

From **Brunelli, Lina & Cicchitelli, Giuseppe (editors). Proceedings of the First Scientific Meeting (of the IASE).** Università di Perugia (Italy), 1994. Pages 115-122. Copyright holder: University of Perugia. Permission granted by Dipartimento di Scienze Statistiche to the IASE to make this book freely available on the Internet. This pdf file is from the IASE website at <http://www.stat.auckland.nz/~iase/publications/proc1993>. Copies of the complete Proceedings are available for 10 Euros from the ISI (International Statistical Institute). See <http://isi.cbs.nl/sale-iase.htm> for details.

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## THE EDUCATIONAL TRACKS OF "THE MAKING STATISTICS MORE EFFECTIVE IN SCHOOLS OF BUSINESS" CONFERENCES

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### 1. Introduction

Statistical instruction is, and has always been, an important component of both graduate and undergraduate business schools in the United States. Most of these schools require at least one course in applied statistics. In the middle of the 1980s a small group of faculty members felt that there was a need to examine the content and delivery of such courses (and the use of statistics) at their schools. These concerned faculty members organized a conference at the University of Chicago in 1986 to discuss these issues. Based upon the success of the first conference, there now have been seven additional annual "Making Statistics More Effective in Schools of Business" (MSMESB) conferences. The last conference was held at the University of Minnesota. From the first conference that included workshops on industry perspectives on the curriculum; the basic statistics course; quality control, quality and productivity improvement, and experimental design; statistical computing and graphics; forecasting and time-series analysis; and the interaction of statisticians with researchers in accounting, finance, marketing, production, and other areas in business schools, there has always been an educational track at these conferences. The 1993 teaching and curriculum track had workshops on learning styles, improving students' writing and oral presentation skills, cooperative learning, and field projects. In this report the author, who is a member of the conference's planning committee, describes and summarizes all of the educational tracks of these eight conferences. In addition, he discusses the impact of these conferences on statistical education at business schools. He mentions the numerous benefits from attending such conferences for any group of statisticians. Finally, he reports on the plans for the 1994 conference to be hosted by Rutgers University.

### 2. The first MSMESB conference

In the middle of the 1980s George Tiao, Harry Roberts and George

Easton of The University of Chicago recognized the need for a conference to discuss the role of statistics in schools of business. For, while such schools have almost always had one or more required applied statistics courses since they began in the late 1800s, Tiao, Roberts and Easton believed that these courses had become stagnant. The content of these courses had not really changed for close to 30 years; the standard delivery for a longer period of time. There were few textbooks that included real data or made serious use of statistical computing. In addition, many of the instructors of these courses had limited knowledge of how statistics was used in their school's curriculum. Nor did they know much about the use of statistics in the workplace.

Hence they organized the first "Making Statistics More Effective in Schools of Business" (MSMESB) Conference at The University of Chicago on 20-21 June 1986. About 130 people interested in business statistics participated in this conference. Approximately one quarter of these attendees came from industry. The conference had four components: three plenary sessions, six task force workshops, reports from the workshops and discussions of these reports and follow-up. In preparation for the conference information was gathered to assist some of the workshop participants. For example, there was a comprehensive survey of the teaching of statistics in business schools (see Rose *et al.*, 1988). Except for one traditional presentation, the conference was organized to allow for active participation by all of the attendees.

The three cochairs produced proceedings of this first conference (Easton *et al.*, 1987). It, and subsequent proceedings of the conference, are available from George Tiao at the University of Chicago.

It was also decided that based upon the enthusiastic response from the participants that similar conferences would be held the next three or four years. Yet, this was not to be, because MSMESB conferences are now an annual event.

### 3. The next seven conferences

The second conference was held at New York University in 1987 (see Charterjee and Tenenbein, 1988). It was followed by two Midwest conferences held at The University of Wisconsin (Finster *et al.*, 1989) and The University of Michigan (see Spivey, 1990). The 1990 conference was held at the Wharton School at The University of Pennsylvania (see Hildebrand, 1992). The University of Kansas was the site of the next conference (Hiller and Sherr, 1991). Approximately 120 people attended each of these conferences.

