THE STATISTICS TEACHER NETWORK

September 1987 Issue #16

A newsletter published three times a year by the American Statistical Association-National Council of Teachers of Mathematics Joint Committee on the Curriculum in Statistics and Probability.

A NEW PROJECT IN QUANTITATIVE LITERACY

The National Science Foundation recently funded the project, "Quantitative Literacy: Leadership Training for Master Teachers and Mainstream Educators". The major goal of this project, which was submitted to NSF by the ASA/NCTM Joint Committee on the Curriculum in Statistics and Probability, is to promote the teaching of statistics in the K-12 mathematics curriculum. To achieve this goal, the project will provide detailed curriculum frameworks in statistics and probability, train teachers to implement these frameworks, and design improved materials and methods for use in their implementation.

The original Quantitative Literacy Project succeeded in raising the consciousness of teachers and supervisors about the importance of including statistics in the curriculum and has enhanced the teaching of statistics for many. This new grant will provide materials and mechanisms for making statistics an integral, planned component of the mathematics curriculum. The guidelines for teaching statistics will be expanded into a scope and sequence plan which will indicate what topics should be taught and how the topics build upon one another. To achieve this aim, experienced statistics teachers and mathematics supervisors will be asked to address these issues as well as related needs in teacher training and materials development.

A second goal of the project is to develop regional networks of supervisors of mathematics, mathematics teachers, mathematics coordinators, mathematics educators, and local statisticians to promote and support the teaching of statistics within that region. The members of the network will be assisted by project staff and trained "master teachers". Summer institutes will be held at several sites around the country. In addition, there will be structured follow-up sessions in the succeeding school year. Participants will be selected from both junior and senior high school teachers. Another aim of the project is to include teachers in the science and social science fields as well as mathematics teachers.

The three year project should produce approximately five regional centers. Each center will have trained teachers who will be implementing statistical activities designed to produce quantitatively literate students within their districts. Curriculum materials, references for additional topics, software, training manuals, and a list of resource persons will be produced as adjuncts to the teacher training programs.

The opportunities offered by this project are exciting and challenging. In order to maximize these opportunities, the members of the Joint Committee would appreciate any help as well as any input from those of you who are concerned with statistics education in the United States. For further information, please contact:

-Gail Burrill, Chairperson
ASA/NCTM Joint Committee
Whitnall High School
5000 S. 116th Street
Greenfield, WI 53228

WINNERS OF THE FIRST ANNUAL STATISTICAL PRIZE COMPETITION

The sponsors of the First Annual Statistical Prize Competition, the ASA/NCTM Joint Committee and the Center for Statistics Education, are pleased to announce the results of the competition. The contest attracted widespread interest, and more than 130 requests for brochures and application forms were received by Dwayne Cameron, the contest director. Entries came from all parts of the country - from coast to coast (California to New Jersey) and border to border (Wisconsin to Texas) with a wide and diverse range of interests being represented. Topics included: school closings, supermarket pricing, attendance trends, soft drink preferences, suspensions, sexual attitudes of teens vs. adults, concert banning, and students preferences.

This new competition joins the Annual Applied Statistics Competition for Schools and Colleges of Further Education which has been held for a number of years in the United Kingdom as one of only two statistics competitions conducted at the national level. Evaluations of this year's contest have been very good, and the judges were generally impressed with the entries received. However, sponsors are hoping for an even greater level of participation this coming year. Because of the additional time required to design the format for the contest and organize it, publicity this past year was not as wide spread as sponsors would have liked, and the deadline for submitting entries did not provide an abundance of time for conducting experiments and analyzing data.

