



May, 1995

This issue contains the last two reports from the working groups on curriculum issues at the 4th International Conference on Teaching Statistics (ICOTS-4) held in Morocco, July 1994.

THE STATISTICS CURRICULUM TOWARDS THE YEAR 2000

SPANISH-SPEAKING GROUP

Dr. David Ospina Botero from Colombia was the group organiser; 28 people attended, and 5 countries were represented; Argentina, Colombia, Mexico, Morocco, and Spain. This report was written by Carlos E Vasco.

The initial presentations were about the situation in Argentina, Spain, and Colombia. Further comments were added about Mexico and Morocco, where many differences were observed. The discussion showed at least seven different curriculum problems;

1. Elementary School Curriculum
2. High School Curriculum
3. Teachers' Initial Training Curriculum
4. Teachers' In-service Training Curricula
5. Statistics Curriculum for Undergraduate Majors
6. Statistics Curriculum for Other Careers
7. Graduate School Curricula

The group agreed that no general principles could be drawn for all these situations, and discussions became focused towards collecting ideas about the specific types of curricula.

1. Elementary School Curriculum & 2. High School Curriculum

With only one person disagreeing, most members proposed that at least some statistical concepts should be introduced from Grade 1 on, with care being taken to provide for continuity. In Colombia, getting data, representing them, and interpreting other children's representations are prescribed topics in Grades 1 to 3.

To decide what to teach in school, the needs of the average citizen are more important considerations than logical or disciplinary arguments used *a priori* to introduce particular topics. Regarding the *what*, the *when*, and the *how*, it was said that a lot of research is still needed to make informed decisions.

The main difficulty to introducing statistics in schools is preparing teachers to handle statistical topics. Even in countries where mandatory curricula require such topics, most teachers skip them because they feel ill prepared to teach them.

International Association for Statistical Education

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3. *Teachers' Initial Training Curriculum &*
4. *Teachers' In-service Training Curricula*

The need to have good curricula and good materials for teacher education, both initial and in-service, is clear. The *what* and the *how*, though, is not so clear. It was noted that very few people are well prepared to teach teachers how to handle these topics.

5. *Statistics Curriculum for Undergraduate Majors*

In Argentina, there is only one university that offers a full undergraduate course in statistics. It has done this for almost 50 years. In Colombia there is also only one school offering such a course. Both have had good years with many applicants and graduates, but now there seems to be a shortage of applicants, in spite of good job opportunities for graduates. This contrasts with the situation in Morocco, where many people apply for the statistics and economics programmes. A tentative conclusion was drawn; it may be better to offer more practice-oriented courses, like statistics and economics, or bio-statistics

In contrast, Spanish universities offer only courses in mathematics, and in some of them you can take a major in statistics during the last two years. Only now is a full programme in statistics being considered for approval. In Colombia, it is now considered quite probable that the statistics undergraduate programme will have to be phased out, and only graduate programmes would then be offered.

The Moroccan experience also suggests engaging students in full research programmes, where they must start from devising the questionnaires and go through all phases up to analysing data and writing full reports.

Too many programmes in statistics are too theoretical in content, and graduates finish with little or no practical experience in problem-solving or applied research.

6. *Statistics Curriculum for Other Careers*

The group made some suggestions for courses in statistics for other careers:

- It is better to delay them to the later semesters, when students need statistics for their undergraduate thesis research.

- Such courses should be articulated as research methods courses.

- These Courses should not have too many topics; only a few interesting and illustrative topics, geared to arousing interest and motivation for further study, to using tools for actual research, and to letting students experience their power.

They should be aimed especially at enhancing consciousness of the need to seek advice from statistical consultants right from the beginning phases of research, when goals and hypotheses are being refined, and not only when all the data have already been collected. This aim should be communicated clearly not only to students, but also to teachers, to administrators, and to thesis advisors in all fields.

The group acknowledged the difficult situation that can arise when the professors who teach statistical methods in their own fields (education, engineering, sociology, economics) are not trained statisticians but self-made practitioners or, if they were originally well trained a long time ago, but have not kept up with progress in statistics.

7. *Graduate School Curricula*

It was noted that there are different types of graduate programmes. As far as the participants are aware of, there are no PhD programmes in statistics in Latin-America. Most are Master's degree programmes for non-statistical professionals. Very few require an undergraduate degree in statistics or its equivalent. Others are just three-semester graduate programmes that lead to intermediate certificates.

ARABIC-SPEAKING GROUP

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The year 2000 is just around the corner. It is certainly unlikely, at least in the case of Arabic-speaking countries, that in such a short time any serious changes could take place in appropriate directions to affect;

- (a) the statistics curriculum, or
- (b) teaching methods of statistics.

Thus, it is better and safer to plan for the year 2025.

Although Arabic-speaking countries share some similarities, including language, uniformity may not necessarily prevail. For example, levels of socio-economic under-development differ, and higher levels of socio-economic development are not necessarily synonymous with higher levels of educational development.

The teaching time-table, in general, and the teaching hours allocated to statistics, are not always the same in all countries at the different educational levels.

Within each group of students there is a variety of interests and therefore different emphasis is needed to satisfy the requirements of students in each of these fields.

