A WEBSITE CONTAINING INFORMATION ON STATISTICAL TEXTBOOKS

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This paper describes a website containing information on textbooks for the introductory, applied statistics course. After an explanation of the rationale for such a site it lists the general education and business and economics textbooks on the site followed by characteristics of each text on the site. It concludes with future possibilities for such a site.

INTRODUCTION

Diligent instructors frequently find the task of researching, comparing, and selecting a textbook a frustrating and time-consuming task. Such faculty, regardless of discipline, would find useful a resource that provides easy access to timely, accurate, and dispassionate information about textbooks in their field. This is particularly true for younger and less experienced instructors.

We believe that instructors who teach statistics have an even greater need for such a resource than those who teach other subjects. It appears that the introductory, applied statistics course is the fastest-growing mathematics course in United States four- and two-year and colleges. Moreover, while precise figures are hard to come by, it is clear that many introductory, applied statistics courses are being taught by instructors who lack a background (and it must be added, an interest) in the subject. Statistics may be unique not only because it is frequently taught by non-specialists but also in the extent to which it is taught in the workplace. Both government and industry offer an enormous range of statistics courses at all levels. All this suggests a large pool of concerned instructors who would make use of a website devoted to statistical textbooks.

Now with recent advances in technology, it is possible to construct such a database that will be up-to-date and easily accessible. This paper will describe a website (http://155.48.40.90/StatTextbooks/) that can be referenced worldwide by instructors of introductory, applied statistics courses.

TEXTBOOKS

Initially, the website will contain information on 18 textbooks that are designed for a general education course and 19 texts designed for a business and economics course. These texts were copyrighted between 1998 and 2002 by publishers with a history of producing texts in statistics in the United States and Canada. Versions of these texts with abbreviated contents or similar content directly towards software have not been included. We feel that these texts are broadly representative sample of the current market, but they are not a census of all such texts. The texts themselves are listed in the Appendix.

CHARACTERISTICS

The authors came to this project with their own ideas of what characteristics of introductory, applied statistics textbooks were important for instructors to consider. However, before settling on the final list of attributes we examined the literature to discover what others felt were important characteristics. There is, in fact, little in the statistics literature dealing with the selection of textbooks. Cobb (1987) provides an excellent framework for evaluating introductory statistics texts. Hayden (2001) also focuses on assessing introductory statistics textbooks. Many of the recommendations of these two authors are incorporated into our list of characteristics below. Our final list of characteristics are arranged in order of importance according to the results of a survey that the authors conducted at the 1997 Conference on Assessment in Statistics Courses organized by the Boston Chapter of the American Statistical Association (ASA). The survey asked each attendee to check all the ways that he or she assessed a textbook. Here are the results of the survey: exercises (90%), readability (90%), data sets (77%), topical coverage (75%),

author(s) (58%), layout (57%), software coverage (51%), cost (42%), reviews (40%), supplements (33%), promotional material (17%), and preface (16%). Our more detailed list of characteristics is given below.

- Exercises: number per chapter by location (section, end-of-chapter, end-of-block-chapter), type (plug-and-chug, interpretative, case study, project, etc.)
- Readability: Flesch Reading Ease Score, Flesch-Kincaid Grade Level, average sentence length, etc. for similar topical passages for each text
- Data sets: number of context-free, number of pseudo-real, and number of real data sets
- Listing of chapter titles and fraction of text devoted to each chapter
- Title, author(s), author affiliation(s), edition and year of publication, publisher
- Layout: print size, use of color, use of photographs, use of vignettes, etc.
- Ancillary materials: front and back of chapter material, tables, appendices, etc.
- Software coverage: package(s) used, version, intensity of use, and availability of formatted data files.
- Cost as of the week of March 18, 2002: publisher's list price, price on Amazon.com and Barnesandnoble.com
- Reviews: citations with links to each review that is available on-line
- Supplements: availability of supplements (print, CD, website, etc.) for both instructors and students
- Publicized innovations and differences from other texts

Each textbook author makes choices about placement of material, approaches to topic, and the ordering of statistical methods. The website will indicate answers to the following pedagogical questions:

- Are the same data sets used subsequently through the text?
- Are graphical techniques used in later chapters?
- Does data analysis for categorical variables precede data analysis for quantitative variables?
- Does the discussion of collecting data precede the discussion of data analysis?
- Is inference introduced early in the text?
- Are the descriptive aspects of regression and correlation introduced early in the text?
- Are descriptive aspects of contingency tables introduced early in the text?
- Does the Z table contain cumulative probabilities?
- Is inference about means introduced before inference for proportions?
- Are confidence intervals introduced before hypothesis testing?
- Is hypothesis testing introduced with the p-value or the critical region?
- Are the *p*-value and the critical region approaches to hypothesis testing compared pictorially?
- Is the distinction between "accept Ho" and "do not reject Ho" clarified?
- Is ANOVA treated before (inferential methods in) regression?
- Is there a discussion of the adjusted R-square?

In addition, the website will contain insights from the website authors on what innovations are present in each text. We will also present our thoughts on what distinguishes each text from its competitors.