There were four winners selected. Each winning entry in the three levels (Grades 4-6, Grades 7-9, and Grades 10-12) was awarded a $300.00 prize, and a $100.00 prize was awarded to the best computer project. Winners were:

Grades 4 - 6

Katie Anders
Nancy Haley
Brandie McNabb
Leann Pace

Michael Colwell
Jennifer Chen
Tommy Loe
Michael Thomas

A. E. Phillips Laboratory School
Ruston, Louisiana

Advisor: Mrs. Louise James

Topic: A Study of Physical Fitness at Phillips Laboratory School

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Grades 7 - 9

Scott Kozak
Whitnall High School
Greenfield, Wisconsin

Advisor: Mrs. Gail Burrill

Topic: Procedures for Evaluating the MVP of the National Basketball Association

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Grades 10 - 12

Elizabeth Barnum
Bellaire High School
Bellaire, Texas

Advisor: Ms. Diann Resnick

Topic: A Statistical Comparison of the Grades, Attendance, and Behavior of Children of Divorced Parents and Children of Married Parents

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Computer Prize

Kim A. Meyer
Bellaire High School
Bellaire, Texas

Advisor: Ms. Diann Resnick

Topic: Computers and Young People

The entry deadline for the Second Annual Statistics Prize Competition (1987-88) will be March 15, 1988. Entry forms and brochures describing the contest can be obtained by sending a self addressed stamped envelope by Nov. 15, 1987, to the contest director:

-Mr. Dwayne Cameron
Old Rochester Regional High School
135 Marion Road
Mattapoisett, MA 02739

HELP!

THIS SECTION OF THE NEWSLETTER IS FOR YOUR QUESTIONS. SEND YOUR REQUESTS TO THE EDITOR. IF YOU HELP ANYONE SOLVE A PROBLEM, PLEASE MAIL A COPY OF YOUR LETTER TO THE EDITOR SO THAT OTHERS MAY BENEFIT FROM YOUR REPLY.

THE CENTER FOR STATISTICAL EDUCATION NEEDS HELP FROM SCIENCE TEACHERS

The Center for Statistical Education at the American Statistical Association is alive and moving forward on plans to enhance the teaching and use of statistics within the K-12 mathematics and science curricula. Through the work of the ASA/NCTM Joint Committee and the NSF-supported Quantitative Literacy Project, strong working relationships have been formed with a network of mathematics teachers across the United States and Canada. Now, we want to develop a similar working relationship with science teachers. So, if you are a science teacher or if you are willing to help us spread this message to science teachers, please read on!

The CSE needs help from science teachers on the following projects:

1. Four workbooks on statistics and probability (Exploring Data, Exploring Probability, The Art and Techniques of Simulation, and Exploring Surveys and Information from Samples) have been published and are available from Dale Seymour Publications. These were written to supplement the mathematics curriculum, but portions are relevant to science education as well. We would like to adapt this material for use in the science curriculum, but we need teachers to review the material and provide suggestions on what parts are most useful for science.

2. A major effort will be forthcoming on developing statistical computer software to meet the needs of secondary and elementary schools in mathematics and science. Again, we need input from teachers who use or would like to use computers to handle scientific data.

3. New materials are planned to expand the coverage of topics beyond what is provided in the units listed in (1) above. One such unit will be on the planning of experiments and analysis of experimental data. It will cover such topics as measurement error, sampling error, bias, principles of designing experiments, and graphical as well as numerical data analysis techniques. If you have experience in helping students plan scientific investigations, we could use your help on this project.

4. Teacher training seminars and short courses will be planned. Please let us know if you would like to participate in or help to plan such a training program for science teachers in your geographic area. We also need input on topics that should be covered in such training efforts.

5. The CSE is establishing a list of resource people who will be available to speak at meetings or lead workshops on statistics in the science curriculum. If you have experience in this area, please send us a description. If you need the services of such a resource person, please let us know.

In general, if you have any ideas to share on statistics in the science classroom or any questions or concerns to raise in this area, please contact:

-Dick Scheaffer
Department of Statistics
University of Florida
Gainesville, FL 32611

NEW PUBLICATIONS AND PRODUCTS

The Center for Statistical Education has acquired a number of packages of statistical software with a view to building up a library of such items. The aim is to be able to provide guidance to teachers as they attempt to make a selection from the wide variety of software currently available. Unfortunately for precollege instructors, most of the commercial software on the market has been written for college students or professionals.

Thus, there is an urgent need to find appropriate statistical packages for use in the high schools, and the Center is continuing its search for software at that level. Meanwhile, The Network is pleased to be able to share with its readers reviews of some of those packages which have already been acquired by the CSE. These reviews are mainly descriptive commentaries with some additional remarks pertaining to the usefulness of the packages at the precollege level. The first of these, STATISTIX, follows. Others will be included in future issues of the newsletter. -Ed.

