

INTERNATIONAL ASSOCIATION FOR STATISTICAL EDUCATION

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This column begins with a report on the Fifth International Conference on Teaching Statistics, followed by an announcement regarding the next IASE Round Table conference which will be held in the year 2000. A report on IASE involvement in meetings in Mexico and Iran is included. The column concludes with articles on statistics education in Argentina and Belgium written by IASE correspondents.



1. ICOTS-5

Brian Phillips, Chair IPC, ICOTS-5

Swinburne University of Technology

In June, 1998 the Fifth International Conference on Teaching Statistics, ICOTS-5, was held over five days at Nanyang University of Technology, Singapore. The ICOTS conferences are one of the main activities of the IASE and are held every four years. Over 400 participants from some 40 countries attended and more than 200 papers were presented. One of the many gratifying aspects of the conference was that about 120 local teachers took advantage of the local teacher registration enabling them to attend the first two days of the conference which included some sessions specially organized for them. Furthermore, it was also very pleasing that the IASE and the ISI were able to support some 20 people from developing and transitional countries, thus helping the IASE implement one of its aims, that is supporting and promoting statistical education, especially in developing and transition countries. The main disappointment was that, because of the Asian



Paul Cheung addresses ICOTS V delegates

financial crisis, few non-Singaporean Asians were able to attend.

The conference got off to a great start with a welcome party at the Grand Plaza Hotel where many of the participants were staying. The first session each day was given by a keynote speaker, followed by three sessions of invited and contributed papers. As well as the regular sessions, the program consisted of a number of other activities including graphics calculator workshops, software demonstrations, demonstration lessons, and meetings of special interest groups. There were also posters on display throughout the conference and a number of commercial firms had displays.

One of the general themes made by a number of the keynote speakers was the importance of bridging the gaps between statistical educators, practicing statisticians and others who use statistics in their work. This point came through in talks by Dr. Paul Cheung, the Chief Statistician of Singapore, Professor Richard Scheaffer from the University of Florida (USA), and Mr. Roger Luk, of the Hang Seng Bank in Hong Kong, China. The importance of making constructive use of technology to help formulate hypotheses was highlighted in the keynote address by Dr William Cleveland from Bell Laboratories in the USA. Cleveland demonstrated how increased computing power and the use of visualization using packages such as trellis graphics displays can be used to help uncover the structure of data even when complicated interactions might be present.

In another keynote address, the importance of understanding our historical links was stressed by Professor David Vere-Jones from Victoria University of Wellington, New Zealand. Vere-Jones spoke about differences between countries in their approaches to statistics and how the histories of the countries had influenced the effect they placed on different aspects of statistics. Both Vere-Jones and Scheaffer addressed issues related to the question 'Is the Statistical Profession Under Siege?' The motivation to address this question came in light of the rapid advances in computing, the perceived down-grading of the quantitative sciences and shrinking enrollments in statistics majors. They strongly advocated that, as most quantitative sciences have a need for statistical skills, appropriate statistical training should be given at all levels of education from primary school to university and continued statistical education encouraged in the workforce. Furthermore they felt that greater communication was needed between

schools and universities, workplaces and across departments.

One of the innovative aspects of the program was the incorporation of the conference theme, *Expanding the networking* as a formal part of the program. The purpose was to establish special interest groups of people who met at the conference who wished to have ongoing communication. These networks were designed to keep each other informed of activities in the area, to share hard-to-find information with others in the group, and for general discussion and interchange of knowledge and ideas. Several groups were established and a number of internet list-servers have already been set up which have now started to operate. These can be found on the site <http://www.stat.ncsu.edu/info/iase/>

The invited paper sessions included papers on statistical education at all levels including secondary, post secondary, continuing education in the workplace and in the wider society. The program also provided opportunities for participants to gain an international perspective, to learn about the roles of technology and research in statistical education as well as to have exposure to a number of other determinants and developments in statistical education. Among the many issues which were addressed was the recommendation to place more emphasis on giving better opportunities for understanding concepts, to gain practical experience in areas such as data collection, sampling, design of experiments, graphical display of data, problem solving, building models and the use of real data.

A number of distance and web based courses were discussed. This form of course delivery is seen as particularly important in statistics due to its increasingly important role in disciplines across the board. It is gaining popularity not only for problems of distance, but also because of factors such as convenience and preferred learning method which help make the gaining of statistical knowledge more readily assessable.

