

International Statistical Education Newsletter

A Publication of
the International Statistical Institute

Dr. M.H. Regier, Editor
Editorial Address: ISEN
Dept. of Mathematics & Statistics
Case Western Reserve University
Cleveland
Ohio 44106, USA

Volume 9, No. 2, June 1989

EDITORIAL

The summer months usually see a heightening of activities in the educational community in terms of meetings, conferences, and special projects. Please send your reports on such activities to the editor for publication in the October issue of the newsletter. The report could be a simple statement about the occurrence of the meeting or a paragraph or two containing more information. Longer reports are also welcome and may be included in the October issue or a later one. Please include news of recent publications pertinent to statistical education, as well as information on the availability of new material aids, and announcements of forthcoming activities.

EDUCATION COMMITTEE

ISI STATISTICAL EDUCATION VIDEO PROJECTS

The following report was contributed by Project Director, Dr. Kenneth R. Bryson, who is also Assistant to the Director of the ISI Permanent Office.

The ISI Committee on Statistical Education is undertaking the production of an ISI Statistical Education Video Series. The aim of this project is to increase the effectiveness of national and regional statistical education and training programs in developing countries.

Phase I of the project is a feasibility study. This phase of the project consists of three activities:

- 1) Preparing an inventory of existing video-cassette courses in various countries
- 2) Testing and evaluating a selected course at two education and training centres in Africa
- 3) Writing a feasibility report with recommendations for the use of video-cassette teaching aids to improve teaching effectiveness in developing countries.

Funding for Phase I has been obtained from the International Development Research Centre (IDRC), Ottawa. A panel of experts was formed and had their first meeting in Voorburg on 16 March. They selected the video course to be used in the feasibility study. It will be tested during the Summer of 1989 at the Eastern Africa Statistical Training Centre (EASTC) in Dar es Salaam, Tanzania, and at one other site in Western Africa. Based on these tests a preliminary version of the feasibility report will be prepared for presentation at the ISI Session in Paris.

Some information for the inventory of video-cassette courses has been obtained from existing inventories and from responses to a questionnaire sent to university statistics departments. The United Nations Statistical Office and the ISI are cooperating in obtaining information from all national statistical offices on their production and use of statistical video materials.

Cooperation between the UN and the ISI is crucial to the success of the statistical education video project. At the 25th Session of the UN Statistical Commission in February 1989 the ISI representative made a verbal presentation on the video project and a written submission on this and other ISI activities related to technical cooperation. The video project received very strong support from the Statistical Commission. Other representatives spoke in favor of its objectives in promoting the statistical development of developing countries. The President of the ISI and the Director of the UN Statistical Office emphasized that it is a "joint venture" of these two organizations.

Quoting from the written statement of the ISI to the Statistical Commission:

"The cooperation of the UN Statistical Office with the ISI video project will help to:

- Identify topics of greatest value in training for statistical development in developing countries
- Conform the contents of the courses to appropriate statistical standards and international statistical guidelines
- Obtain the support of donors to pay the cost of production and distribution."

Already some negotiations are under way to obtain support from a UN source for the production of the pilot course in the ISI Statistical Education Video Series. More information about this, Phase II of the video project, will be given in a later issue of ISEN.

Support by the members of the ISI and its Sections is equally important to the success of the ISI video project. If you have ideas for topics of video courses and sources of funding, and especially if you are willing to serve on a steering committee to assist in the implementation of your ideas, write to:

Professor David Vere-Jones
Chairman, Committee on Statistical Education
Department of Mathematics
Victoria University of Wellington
Private Bag, Wellington, New Zealand

Important message from the ISI Task Force for International Conferences on the Teaching of Statistics

The first international conference on teaching statistics, ICOTS 1, was held in Sheffield, UK, 1982, then followed ICOTS 2 in Victoria, Canada, 1986, and now we are looking forward to ICOTS 3 in Dunedin, New Zealand, 19-24 August 1990. Then the question arises: WHERE WILL ICOTS 4 TAKE PLACE IN 1994?

The ISI Task Force for International Conferences on the Teaching of Statistics is responsible to explore possible sites for ICOTS and to recommend to the ISI Education Committee the site of the next conference so that at each such conference the place for the next conference can be announced. The task force has now started its work to look for suitable sites for ICOTS 4 and will discuss this issue at the next task force meeting that will be held in connection to the ISI session in Paris, 27-28 August 1989.

