Subscription Information

2000 Contents and Abstracts

1999 Contents and Abstracts

JSE Archive (1993-1998)

Index to Articles

JSE Information Service

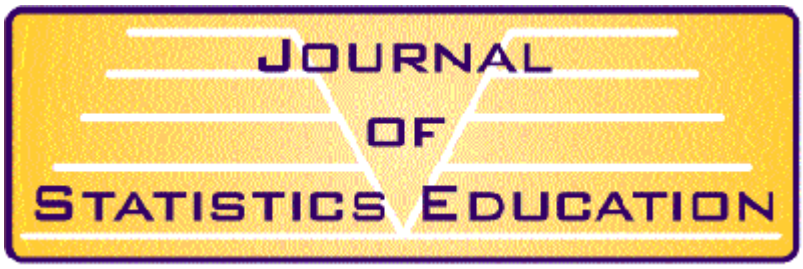
Data Archive

JSE Editorial Board

Information for JSE Authors

Information for Data Contributors

ASA Publications



1999 Abstracts

Volume 7, Number 2 (July 1999)

Wlodzimierz Bryc, "Decoding a Scrambled Text: A Hands-On Project to Illustrate Sampling and Variability" (19K)

Students crack a simple substitution code using character frequencies in texts sampled from web pages. Frequencies are tabulated by a web-based character counter. This quick and simple project reinforces notions of sampling variability and emphasizes the need to complement statistical techniques with intuition. --WB

Key Words: Active learning; Statistics education; Substitution code; Teaching statistics; World Wide Web material.

Herman Callaert, "Nonparametric Hypotheses for the Two-Sample Location Problem" (70K)

Students in an applied statistics course offering some nonparametric methods are often (subconsciously) restricted in modeling their research problems by what they have learned from the *t*-test. When moving from parametric to nonparametric models, they do not have a good idea of the variety and richness of general location models. In this paper, the simple context of the Wilcoxon-Mann-Whitney (WMW) test is used to illustrate alternatives where "one distribution is to the right of the other." For those situations, it is also argued (and demonstrated by examples) that a plausible research question about a real-world experiment needs a precise formulation, and that hypotheses about a single parameter may need additional assumptions. A full and explicit description of underlying models is not always available in standard textbooks. --HC

Key Words: Median; Stochastic ordering; Teaching statistics; Wilcoxon-Mann-Whitney.

Emmanuel N. Lazaridis, "Constructionism and Reductionism: Two Approaches to Problem-Solving and Their Implications for Reform of Statistics and Mathematics Curricula" (42K)

The First International Conference on the Teaching of Mathematics was held in Samos, Greece, in July 1998. Presentations by the attendees reflected a recent debate on reforms of the mathematics curriculum and related pedagogy. Chief among these

was a greater emphasis on connecting the mathematics curriculum with applications, to make courses in mathematics more "relevant" to students. This manuscript notes that mathematicians tend to teach students to approach data analysis in a constructive manner, proceeding from an understanding of the basic science, while statisticians concentrate on reductive approaches, whereby models are generated upon consideration of the data themselves. It is suggested that departments of mathematics and statistics will need to adopt a new spirit of cooperation, and partner with colleagues in application areas, if curricular enhancements in either domain are to have a reasonable chance at success. --ENL

Key Words: Applied statistics; Curriculum reform; IJssel lake; Modeling.

Ying Taur and Charles E. McCulloch, "A Teaching Tool for Nonlinear Regression: *Visual Fit*" (69K)

We describe a Java applet that allows users to see and learn the fitting of regression models in a manner that is both visual and interactive, as well as consonant for linear and nonlinear models. In addition, this program familiarizes users with the fact that many different parameterizations exist for a single function, and it provides insight about the relationship between these models. Called *Visual Fit*, this program draws scatterplots of data and allows users to fit various nonlinear models to the data. The program can also provide least squares estimates or true population parameters for comparison with the estimates made by the user. We discuss what types of parameters can be represented in a visually obvious way and which cannot. *Visual Fit* may be useful for both introductory statistics classes and higher-level courses. *Visual Fit* is available at http://www.amstat.org/publications/jse/secure/v7n2/visualfit.html --YT

Key Words: Interactive; Java applet; Web-based.

"Teaching Bits: A Resource for Teachers of Statistics" (33K)

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

Deborah Lynn Guber, "Getting What You Pay For: The Debate Over Equity in Public School Expenditures" (30K)

Using data from the 1997 *Digest of Education Statistics*, this teaching case addresses the relationship between public school expenditures and academic performance, as measured by the SAT. While an initial scatterplot shows that SAT performance is lower, on average, in high-spending states than in low-spending states, this statistical relationship is misleading because of an omitted variable. Once the percentage of students taking the exam is controlled for, the relationship between spending and performance reverses to become both positive and statistically significant. This exercise is ideally suited for classroom discussion in an elementary statistics or research methods course, giving students an opportunity to test common

assumptions made in the news media regarding equity in public school expenditures. --DLG

Key Words: Multiple regression; Omitted variable bias; Partial correlation; Scatterplot.

Editorial Board for Volume 7, Number 2

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