

The 9th International Congress on Mathematical Education, August 2000

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The following five short pieces are all commentaries by attendees at the 9th International Congress on Mathematical Education held in Japan, July 30th to August 6th, 2000

(a) Colette Laborde

Le neuvième congrès international sur l'enseignement des mathématiques (ICME-9) s'est déroulé dans un ensemble complexe de bâtiments destinés à recevoir de grandes manifestations d'aspect futuriste, architecture que Jules Verne se serait complu à décrire avec talent. Makuhari, centre de convention de taille gigantesque, accueillait en effet le congrès ICME-9. La géométrie des passerelles de niveau multiple et des édifices verticaux fournissait un objet d'étude inépuisable pour tous les amateurs de géométrie 3D ou de repérage dans l'espace.

Les 2069 participants d'ICME 9 (venant de 79 pays différents) se sentaient un peu perdus dans ces locaux prévus pour des masses plus importantes. La plus faible participation (les congrès de Séville et de Québec avaient attiré 4000 et 3000 participants) a conféré au congrès un caractère plus intime qu'à l'habituel et après deux jours de congrès, chacun était assuré d'avoir rencontré tous ses amis, collègues et connaissances, ne serait-ce qu'à l'occasion de la Happy Hour qui se tenait le soir de 19h à 21h, dehors dans le parvis au pied d'escaliers menant au grand hall. Un autre avantage de l'environnement tenait certainement à la qualité l'équipement audio-visuel mis à la disposition des conférenciers et groupes divers.

Comme prévu, mes journées ont été bien remplies entre 7h 30, heure à laquelle je quittais Tokyo pour prendre le métro puis le train, et 22h 00, heure de retour à Tokyo. Un peu plus de deux heures de transport, où je surveillais avec anxiété les noms des arrêts du métro et du train quand je croyais être proche du lieu de changement ou d'arrivée.

Les déplacements ont été nombreux aussi pendant la journée et s'il reste un souvenir fort du congrès c'est bien celui de marcher à vive allure pour rejoindre un groupe de travail ou une conférence, tout en saluant au passage les nombreux amis et collègues. Des moments calmes où je pouvais être assise, je retiens quelques points forts.

Une conférence particulièrement réussie sur tous les plans a été la conférence plénière de T. Nunes qui clôturait de façon heureuse le congrès: 'How mathematics teaching develops pupils' reasoning systems', dans laquelle elle a exploité l'approche vygotkienne de signe et d'outil dans l'apprentissage de la division. Clarté du propos s'appuyant sur un diaporama Power Point, insertion de vidéos montrant des enfants résolvant des problèmes,

Une autre conférence brillante a été la conférence régulière de C. Alsina sur la géométrie de Gaudi, architecte catalan, concepteur de la Sagrada Familia et aventurier audacieux dans l'étude des formes fondée sur une grande connaissance de la géométrie. Les aspects culturels ont aussi été fortement présents dans la conférence de T. Osamu ('Some characteristic features of Wasan, the Japanese traditional mathematics') sur les mathématiques Wasan, c'est-à-dire les mathématiques japonaises, développées en dehors de toute influence occidentale avant l'ouverture du Japon à l'ère Meiji.

Diversité et variété dans le Working Group 11 sur l'usage des technologies (groupe de taille géante, il a attiré un grand nombre de participants, en particulier parce qu'il était le seul sur ce thème) et le Topic Group sur la géométrie plus modeste en audience: présentation des usages variés de différentes technologies (calculatrices, tableau blanc électronique interactif, tableur, ...) dans le premier groupe, expérimentations avec des élèves sur l'apprentissage de notions spécifiques, exposés théoriques sur les processus d'apprentissage en géométrie ou les aspects épistémologiques pour le second groupe.

Grande variété de propos aussi au groupe international Cabri-géomètre qui a bien reflété la diversité culturelle de ses participants. Les exposés tenus ont porté sur les environnements de géométrie dynamique, leur usage dans différents pays du monde, leur intégration dans le curriculum, aussi bien que les nouveaux problèmes conceptuels rencontrés par les élèves dans leur usage, ou les modélisations rendues possible de propriétés mathématiques (théorème des résidus, transformations conservant l'aire, 5^{ème} problème de Hilbert).

En conclusion, un congrès de contrastes, un lieu futuriste et des danses traditionnelles, des locaux immenses et un nombre plus restreint de participants qu'habituellement, de nombreux 'anciens' mais aussi beaucoup de nouveaux participants des pays d'Asie

(b) William C. Higginson

There is a theme in contemporary literature on cultural evolution which might be called 'the primacy of place'. Most prominently articulated in Jared Diamond's *Guns, Germs, and Steel: the Fates of Human Societies* (Norton, 1997), it argues that the critical early factors for the social evolution of human groups are the immediate environmental realities of climate and topography. In thinking back to ICME-9 this past summer, and to five of its predecessors which I have attended over the past three decades, I am

reminded of this theme because of the preponderance of 'place' in my recollections of these gatherings.