In 1992 the seventh conference was held at The University of Tennessee (Lin and Sylwester, 1993). The University of Minnesota hosted the most recent MSMESB conference (Benson, 1993). Over 175 people attended each of these last two conferences. Participants at the most recent conferences can be broken up into two groups: regular attendees and first-time attendees. Many of the first-time attendees reside near the conference site. Making the conferences available to business school statisticians in different regions of the country and at a reasonable cost are two of the objectives of the MSMESB Planning Committee. This is an informally organized group of individuals who plan the conferences. The Committee meets only twice a year, once at the conference. It selects a chair for an upcoming conference and suggests some topics for that chair's conference.

Based upon what has been successful in the past, there is now an almost standard format for these two-day conferences. There are usually three tracks: one dealing with education, one dealing with quality and productivity and one dealing with an application of statistics to a major field of management. For each of these tracks there is usually a plenary session and a series of workshops, where the attendees actively participate in the program. A lot of time is intentionally scheduled between sessions for informal discussion. Three other successful additions to recent conferences have been plant tours before the formal conference, roundtable discussions during one of the luncheons, and contributed paper sessions, that enable some statisticians to attend the conference. One recent complaint (?) has been that the conference contains too many interesting activities in its two-day format.

The planning committee has recently established a vision statement, a mission statement and goals for the conferences. It is recognized that these may be altered in the future based upon the need for continuous improvement.

There has only been limited financial support for the MSMESB conferences. For, while the conferences did obtain a major grant from the Allied Signal Foundation, most of its support has come from the host institutions, including the time of the Planning Committee members.

One of the goals of the conference is to produce proceedings. In addition, Planning Committee members have presented summary reports of the conferences at the Joint Statistical Meetings and at annual meetings of the Decision Science Institute.

#### 4. The educational tracks of first eight conferences

For all of the conferences there has been an attempt to assist the

participant in teaching statistics and statistical thinking, where such thinking is based upon David S. Moore's ICOTS II formulation:

- The idea of a *process*.
- The omnipresence of *variation* in processes.
- Variation can be *explained*:
  - Statistical *control*;
  - Randomness* and *distributions*;
  - Systematic effects – *regression*, etc.
- The need for *data* about processes.

One of the ways this has been done is by the presence of an educational track at each conference.

Here is a listing of the sessions related to pedagogy from the first eight conferences:

- 1986 Conference at The University of Chicago:
  - What Business School Graduates Need to Know about Statistics: the Management Perspective;
  - Making Statistics More Effective in Schools of Business: the Dean's Perspective;
  - Transformation of the American Style of Teaching Statistics;
  - Curriculum: Industry Perspectives;
  - Curriculum: Basic Statistics Courses.
- 1987 Conference at New York University:
  - M.B.A. Panel: Importance of the Statistics Curriculum in Relation to Different Areas in the Business World;
  - Essential Changes for the Teaching of Statistics;
  - Basic Statistics Course Curriculum: Report of the Curriculum Committee;
  - Statistical Methods for Quality and Productivity Improvement: Designing a Course;
  - Statistical Computing in Business Teaching.
- 1988 Conference at The University of Wisconsin:
  - Quality in Education;
  - Teaching with Emphasis on the Improvement of Delivery: There is More to a Course than Content;
  - Teaching with Emphasis on the Improvement of Delivery: Pareto Analysis of Delivery Problems;
  - Teaching with Emphasis on the Improvement of Delivery: Short Presentations on Successes and Failures in Dealing with Delivery Problems and Showing of Videotapes.

