THE STATISTICS TEACHER NETWORK

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by the American Statistical Association - National Council of Teachers of Mathematics
Joint Committee on the Curriculum in Statistics and Probability.

INTERNATIONAL CONFERENCE ON TEACHING STATISTICS

The Third International Conference on Teaching Statistics (ICOTS 3) will be held 19-24 August 1990 at the University of Otago, Dunedin, New Zealand. The objectives of ICOTS 3 include improving the quality of statistics instruction on a world-wide basis, fostering international cooperation among teachers of statistics and promoting the interchange of ideas about teaching materials, methods, and content.

The program will include plenary, invited and contributed paper sessions, workshops, panel and poster sessions. Teaching from beginning school to college, polytechnic and university level will be included, as well as sessions on teaching statistics in government, business, and industry. Opportunities will be provided to see and experiment with the latest in computer hardware and software.

There will be approximately eight invited paper sessions offered within each of the following streams: Teaching Probability and Statistics in Schools, Teaching Probability and Statistics in Universities and Technical Institutes and Statistical Training Outside the Teaching Institutions: General Issues. Approximately eight workshops will be offered on topics ranging from using calculators and computers in the classroom through advanced statistical techniques.

The previous ICOTS Conferences have been major international events as our teaching of statistics progresses.

If you plan to submit a contributed paper, workshop, or poster session, or want further information, please contact one of the following:

Prof. Richard L. Scheaffer
Department of Statistics
University of Florida
Gainesville, FL 32611

Prof. Joe Gani
Probability and Statistics Program
University of California
Santa Barbara, CA 93106

The Secretary
ICOTS 3 LO.C
University of Otago
P.O. Box 56
Dunedin, New Zealand

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FOCUS ON QUANTITATIVE LITERACY IN THE SCHOOLS

The American Statistical Association's (ASA) Quantitative Literacy (QL) Project will conduct five-day workshops this summer for junior and senior high school mathematics, science and social science teachers. Designed to provide a practical in-service program on teaching statistical and probabilistic concepts, the workshops emphasize both content and instructional techniques. Participants will also have access to lesson-planning assistance and hands-on critiques through 12 hours of follow-up sessions during the school year.

A joint project of the ASA and the NCTM, the QL Program also has the goal of forming a local network of individuals concerned with statistical education. Participants are required to have a commitment from their district or school system allowing them to integrate the workshop material during the 1989-90 school year. They must also be provided with the opportunity to inservice other teachers in their building, department or district. When possible, teams of teachers are encouraged to apply.

The following are the locations and revised dates (since our last newsletter) of the National Science Foundation funded workshops:

Washburn University of Topeka
Topeka, KS, June 12-16, 1989

Towson University
Towson, MD, June 19-23, 1989

Oregon State University
Corvallis, OR June 19-23, 1989

John Carroll University
University Heights, OH June 26-30, 1989

Virginia Commonwealth University
Richmond, VA, July 10-14, 1989

For more information on the QL Project, contact Kathryn Rowe, American Statistical Association, 1429 Duke Street, Alexandria, Virginia 22314. Please do not contact the colleges and universities serving as sites for these programs.

– – Kathryn Rowe

WOODROW WILSON INSTITUTES

The Woodrow Wilson National Fellowship Foundation's (WWNFF) three traveling teams of statistics teachers will be on the road again in the summer of 1989 to conduct eleven one-week institutes. (See the last edition of the *Statistics Teacher Network* for sites and contact persons.) The institute fee at most sites is $125; availability and cost of graduate and/or in-service credit varies from site to site.

All of the extraordinary teachers who conduct the institutes participated in a WWNFF four-week institute in mathematics held during the summer at Princeton University. These teachers (who include Presidential Award winners) bring with them a wealth of information, but also encourage and provide ample time for sharing of ideas by participants. The atmosphere of WWNFF institutes is one of professional colleagues working together to discover new and better ways to nurture their own development and that of their students.

To learn statistics you do not need an extensive background in mathematics. Learning is primarily hands-on and the focus is on new statistical techniques that can and should be used in the classroom. Participants use computers and teacher-friendly software as aids to learning and as tools for teaching statistics. Data gathering and analyzing, simulations and probability experiments are but some of the many activities of the institutes.

Don't miss out on a great experience. As one teacher wrote: "After the first morning, I wanted to call the members of my department to tell them to drop everything and come–that they could not afford to miss this." Another participant said, "I expected to get a better understanding of statistics. I was rewarded with not only understanding but a fantastic array of teaching methods."

