China), Masataka Koyama (Japan), Chap Sam Lim (Malaysia), KyungMee Park (South Korea), Yoshinori Shimizu (Japan)

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Local Organizing Committee Shizumi Shimizu (Chair), Sigeru Iitaka, Yasuo Morita, Yoshihiko Hashimoto, Toshiakira Fujii, Ryousuke Nagaoka, Takayuki Kodera, Toshikazu Ikeda, Hiroyuki Ninomiya, Masami Isoda, Masataka Koyama, Yoshinori Shimizu, Yasuhiro Sekiguchi, Keiko Hino, Mikio Miyazaki, Tatsuo Morozumi, Nanae Matsuo, Hiroyuki Kumakura, Kazuya Kageyama, Hideo Emori

For Contact : earcome5@sme.or.jp

5. Chilean Journal of Statistics (ChJS)

Dear colleague :

I am very pleased to inform you that on August, 2009, we are launching the new version of the Chilean Journal of Statistics (ChJS).

More details about the journal, that now is including papers in statistics education, can be checked in the journal web page http://www.soche.cl/chjs

In this way, the Chilean Society of Statistics (SOCHE, http://www.soche.cl) materializes the dream of publishing an international journal, and we hope this will serve to begin a new stage for statistics in Chile.

We greatly appreciate any diffusion that you can make of ChJS.

Best regards, Victor Leiva, Executive Editor, Chilean Journal of Statistics, victor.leiva@uv.cl

6. Calendar of Events of Interest to the ICMI Community

"Models in Developing Mathematics Education" The Mathematics Education into the 21st Century Project Dresden, Saxony, Germany, September 11-17, 2009 alan@rogerson.pol.pl

The 43rd Korean National Meeting of Mathematics Education, Hannam University, Daejeon, Korea, October 16-17,

2009 http://www.ksme.info, ksme_ser_d@yahoo.co.kr

ICREM4 - The 4th International Conference on Research and Education in Mathematics 2009 Kuala Lumpur, Malaysia, October 21-23, 2009 http://einspem.upm.edu.my/icrem4/

CoSMEd -Third International Conference on Science and Mathematics Education Improving Science and Mathematics Literacy : Theory, Innovation and Practice Penang, Malaysia, November 10-12, 2009 http://www.recsam.edu.my/cosmed/

2009 SAMSA Conference Southern Africa Mathematical Sciences Association Belinda Hotel, Dar es Salaam, Tanzania, November 23-27, 2009 http://www.samsajournal.org/

SRD'09 - Southern Right Delta'09 7th Southern Hemisphere Conference on the Teaching and Learning of Undergraduate Mathematics and Statistics Gordons Bay, South Africa, 29 November-4 December 2009 http://www.delta2009.co.za

TIME 2009 - Third National Workshop & Conference "Technology and Innovation in Math Education" IIT Bombay, India, December 4-7, 2009 Prof. Inder K. Rana Prof. Inder K. Rana, Convener (ikrana@iitb.ac.in)

"Numeracy : Historical, philosophical and educational perspectives" St Anne's College, Oxford, England, December 16-18, 2009 benjamin.wardhaugh@all-souls.ox.ac.uk

ATCM 2009 - The 14th Asian Technology Conference in Mathematics Beijing Normal University, Beijing, China, December 17-21, 2009 http://atcm.mathandtech.org or http://atcm.mathandtech.com

10th Islamic Countries Conference on Statistical Sciences (ICCSS-10) Cairo, Egypt, December 20-23, 2009 http://www.iccs-x.org.eg/

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/

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/

7. ICMI encounters : Hassler Whitney, Laurence C. Young and Dirk J. Struik : Personal recollections.

I owe much of my academic life to my professors in the High School and in the college and, later, to my graduate advisor and research mentors. I never had a formal preparation in neither Mathematics Education nor in the History of Mathematics. After my graduation, in 1954, I taught for a few years in Elementary and High School. I owe much of my style of teaching to my father, who was a Math Teacher. Out of my practice in classroom I reflected about the meaning and purpose of Mathematics Education and published a few papers, which later proved to be influential. But I soon devoted my attention to research in Pure Mathematics and engaged in a doctoral program, completed in 1963. My research area was Calculus of Variations and Area Theory. Immediately after my doctorate, I went to the USA as a post-doctoral fellow, to continue my research. Due to political circumstances, I decided to stay in the USA and taught undergraduate and graduate courses. In 1972 I decided to return to Brazil, to become the Director of the Institute of Mathematics, Statistics and Computer Science/IMECC of a new university, the State University of Campinas/UNICAMP, which had been created in 1968.