In many sessions it was emphasized that it was important for students to construct their own knowledge and develop statistical concepts through the use of active learning strategies. To help with this a number of classroom activities and interactive computer packages which have been especially developed for the learning of statistics were discussed and demonstrated. These and other software developments show how statistical educators are rising to the challenge of trying to make the difficult ideas in statistics more easily compre-

hended by the increasing range of students who study the subject. Another important piece of technology which was discussed and demonstrated in a number of sessions was the graphics calculator. Due to the portability and relative cheapness of this device most of the computational power and graphing ability that is required in a first level statistics course can be placed in the hands of students.

Many papers discussed research which is being done in statistical education. These include work on understanding and using graphs on how students learn to reason from data, some misconceptions which secondary students acquire about topics such as correlation and regression, the effect of ethnic and gender differences in attitudes and performance, and the effects of using technology in the learning environment. The large attendance at special International Study Group meetings showed the strong interest in research in this area.

A number of speakers discussed how they used a variety of methods to motivate students and give them real life experiences. These included outlines of how they make use of projects and competitions to make statistics more relevant and interesting to their students. However despite such attempts which have been used to try to improve statistical education, it was claimed that more was required to engage the statistics student with issues that confront statisticians and researchers and pay more attention to the conceptions of our learners and how it is that they best learn. Many other aspects of statistical education were discussed including the huge influence that texts and assessment have on what is taught and how it is taught.

In this short article it is impossible to mention all the important issues which were discussed at the conference. However one general area which is emerging as an important issue for statistical educators to tackle is that of making a statistically literate community. This was highlighted in Anne Hawkins' closing address where she emphasized the importance of training not just the students in formal courses, but also the importance of making a statistically literate society, a theme that also pervaded a number of the talks at the conference.

The non-scientific part of the program was extremely well organised and helped tremendously with the great success of the conference. The local organizers are to be congratulated for providing such good information, facilities and entertainment for the conference. As some participants pointed out, they initially were concerned about the 25 km bus ride each way to and from the venue, but in fact got to quite enjoy the trips as they gave another opportunity to meet new people, thus increasing the networking in quite an unplanned way. Lionel Pereira-Mendoza and his team did a wonderful job in getting the three volume proceedings published before the

conference. These give the best continuing record of the conference and all people interested in statistical education should obtain copies. They are available from

CTMA Ltd, 425 Race Course Road, Singapore 218671; Tel: (65) 299 8992, FAX: (65) 299 8983, Email: ctmapl@singnet.com.sg

The cost is:

IASE/ISI Member \$65 plus shipping/handling

Non-member \$80 plus shipping/handling

I again want to thank everyone who was involved with the conference in any way, organizers, session chairs, speakers, participants etc who made the conference the great success it was. It was most pleasing to receive many messages from people saying how much they enjoyed the conference. Planning for ICOTS-6 which will be held in South Africa in 2002 has started. Anyone who would like to be involved in an organising role should contact me at bphillips@swin.edu.au or keep an eye on the IASE site:

<http://www.stat.ncsu.edu/info/iase/>

2. IASE Roundtable Conference

Since 1968, a number of Round Table Conferences have been organised on statistical educational topics, initially by the Education Committee of the International Statistical Institute and, since 1988, by IASE. It has been usual for these conferences to be held as satellite meetings to each ICME (International Congress on Mathematics Education).

2000 will be the year of the IASE Round Table in Japan on the topic: Training Researchers in the Use of Statistics. This meeting will be held at Meiji University which is located in the central area of Tokyo, before or after the International Congress on Mathematics Education (ICME 9). The goal of the Round Table Conferences is to bring together a small number of experts, representing as many different countries as possible, to provide opportunities for developing better mutual understanding of common problems, and for making recommendations concerning the topic area under discussion. A main outcome is a monograph containing a set of refereed papers, which presents a global overview of the conference subject. The following are possible topics and issues to be discussed at the Round Table Conference:

- (1) Statistical competencies that researchers in different disciplines should acquire in their postgraduate training;
- (2) Needs and problems in the statistical training of researchers in specific fields;
- (3) Main learning problems, misconceptions and errors concerning advanced statistical concepts and procedures;
- (4) Design/ evaluation of courses for training researchers in statistical topics;

(5) Effects of technology on the statistical training of researchers;

(6) Assessing/ identifying frequent errors in the use of statistics by researchers;

(7) Researchers' attitudes towards statistics and its effect on the role of data analysis in experimental research;

(8) Consultation as a teaching/ learning process;

(9) Informal statistical learning from reading research literature.