CONCLUSION

To remain relevant and timely the website will, of course, require frequent updates. (Authors and publishers will be encouraged to provide factual corrections to the database.) For this reason and to ensure adequate promotion, we would like to see a fully-operational site run by a professional organization with an interest in providing regular updates. The ASA Section on Statistics Education comes immediately to mind.

Eventually, the website could be expanded to include information about textbooks other than those aimed at the introductory, applied statistics course. Areas might include probability and mathematical statistics, biostatistics, popular introductions to statistics, intermediate applied methods, and casebooks. Texts published in countries other than the United States may eventually be included. As well as providing detailed information about specific textbooks the site could eventually serve as a more general resource for issues related to textbooks in statistics. There could be links to articles about textbooks, updates on issues such as customized books and e-books, and websites for texts.

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APPENDIX A: GENERAL TEXTBOOKS

Bluman, A.G. (2000). Elementary statistics: A step by step approach. Boston: McGraw-Hill.

Brase, C.H., & Brase, C.P. (1999). *Understandable statistics* (6th edn.). Boston: Houghton Mifflin.

Chase, W., & Bown, F. (2000). *General statistics* (4th edn.). New York: John Wiley.

Devore, J., & Peck, R. (2001). *Statistics: The exploration and analysis of data* (4th edn.). Pacific Grove, California: Duxbury.

Freedman, D., Pisani, R., & Purves, R (1998). *Statistics* (3rd edn.). New York: Norton.

Freund, J.F. (2001). *Modern elementary statistics* (10th edn.). Upper Saddle River, New Jersey: Prentice Hall.

Johnson, R., & Kuby, P. (1999). *Just the essentials of statistics* (2nd edn.). Pacific Grove, California: Duxbury.

Larson, R., & Farber, B. (2000). *Elementary statistics*. Upper Saddle River, New Jersey: Prentice Hall

Mann, P.S. (1998). *Introductory statistics* (3rd edn.). New York: John Wiley.

Mendenhall, W., Beaver, R., & Beaver, B. (1999). *Introduction to probability and statistics*. Pacific Grove, California: Duxbury.

Moore, D.S. (2000). *The basic practice of statistics* (2nd edn.). New York: Freeman.

Moore, D.S, & McCabe, G. (1998). *Introduction to the practice of statistics* (3rd edn.). New York: Freeman.

Peck, R., Olsen, C., & Devore, J. (2001). *Introduction to statistics and data analysis*. Pacific Grove, California: Duxbury.

Sanders, D.H, & Smidt, R.K (2000). *Statistics: A first course* (6th edn.). Boston, McGraw-Hill.

Smith, G. (1998). *Introduction to statistical reasoning*. Boston, McGraw-Hill.

Triola, M.F. (2001). *Elementary statistics* (8th edn.). Massachusetts: Addison Wesley Longman.

Utts, J., & Heckard, R. (2002). *Mind on statistics*. Pacific Grove, California: Duxbury.

Weiss, N.A. (2002). Elementary statistics (5th edn.). Massachusetts: Addison Wesley Longman.

APPENDIX B: BUSINESS AND ECONOMICS TEXTBOOKS

Aczel, A.D. (1999). *Complete business statistics* (4th edn.). Boston: Irwin/McGraw-Hill.

Albright, S.C, Winston, W.L., & Zappe, C. (2002). *Data analysis and decision making with Microsoft Excel*. Pacific Grove: Duxbury Press.

Anderson, D.R., Sweeney, D.J., & Williams, T.A. (2002). *Statistics for business and economics* (8th edn.). Cincinnati: South-Western College Publishing.

Berenson, M.L., Levine, D.M., & Krehbiel, T.C. (2002). *Basic business statistics: Concepts and applications* (8th edn.). Upper Saddle River, New Jersey: Prentice-Hall.

Black, K. (2002). *Business statistics: Contemporary decision making* (3rd edn.). Minneapolis/St. Paul: West Publishing Company.

Blaisdell, E.A. (1998). *Statistics in practice* (2nd edn.). Orlando, Florida: Harcourt College Publishers.

Canavos, G.C., & Miller, D.M. (1999). *An introduction to modern business statistics* (2nd edn.), Pacific Grove, California: Duxbury Press.

Bowerman, B.L., O'Connell, R.T., & Hand M.L. (2001). *Business statistics in practice* (2nd edn.). Boston: Irwin/McGraw-Hill.

Groebner, D.F., Shannon, P.W., Fry, P.C., & Smith, K.D. (2001). *Business statistics: A decision-making approach* (5th edn.). Upper Saddle River, New Jersey: Prentice-Hall.

Harnett, D.L., & Horrell, J.F. (1998). *Data, statistics, and decision models*. New York: John Wiley & Sons.

Keller, G., & Warrack, B. (2002). *Statistics for management and economics* (6th edn.). Belmont, California: Duxbury Press.

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Pelosi, M.K., & Sandifer, T.M. (2002). *Doing statistics for business with Excel: Data, inference, and decision making* (2nd edn.). New York: John Wiley & Sons.

Siegel, A.F. (2000). *Practical Business Statistics* (4th edn.). Chicago: Irwin.

Webster, A.L. (1998). *Applied statistics for business and economics: An essential version* (3rd edn.). Boston: Irwin/McGraw-Hill.

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