In this short note, I will comment on my personal experiences after my return to Brazil, focusing on Hassler Whitney (1907-1989), Laurence Chisholm Young (1905-2000) and Dirk Jan Struik (1894-2000). I owe much of my attitudes and views on Mathematics Education and the History of Mathematics to these distinguished mathematicians, who became my very close friends.

The work of Hassler Whitney, particularly his book on Geometric Integration Theory, where he gives a theoretical basis for Stokes' theorem with singularities on the boundary, was basic for my research. My doctoral thesis, on Calculus of Variations and Measure Theory, was based on the generalized surfaces introduced, in the fifties, by Ennio De Giorgi and Laurence C. Young, both internationally recognized for their works on measure theory and the calculus of variations.

Although the focus of the Institute in Campinas was research in Pure and Applied Mathematics, I soon realized how fundamental it was for our country to develop also the area of Mathematics Education. We had enough funding to invite foreign mathematicians as visiting professors and I used these funds to invite Hassler Whitney and Laurence C. Young, two basic references in my doctoral research. Whitney came to Campinas for the first time in 1976 and returned for a number of years, for one-month visits. Young came in 1978 and later returned. When I invited Hassler Whitney for the first time, he very kindly thanked the invitation, but, to my surprise, he said that he was not doing research in mathematics anymore and that his interest was only Mathematics Education. Since I was willing to get started some projects in Mathematics Education at UNICAMP, I promptly confirmed the invitation. At the Institute we were all excited to have such a distinguished mathematician with us. He was always prompt to engage in conversation with the faculty and he agreed to give a memorable mathematical lecture on the "Four Colors Problem", which we, fortunately, taped. But he was more interested in our projects on Mathematics Education. It was an opportunity for him to apply his theories of education in a different cultural environment. His proposals for education were supported by the humanistic and phenomenological approach to psychology of Carl Rogers (1902-1987), who was his friend. Essentially, Whitney believed that all individuals exist in a continually changing world of experience of which they are the centre. His ideas about mathematics education were synthesized in a booklet published as Elementary Mathematics Activities. Part A. in the series of Trial Materials 1976, of Institute for Advance Studies, in Princeton. He always referred to it as Part A. This was a basic manual for me and for our projects. Our objective was to develop curricula for elementary and secondary schools based in a sort of experimental mathematics. Influenced by Eliakim Moore's Presidential Address to the AMS, 1902, we were developing a series of instruments to favor mathematics experiences. Whitney writings encouraged us. He clearly wrote "The child's need is to live and grow in his own way. Story problems become part of oneself when acted out ; in this way, they become real, and in particular, numerical relations appear naturally. The child's natural approach is to experiment and explore. Carrying this out, he finds courage to try many things ; some work out in funny ways (which we prefer to call wrong), others come out right. Intrigued, he plays with the funny things, changes them, sees what happens, and makes them come out right also. He is beginning to act like a research worker."(Part A, p.3)

Problem solving was the focus of much interest in Brazil, maybe as a sort of reaction to the dominance of the

so-called Modern Mathematics Movement, in the previous decade. As an alternative to formal problems, frequently hindered by lack of motivation, we favored story problems. In a very inspiring writing, Hassler Whitney says in the same book : "How does one solve story problems ? First of all, replace 'solve it' by 'play around with it'. Half the difficulty is now over. Make it concrete : act out the story. Have courage to try the story in different ways, getting used to its various features. When things turn out wrong, be interested in how they are wrong, and try changes ; act out the story again. Now if you ask what was wanted, you may be ready to see or quickly find the answer. It is really basically as simple as that. Courage to play with and try different things is the key note."(Part A, p. 41)

Hassler Whitney behavior goes much beyond the great mathematician and educator he was. Hass, as he wanted to be called, was very kind and gentle. In his first visit to Brazil, in 1976, I went to receive him at the airport. It was a surprise, Simply dressed, with a backpack, a small piece of luggage and a violin case. We reserved a suite in the best hotel of Campinas. Next day, we went to pick him up and he asked to go to another hotel, near the train station. He had decided to walk in downtown and found this low category hotel. We, surprised, complied to his wish. Every year, on his returns to Campinas, he would go to the same hotel. He asked for us to pick him up in the early afternoon. In the morning he would juggle and he became well known in the neighborhood, which was downtown, dense with popular commerce. We were surprised. I frequently invited him to have dinner in our home. His meals were frugal. But he would always bring his violin to play with my son Alexandre, then 13 years old. Beatriz, then 16 years old, played flute. Together they would spend some hours playing. He was so patient with them. Also, many colleagues in the faculty would look for Hass, as a sort of psychoanalyst, to talk about personal problems. Hass, patiently, listened to them and gave advise. Hassler Whitney, besides the recognized distinguished mathematician, was an inspired mathematics educator and a remarkable human being.

