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1999 Abstracts

Volume 7, Number 1 (April 1999)

Carolyn R. Boyle, "[A Problem-Based Learning Approach to Teaching Biostatistics](#)" (69K)

Courses taught using problem-based learning methods give life sciences graduate students direct practice in the statistical reasoning skills needed to choose appropriate procedures for analyzing data from their research studies. This paper describes a graduate-level, case-based biostatistics course designed to cultivate these skills in veterinary medical science students who have had some initial preparation in statistics. The course gives students practical experience by focusing on the analysis of data from actual biomedical research studies. Student evaluations indicated that this course improved the students' ability to understand and apply statistical methods in their research. --CRB

Key Words: Graduate education; Life science; Teaching methods; Veterinary medical science.

Paul L. Gardner and Ingrid Hudson, "[University Students' Ability to Apply Statistical Procedures](#)" (83K)

Statistics educators have previously noted that university students experience some difficulty in knowing *when* to use statistical concepts that they have encountered in their courses. In the present study, statistics educators were asked to rate the importance of various descriptive and inferential statistical procedures for inclusion in introductory statistics courses for the behavioural sciences. Items describing research situations and presenting sample data were written, each item representing a different statistical procedure. A sample of 23 undergraduate and postgraduate students enrolled in various departments in two universities in Melbourne, Australia was presented with these items. Students attempted as many of these items as they could within a 45-minute period. They were asked to identify which procedure(s) they considered appropriate for answering the research question, to justify their choice, to state other choices they had considered and rejected, to express their level of confidence in their choice, and to rate their familiarity with the various procedures. Quantitative and qualitative data are reported, and provide detailed confirmation that the skill of identifying appropriate statistical procedures in new situations is indeed difficult. Error patterns have been identified that provide a basis for some alternative approaches to teaching this skill. --PLG

Key Words: Misconceptions; Problem-solving; Research design skills.

Graham W. Horgan, ["Use of Spreadsheets for Demonstrating Experimental Power and Variability"](#) (20K)

The statistical power of an experiment is a subtle idea that is difficult to explain to a non-statistician, and yet it is fundamental to the design of scientific experiments. We have developed some spreadsheets that have been useful in illustrating the ideas by simulation. These allow scientists to simulate situations using parameters similar to what they expect in their own work, and to explore the effect of experimental variability. Our examples are available on the World Wide Web. --GH

Key Words: Comparative; Dose-response; Sigmoid; Simulation.

Peter Tryfos, ["Three Statistical Business Simulations"](#) (23K)

The aim of this paper is to draw to the attention of statisticians teaching business students three substantial computer simulations, the single objective of which is profit maximization. It is believed that in pursuing this purely business objective, students gain a better understanding of the need for and utility of statistical methods for research, analysis, and forecasting. The full text of these simulations and the associated computer programs, teaching notes, and sample student responses may be freely downloaded and used for classroom purposes. --PT

Key Words: Business statistics courses; Problem-oriented instruction; Statistical games

["Teaching Bits: A Resource for Teachers of Statistics"](#) (44K)

This column features "bits" of information sampled from a variety of sources that may be of interest to teachers of statistics. Bob delMas abstracts information from the literature on teaching and learning statistics, while Bill Peterson summarizes articles from the news and other media that may be used with students to provoke discussions or serve as a basis for classroom activities or student projects. --JG

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