

Some notes on the early ICMI Studies ⁽¹⁾

Geoffrey Howson

The idea of the ICMI studies developed from conversations which Bent Christiansen and I held in the years 1980-82. At the beginning of that period we believed that Bent would become the next President of ICMI and that I would be his Secretary: a situation which was later to change. We met frequently because of the formation of the BACOMET group which we directed along with Michael Otte.

In a sense this was a continuation of the old ICMI process of determining upon themes to be discussed at the ICMI conferences and on which national representatives were requested to prepare national statements/reports. However, we wished to appeal directly to interested people. Too many national delegates did little and it was unwise to rely on them passing on messages or initiating action. (I discovered a year or two after becoming ICMI Secretary that the delegate for one country had been dead for over twenty years – so he, at least, had a good excuse!) There had also been sporadic meetings in which ICMI was involved and which were devoted to the discussion of particular issues. Reports on these, together with some of the papers delivered, can be found in the 1960s and 1970s issues of *L'Enseignement Mathématique*. Often, though, these meetings were not initiated by ICMI, but ICMI simply gave them its blessing. An example of such a meeting was that held in 1973 in Echternach, Luxembourg, when Sir James Lighthill was the ICMI President and Luxembourg's energetic national representative was Lucien Kiefer.⁽²⁾ The topic was “new applications of mathematics in the secondary school”. A report was published⁽³⁾ but all I recall was a delightful article by Margaret Brown with suggestions such as determining the optimum height at which the Chelsea Football Club (for Margaret was then attached to Chelsea College) should place its floodlights.

An even more important study-conference in which ICMI played some part was that on *Interactions between linguistics and mathematical education*, held in Nairobi in 1974. This was funded by UNESCO (for whom Bent Christiansen was then the relevant officer) and the British ‘Centre for Educational Development Overseas’ (CEDO, soon to be absorbed into the British Council). However, it received the ICMI imprimatur and was opened by Sir James Lighthill – that conference was the first of the series of so-called “ICMI Regional Conferences”. Selected delegates from twelve African countries participated and experts on language drawn from Anglophone countries attended and spoke. Numerous language problems had arisen in Africa, for example, which language to use when teaching mathematics and at what school level to switch from the vernacular to English: a question answered differently within Kenya, Tanzania and Zambia. A report of the meeting was published by UNESCO.⁽⁴⁾

Bent and I, then, wished to develop such ideas, but believed that certain changes were essential. Meetings should be publicised more; there should be more attention paid to preparations for the meetings; it was essential that meetings should not, except in especially rare cases, be by invitation only; membership should be open to anyone who demonstrated an active interest in the matter under discussion, rather than those personally known to the organisers; and reports of the meeting should be properly prepared and edited and then made commercially available in as cheap a form as possible.

However, something happened which might have disrupted the plans that Bent Christiansen and I had made: we were told that the next President of ICMI would not be Bent but Jean-Pierre Kahane, whom neither of us had ever met. Bent would remain a Vice-President. Both Bent and I were later to acknowledge that this change of direction, although particularly disappointing to Bent, was of great benefit to ICMI. Jean-Pierre was a marvellous President and a delight to work with and he did much more than just open doors to which Bent did not have access. So the formal development of the studies began in December 1982 when, prior to us all assuming office, we met at Jean-Pierre's home in Paris together with Ed Jacobsen of UNESCO. There, Bent and I spelled out our ideas concerning the studies – Bent especially wanted a study on cognition; I had one or two suggestions. Jean-Pierre immediately supported the idea and proposed that we began with a study on the impact of computers. He cast around for a possible venue and enlisted the aid of Francois Pluvillage at Strasbourg. We decided that the best procedure would be to appoint an International Program Committee and with its aid prepare a discussion document that would be sent to all national delegates of ICMI and would also appear in a selection of mathematical and mathematics educational journals. The committee appointed was an extremely strong one: R.F. Churchhouse, A.E. Ershov⁽⁵⁾, J.H. van Lint, A. Ralston and M. Yamaguti were outstanding mathematicians making great use of computers, while Bernard Cornu and Pluvillage were concerned with both the computing and educational research areas. As far as I recall we only had a one-weekend meeting prior to Strasbourg (in Paris and in Henri Cartan's office at the *École Normale Supérieure*) and after that post was almost the only medium of communication. Financial assistance was obtained from a number of bodies: DCRI (the French intelligence agency), the French Mathematical Society, the Royal Society, IBM, ICSU, UNESCO and the University of Strasbourg. So far as membership of the meeting was concerned, we wanted to make it open, but not to be filled by people who were there solely to visit Strasbourg and sample its excellent restaurants. We decided, then, that everyone was invited to submit a paper based on some aspect of the study and that committee members would read these and invite those to attend who appeared to have most to offer. These papers would not be read at the meeting, but there would be one or two plenary lectures given by special guests (such as Benoit Mandelbrot). Those introducing either general sessions, or working group sessions devoted to particular areas, would draw on the relevant submitted papers. In the end we got an excellent membership ranging from distinguished mathematicians and computing experts, to mathematics educators heavily involved in computing, and schoolteachers who had already begun to introduce interesting computing work to their classrooms. Alas, there was also a foretaste of problems to come when one member, learning that he would not be given time in which to present his paper and that its publication was not guaranteed, immediately left the conference for home. That his primary intent in coming to Strasbourg was not to learn, but to enhance his CV, was my first encounter with what has become the 'no publication, no attendance syndrome'.

