MATHEMATICS CURRICULUM, K-12

Should more statistics and probability be taught in the schools? Most readers of this newsletter would say YES, but do others in mathematics agree? Some answers to this and other questions are in a recently issued report, "The Mathematical Sciences Curriculum K-12: What is Still Fundamental and What is Not." The report is from the Conference Board of the Mathematical Sciences (CBMS), which represents the presidents of thirteen mathematical sciences professional organizations including ASA and NCTM.

The report was prepared for the Commission on Precollege Education in Mathematics, Science, and Technology, a national, blue-ribbon group formed last summer. One member is Fred Mosteller, of Harvard University, who in 1968 helped found the Joint Committee that publishes this newsletter. As input to the Commission, CBMS organized a special conference to gather information, opinions, and consensus from all segments of the mathematics community. This conference produced the report. Two present members of the Joint Committee, Jim Landwehr and Jim Swift, represented ASA at the conference.

Here are some statements from the Executive Summary of the report concerning statistics and probability. "With regard to elementary and middle school mathematics, in summary, we recommend: ...That direct experience with the collection and analysis of data be provided for in the curriculum to insure that every student becomes familiar with these important processes." "With regard to the secondary school curriculum, in summary, we recommend: ...That discrete mathematics, statistics and probability, and computer science now be regarded as 'fundamental' and that appropriate topics and techniques from these subjects be introduced into the curriculum."

Other major recommendations were put forward. For elementary and middle school, calculators and computers should be introduced as early as practicable to enhance the understanding of arithmetic and geometry and to learn problem-solving. More emphasis should be placed on mental arithmetic, estimation, and approximation and less on paper and pencil execution of the arithmetic operations. For secondary school, traditional topics should be streamlined to make room for important new topics, and approaches to the traditional topics need to be re-examined in light of new computer technologies.

The report also notes, however, "that the most immediate problem is not the mathematics curriculum, but the need for more and better qualified, mathematics teachers." There are recommendations on attracting and training prospective teachers, and for better utilizing the talents of current teachers of mathematics. For example, the grade 4-6 (or 4-8) teachers in a given school who most enjoy teaching mathematics could be identified, given further training, and assigned to teach all mathematics courses across a grade level.

What will happen to these recommendations? First, they may influence the Commission report, which may influence national policy. We will have to wait and see. More immediately, though, perhaps we should determine whether or not these recommendations really do represent a consensus by discussing them with our colleagues. If we do feel that changes are needed, many of you are in positions to influence such changes, and indeed many have already begun to do so.

If you have comments on the

recommendations summarized above, or comments about trying to implement some of them (successfully or unsuccessfully), please send them to the newsletter editor so they can be shared. We need to learn from each other!

The complete report can be obtained from the NSB Commission on Precollege Education, National Science Foundation, 1800 Sixth St., N.W., Washington, D.C. 20550. There will be a session on precollege mathematics and the work of the special Commission at the ASA annual meeting in Toronto this August.

THE ASA-NCTM JOINT COMMITTEE ON THE CURRICULUM IN STATISTICS AND PROBABILITY

There have been several requests for a list of members of the committee. Any member will gladly provide information or help to teachers who want to teach probability and statistics.

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Claire Newman is chairing a Subcommittee on State Curricula and is gathering current curriculum guidelines. Write Claire if there is any progress in your state in introducing probability and statistics into the official elementary or secondary curriculum or into the teacher training program.

There is also a Subcommittee on Meetings and Speakers which will try to arrange for speakers at meetings of NTCM, ASA, or related societies. Write to Dick Scheaffer if you would like a speaker or if you would like to be on the list of speakers yourself.

NEW PROGRAMS

The November 1982 issue of the *Amstat News* (published by the American Statistical Association, 806 15th Street N.W., Washington, D.C. 20005) contains a list of U.S. and Canadian colleges offering degrees in statistics. If you have college bound students interested in statistics, they should see this list.

Our N.S.F.-L.O.C.I. project entitled "Statistical Experiences for Undergraduates" is beginning to produce some ideas that appear to be promising for teaching introductory statistics to non-science majors at the undergraduate level. Among these is an instructional software system which emphasizes the "what and why" as well as the "how," i.e. not just a statistical analysis system to get answers but a graphical approach to explain concepts. This appears to be especially effective with the students who are weak in manipulative skills. This software should be available next summer. However, I will have a complete description of the system written up soon. (It is written in BASIC and 6502 assembler for Apple II.)

Although aimed at college level instruction, this project should produce information, ideas, and evaluation results of interest to all.

— Mike Perry
  Department of Mathematical Sciences
  Appalachian State University
  Boone, NC 28608

The Curriculum Research and Development Group of the College of Education at the University of Hawaii has written and pilot tested 16 modules in mathematics instruction. Among them are three which deal with statistics.

Applying Problem Solving to Statistics and Consumer Mathematics ($8.25) is a 132 page teacher's manual which contains a sample course based on *Statistics and Information Organization* by the Mathematics Resource Project (Creative Publications). *Applying Problem Solving to Statistics and the Metric System* ($7.00) is a 99 page teacher's manual which contains a sample course based on *Sampling and Statistics* by Johnson, et al (Scott-Foresman). *Statistics Manual* ($12.75) is a 201 page manual for using Newmark's *Statistics and Probability in Modern Life* (Holt, Rinehart and Winston) for a one-semester statistics course in the high school. It includes a course outline, suggested time schedule, notes about the lessons, suggested assignments, tests, and quizzes.