Even within each country, therefore, *different* content and teaching approaches are needed to cater for;

- a) art, science and mathematics pupils at the pre-university secondary level (let alone primary and preparatory), and for
- b) students of the experimental and social sciences at the university level.

Thus, within the *experimental sciences*, we must provide for agricultural students, students of medicine, of engineering, of biology, etc., and within the *humanities*, for students of commerce, economics, management, law, psychology, sociology, education, geography, history, etc.

Within each context, a specific training curriculum is needed, and this should also take account of whether the students are following a course leading to a specialist degree or whether they will become end users.

Teaching and training materials should be developed to suit these different situations covering, for example;

- censuses versus sample surveys (field operations)
- micro versus macro levels
- regional, provincial, national contexts
- policy-oriented versus research-oriented approaches.

Other aspects that the group felt need careful consideration relate to career development and continuing education, including apprenticeship, certification, accreditation and licensing of practitioners.

NEWS AND ANNOUNCEMENTS

50th Session of the International Statistical Institute, Beijing, 21-29 August 1995

Statistical Education sessions include: The Relative Roles of Universities and Employers in Training Professional Statisticians; Networking Innovations and Resources - the Internet as Toolbox; Teaching Statistics in Asia; Teaching Statistics in Geographical Courses - Links with GIS (Geographical Information Systems); Statistics at School Level; Training Statistical Staff and Continuing Education in Developing Countries; Statistical Literacy in Educational Programmes; Statistics Service Courses at Higher Education level.

Contact; Executive Secretariat of the 50th ISI Session, c/o State Statistical Bureau, No.38 Yuetan Nanjie, Sanlihe, Beijing 100826, Republic of China [Tel +86-1-38-10965/10051 Fax +86-1-3810035; E-mail: wangjl@bepc2.ihep.ac.cn]

IASE Executive Committee

At Beijing, Anne Hawkins will take over from David Moore as President of IASE. The other members of the 1995-97 Executive Committee (1 President-Elect and 4 Vice-Presidents) will also take office then, elected from among the following nominations;

Vice-Presidents:

Manfred Borovcnik (Austria)
Abdelmegid Farrag (Egypt)
Peter Nuesch (Switzerland)
Brian Phillips (Australia)
Richard Scheaffer (USA)

President-Elect:

Maria Gabriella Ottaviani (Italy)
Shir-Ming Shen (Hong Kong)

ICOTS-5. Plans are in progress for holding the next International Conference on Teaching Statistics in Singapore, during the summer of 1998.

Special Education Issue of the International Statistical Review

The first 1995 issue of this ISI flagship journal, which all IASE members receive, includes a special part-issue on statistical education edited by IASE president David Moore. The articles are; *How Students Learn Statistics*, by Joan Garfield, *The Coming of Age of Statistical Education*, by David Vere-Jones, *Continuous Quality Improvement in Higher Education*, by Robert V & Mary C Hogg, *Continuous Improvement of Teaching: A Case Study in a Large Statistics Course*, by C J Wild.

Membership concessions

IASE has introduced special subscription rates for institutions in developing and transition countries. Institutes taking advantage of this offer will also be able to select one of the recent IASE publications, paying only a fraction of the normal price.

Please take every opportunity to bring this innovation to the attention of personnel from institutions that might be eligible. Further details from ISI Permanent Office.

IASE Roundtable, 23-26 July 1996, Granada, Spain

Research into the Role of Technology in Teaching and Learning Statistics.

Contact Joan Garfield, General College, University of Minnesota, 140 Appleby Hall, 128 Pleasant St S E, Minneapolis, MN 55455 [E-mail: jbg@vx.cis.umn.edu].

8th International Conference on Mathematical Education, Seville 14- 21 July 1996

IASE will convene an ICME-8 topic group "Statistics and Probability at the Secondary Level".

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Journal of Statistics Education

Volume 2(2) is now available. To retrieve a list of contents and instructions for retrieving articles, send one-line e-mail message to archive@jse.stat.ncsu.edu;

send jse/v2n2/contents

Two versions of the JSE are now maintained - one in electronic plain text with graphics available as separate files (this is so people with e-mail access only are not locked out of information access). The other version is the live-linked world-wide-web version, complete with searching, in-line graphics, animations, etc.

The journal's changes are already becoming apparent - an article on software has live 'buttons' in the document itself so readers can automatically download the package. The next issue will have a simple animation as one of its figures. Soon, also, the journal will be searchable as an archive of articles (i.e. issue-independent searches).

Users of World Wide Web client software, go to:

<http://www2.ncsu.edu/ncsu/pams/stat/info/jse/homepage.html>

Newsletter of the American Statistical Association Statistical Education Section

The first issue of this newsletter was recently published. It is intended that two issues will be produced during the first year containing; short descriptions and references to resources where section members can learn about new ideas on how to teach or how people learn statistics, news items about current happenings in the teaching of statistics that are of interest to teachers of statistics but are not directly applicable to classroom practice, and actual descriptions of teaching ideas.

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Future Issues of IASE Matters

Until the appointment of a new editor for *IASE Matters*, potential contributors are invited to send copy to Dr Anne Hawkins, 64 Bedford Court Mansions, Bedford Ave, Bloomsbury, London WC1B 3AD, UK. [Tel/Fax: +(0)171-636-0058 teexash@ioe.ac.uk]