

# INTERNATIONAL ASSOCIATION FOR STATISTICAL EDUCATION

**Editorial Address:** Dr. Richard L. Scheaffer, Statistics, University of Florida, Gainesville, FL 32611-8545, USA. Tel: +1-352-392-1941(#224) Fax: +1-352-392-5175  
E-mail: [scheaffe@stat.ufl.edu](mailto:scheaffe@stat.ufl.edu)

**President of the Association:** Dr. Anne Hawkins, Director, Royal Statistical Society Centre for Statistical Education, University of Nottingham, Nottingham, NG7 2RD, UK.  
Fax: +44 (0)115-951-4951, E-mail: [ash@maths.nott.ac.uk](mailto:ash@maths.nott.ac.uk)

## THE FIFTH INTERNATIONAL CONFERENCE ON TEACHING STATISTICS: ICOTS-5

Statistical Education - Expanding the Network

### Key Information

**Place:** Nanyang Technological University, Singapore,

**Dates:** June 21 - 26, 1998.

**Chair IPC:** Brian Phillips  
([bphillips@swin.edu.au](mailto:bphillips@swin.edu.au)  
Fax + 61 39819 0821)

**Chair LOC:** Teck-Wong Soon;  
([twsoon@singstat.gov.sg](mailto:twsoon@singstat.gov.sg))

**Singapore contact:** Lionel Pereira-Mendoza  
([pereiraml@am.nie.ac.sg](mailto:pereiraml@am.nie.ac.sg))

**WWW site:** <http://www.mrc-apu.cam.ac.uk/mhonarc/conferences/msg00007.html>

### Brochure:

The first brochure on ICOTS-5, containing information on Singapore and the theme of the meeting, is available from the Conference Secretary, Dr. Eric Nordmoe, Department of Economics and Statistics, National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260 ([ecsicots@nus.sg](mailto:ecsicots@nus.sg); Fax 65 775 2646).

### Call for Papers:

If you are interested in presenting a paper at ICOTS-5 please submit an abstract, 300-500 words in length, of the paper you would like to be considered as soon as possible to the relevant topic convener whose name and e-mail is listed below or the IPC Chair. You will then be put in touch with the appropriate session organiser.

Because of the limited number of speakers who can be accepted for each session, people whose abstracts are not accepted for the session they nominate may be referred to organisers of other relevant sessions and/or the contributed paper or poster sessions.

### Topics:

- 1 Statistical education at the school level (Elementary level, secondary level, teacher training, local teachers) Lionel Pereira-Mendoza; [pereiraml@am.nie.ac.sg](mailto:pereiraml@am.nie.ac.sg)

Statistical education at the post-secondary level (Introductory statistics, mathematical statistics, design and analysis of experiments, regression and correlation, Bayesian methods, categorical data analysis,

sample survey design and analysis) Richard Scheaffer; [scheaffe@stat.ufl.edu](mailto:scheaffe@stat.ufl.edu)

3. Statistical education for people in the workplace (Statistical consultancy, continuing education, distance education, total quality) Kerstin Vannman; [kerstin.vannman@ies.luth.se](mailto:kerstin.vannman@ies.luth.se)

4. Statistical education and the wider society (Statistical Societies, statistical literacy, publications, legal contexts, journalists, informed society) Anne Hawkins; [ash@maths.nott.ac.uk](mailto:ash@maths.nott.ac.uk)

5. An international perspective of statistical education (African region, Asian region, Spanish speaking, Other developing regions,) James Ntozi; [isae@mukla.gn.apc.org](mailto:isae@mukla.gn.apc.org)

6. Research in teaching statistics (Junior levels, senior school levels, post-secondary levels, probability) Joan Garfield; [jbg@maroon.tc.umn.edu](mailto:jbg@maroon.tc.umn.edu)

7. The role of technology in the teaching of statistics (Software design, teaching experiments, graphics calculators, visualization, research, multi-media and WWW) Rolf Biehler; [rolf.biehler@post.uni-bielefeld.de](mailto:rolf.biehler@post.uni-bielefeld.de)

