

INTERNATIONAL ASSOCIATION FOR STATISTICAL EDUCATION

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Publications in Statistical Education

Members of IASE have asked about possible outlets for their creative work in statistical education. One such possibility is the Journal of Statistical Education, described below by Jackie Dietz, Editor. The Journal of Statistics Education (JSE) is a rigorously refereed and edited electronic journal on postsecondary statistics education.

The goal of the JSE is to provide interesting and useful information, ideas, software, and data sets to an international readership of statistics educators. The intended audience includes not only members of university statistics departments, but also mathematicians, psychologists, sociologists, and others who teach statistics. All journal materials are available free of charge and can be freely shared among individuals for pedagogical uses. JSE publishes high-quality articles on a variety of topics related to the teaching of statistics. Topics discussed in the first five issues of JSE include curricular reform in statistics, the use of cooperative learning and projects, assessment of students' understanding of probability and statistics and their attitudes and beliefs about statistics, ideas for teaching hypothesis testing, and the use of computers in teaching.

Regular features of the journal are "Teaching Bits: A Resource for Teachers of Statistics" and "Data sets and Stories." "Teaching Bits" summarizes interesting current events and research that can be used as examples in the statistics classroom, as well as pertinent items from the education literature. The "Data Sets and Stories" department not only identifies interesting data sets and describes their useful pedagogical features, but enables instructors to download the data sets to their own computers for further analysis or dissemination to students.

The technological capabilities of the journal have increased as rapidly as the readership. The first issue of JSE contained only plain ASCII text articles accessible to readers by electronic mail or gopher. Subsequent issues have included graphics, downloadable software suitable for classroom demonstrations or for hands-on use in computing lab, and an animation demonstrating an experiment by Galileo.

A hypertext version of JSE is now available on the World Wide Web (WWW). An ASCII text version of JSE, accessible to anyone with electronic mail, will continue to be available to readers without access to the WWW. The JSE homepage can be found at: <http://www2.ncsu.edu/ncsu/pams/stat/info/jse/homepage.html>

The Journal of Statistics Education is a part of the JSE Information Service, a collection of information of interest to teachers of statistics that is available via electronic mail, gopher, or the WWW. The JSE

Information Service includes, in addition to the JSE itself, the archives of EdStat-L, an electronic discussion list on statistics education, and several other e-mail lists; free software; data sets for use in class; and information about the International Association for Statistical Education.

Members of the IASE are encouraged to submit articles for possible publication in JSE. Submission of manuscripts via e-mail is preferred, but materials on diskette or paper can be accommodated. The electronic format of the journal requires that articles follow certain formatting conventions; consult the Guidelines for Authors before submitting materials to JSE. The Guidelines for Authors may be obtained by sending e-mail to archive@jse.stat.ncsu.edu with the one-line message: send jse/author.guide A free subscription to JSE may be obtained by sending e-mail to listserv@jse.stat.ncsu.edu with the one-line message:

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Teacher Preparation in Statistics at the Secondary School Level: Need, Innovation and Challenges
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[Note: This discussion will be presented in two parts.

This issue contains the objectives and description of the program. The next issue will contain the dissemination, evaluation and conclusions.]

This paper presents the details of a United States National Science Foundation (NSF) sponsored Teacher Enhancement Program (TEP) in Statistics as implemented in the western region of Puerto Rico, a U.S. territory in the Caribbean during the period 1991-1994. The project evolved from the belief that statistics is more meaningful to students when they plan, experiment, collect and analyze data themselves rather than when they learn a set of formulas and techniques. This idea was first incorporated locally in an NSF Sponsored Young Scholars Program in statistics during the period 1989-1991 in which the author worked with talented students from high schools in the region.

The experience and success of the Young Scholars Program and the education department's request to expand it led to the TEP in statistics presented herein.

The project is important for four reasons. First, it provides pedagogical methods whose innovation is founded on an alternative vision; that is, that statistics must be taught through real life

applications and student projects. Second, it emphasizes the need for mathematics teachers to change their approach to the field such that they treat and teach statistics as an applied science, as opposed to traditional courses in algebra and geometry. Thirdly, the specialty of the TEP lies in its comprehensiveness: its focus on classical statistics, modern teaching methods, the role of statistics in research, critical thinking, as well as the use of computer packages, lectures by practitioners and hands-on data analysis. Finally, the program portrays a teacher preparation model for dissemination and integration into hierarchical educational systems.

Objectives of the Program

The main objectives of the program was to impart comprehensive statistical education to the teachers with emphasis on modern methods of teaching statistics. The project sought improvement in both subject matter knowledge and classroom practice.

The specific objectives were:

- To prepare the teachers in classical statistics
- To prepare teachers in modern pedagogical techniques in statistics
- To impart computer literacy
- To teach the use of statistical software
- Exposure to rudiments of research methodology
- Explanation of the role of statistics as a research tool
- To stress the importance of research projects in the classroom
- To provide career orientation in statistics
- To illustrate the multidisciplinary nature of statistics through interaction with users of statistics and
- To disseminate the program for integration into the educational system of Puerto Rico

Description of the Program

The basic philosophy behind the TEP program is similar to that of the Quantitative Literacy (QL) Program, designed by the Joint Committee of the American Statistical Association (ASA) and the National Council of Teachers of Mathematics (NCTM) to respond to what the CSE has termed "the critical need to modify the status of the mathematics and sciences curricula in the United States."

