COMMISSION INTER-IREM FOR TEACHING STATISTICS AND PROBABILITY

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The IREM network in France is made up of 26 Institutes for Research in Mathematics Education. At a national level it is expressed by the journal Repères-IREM, and there are 14 national commissions interested in either the set of questions concerning a teaching level or a particular domain of mathematics. These commissions gather teachers and researchers interested in the particular topic, who collect and distribute at a national level the works by the IREM teams, and, therefore, contribute to defining new research orientations. The Inter-IREM Commission "Statistics and Probability", with 16 members, was established in 1990. The person responsible is Jean-François Pichard, IREM de Rouen, assisted by Jean-Claude Girard, IUFM de Lyon.

Since 1970, the mathematics programmes in France include an introduction to probability at some educational levels, this was generalised in 1980, when some elements of statistical inference were also introduced at post-secondary levels. Finally, since 1986 descriptive statistics was also introduced, whereas the curriculum for training teachers did not contain the minimal theoretical basis of probability and statistics. The necessity for continuous training was then added to the didactic reflection on these teaching domains.

At an initial stage the Commission worked on the teaching of statistics at secondary level: *colleges* (age 11-15) and *post-baccallauriate* (age 18-21). At *college* level, the Commission received the support from l'ASU (Association pour la Statistique et ses Utilisations: Association for Statistics and its applications) which includes university and industrial statisticians. The commission has contributed to the success of the competition "Your stats 1991" organised by the IREMs. It has published papers in the book "Numbers and letters at school" edited in 1992 for the first college level, and in the special booklet prepared for ICME-7 (the International Congress on Mathematics Education, Quebec 1992). At the same time, the commission has organised the conference "Around Statistics at College", in Toulouse, June. 1993.

The Commission has also worked on inferential statistics (probability models, hypothesis tests). This work has been spread at summer universities (plans for continuous training of teachers and teacher' educators within the national program of training sponsored by the French Ministry of Education) directed at post-secondary teachers. The Commission has published the proceedings of these summer universities, which were held in La Rochelle in 1992 and in Rouen in 1994, and which contain plenary lectures and workshops.

Since 1993 the Commission started to analyse and synthesise the IREM publications on teaching probability at *lycées* level (age 16-18), which have been published in a book centred on the didactic and epistemological analysis of the frequentist approach proposed by French programs. This book (460 pgs.), which also presents a number of ideas for classroom activities, was published in October, 1997 with the title "Enseigner les Probabilités au Lycée". It served to organise another summer university in Metz, August, 1996, whose proceedings developed these ideas.

In 1997, the Commission participated in the edition of a special issue of the journal "Repères-IREM" (n. 32) on teaching probability, published in July, 1998, which contains original papers on the history of probability and on modelling. The current work of the Commission concerns the role of graphics in statistics, the modelling of real random situations in the classroom and the use of basic probability models. For more information about the Commission and how to obtain its publications contact Michel Henry (e-maiil: henry@vega.univ-fcomte.fr).

STATISTICS EDUCATION IN HONG KONG SCHOOLS

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Statistics was introduced into the school
mathematics curriculum in Hong Kong as part of
the New Mathematics movement in the 1960s. In
the present mathematics curriculum for primary
school, which was introduced in 1995, Data
Handling is one of the five dimensions of the
mathematics curriculum. Throughout the 6-year
primary school mathematics curriculum for
students between 6 and 11 years old, students
spend about 9% of their lessons in Data
Handling. The learning objectives for Data
Handling in primary school are as follows:

Primary 1-3. Collect and classify simple data
on topics from the environment. Draw and
interpret graphs (pictograms, block graphs and
bar charts) using one-to-one representation.
Present and interpret simple bar charts, using
one-to-two or one-to-ten representations.

Primary 4-6: Collect and group data of greater
frequency counts. Present and interpret bar charts
using one-to-thousand and compound bar charts.
Present and interpret pictograms using one-to-ten
or one-to-hundred representation. Present and
interpret line graphs. Interpret pie charts.
Understand averages and make estimates from
bar charts. Look for relationships, patterns or
trends from graphs.

Secondary School

In the current 5-year secondary school
mathematics curriculum, Statistics occupies about
12% of the lessons and comprises the following
topics:

Secondary 1: Frequency and data collection.
Construction and interpretation of bar charts,
pictograms, pie charts and histograms.

Secondary 2: Frequency distribution,
histograms, frequency polygons and curves and
their interpretations.

Secondary 3: Experimental and theoretical
probability. Meaning of probability. Measures of
central tendency: mean, median, mode and
modal class. Misrepresentation of data and
averages.

Secondary 4 & 5: Addition and multiplication
laws of probability. Weighted averages. Measures
of dispersion: range, mean deviation, variance
and standard deviation.