8. Other determinants and developments in statistical education (Cultural/historical factors, learning factors, assessment, gender factors, projects/competitions) Guiseppa Cicchitelli; [pino@stat.unipg.it](mailto:pino@stat.unipg.it)

9. Contributed papers, Shir-Ming Shen; [hrtssm@hkucc.hku.hk](mailto:hrtssm@hkucc.hku.hk)

10. Poster sessions, Peng Yee Lee; [leepy@am.nie.ac.sg](mailto:leepy@am.nie.ac.sg)

Anyone who wants to run a special session such as a special interest group discussion, a demonstration/training session should contact the IPC Chair for consideration.

### DUES FOR 1997

Please note the new converted dues for IASE membership in 1997. The DUTCH GUILDER amounts remain unchanged.

HFI 70.00 (38.00 for developing and transition countries)

USD 40.83 (22.17)

GBP 26.25 (14.25)

FRF 214.67 (116.53)

CHF 52.50 (28.50)

DEM 61.83 (33.57)

Please do not forget to renew your membership for 1997, and encourage a friend or colleague to become a new member. Your statistical society business firm or government agency can become an institutional member. We must expand the network if we are to have dramatic impact upon statistical education around the world. For more on benefits of membership, read on.

### BENEFITS OF MEMBERSHIP IN IASE

Among the benefits, other than supporting statistical education around the world, are free copies of this newsletter, *The International Statistical Review*, *Short Book Reviews*, and the *Annual Report on International Statistics*. Members can receive other publications at reduced rates. For example, *Teaching Statistics* is available to members for 20% less than the usual price. For more information on members' benefits, or for a copy of the *IASE Review* for 1996, please contact the Editor or the President.

### A REFORMULATION OF THE PROBLEM OF STATISTICAL EDUCATION: A LEARNING PERSPECTIVE

*Roberto Behar Gutierrez  
and  
Mario Miguel Ojeda Ramirez,  
Apartado Postal 475,  
Xalapa,  
Ver. Mexico  
ojeda@speedy.coacade.uv.mx*

This article presents a characterization of the problem of statistical education based on the concept of learning. The importance of motivation in connection with participative learning and the applications of statistical methodology to real problem-solving in the context of the student's own discipline are pointed out. General guidelines for improving statistical service courses to optimize learning at different levels are given in a complete version of this work, available from the authors.

**Key Words:** Teaching statistics, Learning process, Statistical education,

*Summary:*

Statistical learning is gaining great importance within the theme of statistical education at an international level. The title of one of Garfield's (1995) articles is precisely "How students learn statistics?" This article, which appeared in the *International Statistical Review*, the Journal of the International Statistical Institute, deals with different aspects concerning psychological approaches to learning and their role in the learning of statistical concepts, methods and procedures. However, in statistical education the traditional approach oriented to teaching is more common.

Good illustrations of complete-learning programs are the ones designed for medical doctors, whose practical training takes place in real-life situations. Let's go back to the value of motivation, the focus of our discussion.

Why does someone decide to study something? We can simply answer: because he has a motivation for doing so. There are many different reasons why someone studies a particular subject and likewise learning may occupy a different degree of importance for each person. Let's see some extreme examples: a reason to study statistics could be the fact that it is part of the course work of the study program and it is absolutely necessary to have those credit hours. This could be the case of a student in engineering, biology, business administration, economics or sociology. In such a situation, the purpose of studying is not learning, but passing (a course). This student's strategy is aimed at pleasing his teacher, at exercising himself to pass, rather than answering his own questions; he is not interested in incorporating new conceptual frameworks in order to succeed when facing different situations in his professional life. Here the nature of motivation does not have a level sufficient to produce the attitude for statistics learning. The reason why the student has to take the course is not clear in itself, only that it is part of his study program. Besides, he sometimes feels moved not to try his best at completing homework and activities because he hates "math" or "numbers". This "no math" kind of student is frequently found in social sciences and the behavioral sciences. What happens to these students when they realize they have to take more than one statistics course in their study program? Undoubtedly, they react negatively.