But how were the results of the study to be published? This, for better or worse, became my responsibility and I turned back to the *Proceedings* of ICME-2⁽⁶⁾ for a model. That comprised a long introduction, which I, as editor, based on the contributions sent to me by the various working group secretaries and chairpersons, the papers of the plenary lecturers and eight or so submitted papers which were selected from all those submitted by a specially invited international group (R.B. Davis, T.J. Fletcher, H. Freudenthal, M. Glaymann and T. Varga). This had proved most successful in both publishing and sales terms, but more to the point the Cambridge University Press had only agreed to publish the *Proceedings* (something which they rarely, if ever, did for conferences), if I promised that all the papers to be published were strictly vetted. When approached, the CUP agreed to publish the proceedings of the ICMI studies provided we stuck to this model. As a result, the editorial board (a subsection of the planning committee) for Strasbourg recommended which papers were to be published: “in some cases a paper has been selected because of its originality, in others because it represents a theme treated in several contributions – in such cases our choice reflects our wish to give prominence to the theme, and not necessarily our support for the arguments advanced in a particular paper” (from the Foreword of the CUP book). Those who chaired working groups also submitted brief contributions on the discussions that had taken place in their areas and these were brought into a homogeneous account by Jean-Pierre and me, which was then approved by the whole editorial board. The intention was to produce an inexpensive report to which end we were restricted to no more than 128 pages and forced to desert the traditional typesetting approach still used by the CUP, in favour of printing from photographs of the typescript. The paperback⁽⁷⁾ then came out very quickly and at a very low price – made even less by our agreeing to receive no royalties on it. We did get royalties from the sales of the more expensive hardback and ICMI also retained rights for publications in languages other than English. That particular book, *The Influence of Computers and Informatics on Mathematics and its Teaching*, appeared in translation in Japanese, Chinese and, I believe, Spanish. It was also reprinted after the first run had sold out (and later appeared in a revised edition thanks to financial assistance from UNESCO). I think it important to contrast the sales of the early “brown” studies and the fact that these were translated into several languages, with those of today’s larger and much more expensive study volumes that would not have a great appeal to schoolteachers – one cannot envisage any of these being translated into Finnish; the prospective readership would be so small! It is also interesting (and valuable) to go to the COPAC website (the listing of books held in more than 20 of the major university and state libraries in the UK) and to compare the number of universities that still have the early studies on their shelves with those that have bought the later ones. Does ICMI wish to produce books that have relevance and appeal to teachers and anyone particularly interested in mathematics education, or are they to be of more limited interest and directed more to researchers and research students? Are these latter already well enough served by the various research journals on mathematics education that now exist? These are not simple questions to answer for whatever options one chooses then complications and problems arise.

What were we to do with the unpublished papers which conference members had submitted – many still of great value? The answer at Strasbourg was a collection, *Supporting Papers*, published by Strasbourg University. These included some papers by authors who could not attend the meeting and also contained papers by, for example, M. Artigue, H. Burkhardt, N.G. de Bruijn, E. Dubinski, A. Engel⁽⁸⁾, K.D. Graf, B.R. Hodgson, L.A. Steen, J.H. Mason, M.F. Newman, and D. Tall. A remarkably talented array – and their papers did not even appear in the CUP Study Volume!

The next study was planned to be on *cognition* and it was intended to adopt the same approach. Jean-Pierre and I visited one German university that would possibly host the meeting, but money was proving hard to get and our welcome was none too warm. My approach to industry proved unsuccessful: Shell told me that they would give financial support to a proposed meeting on mathematics as a service subject (which occupied a position further down the production line) but would not want any of their money spent on psychology! In the end, it was decided to ask PME to be responsible for producing a study volume on this theme. PME agreed to this and produced a volume edited by Perla Neshet and Jeremy Kilpatrick, which met the CUP requirements, and in which the contributing authors simply provided readers with an overview of current understanding and research on the topic. (It still retains its position on the shelves of the vast majority (20) of the UK university libraries covered by COPAC.)