The meetings where I remember most about the 'sessions' are Exeter ('72), Berkeley ('80) and Quebec ('92). Not coincidentally, these were settings I knew fairly well before the congresses took place and ones where there were relatively few language barriers for me. Adelaide in 1984 was new terrain and my major memories are of the 'first time to Australia' variety. Karlsruhe (1976) added a dimension of linguistic complexity to a moderately familiar setting. ICME-9 in Tokyo brought me the double challenge of unknown territory and, for many interactions, major linguistic challenges.

A few months later, therefore, my memories of our discipline's ninth global gathering are largely filtered through images of sweltering heat, a near-surrealistic setting and the extraordinary efforts of our gracious and patient hosts to meet the numerous and perplexing demands of their visiting colleagues. Makuhari Messe, the imposing new complex where we gathered, is one of Japan's major sites for international trade fairs. For manufacturers in the aerospace, construction or electronics sectors, it may well be an ideal location. For mathematics educators and the purveyors of 'teaching aids' for mathematics, it was not particularly inviting. Massive and cold, it had more the *ambiance* of a film set for a science-fiction movie than a backdrop for discussions about the issues in mathematics education.

The programme committee had clearly worked hard to meet a strong set of constraints including gender, discipline and geography. For the most part, their recommendations were well-founded. The four plenary sessions were, for this listener, well above the historic average standard for this category. Mogens Niss's opening talk with its carefully-crafted survey of the field, 'Key issues and trends in research on mathematical education', was especially memorable. The invited, one-hour 'regular' lectures varied much more in every dimension, but many participants found their choices in this category to be quite stimulating. Reviews of the Working Groups for Action, and Topic Study Groups were mixed. The breadth of the themes and the size of the groups make this part of the programme a particularly challenging one to organise. Among the intellectually strongest and most interesting presentations I attended were those arranged by the 'History and pedagogy' and 'Women and mathematics education' Affiliated Study Groups. The national and commercial exhibits were worth examining with the numerous projects from the host country being particularly interesting.

The real benefit of international gatherings of this sort often comes from time spent in informal discussions with old and new friends. ICME-9 was no exception to this rule. The organizing committees and the host nationals did an outstanding job of structuring a week in which these interactions were encouraged. They deserve our thanks for a task very well done.

(c) Cynthia Nicol

This was my first ICME as a beginning teacher educator. I had attended ICME-7 in Québec City as a graduate student, but ICME-9 in Japan receives recognition as being the first

It was a first in many ways. My first trip to the Asian Pacific. My first international conference attended by myself, that is without the good company of my graduate student peers, in particular Sandra Crespo. My first opportunity to present a paper at ICME. And a first chance to make connections with so many wonderful people and to meet personally the many authors whose writing has been a part of my work.

What stood out for me? Almost everything! I left Vancouver for Tokyo with eyes and ears wide open. I returned with stories and experiences that have influenced my personal and professional life. ICME-9 was special. From the International Round Table on the first day to the Bon Odori (Festival Folk Dance) on one of the last days, ICME was a celebration of mathematics, education, culture, difference and shared visions.

One of the most significant events was my congress tour. Although a trek along the slopes of Mt. Fuji would certainly have been memorable, I chose instead to visit a Japanese elementary school. I hoped that a first-hand experience of a Japanese classroom would help contextualize some of the research I have read on the teaching and learning of mathematics in Asian classrooms.

Our school hosts were gracious. Schools were actually out of session for the summer, but a number of teachers and a class of Grade 6 students returned for our benefit. The lesson we observed was titled 'The curious cube'. I squeezed into the back of the small classroom with the other ten ICME participants present and was quickly involved in making a curious cube with a table of four students. (The curious cube is a $2 \times 2 \times 2$ cube made of eight smaller unit cubes taped together in a way that will allow the cube to be re-arranged to change its surface colour from red to blue to yellow.)

The Grade 6 students were quickly engaged in the task and before the lesson finished a couple of students had constructed the curious cube with its changing colours. The task, the teacher said, is used to stimulate students' curiosity about cubes and their structures. It certainly stimulated mine for I pulled out my set of cubes more than once on the bus ride back through Tokyo (and I am now using the cubes with pre-service teachers in my own classes).