In secondary school, students are allowed to
use calculators but the use of the computer in
teaching mathematics or statistics is uncommon,
despite the existence of many computers in
schools. Emphasis is still made on computation
and getting unique answers. Few teachers have
formal education in statistics at tertiary level and
are thus very conservative towards introducing
new topics. It is thus not surprising to discover
that topics such as stem-and-leaf diagram are
studied at sixth form rather than in primary
school as in many other countries.

Sixth Form: About one-third of the
secondary school graduates proceed to a two-
year sixth-form curriculum leading to the
Advanced Level Examination for university
entrance, where statistics and mathematics are
optional.

In 1997, about 27% of the candidates for the
Advanced Level Examination took Advanced
Level Pure Mathematics, which contains no
statistics, and another 15% of the candidates took
Advanced Supplementary Level Mathematics &
Statistics, half of which is statistics. Students who
took Pure Mathematics are mainly preparing for
university studies in engineering and physical
sciences whereas students taking Mathematics &
Statistics might be interested in studying
biological sciences, arts or business sciences.

18% of the those students taking Pure
Mathematics, also took Advanced Level Applied
Mathematics, which contains 25% of statistics and
another 18% of them took Advanced
Supplementary Level Mathematics & Statistics in
1997. The statistics components in these sixth
form subjects are as follows:

*Advanced Supplementary Level Mathematics
& Statistics:* Population parameters and sample
statistics. Mean (including weighted mean with
application to index numbers), mode, modal
class, median, range, interquartile range,
percentiles, variance and standard deviation.
Frequency distributions and their graphical
representation, including stem-and-leaf and box-
and-whisker diagrams. Sample space and events.
Probability of an event. Mutually exclusive,
exhaustive and complementary events. The
addition rule, conditional probabilities and the
multiplication rule. Bayes' theorem. Bernoulli,
binomial, geometric, Poisson and normal
distributions. Use of the normal table.
Comparison of observed frequency distributions
with fitted frequency distributions.

*Advanced Supplementary Level Applied
Mathematics:* Simple and compound mean,
mode and median. Standard deviation and
variance. Probability laws. Sample space and
events. Combinations and Permutations. Sum
and product laws. Tree diagrams. Mutually
exclusive and independent events. Conditional
probability. The addition and the multiplication
rule. Bayes' Theorem. Random variables.
Probability and distribution functions for
discrete variables. Probability density and
distribution functions for a continuous variable.
Expectation and variance. Expectation and
variance of the sum of two independent random

variables. Binomial and Normal distributions. The normal distribution as an approximation to the binomial distribution. Linear combination of two independent normally distributed variables. Statistical inference. Estimate of a population mean from a random sample. Confidence interval for the mean of a normal population with known variance. Hypothesis testing for one sample problems involving the use of normal distribution: critical region and significance level. Type I and Type II errors.

NEWS FROM IASE

Fourth Iranian Statistics Conference

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The fourth Iranian Statistics Conference was held at Shahid Beheshti University, Tehran, Iran, on 23-25 August 1998. This series of conferences were started in 1990 at Isfahan University of Technology, in connection with the establishment of the Iranian Statistics Society. In addition to statisticians, the 1200 participants included official statisticians, representatives from government, medical and business institutions, mathematicians, actuaries, 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 from Canada, France, Georgia, the Netherlands, India, Italy, Kenya, Spain, UK, and the USA. There were some days with up to 11 parallel sessions, which included theoretical and applied papers, applications to environmetrics, official statistics, economy, agronomy, engineering, psychology, sociology, management, biostatistics and education.

A section of the conference was devoted to Statistics Education, and chaired by Ali Rejali of Isfahan University of Technology. Katherine Hart, from the Shell Centre of the University of Notthingham, England was invited to present a workshop on *Teaching probability and statistics at elementary level of schooling*, and Carmen Batanero, from the University of Granada, Spain and IASE vice-president was invited to present a plenary lecture on *The current situation and future perspectives for statistical education*.

The following papers were presented: A *review of high school statistics text books*, by Ali Madani, Tehran University; *Some important but easy examples for introductory probability courses*, by Javad Behboodian, Shiraz University; *What should be taught in mathematical statistics courses at B.Sc. level*, by Ahmad Parsian, Isfahan University of Technology; *Using Minitab as a tool for teaching statistics in elementary courses*, by Mahbanoo Tata, Kerman Shahid Bahonar University; *A historical survey on mathematical statistics, using an observation from bivariate normal distribution*, by Mina Amin Ghafari, Shiraz University; *A proposal for teaching applied statistics in Universities*, by Hamid Reza Navabpour, Tehran Alameh Tabatabaee University; *The connection between teaching theoretical and applied statistics*, by Ali Reza Fotouhi, Meshed Ferdowsi University; T*eaching probability and statistics to engineers* by Mahmood Taheri, Isfahan University of Technology; *A look at the M.Sc. program and the need for a change*, by Majid Reza Ketabdar, Ghazvin Medical Sciences University; *The role of probability in the high school curriculum*, by Bijan Zohori Zangeneh, Sharif University of Technology.