The major focus of the project was the development and delivery of a program for middle and secondary school teachers of mathematics that will prepare them to teach statistical and probabilistic skills and concepts effectively. The project emphasized statistical literacy and reasoning, primarily through the use of examples related to real life events of interest to the students. At the end of the summer of 1993, "roundtable" teams were formed in each town consisting of the trained teachers and

administrators to serve as resources for future statistical education in the districts. The teams jointly developed a syllabus. This syllabus integrated the QL philosophy into the Education Department's original eighth grade math program. This highly specific document listed statistical skills and concepts to be taught, the amount of time teachers should devote to each, and a number of related potential activities intended to stimulate student interest. The regional office of the Education Department in Mayaguez is now making efforts to teach basic concepts of probability and descriptive statistics to all eighth grade students as part of their mathematics course.

Teachers were at the Mayaguez campus for about 210 hours each summer for two summers. They spent approximately 25% of their time learning classical statistical methods. A quarter of the time was spent on orientation about modern teaching methods and lectures from invited speakers about applications of statistics in their fields. The remaining time was devoted to hands-on experience, through research projects, problem solving and computer practice.

For imparting computer literacy, during the first summer, teachers were introduced to computers and taught the use of statistical software packages. In the second summer, teachers used the software to do assignments, problems and projects without much additional instruction.

Research Methodology was covered at the request of the Education Department for use in planning research projects and training students for national

and international competitions. Teachers had a brief introduction to the basic principles of research design and were explained about the role of statistics as a research tool. All teacher participants had the experience of writing a proposal, collecting and analyzing data and ultimately writing a final report.

Research projects by teacher participants were an important feature of the program. Teachers themselves did research projects during their second year.

The performance of teachers in their projects helped the project personnel assess their learning of statistics. The teachers themselves chose the topics. They collected the data, analyzed and presented a research report. All teachers did two projects, one using regression analysis and the other using questionnaire analysis. The projects showcased a remarkable breadth of interests. Some of the topics included feasibility studies on establishing a tutorial center for students, a retail business and a beauty parlor service. Other projects focused on developing models to predict grades, performance in college board exams, student performance in Education Department tests, and student and teacher absenteeism in schools. Some did research on social and educational issues like factors leading to divorce, alcoholism, and high school attrition.

Each summer, workshops were given to teachers for 40 hours. Workshops covered a number of topics including the teaching of computers to adults and children, ways of giving workshops to colleagues

and motivating talented students. Still other workshops focused on methods of teaching probability and statistics, QL material, the importance of a global outline in pedagogy, teaching of statistics through cases, critical problems faced by teachers in teaching statistics and mathematics and evaluation of students in mathematics and statistics.

Conferences by engineers, scientists and researchers on the applications of statistics in their fields explained the multidisciplinary aspects of statistics. Each summer, teachers were also given five to six conferences about subjects including ethics in research, data analysis, the use of libraries for collection of secondary data, career orientation in statistics, the limitations and uncertainties of data analysis, and others. These conferences helped teachers to give career orientation to their pupils on the manifold uses of statistics.

Field Trips were also part of the summer program. Each summer, teachers visited two industries or research organizations to observe the use of statistics in real life. They were exposed to the applications of statistics in manufacturing and quality control and research data analysis.

Teachers attended three interaction meetings on Saturdays each semester at the campus to exchange ideas and experiences, to clear doubts in statistical methods, to use computers which are unavailable in some schools, to develop model lessons and to prepare global plans to teach statistics in the region.

INTERNATIONAL ASSOCIATION FOR OFFICIAL STATISTICS

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The IAOS brings together users and producers of official statistics. The objectives of the association are:

- * to promote the understanding and advancement of official statistics and related subjects
- * to foster the development of effective and efficient official statistical services, particularly in developing countries, through international contacts among individuals and organisations including users of official statistics as well as research institutions

One of the exciting aspects of the ISI and its associated sections is the wide dispersion of its members but it is also one of the greatest obstacles to creating lively active associations. Fortunately the IAOS has had two opportunities this year to gather together members from different parts of the world - at Addis Ababa in May for the first joint IAOS/African Statistical Association meeting, which was reported

in the last *ISI Newsletter*, and then in August at the ISI session in Beijing. The Beijing conference had good attendance by users and producers of official statistics and the papers presented provoked plenty of debates. Significant challenges face official statisticians who are under pressure to improve the quality and range of statistical services but with a diminishing resource base.

The vitality of the IAOS owes a great deal to the enthusiasm and commitment of Hallgrímur Snorrason who was President of the Association for the two years culminating in the Beijing meeting. Without his efforts the very successful conference in Addis Ababa would not have taken place. We were very pleased therefore to learn that Mr. Snorrason will continue to play an active role in the IAOS as evidenced by the planned conference in Iceland in 1996 - see below.

Thanks are also due to the outgoing Vice-presidents of the association; Gordon Brackstone of Canada,

Len Cook of New Zealand, Mostafa Tadili Fariss of Morocco, and Ian Maclean of the UK. Asta Manninen of Finland remains the representative of the standing committee on regional and urban statistics on the IAOS executive committee.

At the AGM of IAOS held in Beijing a report was given of the IAOS/AFSA conference held in May in Addis Ababa and the associated workshops on monitoring living conditions and poverty and on the principles of data interpretation and presentation. We put on record our sincere thanks to Statistics Norway and Statistics Canada for their contribution to the workshops, and to Statistics Canada for assistance with translation into French, to the World Bank for financial support and to the UN Economic Commission for Africa who hosted the meeting. We look forward to holding a second joint conference with the African Statistical Association - perhaps in 1998 - and preliminary discussions on this proposal began in Beijing.