What I found surprising was the school itself. The building, old and dark with little storage and antiquated resources, was in stark contrast to the high-tech presence in Makuhari and the conference area. When I asked about the use and availability of technology, we were taken to the school's computer room. Up a flight of stairs, past the science room with its lead-covered tables, concrete floor and bare wooden stools, and down a dark hallway. Inside the computer room, there were twenty new computers with flat screen colour monitors, carpeted floors and padded steno chairs ready for student use. This room and the school are an example of the contrasts within a country with its world-leading technology amidst the honour of tradition and ancient history.

Special ICME highlights were the short presentations and the exhibitions. I spent many hours on Friday and Saturday in the Exhibition Hall visiting the various commercial and non-commercial exhibits. It was here that I felt the spirit of ICME. In contrast to the plenary and regular lectures, the short presentations and exhibitions offered hands-on activity, personal engagement with authors and opportunities for

more in-depth discussions on mathematical and pedagogical issues

It was here that I made many contacts. I spent hours at the Origami Land tables and tables sponsored by a number of Japanese mathematics and mathematics education associations. I folded, built and puzzled while talking with participants from Scotland, The Netherlands, the UK and Japan about change issues in mathematics education. The exhibitions brought together mathematicians, teachers, researchers and teacher educators. Our discussions of mathematics while doing mathematics make me think about the potential of a *Math Bar*, where, like a coffee bar or cyber café, people might meet, talk, and share ideas while puzzling over a mathematics problem. Perhaps such a bar or café might work toward improving adult numeracy, increasing public participation and transforming public perception of mathematics.

The success of the exhibitions and short presentations made me wonder how we might make the Working and Topic Groups of ICME more workable. I attended and participated in two very interesting groups: Working Group 8 on issues of connecting research, practice and theory of mathematics education and Topic Group 8 on vocational mathematics.

I had thought that the size of my working group made it somewhat difficult for extended in-depth discussion and analysis of some of the issues presented. However, my topic group was quite small in comparison, yet with multiple paper presentations there was little time for discussion. It is clearly challenging to structure Working and Topic Groups that will meet the needs of participants, offer opportunities for an international sharing of research, ideas and projects, and time for the group to work on/ in/ out important issues that arise. Perhaps offering participants electronic versions of papers before the congress might allow more time for participants to engage and examine important questions and issues. Moving from the presentation of ideas to an engagement in and investigation of ideas for Working and Topic Groups is a complex task, but one certainly worthy of further consideration.

As a first congress, ICME-9 was wonderful. I was continually impressed with the graceful and polite Japanese hospitality, whether at the congress site or on my adventures by train to Tokyo. I had, however, hoped to attend some sessions given by presenters in their first language (with good simultaneous English translation available) to portray a flavour of sharing multi-cultural knowledge and ideas. All of the plenary sessions and many of the regular lectures were in places equipped with translation devices. Perhaps these devices could also be used for English-speaking participants. I recognize this is a complex issue, translating ideas in mathematics education involves more than translating words from one language to another. Yet, I wonder how we might honour and celebrate the multi-cultural exchange of ideas in ways which respect and represent our cultural differences.

As a beginning teacher educator, I wonder if ICME might offer sessions or working groups for those participants who, like me, are beginning their teaching and research practices. An international exchange of ideas around issues related to

negotiating academic life, establishing research connections and discussing the political and social fabric of mathematics education would be valuable. What might ICME offer its newest participants?

My eyes and ears are wide open. ICME has changed me. I look forward to attending the next one.

(d) Bill Barton

ICME has always been more of a people conference rather than a presentation one – and ICME-9 was no exception. There is an excitement generated by the concentrated presence of experience and scholarship mixing with enthusiasm and questioning. It is moderated at ICME by the difficulties of multi-lingual communication, the dilution of large numbers and the difficulties of multi-choice sessions.

Let me first say that the Japanese organisation was fantastic in my experience: last minute changes were rare, information flow was clear and facilities were great provided by a large, competent and very helpful team. The reception and Happy Hours were generous and ideal opportunities to meet colleagues. Thank you, Japan, for your hospitality.

ICME plenary speaking must be one of the most difficult tasks in the mathematics education world. To say something which warrants thousands of people sitting attentively for an hour, many listening in an unfamiliar language (or through earphones), many primarily there because it is a plenary not because of its subject matter, all puts a huge onus on the speaker. The options are to entertain, or to be deeply significant.

Frankly, I prefer more entertainment in such situations, but at this ICME I did find food for thought in Mogens Niss's challenge to us as mathematics educators to attempt a more encompassing research approach rather than the focus on small-group, context-dependent studies which have characterised the last 15–20 years. What is it we know about mathematics education? What can we say to teachers (and yes, he emphasised that we must speak to those in front of classes more) about what they do? This challenge to be able to make statements about our field was with me for the rest of the conference, and became a useful touchstone for the work we did and presentations we heard.

