IASE matter

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## ICOTS CONFERENCES: FROM THE PAST TOWARDS THE FUTURE

*Closing speech of Maria Gabriella Ottaviani IPC Chair ICOTS-6*
*University of Rome "La Sapienza", Italy*

The ISI interests in the improvement of statistics education began in 1949, immediately following the Second World War, with the founding of the Committee on Statistical Education. Through this Committee, the Institute itself promoted the university training of statisticians at an international level, while in developing countries the ISI concerned itself with the education of official statisticians. The ISI began paying more attention to teaching statistics in schools following the mid-seventies. In those years, mainly in developed countries, the teaching of mathematics in schools began to change, so that also statistics and probability could find a place within the mathematics programme in pre-university schools. From 1979-1987, the Education Committee, chaired by Professor J. Gani, succeeded in obtaining important results through the creation of diverse “Taskforces”. Thanks to these, but also thanks to the willingness and involvement of those in charge of each taskforce, significant initiatives were taken. In 1979, at the International Centre for Statistical Education at Sheffield University, “Teaching Statistics” was first published, one of the most important didactic statistical journals distributed all over the world. Furthermore the International Conferences on Teaching Statistics were initiated in Sheffield in 1982, thanks to L. Råde and V. Barnett. Since then they have continued once every four years, in accordance with the views expressed by the first ICOTS participants, who hoped that "this Conference will be the first of a series of such international conferences on teaching statistics to be held at four-yearly intervals". According to these wishes, ICOTS-2 was held in Victoria (Canada) in 1986 and ICOTS-3 took place in Dunedin (New Zealand) in 1990. The success of the ICOTS demonstrated that statistics teachers felt a strong need to unite, talk and discuss the problems experienced in the course of their daily activities. In the meantime, it gave specialists in epistemology, psychology and statistical education the possibility to expound the results of their research and theories. The importance of these forces was recognised by the ISI at the Cairo Conference in 1991, where the proposal to establish an International Association for Statistical Education (IASE) as a new Section of the ISI was approved by a unanimous vote of the ISI General Assembly. As a consequence of this, the statistical education activities were transferred to the IASE, who had to continue with the ICOTS program. A Transitional Committee, chaired by D. Vere-Jones (1991-1993), took the most important decisions about the venue and organisation of ICOTS-4 in Marrakech (Morocco) in 1994. ICOTS-5 in Singapore, in 1998, was the first ICOTS completely designed and organised by the IASE.

International Association for Statistical Education

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The contents of any thematic conference are supposed to evolve and change over time. The ICOTS conference is now 20 years old and 6 meetings have taken place, ICOTS-6 having been held in Cape Town (South Africa) in July 2002. The time has come to analyse if and how a line of thought exists which has developed from 1982 to 2002. To examine carefully the Proceedings of the previous five ICOTS is quite an impossible task as the number of published papers is 783. About ICOTS-6, at October 27, 2001, the date of this analysis, the International Programme Committee web site presented 224 invited paper titles. A possible solution to the problem posed comes from statistics itself, in particular from "*textual statistics*" (Elbert, Salem, Berry, 1998), a field of research helpful to describe, compare and classify sets of texts. The textual analysis has proved to be a useful Arian's thread in the labyrinth of the six *corpora* formed by assembling the papers' titles of each ICOTS Conference. In particular the analysis has allowed enlightening that ICOTS-1 was mainly a matter of teachers and teaching, neither the students nor the learning problems being the Conference concerns. At ICOTS-2 students were in more evidence as well as teaching and learning problems. At ICOTS-3 the students were right in the centre. At ICOTS-4 the focus was on the teaching of statistics *per se.* ICOTS-5 emphasised the necessity to prepare teachers and students in statistics. At ICOTS-6 the focus has been on research. The textual analysis has allowed showing that, from an academic *incipit* due to its strong link with university professors, the Conference moved to deal with teaching/learning problems and came to enlighten students' problems and their performance. Teaching by real data, suitable computer packages, and research methods were emphasised to grasp the concepts of statistics and probability. In higher education the attention was on introductory courses and on courses of applied statistics for students of the experimental sciences. In more recent years, the proposal of instructional models suitable for statistics and probability, and the necessity to assess students have enhanced the interest of ICOTS attendants towards research.