If you are unable to reach the site contact, call Beth Jeppesen or Janet Gnall at (609) 924-4666.

– – Janet Gnall

STATISTICAL PRIZE COMPETITION

The Center for Statistical Education and the American Statistical Association announce the *Third Annual Statistical Prize Competition (1989).*

The competition takes the form of an applied statistics project planned and executed by a team of two or more students. The competition is an ideal way for students to work together as a team to discover the scope and applicability of techniques in statistics with which they are familiar; to apply them in what might be an unfamiliar context and to develop a critical appreciation of the logical progression from research questions to research conclusions.

This year one prize of $300.00 will be given in each of the categories: Grades 4-6, Grades 7-9, and Grades 10-12. A special prize of $100.00 will be awarded to the team submitting the statistics project making the best use of a computer.

For an informational brochure and an entry form please send a self-addressed stamped envelope to:

Mr. Dwayne Cameron
Contest Director
Old Rochester Regional High School
135 Marion Road
Mattapoisett, MA 02739 U.S.A.

All entries must be postmarked by May 15, 1989.

-- Dwayne Cameron

STATS

Three hundred names have been randomly selected from the mailing list of this newsletter to receive the first edition of *Stats: The Magazine for Students of Statistics*, compliments of the American Statistical Association and the Center for Statistical Education.

Do you know the answers to any of these questions? Do you know where to find the answers?

How did five top statisticians get involved with statistics?

Who are the "data pushers"? What dangers do they present?

How did the American Statistical Association get its start one wintery morning in Boston in 1839?

The answers to these and many similar questions are contained in the premier issue of *Stats*. The magazine also promises to identify content material that will be of interest to students as well as to determine the best way to present the material. Students who are seeking information about careers in statistics are included in the target audience of the magazine.

The magazine will be published in the spring and fall each year by the American Statistical Association, 1429 Duke Street, Alexandria, VA 22314-3402. Subscription: $14 a year; the bulk rate is $2 per copy when 10 or more copies are ordered.

-- Kathryn Rowe

AGAINST ALL ODDS

Next August a new television course in Statistics will be released for purchase and broadcast over public broadcasting stations. The series, AGAINST ALL ODDS: INSIDE STATISTICS, consists of twenty-six half hour television programs which make up a one semester course in Introductory Statistics. While the course and textbook are intended for general education students at the collegiate or senior high school level, the series or parts of it will be of interest to students in junior high school. The mathematical requirement is two years of high school algebra. No calculus is used.

The series is developed under the administration of the Consortium for Mathematics and its Applications (COMAP, INC.), with major funding for the television films from the Annenberg/CPB Project. The complete set of programs will be available next August. The textbook, INTRODUCTION TO THE PRACTICE OF STATISTICS, is published now, by W.H. Freeman and Company. David S. Moore, Purdue University is the content developer of the series, and co-author, with his Purdue colleague George McCabe, of the text and supplements.

Professor Moore developed the statistics unit for the series FOR ALL PRACTICAL PURPOSES and it proved so effective that the full statistics course proposal was developed and funded. The powerful combination of television production and textbook materials provides a very exciting motivation for students and faculty.

Statistics is an unusually attractive subject for television because the instruction can be illustrated with many visually attractive examples. Specific skills and numerical reasoning are stressed in the course; emphases on data and conceptual under-

standing are made vivid by the skillful use of the television medium.

Each program in the series takes shape around a core of documentary segments. These stories introduce the key teaching points through location footage and action sequences and are enhanced through animation. Statistics' new emphasis on graphics can be attractively and effectively conveyed via television.

SUPPLEMENTS: There is a Faculty Guide with solutions to the exercises. Also included in the Guide are tests and discussions of each chapter, with hints for teaching. The appropriate television programs are also discussed.

A Telecourse Study Guide is also available. This guide provides the bridge between the textbook and the television programs.

A third valuable supplements is in preparation, a MINITAB Guide which parallels the text, and keys many of the worked out examples and data sets into the Minitab statistical software computing program.

BROADCASTING: AGAINST ALL ODDS is not a prime time series. In order to arrange for its broadcast in your area, a phone call to your area public broadcasting station will help. Each of the 330 PBS stations function independently in setting their programming. Therefore, please call the station in your area and tell the Program Manager that you want the series broadcast.