STATISTIX
NH Analytical Software
801 West Iowa Avenue
St. Paul, MN 55117
1986, $75.00

This software package was designed for use in teaching statistics with an IBM PC (XT or AT) with a minimum of 64 K memory. The major attraction of the package is the price, and the manual is easy to follow with many examples.

The module is an advanced package (from the high school viewpoint) which is directed more to the college level. It is menu driven but also somewhat resembles a "language" for interactive data analysis. All of the output, including graphics, is text based. This makes it easy to include the output in a report, although it does not make for very stimulating graphics.

The topics covered include: data and file management, linear models, summary statistics, goodness of fit tests, probability functions, randomness & normality tests, data transformations, analysis of variance, regression analysis, and one/two/multisample tests.

BOOTSTRAP STATS
Scholar Tech
P. O. Box 83371
Lincoln, NE 68501
1987
Software Package: $99.95
Lab Pack: $169.95
Class Pack: $219.95
(The package is also available from Dale Seymour Publications.)

BOOTSTRAP STATS is a computer language that enables the user to perform Monte Carlo simulations of problems in probability and statistics. Twenty-five commands comprise the language. They mimic the physical operations performed when conducting trials with dice, cards, or other devices as a means of estimating answers to probabilistic and statistical problems. The speed of a computer and the power of BOOTSTRAP STATS gives students the capability of quickly solving otherwise difficult and tedious problems.

The package, which has a 30 day preview option, is available in Apple II (C, E, +, and GS) and IBM PC (XT and AT) versions. It includes the program diskette, user's guide, command reference cards, teacher's guide, and student text. The student text introduces fundamental concepts of probability and statistics as well as famous probability problems and hypothesis testing. The teacher's guide includes a history of the Monte Carlo approach as well as complete solutions to all problems. Also available is a set of BOOTSTRAP STATS program steps for the problems appearing in The Art and Techniques of Simulation, a module of the Quantitative Literacy Series published by Dale Seymour Publications.

-Pamela Coffield
Brookstone School
440 Bradley Park Drive
Columbus, GA 31995

LETTERS

PLEASE WRITE TO THE EDITOR IF YOU WOULD LIKE TO SHARE ANNOUNCEMENTS, BOOKS, ARTICLES, IDEAS, OR LESSONS THAT HAVE BEEN SUCCESSFUL IN YOUR CLASSROOM.

ISI ROUND TABLE CONFERENCE "TRAINING TEACHERS TO TEACH STATISTICS"

It is proposed that this conference will be held as a satellite conference to The Sixth International Congress on Mathematical Education. The venue is expected to be Rackeve, Hungary from the 23rd to the 27th of July, 1988. Arrangements are currently being sought for an appropriate Budapest-Rackeve travel and accomodation package.

This round table conference is for a restricted number of invited international delegates plus some local observers. Each delegate will present a pre-circulated paper for discussion at the conference. It is anticipated that the conference proceedings and recommendations will be published in 1989.

The objectives of the conference are to determine the current situation with respect to training teachers of statistics, to identify training needs and good practices, and to recommend measures which should be encouraged and implemented. Initial, inservice, and continuing training of teachers of primary, middle, and secondary school levels in mathematics and "user" disciplines will be considered.

The proposed program outline will include: the changing nature of statistics with implications for teaching and assessing statistics, evaluation of training programs in existence, defining problem areas in the training of statistics teachers, identification of training needs and proposed solutions, evaluation of training materials and resources, research in statistical education including pedagogical and curriculum implications for teachers and classroom practices, and future trends and recommendations.

For more information about the conference, write to:

-Mrs. Anne Hawkins
Math, Statistics, & Computing
University of London Institute
of Education
20 Bedford Way
London, U. K. WC1HOAL

CAN YOU EAT YOUR CANDY AND ENJOY THE COLORS, TOO?

Ann Watkins shares the following letter she received from Ruth Mottram of the Consumer Affairs Divsion of Mars, Incorporated:

...The staff at M&M/MARS has been delighted by the fantastic reception of consumers to the news that the red color has been restored to our blend of M&M's.