More information can be obtained from the web pages: <http://www.stat.ncsu.edu/info/iase/> and <http://www.ugr.es/~batanero/iasert.htm> or from Carmen Batanero, Departamento Didáctica de la Matemática, Facultad de Educación, Campus de Cartuja, 18071, Granada, Spain. E-mail: batanero@goliat.ugr.es

3. IASE Activities Around the World

Contacts between the IASE and other national and international organisations were established by M. Gabriella Ottaviani, the IASE President, in order to promote the understanding and advancement of statistical education. Recently, Dr. Carlos M. Jarque, the President of the INEGI (Instituto Nacional de Estadística Geografía e Informática de México), invited the IASE President to take part in the IASS-IAOS joint Conference on "Statistics for Economic and Social Development" in Aguascalientes and also sent an INEGI delegate to ICOTS 5. In addition, Professor Siamak Noorbalooghi, from Iran, invited the IASE President to participate as invited speaker at the Fourth International Iranian Statistics Conference where a number of sections on statistical education were organised. Two short reports related to these initiatives follow.

IASE Presence at the IASS-IAOS joint Conference in Mexico

M. Gabriella Ottaviani, University of Roma "La Sapienza"

This very interesting conference took place in the modern, splendid building of INEGI in Aguascalientes, Mexico, the Institute being the wonderful host of the meeting. About 400 people attended the Conference, mainly Official Statisticians and applied statisticians in the field of economic and social statistics. About 150 papers were presented.

The IASE President noted in her presentation that the three sister Associations (IASS, IAOS, IASE) share some common themes. They are involved with "producers and users of statistics" problems, and in particular the IASE is concerned with citizens as "users" of statistics. These three associations are involved with "globalization" and the IASE has worked to illustrate the usefulness of

the teaching of statistics to develop skills required by the global world and the information society.

In her invited paper, *Developments and Perspectives In Statistical Education*, M.G. Ottaviani discussed in particular two key issues emerging from the concerns of the ICOTS 5 Conference. One is the demand for recognition in the academic world that research in statistics education is a research discipline in its own right. The other is the problem in statistics training of those researchers and professionals who must then apply statistics to diverse substantive disciplines. The paper was distributed to the Conference participants, along with some IASE materials and copies of the "Table of Contents" of the *ICOTS 5 Proceedings* volumes.

Statistics Education at Iranian conferences this summer

Carmen Batanero, University of Granada

The 4th Iranian International Statistics Conference was held at the Shahid Beheshti University, Tehran, August 23 to 25, 1998. In addition to statisticians, the 1200 participants included actuaries, official statisticians, representatives from government, medical and business institutions, mathematicians, mathematics educators, and students. About 200 posters and papers were presented, selected from more than 300 applications.

Most of the papers were presented in Farsi, with a reduced number of English papers presented by invited speakers, which included experts in different fields who came from Canada, France, Georgia, the Netherlands, India, Italy, Kenya, Spain, UK, and the USA. There were up to 11 parallel sessions each day, which included theoretical and applied papers, applications to environmetrics, official statistics, economy, agronomy, engineering, psychology, sociology, management, biostatistics and education.

Papers in statistical education covered two days of the conference in one of the parallel strands. They included a workshop on "Teaching Probability to Young Children" by Katherine Hart, Shell Centre, University of Nottingham, a plenary lecture on "Current Situation and Future Perspectives for Statistical Education", by Carmen Batanero, IASE vice-president, from the University of Granada, and a panel on the new programs to train statisticians in Iran. A special message from the IASE president M. Gabriella Ottaviani was read at the beginning of the statistical education sessions.

Professors Hart and Batanero also presented lectures on statistical education at the Third Annual Iranian Mathematics Education Conference, Kerman, 26-28 August, where about 800 mathematics teachers, mathematics educators and students attended the conference.

There is an active group of statistical educators in Iran, and, in particular, at the University of Esfaham, where the Fifth Iranian International

Statistics Conference will be held in the year 2000. This group, chair by Ali Rijali, is starting a statistical competition in schools, developing materials for teaching statistics and is interested in establishing future co-operation with the IASE.

