

issues arising (for me) in this working group. For example:

- 1) A PME (Psychology of Mathematics Education Group) presentation by Laurinda Brown gave an account of her use of a methodology of offering "stories" as a basis for encouraging student teachers' reflection on significant aspects of their practice;
- 2) An ICME 8 lecture by Tom Cooney talked about approaches to teacher education and, in particular, activities which he and his colleagues had developed to enable prospective teachers to reflect on the processes of teaching and learning.
- 3) Evaluation reports from a one-year teacher education course at my own university, partially taught by me, said there was too much emphasis on reflection, and that it was boring and unproductive;
- 4) An issue which niggles at me constantly in my professional life is my own development as a teacher-educator and researcher, and how reflection influences my own practice.

If my students are unappreciative of my efforts to get them to reflect (3), then either reflection actually isn't of use to them, or I am being ineffective in the way I work with the students. It might be that I am not seen to be effective myself as a reflective practitioner (4). As I reflect on these students' evaluations, how is this reflection going to influence the way I work in next year's course? Is it legitimate for this overt reflection to be regarded as research?

Laurinda offered a methodology to aid reflection. Tom offered activities on which to reflect. In both cases I was aware of similarities and differences between the practices described and the ways in which I work myself. This raises important issues for teaching. The main value of these sessions seemed to be to alert me to activities and processes I might employ, and reinvigorate me towards using them. How might I best research the process of their use? Would this be more fruitful if I drew my students into this thinking and encouraged them to help me evaluate effectiveness? Perhaps student's overt involvement at this level might make for a more collaboratively reflective venture. How might I turn these reflective questions into positive action for the enhancement of my teaching?

I observe now that I am focusing on my own local development of expertise and its potential influence. What does this have to do with more global developments in education — perhaps worldwide? There is a tension, maybe a productive one, between seeing educational development locally and globally. Is the latter merely the sum of all the instances of the former? Somehow I don't think so. From many theoretical perspectives a collaborative approach to global development might seem to have the best chances of success. Here collaboration is meant to be the widest possible, i.e. including students, teachers, educators, researchers, wherever they may be found.

My word limit forbids more extensive deliberation on these questions here. Let me end by coming back to ICME and its role and purpose. Clearly it has played an important role for me in making the above deliberations possible. This is a local influence. What are the more global possibilities?

At ICME 3-4,000 people gathered from all over the world. Should not the huge effort and expense of organising the congress result in more than the sum total of all the local illuminations that participants achieve?

I am aware that, unlike me, many of my compatriots did not have such a fruitful ICME experience. Maybe they did not choose their sessions well. However, this suggests that some parts of ICME are less valuable than others. Or is this an individual phenomenon: everything will be of value to someone? Again, I don't think so. There seems to be a challenge to ICME participants, and indeed to the organisers of ICMEs, to consider what we want an ICME to be and to offer to all its participants, and what we hope the effects of that might be on the global development of mathematics education.

Nights in the gardens of Spain

JOHN FAUVEL

Sunday

The whole Iberia flight from Heathrow to Seville seems to consist of ICME delegates, recognisable by their blue ICME-7 bags, which have stood up to four years' use remarkably well. Networking starts early, and even before leaving English soil I have several useful conversations with people about future plans and projects. Arriving in Seville with nowhere to stay turns out in retrospect to have been a good move, since the hotel they allocate me, in the centre of Seville a stone's-throw from the Cathedral, is gradually colonised during the week by delegates whose pre-assigned hotels turn out to be located miles from anywhere, at the end of non-existent bus routes.

Monday

Like everyone's rainbow, everyone's ICME is different. The opening day provides an opportunity to use experience of earlier congresses to work out an optimally fruitful path. This involves the ruthless discarding of events that one knows in advance will not work. My experience of ICME-Laval has determined me never to go to another opening or closing ceremony and associated plenaries. From talking to others later about their experience of this opening day I do not regret my decision.

Tuesday

The heart of a big international conference is the internal message board. To communicate with someone at this conference you take a blank card from a box, write a message on it, put this in another box, which is then opened occasionally by the organisers who transfer it yet to another box and post a computer list of people who have messages. Any delegate bold enough to pin a message to the board for someone else finds it is removed by the organisers. All the messages I leave today are still uncollected by the end of the congress; apart from anything else, the organisers have omitted to create any public awareness of there even being a message board.

The first session for the HPM Study Group (History and Pedagogy of Mathematics Group) is well attended. There are delegates from over 30 countries, from Iceland to Papua New Guinea, a graphic reminder of the extraordinary achievement of ICME in bringing together so many far-

flung people to explore common concerns and move towards in mutual support I report on the past four successful years of promoting and facilitating the use of history in mathematics education, before the election of my successor as HPM Chair

Walking back through the park, I fall in with two people who ask me how I'm finding the Congress. I say I'm enjoying it and getting a great deal from it, at which they profess delight and astonishment. They turn out to be two of the organisers who have been on the end of a great deal of flak from delegates over the organisational inadequacies. We put all that behind us as they show me the splendours of Seville by night, the parks, the buildings, and the life.