PURCHASE AND LICENSE INFORMATION: Education institutions must obtain a license to use AGAINST ALL ODDS: INSIDE STATISTICS as a television course. Licenses for off-air taping are also available for classroom use. Information on licensing may be obtained by calling 1-800-ALS-ALS8, or by writing to PBS/ALS 1320 Braddock Place, Arlington, VA 22314.

If you wish to purchase the series at $350.00, or simply duplicate the programs for supplementary use, please call 1-800- LEARNER.

For further information on the textbook or supplements, contact Jeremiah J. Lyons, W.H. Freeman and Co., 41 Madison Ave., New York, NY 10010.

– J.L. Lyons

REVIEW — AGAINST ALL ODDS

Appropriately, the television series *Against All Odds: Inside Statistics* was reviewed by examining a sample of its offerings. The review tape supplied contained programs 3, 8, 13, and 14. Based on the sample, the population appears to be a most exciting way to show that statistics is an important field, with applications to a variety of occupations and areas of interest.

The format of each program is the same. Several key questions are raised, relating to real-life applications. The narrator indicates that statistics has something to say about these questions. The on-screen host, Theresa M. Amabile of Brandeis University, briefly mentions the key statistical procedures to be developed in the program. Then the application areas are pursued in some depth, with the statistical information and techniques arising out of the applications. Ms. Amabile returns to summarize the statistical information. Footage of the application areas is interspersed with excellent graphics displaying the statistical principles involved. The logo of the series is a scatter-plot with two fitted regression lines, which are viewed in two and three dimensions.

In program # 3: *Describing Distributions*, the notion of *comparable worth* (Are women paid at the same rate as men for jobs of equal importance?) motivates a discussion of the mean, the median, skewed distributions, quartiles, and five-number summaries of distributions. Secretaries in Colorado Springs are shown to have used statistical arguments to close the pay gap in that city. An investigation of the caloric content of hot dogs (all beef contrasted with beef/pork and with beef/pork/chicken) brings up comparison of distributions using box plots, and comparison of interquartile ranges. Work at Michigan State University where chemical content of babies' urine samples is set to music serves to introduce the variance and the standard deviation. (Wrong notes are signals of the presence of extreme values of chemicals, with potentially harmful effects on the child.)

Program # 8 is titled *Describing Relationships.* The study of deaths of Florida manatees as related to the number of power boats registered in the state provides a need for the scatter plot. The terms "explanatory variable", "response variable", "positive association", "negative association", and "outlier"

- edit, manipulate, and transform the data or create new data
- describe data in both tabular and graphical format (including plots, histograms, and contingency tables)
- summarize data with descriptive statistics
- perform simple and multiple regression
- perform one-and two-way analysis of variance
- perform nonparametric analysis
- perform time series analysis
- generate random data from any of the ten built-in statistical distributions
- analyze data using the most common statistical procedures, including EDA plots
- use the 40 data sets which are already on the disks and are coordinated with activities in the 365 page manual that accompanies the program.

Minitab uses a series of commands to enable the user to create and manipulate data. Initially the program is more difficult to operate than a menu-driven program, but its versatility and flexibility more than compensate for this shortcoming. For classes where there will be only infrequent computer work, Minitab might not be a good option. (Students forget the commands between sessions.) However, I have seen Minitab used with great success as an interactive teaching device in a class where everyone had a terminal, or in classes where there was frequent computer use.

Minitab is also a powerful tool for demonstration purposes. In addition to all the statistical tools available, you can create macros, or command files, to make computer incorporation into a lecture smoother. Suppose that during a lecture you wanted to compare boxplots from 10 random samples of size 50 from a normal distribution with mean 15 and standard deviation 2.0. Before class you could put all these instructions into a command file named 'sample'. Then, in class, when you type the command EXECUTE 'sample', Minitab will generate 10 columns of data and print out the boxplots of the columns.

After using Minitab on a mainframe, I found the frequent disk swapping on a PC a real nuisance. (There are three 5 1/4, or two 3 1/2 inch disks.) This can be avoided by using a hard disk or creation of a RAM disk if you have sufficient memory.

Those already familiar with the Standard Version of Minitab may be curious about the differences between it and the Student Version. The Student Version worksheet is limited to 2000 data points. The Student Edition does not include high-resolution graphics, some regression subcommands (e.g. xpxinv and weighted regressions), matrices, and some of the more advanced Exploratory Data Analysis features (e.g. median smoothing).