4. The Role of Statistics in the Educational System in Argentina

Nora Moscoloni, Programa Interdisciplinario de Analisis de Datos, Universidad Nacional de Rosario, IRICE (Instituto Rosario de Investigaciones en Ciencias de la Educacion), CONICET, Argentina.

The entire Educational System in Argentina is in the middle of a crucial process of transformation resulting from the Federal Education and Higher Education Acts. Some of the principal changes promoted by the first act which refers to primary and secondary school, are:

Compulsory schooling extended to 10 years (which adds initial education and two years of the third cycle of basic general education)

Transformation within levels and cycles
Revision of curriculum content
Teacher education and updating through the Federal Network of Permanent Teacher Training.

The new levels and cycles are briefly:

Initial Education	5
Basic General Education	
First to	6 to 8
Second	9 to 11
Third	12 to 14
Polymodal Education	15 to 17
Higher Education	18 onwards

The new curriculum content is included in the Common Basic Contents (CBC) by means of a national agreement which defines the notions, procedures and attitudes that should be learned by all students to guarantee equal educational quality throughout the country.

On this base, each province will develop its own curricula and each school its own pedagogic projects. Even now, every province has not reformed their curricula, so some curricula are proposed but not yet implemented.

Statistics and Probability are considered as a chapter of Mathematics in General Basic Education as well as in the Polymodal One. The General Basic Education goal is that the students "should know how to collect, organize, process and interpret information, and to understand, estimate and use probabilities, valuing these procedures when taking decisions". Nevertheless, "only an intuitive, visual and graphical approximation of calculation of correlation measures is included, when arising from applications".

The Polymodal Education goals consist of being able "to interpret statistics and probability terminology, to have notions of the scopes and limitations of these disciplines and to apply their concepts in problems resolution and their results for taking decisions". The content proposed includes probability basic theorems and highly recommends the application of descriptive methods to contents of other disciplines and to the information of the media.

The goals have not typically been implemented yet. In most public secondary schools, specially within the provinces where the Federal Act is not yet being applied, very few concepts of elementary descriptive methods and probability are taught.

The Federal Network of Permanent Teacher Training is a national organizational and management strategy for the permanent development of teaching in its various levels. It is impossible to carry on all of the curriculum transformation without teacher training and updating. One of the positive aspects is the possibility of including Statistics as a tool for scientific research methodology, which is a key point in teacher training. However, it may be noted that the whole process is being done in a difficult context, in a country with serious socioeconomic problems.

The Higher Education Act promotes changes in university education in order to improve academic quality and research work and to increase management efficiency and equity at this educational stage. Some of the principal changes are:

A program of incentives for teacher/researchers to increase their salaries.
A new system of admission to the University.
A shortening of undergraduate courses of study.
Accrediting many new private universities
The production of complementary resources in National Universities.
Self-assessment and external assessment activities.

Statistics in Higher Education differs very much within careers and universities. The degree in Statistics first created in the country was that of the National University of Rosario at the Faculty of Economic Sciences, but Statistics is taught at different levels in the other disciplines.

Statistics content can be found in natural and exact sciences where the positivist paradigm is still well accepted. On the contrary in the social sciences and humanities Statistics has been gradually devalued and replaced by qualitative methodologies. In recent years, revisions made to the false opposition of qualitative versus quantitative methodologies in social research turn the attention to the new tendencies of statistical

studies such as multidimensional data analysis, data mining, etc.

The need for better training in Statistics for undergraduates in social disciplines is recognized as well as the challenge for teachers to present statistical methods from the standpoint of customers and not from that of mathematicians. Perhaps the study of epistemology by teachers might widen the fields of Statistics being applied from other theoretical frameworks.

5. An Experiment in the Teaching of Statistical Methods Using a Videoconference Network

Eduardo Crivisqui, Chairman of the International Committee for the Coordination of the PRESTA Programme, Laboratoire de Méthodologie du Traitement des Données, Université Libre de Bruxelles, Belgium

The PRESTA Programme is a five-year interuniversity cooperation programme, set up in 1994, by the Laboratoire de Méthodologie du Traitement des Données (The Data Processing Methodology Laboratory) of the Université Libre of Brussels (Belgium), in cooperation with other European Universities and with the support of the European Union. In December 1997, PRESTA organised five simultaneous training seminars for researchers in statistical methodology using the videoconference network of the Universidade Federal de Santa Catarina (UFSC), of Florianópolis, Brazil. (More detailed information on PRESTA can be found in the website: <http://www.ulb.ac.be/assoc/presta>)

The UFSC proposed that the programme should use the "d'Encino à Distancia" network which links this university with seven other universities in the state of Santa Catarina to satisfy the lively demand aroused by a previous seminar. It was intended to use this videoconference network as technical support for simultaneous "local seminars" conceived to provide extensive training in multivariate exploratory statistical methods (e.g., principal component analysis, simple and multiple correspondence analysis, and cluster methods).