However, educational research in statistics and probability has not only a value *per se*, but is also finalised to help better disseminate and teach the discipline. Consequently the next step to develop might be reflecting on what the statisticians and the statistics education researchers have to offer and to learn from each other as part of a "sole" community. Statistics education researchers, for example, have shown the characteristics by which statistics may be considered a modern discipline, able to develop some skills needed by modern citizenship. Statisticians as the experts of quantitative research methods may offer their ability to deal with quantitative data observed during statistics education research. Education research in fact pertains to the social research field. As such, true randomised experiments cannot be applied when designing research. This implies that when examining the effects of an instructional strategy, attention must be paid to the internal as well to the external validity of the results. This means that it is necessary to control what are, apart from the treatment, the other possible explanations of the effects obtained within an experiment, as well as to understand the extent to which the obtained effects can be generalised to other populations, settings, and treatment and measuring variables. In other words, statistical education researchers and statisticians have the possibility to work together trying to evaluate the replicability of the experiments done, their reliability, validity, generalisability. It is important for the statisticians, as statistics teachers, to understand what the working relationship between statistics education research and practice is. If statistics teachers have to learn from statistics education research, they need to know what the limits are - in time and place - to the practical generalisation of the results obtained by statistics education researchers, in order to put proposed instructional models and strategies in practice.

References

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## CONFERENCE REPORTS

### ICOTS-6, Cape Town, South Africa, July 7-12, 2002, Local Report

*Delia North, Chair Local Organizing Committee ICOTS-6*

A total of 472 delegates from 54 countries attended the sixth international conference on teaching statistics, held in Cape Town (South Africa) from 7 to 12 July 2002. The many months (actually years!) of hard work by both the LOC and IPC paid rich dividends as all indications are that delegates found the conference organization to be excellent – accommodation, transport, speakers audio-visual requirements, tours and social functions were of the highest standard. The conference was supported by the City of Cape Town

and the South Africa government, evident from the fact that, at the Mayoral reception on the Sunday night, the guest speaker was Tami Mseleku, Director General of Education, while the Master of Ceremonies was Pali Lehohla, the Statistician General of SA. In addition, Trevor Manuel, Minister of Finance of South Africa, opened the conference.

A total of 25 posters were on show during the conference – amongst them three posters by South African school children. The children presented their posters on Tuesday and thoroughly enjoyed the excitement of discussing their posters with the many interested delegates. The posters presented by the children were the winning entries in local statistics poster competitions run at a few schools.

A major local thrust for ICOTS-6 was a series of events put in place to reach out to local schoolteachers. The South African Statistics Association (SASA), Association of Mathematics Educators of South Africa (AMESA), Statistics South Africa and the Department of Education united to present a wonderful program for local schoolteachers to become acquainted with basic statistics concepts that will soon be part of the new school syllabus in South Africa. On Saturday a 1-day CensusAtSchool workshop was held in Durban (following on from the national mathematics school teachers conference which had just ended on the previous day). This workshop was attended by disadvantaged teachers selected from all the provinces in South Africa and focused on the data collection process in the recent CensusAtSchool project in South Africa, as well as demonstrating how to use CensusAtSchool materials in the classroom.

This workshop was repeated in Cape Town on Sunday. The attendees of this CensusAtSchool workshop consisted of international ICOTS delegates, local schoolteachers from the Cape Town area and most significantly, a group of teachers from each province in South Africa, selected by the Department of Education. These teachers include key mathematics co-coordinators from the 9 provinces of South Africa. Aspects of CensusAtSchool from other countries were also presented at both workshops, giving an international perspective to the data sets, which will be made available to all schools in South Africa. A local teacher session, running for the full duration of the conference, was organized by SASA and AMESA, and ensured that the teachers got sufficient training in statistics to be able to meet the demands of the statistics section of their new school syllabus (to be fully implemented in 2005). The local teacher session was split into two strands, Primary (grades 4,5,6) and Senior (grades 7, 8, 9). A workshop approach prevailed throughout and this ensured that the teachers would have adequate materials to use in the classroom. Each teacher received a die, plastic cups and various coloured poker chips and in no time groups were merrily simulating their data and arguing the finer points of probability theory! Other sessions focussed on using details of histograms, charts, plots and other aspects of the school syllabus, as well as interpretation of newspaper articles and other material incorporating statistical concepts. The teachers were very excited to discover the relevance of statistics to all aspects of teaching at school, and in fact to all aspects of life. The local teacher session and the CensusAtSchool workshop was captured on video camera in order to be used in follow-up workshops to be held in the various provinces in South Africa. Presentation of these workshops was a requirement for funding received by many of the teachers who attended ICOTS-6. Support from SASA and AMESA will assist these teachers in spreading knowledge gained at ICOTS-6.