Wednesday

Seville is a stunning place for a conference. In spirit and intention, the Spanish hosts are welcoming and hospitable. In practice the organisation has a slightly out-of-synch quality which some delegates have found distressing. One young organiser has been reduced to tears by harassment from delegates unable to cope with their frustration. I have discovered the reason for the organisational limitations: money. My friend of last night tells me that he was on the staff of an even larger conference held here earlier in the summer which ran perfectly with no organisational hiccups; the only difference was that it was a medical conference heavily subsidized by pharmaceutical companies. By comparison, ICME is run on a shoestring and, alas, it shows. I suspect the complexity of ICME is also far greater than that of most conferences. But there were riots on the streets of Barcelona last week, apparently, over the organisational ineptitude of an architectural congress there, so our organisers get off lightly. It will be interesting to see how the Japanese cope in four years' time.

Across the sun-baked square, I see a Polish mathematics educator I met in Krakow this spring, who wants me to present on her behalf a contribution to the working group on students with special needs. I am very happy to agree, as it is joint work on the mathematical needs of deaf children which I have taken an interest in for some time. She gives me the text she would like me to shorten to ten minutes and present on Friday.

At the ICMI General Assembly I report on HPM activities and future plans, which include working towards the long-planned ICMI study on "The position and role of the history of mathematics in the teaching and learning of mathematics". I sense, and gratifyingly ICMI does as well, that the time has come for a thorough exploration of this dimension of mathematics education, since there is now so much activity on this front throughout the world, though relatively uncoordinated and so far without a very firm theoretical underpinning, or indeed any analysis of whether stronger conceptual foundations would be appropriate. Afterwards, the second HPM session is even fuller than last night's, with three excellent talks providing case studies on the educational use of history in Italy, Japan, and Canada. This demonstrates what a wealth of experience is out there waiting to be pulled together for the ICMI study.

"Happy Hour" is essentially the most vital and important dimension of an international congress such as ICME. This

is where one catches up with old friends, makes new ones, holds discussions about important issues and does the forward planning for future events and projects. Tonight I have a chat with Tony Gardiner about adjoining a History in Maths Education meeting (one of the HIMED series run by the British Society for the History of Mathematics) to the 1998 Mathematical Association conference at the University of Warwick. This will be a useful way of enabling the growing cadre of keen mathematics teachers in Britain to find out more about using the history of mathematics in their teaching.

Thursday

Excursion day: foiled in my hopes of visiting either Granada or Córdoba, the trips to which are full up, I spend the day exploring more of Seville, admiring afresh the tiling patterns of Spain's Islamic heritage. Alerted by Anne Watson to the stupendous tiling of the elliptical chapterhouse floor in the Cathedral, I spend some time there studying and photographing the tiling in an effort to get into the mind of its designer five centuries ago.

In spite of the intense heat of the day, at ground level the park remains surprisingly cool beneath the many green-leaf layers above, so is a good place to sit and prepare for tomorrow's presentations. Walking home through the night-time streets of Seville, which are all cleaned and hosed down in the early hours of the morning. I reflect on the civic pride shown by this great city and its citizens: what a contrast with countries whose politicians have willfully destroyed local democracy and made it hard to sustain any remnants of pride and confidence in the environment and whose streets consequently remain unwashed and unloved.

Friday

I rise early to put last-minute touches to the presentation on deaf students, and arrive in good time for the special needs working group. The Polish lady announces that she has changed her mind, and the English-speaking daughter of a fellow-Pole is to do the presentation instead. Ah, the joys of international conferencing!

At noon I make my way to Topic Group 16 (History of mathematics and the teaching of mathematics) excellently organised by Louis Charbonneau. A well-matched set of talks on using history at different educational levels is given by Anne Michel-Pajus, María Mercedes Diez Barrabés, and Victor Katz, while I lead off with a talk about the research of Helen Gardner, who is almost single-handedly studying the utilisation of history of mathematics in primary schools.

My Open University colleague Christine Shiu is responsible for showing three videos at the conference. All three are scheduled by the organisers to be shown at the same time (which reduces by two-thirds the potential audience for any one of them), so the task of presenting them is shared. I go to lend support to Colleen McMurchy-Pilkington who is introducing the première of our Maori video, "Working mathematically in a cultural context". This spin-off from last year's filming in New Zealand for our new mathematics foundation course seems to me admirable both in conception and execution; the small but enthusiastic audience is composed of people with interests in cross-cultural and multicultural mathematics education in native American and

ticultural mathematics education in native American and other contexts, who are glad to see comparative material that can be shared with trainee teachers facing similar issues in different countries.