If your country or your university is interested in hosting ICOTS 4 in 1994, please contact me or some member of the task force. Then you will get a questionnaire to answer about the facilities you have to host ICOTS. It is very important that the task force has as much information as possible available at its Paris meeting. So, please, do not hesitate to contact me, some member of the task force, or your National Correspondent about this matter. This information has also been sent to your National Correspondent

Kerstin Vannman

Chairperson of the ISI Task Force for
International Conferences on the Teaching of Statistics
Dept. of Mathematics, Lulea University
S-951 87 LULEA, SWEDEN

The other members of the task force are:

James Adichie
Dept. of Statistics
University of Nigeria
Nsukka, NIGERIA

James Landwehr
600 Mountain Avenue
Murray Hill, NJ 07974-2070
USA

Dan Lunn
Old Stone Court
1 Church Street, Kidlington
Oxford OX5 2BA, UK

Maria Ramalhoto
Instituto Superior Tecnico
Departamento de Matematica
Avenida Rovisco Pais
1096 Lisboa Codex, PORTUGAL

The ISI Statistical Education Committee is accepting nominations for two new committee members to replace R.M. Loynes and M.H. Regier, whose memberships will terminate at the end of the 47th Session in Paris next September. If you have any names to suggest as replacements for the two outgoing members, please send your suggestions to Dr. David Vere-Jones, chairman of the Committee, either directly or via the ISI Permanent Office. Replacements will be proposed by the Education Committee and appointed by the ISI Council. Each new member will serve for a maximum of six years.

Activities of the Education Committee include the organization of international conferences, the exchange and dissemination of information on methods for statistical training and education at all levels, and assisting in the development of materials for the teaching of Statistics. Special task forces have been set up for major projects with some task force members coopted from outside the Committee. The Committee oversees the publication of ISEN and has organized open meetings on Statistical Education at several recent sessions of the ISI.

VIEWPOINTS

AVOIDING THE "COOK BOOK APPROACH": TEACHING NURSES TO BE INTELLIGENT USERS OF STATISTICS Part II

Part I of this article, which appeared in the previous issue, sketched developments in nursing and nursing education that are of interest to the teaching of statistics to nurses. We also described the quite commonly used "cook book approach" to teaching statistics, in nursing and other disciplines alike. In this second part, we offer the alternative of grounding statistical education in nursing on the premise of generating intelligent users of statistics.

THE INTELLIGENT USER

It is not that the cook book approach is altogether invalid. On the contrary, its streamlining of decision-making and operations can lend structure and efficiency to statistical analysis. If the cook book approach were integrated into data analyses in order to provide structure and efficiency, there would be no problem. Yet it would not be called the cook book approach anymore, because the goal is no longer to produce an output in the least cumbersome and risky manner.

Avoiding the cook book approach is only possible, however, if the data analyst knows what he or she is doing. This implies a repertoire of specific expertise. Intelligent users of statistics are able to:

- (1) recognize at all times that they are users of statistics, and may need the support of experts with formal statistical credentials;
- (2) translate issues and questions formulated at the conceptual level "down" to the level of representation, measurement, and quantification;
- (3) not only identify the variables of interest, the applicable data sets, and the appropriate statistical models; but also justify the choices, weigh the alternative choices, and defend the chosen model over the other ones;
- (4) understand and consider the implicit and explicit assumptions underlying statistical tests;
- (5) develop and implement data entry, management, and analysis strategies that will optimize the informativeness of the data and the research questions;
- (6) understand most, if not all, of the output associated with particular statistical models, and be able to interpret these within the context of the research questions and variables of interest;
- (7) assess the completeness of the information yielded by data analysis, and if necessary, design and implement additional analysis strategies;
- (8) translate data and results back "up" to the conceptual level, assess the extent to which the conceptual issues and questions have been addressed, and, if necessary, translate back "down" for additional quantitative work;
- (9) integrate conceptual and quantitative information such that it can be communicated comprehensively and disseminated effectively;
- (10) know when to quit and call in help.

Does this sound as if every nurse should be a statistician? Not at all, and the ten skills cited here are relative as opposed to absolute. Instead of characterizing the best possible nurse-user of statistics, the ten skills suggest what intelligent users should be able to do at their level of research sophistication. In other words, the skills must be interpreted by considering what the nurse in question is able to investigate by virtue of preparation in research methods and experience. Thus, for a doctorally prepared nurse researcher the skills should be defined in terms of someone committed to discovering new knowledge using advanced and sophisticated statistical models. For the master's prepared clinician, who provides advanced clinical care and participates in more modest research efforts, the skills should be defined in terms of answering clearly defined research questions of modest or low complexity. For the baccalaureate prepared nurse, who is a consumer of research first and a producer of simple questions for investigation second, the skills should be interpreted at the most basic level.