While on the topic of plenaries, I believe that we must find a way to dispense with much of the formality without offending hosts and sponsors. I found the three messages from Heads of State (Japan, USA and Peru) to be totally unnecessary. I could accept it from the host country, but the USA and Peru? I would much rather Clinton showed his support by donating to ICMI an amount equivalent to the proportion of the salaries of all those present of the time spent sitting listening to empty words. My calculation based on twenty minutes for two thousand people with an average salary of \$US30,000 comes to over \$US 10,000.

The regular lectures were, as usual, varied. Somehow I am willing to put up with this more: I have a choice, and have been to enough ICMEs to know many of the speakers. And I like the idea of a large number of invited speakers from the full range of ICMI representation. The best of my choices this year was Colette Laborde: one more insight into the power of geometric microworlds: this time, my

conceptions surrounding solutions to systems of linear equations were changed forever

The Working Group (mine was *Language and Communication*) is where the guts of the conference lies. It seemed to me that we had more time in these groups this ICME, and I appreciated that. Here is where networking with like-minded souls is critical, where you can meet your bibliography and where there is a chance to seed new initiatives. I was lucky enough that my Topic Group (*Ethnomathematics*) also fulfilled my expectations.

There were, of course, frustrations. The displays never seemed to have a buzz on when I was there, the Study Group report back and Journals seminar did not take off. I hasten to add that my conference philosophy allocates the cause at least as much to my lack of energy in those sessions as to anyone else's deficiency.

Worth it. Of course. Will I be in Denmark in 2004? Certainly. Where else can I find someone who will talk to me enthusiastically about each one of the varied interests I have in mathematics education, get some good work done, have a good social time with new and old friends *and* see a new country and culture, all in one week?

(c) Alexander Karp

ICME-9 was the first ICME I have attended. Maybe that is why I was stunned by the diversity of people, ideas and approaches, which I encountered there. I was equally impressed with the exceptional productivity of the organizers who succeeded in embracing this diversity within the tight space and time limits of the conference. It is refreshing and reassuring to discover that one shares one's opinions with the colleague who lives thousands of miles away. At the same time, colleagues' interest in the issues and problems you have not so far considered stimulates novel perspectives in your research.

The most important thing for me was the vigorous interest in the humanities-related aspects of mathematics education. It is only infrequently that mathematics education gets examined in Russia as the product of and reflection on social and cultural structures, on the one hand, and as the instrument of their reorganization or preservation on the other. In the Soviet Union (which had been permeated with ideology), it was only natural for the most competent mathematics educators to try to stay away from political and social issues. In fact, it was the only way to avoid preposterous official requirements and not slip into senselessly simplistic theorizing. Regrettably, this kind of attitude precluded scholars from the analysis of the processes that transpire in mathematics education. This is the reason why these processes in Russia have remained largely unanalyzed

and unexamined

The groups in whose work I participated and the lectures I attended revealed the aspiration (one which is very close to my heart) to demonstrate in teaching that mathematics evolved as part and parcel of culture, not as the fruit of idle speculation. I also encountered the desire to tear down the walls that artificially separate mathematics education from other fields.

As commonly happens, the shortcomings and merits of something are very closely related. Parenthetically, I would like to note that maybe what I experienced as a shortcoming may have to do with my inability to attend all the lectures. It may very well be that the lectures that I missed focused on the very topics that I found to be in short supply. Still, I would like to note that the word *mathematics* within the term 'mathematics education' tended at times to be subdued. Meanwhile, it seems to me that the influence of social as well as psychological and cultural processes *on our subject area* should be of primary concern to mathematics educators, and not merely these processes as such.

What is happening to school mathematics these days? It is crucially important to try to overcome the view of mathematics as the subject area intended only for an *élite*. It seems that every effort should be made to render mathematics open to all. However, it does not mean that these 'all' should end up being mathematically deprived (and those interested in mathematics having to pursue mathematics education outside of public schools). Is it fair to say that, instead of developing humanistic mathematics (the mathematics which children find accessible and exiting), on occasion mathematics gets replaced with meaningless entertainment activities? I have to confess that I found myself missing a frank discussion of these problems at the congress.

Still, it is more important to discuss now what ICME has accomplished. The congress provided the opportunity to enjoy and learn from remarkable presentations which tackled - among others - such topics as the in-depth, comprehensive analysis of research in mathematics education and the analysis of the current processes and problems in mathematics education development explored against the background of the technological revolution.

I took away with me from Japan suitcases full of literature which I was lucky enough to have been able to pick up at the congress. Lastly, and most importantly, the congress provided me with an opportunity to meet my colleagues from all over the world. These new contacts and ensuing fruitful exchanges conducted via e-mail to this day make me feel connected to the significant scholarly event which unfolded in the majestic hall of Makuhari.