The opportunity then arose to hold a fully-financed small group meeting in Kuwait. I had long wanted to hold, not so much a “state of the art” meeting on a topic, but a “looking forward” one, that attempted to distinguish the nodes at which decisions concerning the school mathematics syllabus, its teaching and its examining, had to be taken: what the possibilities were and what we saw as the likely benefits and drawbacks associated with each decision. Questions concerning the training of teachers and the different approaches to curriculum development also had to be addressed. This became the *School Mathematics in the 1990s* study. As in the case of other studies a discussion document was produced and contributions solicited. However, membership had to be restricted so that discussions could become more intense and ongoing. The generous funding meant that there were no financial or geographical bars so far as the recruitment of members was concerned and on this occasion membership consisted only of 15 people actively engaged in mathematics education. We were all lodged in the local Hilton and I was told that the final bill, paid by the Kuwait Ministry of Education, amounted to almost £50,000 (roughly £140,000 in today’s terms). The resulting report was translated into at least five languages: Japanese, Chinese, Spanish, Finnish and Persian. (I believe there were also other translations.)

The *Mathematics as a Service Subject* Study followed the pattern of the computing one. Here, however, we had great assistance from Angelo Marzollo, who had attended Strasbourg and who divided his time between being UNESCO’s man for mathematics higher education and a member of the International Centre for Mechanical Sciences (CISM) in Udine (Italy). It was at this Centre that the study meeting was held and on this occasion financial help came from UNESCO, ICSU, IMU, CISM, the Royal Society, the French Foreign Ministry, IBM-Europe and IBM-France. The Town Council of Udine produced a splendid conference dinner for us in the leading local hotel – but, somewhat surprisingly, sent no representative to it, which left Jean-Pierre Kahane with no one to thank for Udine’s generosity. The problem of the “surplus” papers was solved in an even more satisfactory fashion on this occasion: Springer published them in the CISM series. Again there were some outstanding authors (including Bernard Hodgson again, and Tibor Nemetz who was to shoulder such a load and to prove a true Atlas at the Budapest ICME): in addition, Gustave Choquet presented a paper drawing on the opinions on the topic given by members of the French Academy of Sciences. Three points of note concerning this meeting were: (a) it was concerned solely with higher education and demonstrated that ICMI was actively involved at that level (something which has become somewhat less apparent over the years), (b) it was attended by the chair of the ICSU Committee on the Teaching of Science (a biologist) and other contributions came from non-mathematicians, and (c)

efforts were made to break the European – North American dominance, its 37 members including some from Sudan, Nigeria (2), Tunisia, India, Argentina, Mexico, and Japan (3).

The fifth study, on *popularisation*, took yet another form. Again there was a discussion document widely published in journals in Europe, the USA and also elsewhere in translation. Indeed, a meeting was held in Granada at which the Spanish Teachers organisation produced its own national response, *Hacias unas matemáticas populares*. The popularisation meeting, even though it had 80 or so members, was still heavily oversubscribed. Alongside the study, held at Leeds University, England, was an exhibition covering over 2000 square metres, including large-scale contributions from Germany and France, that attracted hundreds, possibly thousands, of adult visitors and schoolchildren, who were also able to attend a series of nine popular lectures by a rich variety of speakers including Christopher Zeeman, who had just been awarded the Faraday Medal for his popularising work, a well-known British TV comedian who had a great and active interest in popularising mathematics, and Ruth Lawrence who, at 17, had just become Oxford's youngest ever D.Phil. in Mathematics. A nucleus of this exhibition then toured the UK for a year or more under the auspices of the Royal Society and with financial support from a number of bodies with major contributions coming from Shell and the French Foreign Ministry.

I was less heavily concerned in later studies, although on the planning committee for the next three. That on *assessment*, held in Catalonia, owed much to Claudi Alsina, who managed to get considerable financial support from a local bank. It followed the pattern of the computing and service teaching studies until the publication of the report was concerned. By 1984 I had enjoyed close ties with the Cambridge University Press for over twenty years during which, for a considerable period, the Press depended heavily on the income generated by the SMP with which I was closely concerned and this probably explained their willingness to produce the “brown” paperbacks in a style that was by no means normal for them. Once ICMI got a new Secretary-General, then they did not wish to continue as a publisher of the studies. Moreover ICMI was not fully satisfied with the promotion of the study books done by the CUP. Mogens Niss, my successor, had to find a new publisher and a new *modus operandi* that satisfied the conditions that he was facing. Also the expectations, backgrounds and demands of those attending the study meetings changed. As a result the study reports now look very different to those original ones, are considerably more highly priced – and so appear to serve a more restricted market.