In a completely different strand, Laurence C. Young was also very influential in my personal development and a great benefit for our Institute. He was active in mathematics and always prompt to discuss the research of our young functional analysts, an area of much interest in our department of mathematics. He offered very interesting courses. Young was indirectly influential in our projects of curriculum development for elementary geometry. He told us about the concerns of his parents, Grace Chisholm Young and William Henry Young, both very distinguished mathematicians, with the mathematics education of children. He suggested to us the book Beginner's Book of Geometry, which his parents published in 1905, which starts with paper folding and leads to theorems. We readily acquired this important approach to experimental geometry. I personally owe much to this book.

I particularly benefited from the fact that besides being active in pure mathematics, Young was finishing his book on the History of Mathematics, based on his vast literary culture and personal recalls. The book, Mathematicians and their time, was finished in Campinas and published by North-Holland in 1981. I learned much from Young on literature and the classics, and I developed my approach to historiography by trying to recognize how mathematics and mathematicians were influenced by the material and intellectual atmosphere of their time and the World scenario. Mathematics is like a flower, among many others, in a garden. They all grow in symbiosis. Probably, this was the moment I started to develop my ideas on the dynamics of cultural encounters.

My interest in history developed much earlier. Indeed, historical background, based on "academic" primary sources, was fundamental for my research on the Calculus of Variations and Measure Theory of generalized varieties. But years later, when I taught in Africa, I began to question the hegemony of the "official" History of Mathematics and also of Mathematics Education. Later, teaching in several countries of Latin America and in rural areas and urban periphery in major cities, I became even more uncomfortable with the traditional approach, to both History of Mathematics and Mathematics Education. It was clear that what we call Mathematics emerged in the Mediterranean basin and spread to the entire World after the "discoveries" and the colonial process. I had read Dirk J. Struik's A Concise History of Mathematics and A Source Book in Mathematics, 1200-1800. Both became basic references to look for a broader approach to the History of Science and Mathematics and the colonial scenario. I knew of Struik's political posture and I was impressed by his historiographical approach to the colonial period, as seen in Yankee Science in the Making. I also found The Birth of the Communist Manifesto very elucidative. The interest I developed

about the colonial period and the political overtones of the expansion of Western mathematics to the entire World attracted me to Struik.

In 1984, I boldly wrote to him, with an invitation to visit Campinas. He replied saying he had never been in South America and would very much like to accept the invitation. But he could not travel alone. His wife had to come with him. Since he was ninety years old, we found it natural that his wife should care for him when they were travelling. Since his wife had a degree in Mathematics, we managed to send a ticket also for her. When they arrived, a big surprise. Although Mrs. Struik was younger than him, it was he who had to care for her. She was fragile, losing her memory. He was surprisingly vigorous. She depended on him for permanent care. Dirk, as he liked to be called, was a great company. Always caring much for his wife, they liked to visit the countryside and enjoyed Brazilian food and drinks.

Conversations with Dirk were rewarding. I was much influenced about his deep and comprehensive views of World politics, particularly of the role of Science and Mathematics and education in it. I was structuring the Program Ethnomathematics and Struik was much influential in the development of my ideas. His remarks on the colonial process of developing Mathematics in Latin America and in the short lived Dutch attempt of establishing a colony in Brazil were precious. He gave several lectures and wrote a remarkable paper for the Revista da Sociedade Brasileira de História da Ciência.

It was a great emotion for me when, while driving him to the airport, he said he never thought that at his age he would make such a strong new friendship. Indeed, we became close friends. I visited the Struiks a couple of times in their old home near Boston. When he was awarded the Kenneth O, May Medal, in 1989, in Hamburg, I was there to greet him. Later, I flew from Brazil specially to address the Symposium organized in Providence to commemorate his 100th birthday. A few years later, during the AMS/MAA Joint Annual meeting in Baltimore, in 1998, my colleagues and friends organized a Seminar honoring my 65th birthday. Dirk was the main speaker. When I thanked him for having travelled to Baltimore specially for this occasion, he replied "I had to be here. You came from Brazil for my 100th birthday party. And I will come to your 100th birthday". Although my friendship with Dirk Struik came later in my life, he was a remarkable influence.

I consider Hassler Whitney, Laurence C. Young and Dik J, Struik not only academic mentors, but above all exemplary human beings which inspire my behavior. Ubiratan D'Ambrosio, ubi@usp.br

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