In summary, Minitab at $31.95 is a real bargain. By learning a few simple commands, you can do what most programs in this price range can do. If you are willing to spend more time (there are over 100 commands), you can make uses of features generally found only in advanced statistical packages.

– – Kathy Peterson

EVERYBODY COUNTS!

So said the National Research Council in its recent report urging major reform of mathematics education from K-12 in U.S. schools. But the question is, how well?

Three out of four U.S. students leave school without mastering enough mathematics to "cope with either on-the-job demands for problem solving or college expectations for mathematical literacy," said the report, a consensus opinion of 70 teachers, school administrators, researchers, government representatives, parent groups, business executives, and others.

America must "tap the power of mathematics," conclude these experts, and they offer a coordinated national strategy, to be implemented on a voluntary basis by local school systems, to move math education away from pencil-and- paper techniques and rote memorization toward realistic problem solving and the use of calculators and computers beginning in the early grades. It also urges math study for every student every year and the incorporation of math and science specialists into elementary education.

The goal for math education must be to teach students to think mathematically and to understand that mathematics is not merely computation but a science for understanding patterns and order that includes concepts such as probability, form, and change.

Prepared under the auspices of the National Research Council's Mathematical Sciences Education Board and Board on Mathematical Sciences — as well as their Joint Committee on Mathematical Sciences in the Year 2000 — the 114-page report, *Everybody Counts: A Report to the Nation on the Future of Mathematics Education* is available for $7.95, prepaid, from the National Academy Press, 2101 Constitution Avenue, N.W., Washington, D.C. 20418, 202–334–2000. The report is the first of several planned on the subject of math education reform.

– – Kathryn Rowe

STATISTICS IN ORLANDO

The annual NCTM meeting in Orlando, Florida on April 15-18 provides many opportunities to share ideas about teaching statistics, classroom experiences and materials. The center of this information is the Joint Committee booth in the exhibit hall. Members of the Joint Committee will be at the booth during exhibit hours to answer questions, demonstrate materials and software and share their ideas and experiences in teaching statistics. Please stop and say "Hi" and let everyone know what you are doing in your classrooms. The program also has presentations on statistics and probability from the primary to the college level.

On Wednesday, there are sessions by Edward Wallace on nonparametric statistics, George Daily of the US Census Bureau, Larry Houser – Monte Carlo methods applied to sports, William Sacco – statistics in medicine and law. Thursday's sessions include Brian Joiner – who should teach statistics, George Bratton – descriptive measure, David Hildreth – probability and baseball, Bob Peterson – a joint industry and education effort in statistics, Marianne Weber – descriptive statistics and real data, Rick Billstein – probability, Gail Burrill, Ken Sherrick and Pam Coffield – quantitative literacy, Skip Fennell – probability and statistics for primary grades, William Driscoll – probability and statistics for the middle school and Jack Kinney – probability generating functions. Friday sessions are: Murray Siegel – surveys, Jim McNamara – quantitative literacy in preservice courses, Carol Born – projects, Dick Brannan – middle school statistics, Louis Perone – statistics and spreadsheets, John Russell – statistical software, John Klassen – data analysis integrated in the middle school curriculum, and Janet Schorer – probability and statistics in K-5. Saturday's session will have Cynthia Baumann present probability in 4-6, Susan Friel and Susan Jo Russell on statistics in the middle school using technology, and Siegfried Haenisch on probability and fractions. Check your program brochure for exact times and rooms.

– – Gail Burrill

TEACHING QUANTITATIVE LITERACY A MANUAL FOR WORKSHOP LEADERS

The materials in this handbook and the set of masters which accompany it were assembled and developed at a EESA Leadership Conference in Madison, Wisconsin. The purpose of this book is to provide workshop leaders with materials and suggestions for carrying out professional development and awareness activities with teachers, administrators, and parents. The overall intent is to allow as much flexibility and latitude as possible.

The major portion of the materials are oriented towards and derived from the Quantitative Literacy materials developed by the Joint Committee. However, a number of the ideas are drawn from other sources or are creations of the talented teachers who helped to develop this handbook. It is strongly recommended that any workshop which is conducted using this book as a guide should make the Quantitative Literacy materials available for the workshop participants.

The book is divided into six sections. The first section is devoted to materials and suggestions for a general workshop which is intended to be of a motivational nature and is not designed to impart specific skills or knowledge. The next four sections are devoted to the four books which make up the Quantitative Literacy Series. The final section presents graphical display of data and is designed to contain material that can either stand alone or be used in conjunction with the other sections.