Symbolically stated, then, whether nurses are trained at the "central tendency level", the "*t*-test", the "ANOVA", the "MANOVA", or the "LISREL" levels, they must know their level and define the ten skills at that level. Overestimating one's level of sophistication will make for risky and questionable statistical inference, often done while frantically searching for structure and support. The outcome will be poor research.

A final note on statistical consultation. Being a user means that one is effective and appropriate in applying existing technologies within one's realm of expertise. However, it is the complexities of patient care that generate the need for research projects and the demand for statistical technology, not the statistical expertise of the nurses doing the study. No matter how intelligent a user these nurses are and how well-trained they are as applied statisticians, additional statistical expertise will often be required. There is no shame in working with a statistical consultant, only scientific honor and integrity (for helpful strategies, see Boen & Zahn, 1982; Brogan, 1989; Ferketich, 1989; Jones & Jones, 1989). As Samuel Johnson once said, "knowledge is of two kinds; we know a subject ourselves, or we know where we can find information about it."

REFERENCES

- Abraham, I. L. (1984, Fall). Non-statistical aspects of teaching statistics in nursing. *Bulletin on Teaching of Statistics in the Health Sciences (American Statistical Association)*, No. 38, 1-5.
- Abraham, I. L., Bakker, A., De Becker, P., Hannah, K., McCormick, K. A., & Sweeney, M. (in press). Decision support technology for nursing research. In J. Ozbolt, K. Hannah, & D. Vandewal (Eds.), *Decision support systems for nursing*. New York: N.Y. Brunner.
- Abraham, I. L., Nadzam, D. M., & Fitzpatrick, J. J. (1986). Statistics and quantitative methods in nursing: Overview of a recent invitational conference. *Bulletin on Teaching of Statistics in the Health Sciences (American Statistical Association)*, No. 41, 1-5.
- Abraham, I. L., Nadzam, D. M., & Fitzpatrick, J. J. (1989-a). Statistics in nursing curricula. In Abraham et al., 1989-b.
- Abraham, I. L., Nadzam, D. M., & Fitzpatrick, J. J. (Eds.) (1989-b). *Statistics and quantitative methods in nursing: Issues and strategies for research and education*. Philadelphia: W. B. Saunders.
- Ager, J. W. (1989). On the prioritization of statistical content in curricula. In Abraham et al., 1989-b.
- Boen, J. R., & Zahn, D. A. (1982). *The human side of statistical consultation*. Belmont: Lifetime Learning Publications.
- Brogan, D. R. (1980a). A program of teaching and consultation in research methods and statistics for graduate students in nursing. *American Statistician*, 34, 26-33.
- Brogan, D. R. (1980b). An integrated approach to training in research methodology and statistics. *International Journal of Nursing Studies*, 17, 101-106.
- Brogan, D. R. (1982). Professional socialization to a research role: Interest in research among graduate students in nursing. *Research in Nursing and Health*, 5, 113-122.
- Brogan, D. R. (1989). A statistician's view on statistics, quantitative methods and nursing. In Abraham et al., 1989-b.
- Delesie, L., De Becker, P., & Sermeus, W. (1987). [Hospital care financing: The development of minimum nursing data.] (In Dutch). *Acta Hospitalia*, 27(3), 7-28 (English abstract, *Acta Hospitalia*, 27(3), 106).
- Ferketich, S. (1989). Researcher expertise and consultation in instrument development. In Abraham et al., 1989.
- Jane, L. H. (1989). On statistical expert systems. In Abraham et al., 1989-b.
- Jones S. L., & Jones P. K. (1989). A statistical evaluation of the psychiatric nursing research literature. In Abraham et al., 1989.
- Passos, J. V., & Stalling, A. A. (1973). An introduction of concepts of measurement and statistics to sophomore nursing students. *Nursing Research*, 22, 248-253.
- Schultz II, S. (1988). The incipient paradigm shift in statistical computing. In Abraham et al., 1989-b.
- Shelton, B. J. (1979). Research components in baccalaureate programs in nursing. *Journal of Nursing Education*, 18(5), 22-33.
- Taneja, B. K. (1989). Adding to the statistician's views and concerns. In Abraham et al., 1989-b.
- Werley, H. H., & Lang, N. M. (1988). *Identification of the Nursing Minimum Data Set*. New York: Springer.

Ivo L. Abraham
School of Nursing;
Department of Behavioral
Medicine & Psychiatry
School of Medicine
University of Virginia
Charlottesville, VA 22903, USA

C. Valerie Rice
School of Nursing
Case Western Reserve University
Cleveland, OH 44106, USA