In addition, two panel discussions were devoted to Ph.D. Programs in statistics and to a new school course in statistics and modelling. Finally there was a series of discussions on Statistics Competitions and the establishment of the Iranian Statistics Olympiad (proposed by Ali Rejali of Isfahan University of Technology and approved by the Iranian Statistical Society). The curricula at different levels, publications, journals, etc., were among the non-official programs of this section.

The aims of this section were to study the following problems in statistics education: a) problems of teaching statistics at elementary, high school and university level; b) the effect of computers on statistics education; c) problems of statistical curricula and methods of teaching at different levels. Some of the goals were achieved, and the community of statisticians is trying to work on these problems by doing research and experimental studies at those levels. For example the Isfahan University of technology research group is working on teaching probability and statistics at school-level. The next Iranian Statistical Conference will be held from August 22nd to 24th, 2000 at Isfahan University of Technology.

IASS-IAOS joint Conference in Mexico

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The Conference was attended mainly by official statisticians and by applied statisticians in the field of economic and social statistics. As the IASE President put in evidence in her presentation the three sister Associations (IASS,

IAOS, IASE) share some common interest themes. They are involved with "producers and users of statistics" problem, and in particular the IASE is concerned with citizen as "users" of statistics. They are involved with "globalization" and the IASE members' research has been fundamental to put in evidence the usefulness of the teaching of statistics to develop some of the skills required by the global world and the information society.

In her invited paper titled: *Developments and perspectives in statistical education*, M. G. Ottaviani discussed in particular of 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 to address 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 ICOTS 5 three volumes of Proceedings.

PROCEEDINGS OF THE FIFTH INTERNATIONAL CONFERENCE ON TEACHING STATISTICS

The International Conferences on Teaching Statistics was held in Singapore in June, 1998. 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. The Proceedings cover the eight main topics of the Conference:

1. Statistical education at the school level;
2. Statistical education at the post-secondary level;
3. Statistical education for people in the workplace;
4. Statistical education and the wider society;
5. An international perspective of statistical education;
6. Research in teaching statistics;
7. The role of technology in the teaching of statistics;
8. Other determinants and developments in statistical education.

As these topics indicate, the proceedings cover the spectrum of issues for statistical education at all levels. There are three volumes containing approximately 200 papers, with authors from 40 countries presenting the latest thinking in statistical education. The Proceedings contain some papers that discuss general issues and others that contain practical suggestions for implementing ideas at the classroom level. The

three volumes are an invaluable source of information for anyone who is concerned with statistical education and can be ordered from CTMA Pte Ltd, 425A Racecourse Road, Singapore 218671, Tel: (65) 299 8992, FAX: (65) 299 8983, Email: ctmapl@singnet.com.sg

For people wanting a list of the papers presented at the conference, a complete list can be found at:
www.nie.ac.sg:8000/~wwwmath/THEFINAL.html

FORTHCOMING CONFERENCES

International Research Forum on Statistical Reasoning, Thinking, and Literacy (SRTL) July 18-23, 1999, Kibbutz Be'eri, Israel

The International Study Group for Research on Learning Probability and Statistics is offering the first in a series of International Research Forums, to be held in Israel in July 1999. Sponsored by the Weizmann Institute of Science and the University of Minnesota, this forum offers an opportunity for a small number of researchers from around the world to meet for a few days to share their work, discuss important issues, and initiate collaborative projects. The topic of the first forum will be Statistical Reasoning, Thinking and Literacy. One outcome of the forum will be the publication of monograph summarising the work presented, discussions conducted, and issues emerging from this gathering.

More information is available from Dani Ben-Zvi (e-mail: ntdben@wiccmail.weizmann.ac.il) or Joan Garfield (e-mail: jbg@tc.umn.edu).

Training of Researchers in the Use of Statistics IASE Round Table Conference Meiji University, Tokyo, Japan, August 2000.

The following are possible topics and issues to be discussed at this the Round Table Conference:

(1) Statistical competencies that researchers in different disciplines should acquire in their postgraduate training; (2) Statistical training of researchers in specific fields; (3) Assessing/ identifying frequent errors in the use of statistics; (4) Consultation as a teaching/ learning process; (5) Researchers' attitudes towards statistics and its effect on the role of data analysis in experimental research; (6) Informal statistical learning from reading research literature; (7) Effects of technology on the statistical training of researchers; (8) Design/ evaluation of courses for training researchers in particular statistical topics and learning problems.

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