- 1989 Conference at The University of Michigan:  
Discussion of the Impact of PCs on Delivery in the Introductory  
Statistics Course;  
A Demonstration of the Classroom Use of a Macintosh  
Computer;  
The Role of Group Projects in Teaching Statistics;  
The Use of In-Class Demonstrations in Teaching.
- 1990 Conference at The University of Kansas:  
Teaching Managers in a Short Time: A Panel Discussion;  
The Bead Game: A Demonstration;  
Teaching Statistical Thinking to Managers;  
Teaching with the Case Method: A Demonstration;  
Workshop on Ph.D. Programs.
- 1991 Conference at The University of Pennsylvania:  
A Primer on Statistics, Quality, and Past Conferences Statistics,  
Total Quality Management and Higher Education;  
Improving Statistics Textbooks and Materials: What is the  
Process?  
Improving Statistics Textbooks and Materials: The Voice of  
the Market;  
Improving Statistics Textbooks and Materials: Roundtable  
Discussion - How Can the Process and the Product Be  
Improved?
- 1992 Conference at The University of Tennessee:  
Can TQM Be Applied to Teaching Itself?  
What We Think We're Learning from the Teaching Lab;  
Some Basic Theory about Sampling;  
Analytical versus Enumerative Issues;  
Industry Experience: Enriching the Education of Statistics  
Teachers;  
Using Live Data in Business Statistics Courses;  
Removing a Barrier to Motivation: Grades;  
Management Education;  
Texts & Other Information Modalities;  
Teamwork: Among Students and Among Departments in the  
MBA Curriculum.
- 1993 Conference at The University of Minnesota:  
Unlocking the Genius in Your Classroom: Tapping the Power  
of Learning Styles;

Improving Students' Writing and Oral Presentation Skills;  
Active Learning: Cooperation in the College Classroom;  
Live from the Classroom: Cooperation Learning in Action;  
Minnesota's MBA Field Project Course;  
Grass Roots Total Quality Management for Education;  
Benchmarking Management Education.

Further information about each of these sessions may be found in the proceedings from each conference.

Many of these early sessions dealt with the appropriate curriculum for today's business statistics. There was a sense from the participants that less time should be spent on mathematical probability and hypothesis testing, and more time on descriptive statistics, time series, quality and productivity topics, sampling and statistical communication. Hence it not surprising that quality topics have been discussed in approximately one-eighth of the sessions.

Topics stressed in other sessions include improving the textbooks and statistical software in our courses and our delivery of business statistics courses. One of the major themes of these sixteen delivery-oriented sessions has been the importance of using teams both in and outside of the classroom. Most of these sessions would appeal to any instructor of applied statistics, not just instructors of business statistics.

##### 5. Impact on business statistics

Attendance at one or more of the MSMESB conferences has definitely had an impact on what is taught in business statistics courses and the way it is taught. It is my belief that anyone who has attended a conference has come away with numerous ideas, many of which have been implemented in the classroom. For example, changes from the traditional, but ineffective, lecture method. Participants have also discovered links between statistics and other functional areas in business and became aware of how statistics is used by our students in the workplace.

It has also had an impact on the business statistics textbooks. Some new texts have been developed based upon the recommendations of the conferences. For example, Cryer and Miller (1991). Many authors have incorporated ideas from the conferences in their texts. The same is true of some software developers. Most texts, and some software packages, now include files with realistic business data.

Still there has not been as much change as one might expect. Here are two reasons for this lack of change. First, attendance at one or more con-

ferences encourages participants to implement change, but only a limited number of business school statisticians have attended the conferences. Second, and most important, is the strong resistance to change present among all instructors, including instructors from schools of business.

#### 6. Conference benefits

As explained above, there are numerous pedagogical reasons for business school statisticians to attend a MSMESB conference. Among the most important are being exposed to possible improvements in the curricula of business school statistics courses and in the delivery of such courses.

Still the primary benefit from attending a MSMESB conference is the ability to learn from each other. For example, to meet peers from other institutions who share similar educational experiences with you. The networking found at these vital conferences is superb.

#### 7. Future plans

The next MSMESB conference is scheduled to be held at Rutgers University, The State University of New Jersey, on 9-11 June 1994. The chair of the ninth conference is Douglas Jones.

Based upon the success of the previous conferences, there are now many schools interested in hosting future conferences. Among the states being considered for a future conference are California, Alaska, Texas and Iowa.

It is expected that the 1994 and subsequent conferences will include an educational track. Hence there should be a benefit to any statistical educator who attends one of these conferences because many of the topics covered at the MSMESB conferences are not necessarily just for business school statisticians. Finally, attendance at one of these conferences may encourage statisticians from other disciplines to begin similar gatherings.

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