The color ratio formula has been changed with the resumption of the red candies and is shown below:

Color Ratio in M&M's Plain Candies

Red	Yellow	Green	Orange	Tan	Brown
20%	20%	10%	10%	10%	30%

Color Ratio in M&M's Peanut Candies

Red	Yellow	Green	Orange	Tan	Brown
20%	20%	20%	10%	-	30%

We can not guarantee that every color will appear in each individual package or that a certain number of colors will appear, but we can assure you that the colors are blended mechanically according to the formula. Our present means of color dispensing should place a fairly uniform blend of colors in every package.

Thanks, Ann, for yet another interesting illustration of the integral part statistics plays in all aspects of our everyday lives. -Ed.

STATISTICS A DOMAIN OF THE MATHEMATICAL SCIENCES

Undergraduate mathematics and science majors interested in teaching mathematics in elementary and secondary schools are encouraged to take courses in a wide variety of mathematical disciplines, including statistics. Many of these students have never had a formal course in statistics. Accordingly, they frequently ask where statistics fits in the classification of mathematical disciplines.

When this question is raised by prospective teachers at Texas A&M University, we use the National Academy of Sciences publication, The Mathematical Sciences: A Report, to construct a response. This report provides four useful perspectives:

1. It offers a two-part classification to label each of the mathematical disciplines as basic or applied.

2. It documents the use of mathematical methods in several disciplines outside the mathematical sciences.

3. It provides a single term, "mathematical sciences", to suggest that it is essential to maintain strong and continuous interactions between the applied and basic mathematical disciplines.

4. It suggests that the boundary lines between mathematical sciences and "sciences that use mathematics" are often difficult to draw.

According to the National Academy of Sciences, the "basic" classification encompasses the traditional disciplines of logic, number theory, algebra, geometry, and analysis which are usually seen as the domain of the so-called pure mathematician. The other category, applied mathematical sciences, consists of four major areas which have particularly direct and important relationships with science and technology. These are: computer science, statistics, operations research, and physical mathematics.

Statistics has a dual source of identity. It could not operate without mathematics, especially the mathematical theory of probability. Yet, neither could it exist without an appropriate theoretical framework to guide interpretation and inference. According to the report, "Just as it is still a methodological science, a computational science, and a behavioral science, statistics continues to be a mathematical science." Statistics uses all of the basic and applied mathematical sciences to develop new tools and techniques for data analysis and experimentation, at the same time relying heavily on philosophy (especially logic) to guide interpretation and inference.

Users of statistics are often placed in four categories: those who must be able to understand statistical presentations in their fields; those who select, apply, and interpret statistical procedures in their professional work; applied statisticians who help professionals in other fields to use statistics effectively; and mathematical statisticians who use the theoretical foundations of statistics to create statistical methods that may ultimately be used by those with applied interests.

We recommend four activities consisting of a number of reading assignments to our students to help enlighten them about the importance of studying statistics. The sources we suggest are:

1. The treatment on statistics and probability in the International Encyclopedia of the Social Sciences;

2. The Joint Committee's text of essays edited by Judith Tanur, Statistics: A Guide to the Unknown;

3. Two texts illustrating the use of mathematics to solve societal problems and to investigate public policy issues, Mathematics Today: Twelve Informal Essays and The Mathematical Sciences: A Collection of Essays;

4. Excerpts from the graduate catalogs of Ball State University and Sangamon State University describing the relationship among statistics, mathematics, and education.

Since student feedback about the value of this last activity has been extremely positive, we now circulate this information in classes and orientation sessions on teaching statistics.

My Texas A&M colleagues and I would appreciate hearing other suggestions and tips you are willing to share. Send these to:

-James F. McNamara
Dept. of Educational Psychology
Texas A&M University
College Station, TX 77843

WHERE TO WRITE

Address all letters, announcements, questions, articles being submitted for publication, and requests to get on or off of the mailing list to the editor:

-Beth Bryan
Department of Mathematics & CSC
Augusta College
Augusta, GA 30910

Please share this newsletter with other teachers interested in statistics. You may photocopy anything in it.