What is a higher-level motivation for the student? One motivating factor is the feeling that his role as a future engineer, biologist, economist or sociologist will be quite limited in many situations where his deterministic logic alone renders himself unable to succeed in solving a variety of problems. This is the time when he becomes aware of the value and use of what he studies. When someone knows that what he studies will be crucial in his professional life, he develops a different attitude toward learning. He sees learning in a more conscious way; he pushes

himself and compromises himself beyond the mere demands of the course. No doubt, there are few non-statistics majors who have such a high commitment to statistics in terms of motivation and attitude. This is where the crisis lies and with it the highest challenge for the teacher. In this sense, we can say that non-statistics majors will learn statistics only if the usefulness of it in their professional life is made clear to them. The suggestion is that these students should be made aware of how statistics is a tool as valuable as the knowledge they get in their own field of study. It is clear that in order for the teacher to best invest his energy, he must generate a higher level motivation, one which can cause the student to change his attitude and to seek a new goal: please himself rather than the teacher, answer his own questions, resolve his anguish, make an effort to 'complete' himself, with the presence of an accomplice in his endeavor, the teacher! We should also look at the role of experience in generating positive attitudes toward learning. To fully understand this it suffices to analyze the experience of a group of graduate students who have previous work experience and who are now taking a statistics course. These students have already felt the need for statistics so the teacher's task is just to contextualize his introductory discussions or his justifications of theories, techniques and procedures to be covered in the course. The motivational components (namely the positive attitude toward and the appraisal of statistics) already exist.

The Chinese proverb says: "I listen and I forget; I see and I remember; I do and I understand." In reference to this, we think that any statistics course should include an experiential component. We already know traditional teaching does not include this component, as it results from the presentation of topics from textbooks in which the techniques and procedures appear in an isolated fashion, disconnected from real situations encountered in daily life for which students are supposed to be trained. In the best of cases, illustrations are given which do meet the minimum specifications that would avoid distortion in understanding. It is not that we are totally against this form of teaching statistical procedures, nor against the use of textbooks, which fortunately are now more relevant to disciplines students are supposed to be trained in. But what needs to be said is that this teaching approach is very limited and causes serious problems which make meeting educational objectives difficult. Back in the 1950's statistics was conceived as a useful discipline in the phases of data analysis in a research. Following this old conception, in traditional courses methods and procedures were presented by describing situations depicting the analysis of data in de-contextualized situations. Fortunately, more and more textbook writers stress the importance of statistical design. We now talk more about sampling techniques, experimental statistical design and the design and methods of carrying out observational studies. This has led to the inclusion of the revision of research methodology concepts

and protocols in statistics courses for other disciplines.

It is clear that course content is the first part to be reviewed, and fortunately there is evidence that attention to this has resulted in better-structured courses worldwide. We should point out that it has been widely recognized that in order that statistics for specific purpose courses promote participative learning they must provide students with opportunities to work with real life problems. That is, they must expose students to the experience of applying statistics, even if only after data has been gathered. The best result, of course, is obtained when students carry out a complete project. This is the so called project-based learning. Ojeda and Sahai (1994) provide a general overview and abundant references about this topic, in addition to the report on related concrete experiences. In a more particular proposal, Ojeda and Sahai (1996) present a series of concrete recommendations for improving the learning in an introductory biostatistics course.

*References:*

Ojeda, M. M. and Sahai H. (1995) A general proposal for teaching undergraduate service courses. Proceedings of the American Statistical Association, Section on Statistical Education, 311-316.

Ojeda, M. M. and Sahai, H. (1996) Improving the learning in an introductory biostatistics course: a project-based approach (in preparation).

*Richard L. Scheaffer*