ICOTS-6 certainly gave local teachers the training to assist in creating a statistically literate society in South Africa!

## ISI-53, Seoul, Korea, August 22-29, 2001

*Els Goetghebeur, Ghent University, Belgium, Discussant on the papers presented in the IASE-session 'Postgraduate training of statisticians'*

The topic of this session is a most important and challenging one: "How do we prepare our graduate students for the life of statisticians in a fast changing world of information technology?" Being a very busy teacher (8 courses last year, mostly undergraduate some at the graduate level, supervising 5 PhD. students), I pose myself 3+1 questions: What to teach? How to teach? Who to teach? And finally: where can I get help? Many of us around the world are facing similar challenges, spending hours preparing the right material, and searching for publicly available data with exciting messages and didactical value. Both speakers have gone into great concrete detail on what topics one does or should cover in a graduate's curriculum. I would like to take a step back and think of some qualitative notions. In addressing what to teach I see seemingly opposite qualities that must be reconciled like the ying and the yang of life. Do we stress knowledge or skill? Do we emphasize depth or breadth? Do we move towards harmonization of programs (in Europe and further) or rather seek diversity? Do we pick topics based on expertise available in our institution or on the needs that we perceive (and bring in expertise from outside)? Answers must constitute a compromise between the ideal and some pragmatism. The 'ideal' however, is not easily defined and a moving target. What can be our guide? To quote from Darwin: 'It's not the strongest nor the most intelligent, but the species most

adaptable to change that has the best chance of survival'. This leads me to favour

- More emphasis on skill than I currently see (through some form of problem based learning?)
- Spending ample time on the basics and their in depth understanding, which involves a good marriage of the rigor of mathematics and the art of application
- Encouraging diversity in programs, allowing for different types of students as input, and different skills as output in preparation for a whole range of jobs
- Be generous and share our knowledge and expertise with other institutions

On 'who to teach', both speakers saw mostly a big need to recruit more students into this field. I cannot quarrel with this. Instead, I tried to think of reasons for this lack of popularity, hoping to find in the diagnosis a first step towards a cure. To mind springs a recruitment add for statisticians. We offer: leisurely working hours, big money, high status, and lots of appreciation. We seek: subject matter skills, math skills, organizational skills, computational skills, collaborative skills, communication skills, stress resistance, management skills …all in one please.

We do not (at all) offer as much, but we are seeking really talented people for important statistical jobs. So they must be highly motivated for the intrinsic value, the excitement and the essential contributions statistics can bring to so many important fields. I fear we are not always good (and too often right down the opposite) when it comes to showing how attractive statistics can be. More work is needed on our image, showing the excitement, highlighting the breakthroughs. To have the wanted impact, I feel we should start young, way before undergraduate, indeed work at all levels.

I'd like to close with a request for help. Let's not get isolated in our stats departments but reach out and share our teaching expertise. Personally, I would welcome more networking, more good books, more open data sets and didactical material. Perhaps IASE can play an ever-greater role in promoting this. In closing I thank the IASE and the organizer for encouraging this reflection and for the work they do to help us, busy teachers and students, further along.

## FORTHCOMING CONFERENCES

CERME-3, Bellaria, Italy, February 28 - March 3, 2003. *Dave Pratt, Group 5 Coordinator*
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The Third Conference of the European Society for Research in Mathematics Education is a conference organised by the European Society for Research in Education, and is designed to foster a communicative spirit. It deliberately and distinctively moves away from research presentations by individuals towards collaborative group work. The organisers for the Stochastic Thinking Group invite research-based papers on stochastic thinking, including probability, statistics and the interface between these domains. They will be particularly interested in theoretical, empirical or developmental papers that address one or more of the following themes:

- The nature and development of stochastic thinking and its relationship to other types of mathematical thinking, including the interface between probabilistic and statistical thinking, such as in modelling or data exploration.
- The relationship between stochastic thinking and external factors such as teaching methodologies, tools, tasks and setting.
- The role of computer-based tools, including microworlds, on stochastic thinking.
- The elaboration of theoretical frameworks that may provide insightful models for interpreting evidence from research on stochastic thinking.

Visit http://fibonacci.dm.unipi.it/~didattica/CERME3/.

## IASE PUBLICATION

CD of ICOTS-6 Proceedings:

There are nearly 300 papers given by authors from over 40 countries on a wide range of topics of interest to people involved in teaching statistics or carrying out research into statistics teaching and learning. This is a formidable resource for statistics education. The CD can be obtained from the ISI for $US25 including postage and handling and has ISBN: 085590 782 7

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