The aim of the programme was to keep the structure and content of the "local seminars", using the network as a multiplier instrument. It was necessary in each case to keep the same number of participants, the interdisciplinary character of the groups undergoing training, the "teacher-taught" dialogue (both in lectures and in "practical work"), and even the method of organising the corresponding consolidation cycles. But the use of a videoconference network made it possible to go further in the production of teaching materials to support "assisted training" in applied statistics.

The global organisation of teaching and the theoretical lectures (40 hours, 4 hours/day) were the responsibility of two lecturers. One was from the Université Libre de Bruxelles (Belgium) and the

other was from the Universidad de la Republica Oriental del Uruguay. The lectures were given in the transmission studio of the UFSC video conference network. They were followed by five groups of thirty people, each in a lecture theatre of one of five universities situated in towns of the state of Santa Catarina (Brazil). These are quite a distance from Florianópolis and have limited surface transport means.

The "practical work" sessions (40 hs, 4 hs/day) were organised by five two-teacher teams, formed as a result of the cooperation between sixteen public-sector universities of Brazil, Argentina, and Chile.

Starting in July, the local universities with responsibility for organising each seminar initiated contact with other institutions and advertised the availability of training. This made it possible to bring five interdisciplinary groups together, composed of 150 researchers coming from some 50 local teaching and/or research institutions.

The programme ensured the coordination of all the teachers and local officials responsible for the organisation. During the seminars a coordination meeting of teachers was held every weekend at Florianópolis.

The teaching material (in Portuguese) produced for this experiment consists of the following elements:

The written reference documentation (200 pages) which presents the statistical methods to be taught as well as an annotated reference bibliography.

The supporting graphical aids for the theoretical lectures.

The application exercises, which are a collection of paper documents and computer files for each application, that present the problem (selected didactically) to be analysed, as well as the progressive interpretation approach to the results of the analyses and the formulation of the conclusions. Each exercise is accompanied by a document with the complete solution of the problem presented.

The consolidation cycle exercises: a collection of documents of the same design as the preceding ones, but involving real research problems.

The assessment of this experiment by means of a survey administered to the participants showed a very high level of satisfaction and the comments made were very encouraging for the programme and the teachers involved. The institutional assessment was also very favourable, particularly if the extent of the demand to be satisfied is considered. However, account must also be taken of the fact that, for the d'Encino à Distancia Department of the UFSC, it was the first experiment of videoconference training on such a scale.

The assessment made by the teaching team was just as satisfying and at the same time more qualified. They first noted that the teachers and participants were not yet sufficiently used to the videoconference technique. They had certain difficulties in taking advantage of the interactive nature of these systems. It was therefore difficult to maintain a high level of exchange and dialogue (necessary from the teaching point of view) between the teachers and the taught, but also among the participants themselves. However, these new methods were learned very rapidly when included in the preparation of the courses.

The teachers noted a definite improvement in access to the videoconference instrument as early as the second week of the course. The possibility of using dynamic images in the presentation of the basics of the statistical methods being taught greatly facilitates the participants' perceptions of the properties of representation spaces in statistical data.

The PRESTA programme and the local institutions which participated in this experiment have expressed their willingness to repeat the experience, in order to satisfy the demands of other nodes of this Brazilian videoconference network as well as to perfect the preparation of the teaching materials for both theoretical lectures and practical work. By means of this new experiment, it will be possible to record the progress of the course, to edit all the paper and teaching documents, and to draw up guidance cards for the monitors in charge of the practical work and the consolidation cycle exercises.

This collection of teaching documents will constitute the "didactical kit" for the implementation of other local seminars. The material, put at the disposal of the sub-regional networks, will make it possible to reduce the preparation load for courses given by local teachers, while maintaining the required quality criteria. The PRESTA programme will in this way be able to facilitate the operating of the information network which it has helped to create.

Joan Garfield