This evening's Happy Hour seems, in its well-intentioned impracticality, an archetype of Spanish organisation. The fine wines and foods of Andalucia are on display. The wine is drawn up from a cask by a slim ladle and poured into a glass from a great height. There is one wine expert demonstrating this technique; it is fascinatingly ethnic, while perhaps not the most practical way of serving a thousand thirsty delegates. But the wine, and its accompanying carved ham slices, is wonderful.

Saturday

More history today to round off a bumper week. At noon the second session of the history and teaching topic group lives up to the standard of yesterday's, while the final HPM session in the evening has four excellent talks, from England, Colombia, Israel, and the USA. The Colombian contribution by Luis Recalde, on mathematical ideas in the work of Jorge Luis Borges, was especially memorable, because it exemplified the ideals of an international meeting. Luis spoke in Spanish but the high quality of the simultaneous translation by Ubi D'Ambrosio made for a better pace than most monolingual talks, and when an American professor of Latin American studies joined in, the feeling of multicultural knowledge being opened up and shared was most exciting.

Around 2:00 a.m. I find myself at a fiesta in Triana, the old gypsy quarter on the other bank of the river Quadralquivir. I bump into John Bradshaw from St. Martin's College, Lancaster, and discuss with him the special history issue of "Mathematics in Schools" which he is planning, while around us the fiesta is in full swing: stalls, dodgems, flamenco dancers, and cheerfully shouting children of all ages. I reflect how different Seville is from Milton Keynes, which is not at all like this at two in the morning.

Sunday

Holding to my pledge to avoid closing plenaries in inaudible halls, I arrive at the Palacio de Congresos in time to take the HPM-chartered bus for Lisbon. The journey is an excellent opportunity to get to know some people better and prepare for the week ahead. It will turn out that a conference of 500 people in northern Portugal is an even better, or at least more concentrated, forum for exploring issues of history and mathematics education, and certainly the Portuguese organisational style is rather more coherent and proactive. It will be interesting to sample Japanese and — we hope — Taiwanese hospitality in four years' time.

A partial, simplified, and biased story about expectations

ABRAHAM ARCAVI

This report is necessarily partial and biased: the number of things one can attend to in such a large conference as ICME is limited, and obviously even these are viewed subjectively.

ICME is an international festival with the potential to address the wide diversity of interests of those of us engaged in mathematics education. I talked to many colleagues about

their impressions of ICME, and the conversations usually revolved around the sessions they attended. However, I do not want here to report on the sessions themselves, but rather on the expectations of diverse groups of people, as I was able to pick them up from formal and informal remarks. I was in a favorable position because I speak Spanish (I was born and educated in Argentina), and more than one third of the participants were Spanish speakers (according to "Díario de Sevilla", a daily ICME newsletter distributed during the conference).

Expectations were indeed diverse

A vast majority of the Spanish-speaking participants had expected to learn from colleagues in other countries, but in their own language, and they were disappointed when that was not the case. There were sessions in Spanish and pre-arranged simultaneous translation for the plenaries, but there were many sessions in which translation had to be arranged *ad hoc*. For example, during the second session of the Working Group in which I participated (WG13: Curriculum changes in the secondary school), because of the large Spanish-speaking audience, it was decided that after each 15-20 minute presentation in English, I should provide a 5-minute summary in Spanish. This experience was a convincing confirmation for me that: 1) it is one thing to listen to a talk at leisure, and quite another to listen to it in order to provide an almost immediate summarized translation; and 2) the translation of views and experiences in mathematics education may require more than the matching of words in one language to those in another — what may sound plausible and rational in one language (with all its cultural baggage) may sound strange in another. However, it would be as presumptuous and superficial to assert that communication was established as to deny that it was. This would seem to be an interesting aspect, worthy of investigation.

Another "expectant" group was the interested general public and the media. Apparently, they expected from ICME quick fixes to what they saw as the main maladies of mathematics education. For example, "El Correo de Andalucía", a local newspaper, devoted lots of space to the conference. On July 16, an almost complete page was entitled "La asignatura de matemáticas cosecha el mayor índice de fracaso escolar" ("Mathematics is the school subject with the highest failure rate"). The subtitle asserted that the goal of the conference was to solve this problem. In the opening session, the Rector of the Universidad de Sevilla seemed to imply that ICME should address the universal student question: "What is mathematics for?". According to him, the utility of the subject in daily life was far from clear, except for fairly elementary arithmetic and some descriptive statistics.

In other words, ICME was expected to provide an answer to whether/why math — such a difficult subject that most of those studying it are doomed to failure — should be taught at all. And if it should, ICME was there to provide ways to ensure greater student success.

Some of the teachers I overheard expected to receive from ICME immediate and simple guidelines to apply in their daily work in schools. After a very interesting talk in