I believe the study on *research in mathematics education* lost its way, and, as a member of the planning committee, I must shoulder some responsibility. The discussion document was entitled *What is research in mathematics education and what are its results?*: extremely important questions with, it was intended, the answers to be made available to possible sponsors and doubters. What emerged, however, was a book entitled, *Mathematics education as a research domain: a search for identity*; a large volume which served more as a bonding role for researchers than as a book that would inspire funding agencies to contribute to further research work. In retrospect I believe two publications were required. The first would have been written by a small team, following the Kuwait model, and would have resulted in a short monograph that could be given to prospective donors and read by other educationalists, setting out answers to the original questions and demonstrating ways in which research in mathematics education had helped and illuminated. The other, based on an open meeting, would be intended for researchers and would consider, for example, various research

methods, PhD assignments and methods of working/supervision, etc: it would indeed have had more in common with what actually was published. I believe this clearly demonstrates the need to think more clearly what an ICMI study is intended to achieve and what, then, would be the best means of achieving the desired aims. Simply following an established format may not necessarily be the best means of proceeding.

Unfortunately, although I attended planning meetings in Paris and Sweden, I was unable to be present at the study conference that discussed *gender in mathematics education*.

Summing up, I believe that the ICMI studies could still be extremely important and serve a very useful purpose. I should, however, prefer the resulting ICMI study volumes to be shorter, cheaper and aimed at a wider readership – that a clear distinction should be drawn between an ICMI study and, say, a special number of ZDM. Moreover, studies intended for a wide readership must be written with prospective readers in mind and should not be clouded in a mist of “researchers’ vocabulary”⁽⁹⁾. All this may be hard, if not impossible, to achieve in today’s climate and is, of course, only my opinion which may, as in many other matters, be entirely misguided.

Notes

- (1) This short paper is based on notes prepared in response to a request by Derek Holton who gave a talk on the ICMI studies at the Centenary Meeting of ICMI held in Rome in 2008.
- (2) Mr. Kiefer was a most delightful person and a school Headmaster – and how many schoolteachers are now so involved with ICMI? Not, I fear, ICMI’s fault; for these days in England, and I suspect in many other countries, the Headmaster’s job has become so unattractive and burdensome that there is no time for them to indulge in such out-of-school activities.
- (3) Freudenthal, H. (Ed.), (1975). *Les applications nouvelles des mathématiques et l’enseignement secondaire*. Conférences du 3e séminaire organisé par la C.I.E.M. à Echternach (juin 1973). Esch-sur-Alzette (Gr. D. de Luxembourg), Victor.
- (4) UNESCO (1974). *Interactions Between Linguistics and Mathematical Education*. (Report of a symposium sponsored by UNESCO, CEDO and ICMI, Nairobi, Kenya, Sept. 1-11, 1974) Paris, UNESCO. (<http://unesdoc.unesco.org/images/0001/000149/014932eb.pdf>)
- (5) I was surprised to find on looking again at the report that Andrei Ershov, a pioneer in the field of computing, was a member of the committee. He did not attend the planning meeting or that at Strasbourg and I only met him at the Budapest ICME in 1988. We soon became friends and planned a joint Anglo-USSR meeting to be held in the USSR. Unfortunately, within a year he died of cancer and the meeting was never held.
- (6) Howson, A.G. (Ed.), (1973). *Developments in Mathematics Education*. Cambridge, Cambridge University Press.
- (7) Publication details of the ICMI studies are on <http://www.icmihistory.unito.it/icmistudies.pdf>.
- (8) A. Engel might not be remembered these days, but he was a marvellously innovative German mathematics educator – he gets a passing mention in the ICMI Study on modelling, but, in truth, his work in the ‘60s and ‘70s was far in advance of much to be found in that study.
- (9) An extended (highly critical) review of the Proceedings of the 2008 ICMI Centenary Meeting which appeared in the *Mathematical Gazette* (94 (529), 2010, pp. 168-172) contained this passage:

Most of these topics are not new; one consequence of the didactic approach is that many discussions of them are full of throat-clearing generalisations preparatory to the educational practice, which however is often described rather briefly or even not at all. Terms as such as 'theoretical perspectives' and 'conceptualising mathematical thinking' abound, though often without much in the way of details or circumstances. The Vacuity Prize goes to p. 175, which beat off stiff competition with this appraisal: 'In other words the didactical theory should be constructed and evaluated in relation to the needs and difficulties that appear in the instruction, i.e., in the practice of mathematics instruction. Thus, didactical theory, seen as systems of viewpoints, must include suggestions for strategies that can aid consideration of, as well as opposition to, the instructional needs and difficulties, which the theoretical 'core' in question relates to.'

As the reviewer suggests, this is not necessarily the way to 'make friends and influence people'.

A. Geoffrey Howson

Former ICMI Secretary-General (1983-1990)

1 Chidden Holt, Chandlers Ford,

Eastleigh, Hants SO53 4RJ UK

geoffreyhowson@aol.com