More information and ordering forms can be obtained from Nancy C. Whitman, College of Education, Wist Hall Annex 2, University of Hawaii, 1776 University Avenue, Honolulu, Hawaii 96822.

LETTERS

Since the announcement of this newsletter in the NCTM and ASA newsletters, we have received approximately two hundred requests to be placed on the mailing list. Teachers all over the world, from France to the Philippines, are organizing statistics courses. They need your help. If you would like to share books, articles or lessons with other teachers, please send your ideas to me. — Ed.

Please put me on your mailing list for the *Statistics Teacher Network* newsletter.

This is our second year of teaching a probability and statistics course to college-bound juniors. We incorporate microcomputers in our course. We need all the help we can get. Seems like we are a small voice in the wilderness; not much material out there.

— Donald L. Zepp
  Colonel Richardson High School
  Federalsburg, MD

I would be interested in receiving regularly the newsletter for statistics teachers, announced in *Amstat News* for December 1982. A beginning is being made in this country with teaching of statistics in some high schools, and the newsletter may have useful information for us.

— H.S. Konijn
  Tel Aviv University
  Tel Aviv, Israel

NEW PUBLICATIONS AND PRODUCTS

Packel, Edward
The Mathematics of Games and Gambling
Mathematical Association of America
1529 18th Street, N.W. Washington D.C. 20036
1981, 141 pages, paperback, $8.75 nonmembers, $7.00 members

This excellent book for bright high school students introduces the elementary mathematics (probability, expectation, permutations, combinations, binomial distribution) necessary for the analysis of games and gambling. Games analyzed include craps, roulette, Keno, blackjack, backgammon, poker, bridge, state lotteries, and horse racing. There is also a chapter on elementary game theory and one on the history of gambling. Exercises are included at the end of most chapters.

Careers in Statistics
American Statistical Association
806 15th Street, N.W. Washington, D.C. 20005
1980, 24 pages, paperback, free

This booklet contains the information that a student interested in a career in statistics should know: examples of interesting problems, descriptions of the wide range of jobs, expected salaries, and education requirements. Also included is a list of the U.S. and Canadian schools that offer degrees in statistics. Every mathematically inclined student should see this free booklet.

College Curriculum Support Project
User Training Branch
Data User Services Division
Bureau of the Census
Washington, D.C. 20233
or phone 301/763-2370

High school teachers may wish to add their names to the mailing list for the Census Bureau's College Curriculum Support Project in order to receive announcements of publications such as *Census '80: Projects for Students* ($5.00) and a series of "Census '80 Product Primers" ($1.00 each). These publications are generally too advanced for high school students, but will given teachers ideas about how to use census data in mathematics and statistics courses.

Barnett, Vic (Ed.)
Teaching Statistics in Schools
throughout the World
The International Statistical Institute
428 Prinses Beatrixlaan
P.O. Box 950
2270 AZ Voorburg, Netherlands
250 pages, $10

This book describes statistical education in twenty countries. It includes chapters on the U.S. and Canada, England and Wales, Japan, Sweden, France, West Germany, Hungary, Italy, Australia, New Zealand, Argentina, Malaysia, and several African countries. In order to clarify the statistics curriculum, each chapter also contains an outline of the school system including types of schools, administration, examinations, and teacher training.

HELP!

This section of the newsletter is for your questions and requests. If you help anyone solve a problem, please send a copy of your letter to the editor as there are others who will want the information.

We are currently teaching a unit in probability in the Advanced Algebra Course. We also have units in probability and statistics in our Finite Math course. Next school year (1983-84) we have been approved to teach a course entitled "Statistics for Everyone." The prerequisites for this course will be only General Math credit which is our second lowest freshman course. Please send any material or sources that may assist us.

Thank you for your consideration and service.

— Dan Hildebrandt
   Lake Park High School
   600 South Medinah Road
   Roselle, IL 60172

Over the past few years both Sheffield University and Sheffield City Polytechnic have been involved in Statistical Education to a considerable degree. You may know of Peter Holmes's work in various projects based at the university. At the Polytechnic we have been involved in creating a Regional Centre for Statistical Education dealing with in-service

training of teachers, as well as developing a resource centre. The University and the Polytechnic are now seeking to create a centre for Statistical Education that will be a national Centre for the United Kingdom. I am hoping to obtain a year's secondment to start the Centre off and hope to visit the States to look at what is being done in the area of Statistical Education.

As part of my year I would like to spend some time in the States looking at best practice in schools and at in-service training for teachers. It would be of great help if you could give me some advice on places to visit and people to contact.

— Warren Gilchrist
   Department of Mathematics, Statistics,
   and Operational Research
   Sheffield S1 1WB England

CALENDAR

The NCTM Annual Meeting in Detroit on April 13-16 will include 18 sections involving probability and statistics. (In contrast, there are approximately 100 sessions on computers and calculators.) Check your program booklet for sections # 37, 39, 51, 89, 90, 107, 108, 135, 146, 160, 204, 248, 303, 320, 396, 499, 530, and 535.

A list of "Professional Dates" is yours for the asking from NCTM at 1906 Association Drive, Reston, Virginia 22091. The list includes scheduling and contact information for conventions, conferences, and meetings in the United States and Canada as well as for meetings of NCTM international corresponding societies.

WHERE TO WRITE

Address all letters, announcements, questions, and requests to get on the mailing list for the newsletter to the editor,

Ann Watkins
Department of Mathematics
Los Angeles Pierce College
6201 Winnetka Avenue
Woodland Hills, CA 91371

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