

Using the SAS Statistical Tool from Thesis to Career: Current Experiences and Future Outlook

Presenter Information:

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Presenter Bio and Experience

Jean Chen received a Ph.D. degree in Research Methodologies with a minor in Instructional Design and Technology at the University of North Dakota. She has a solid foundation in using SAS and SPSS to perform various statistical procedures on PC and mainframe operating systems. As the institutional research analyst at UND, Jean conducts various research projects with statistical tools including SPSS and SAS. Jean has broad college teaching experience in both traditional classroom settings and computer-based training formats. Concurrently, Jean teaches a graduate level course in the SAS programming language and in using SPSS data files on SAS statistical application.

Abstract

The class, Small Systems Computer Applications in Education, at the University of North Dakota was designed to teach graduate students in the College of Education whose background in statistics may be weak and have absolutely no familiarity with the SAS System. The 14-week 3-hour class was divided into three sections. An introductory section reviewed fundamental concepts in research methodology and statistics. The second session started out with Excel, ACCESS, and SPSS software for statistical analysis. The third section was on data input and statistical analysis with SAS software. All programming concepts were taught at an introductory level. This SAS session provided detailed examples of how the students should key data and write the statements that create a SAS dataset, prepare the SAS program, and interpret the results for a representative research problem. Students then had a hands-on experience using SAS procedures to measure variable association, T-test, One-way ANOVA, multiple regression, and crit

Areas of Interest: 1. Statistics, Data Analysis and Modeling 2. Training & User Support
Presentation Style: 20-minute presentation

Would you be willing to present your paper as a poster? Yes

Recommended audience level of SAS knowledge: Beginning

Recommended audience level of subject matter other than SAS: Beginning

Specify subject: Teaching and Learning of Introductory SAS Application

Conference Paper

SAS is a statistical software that allows the user to manipulate and analyze data in many different ways. Because of its capabilities, this software package is used in many disciplines, including medical sciences, biological sciences, social sciences, and education. SPSS (Statistical Package for the Social Sciences), another statistical software, is perceived as if the computer actually writes the statistical syntax for the user through the use of manuals and option buttons. There are some major differences between SAS and SPSS; SAS is a comprehensive data analysis system with STAT as its quantitative component while SPSS is mainly for statistical analysis. SAS manuals are more computer-oriented and frequently regarded as less "user-friendly" to read as a guide to apply SAS as a statistical analysis tool. SAS manuals, therefore, are probably harder to learn by reader's own cognition. SPSS manuals, in the other hand, are very well-written since they were designed to be used by social scientists learning how

At the University of North Dakota, all of the data analysis or statistics courses at the undergraduate and graduate levels offered by the Departments of Business Administration, Psychology, and Sociology teach their students to apply SPSS as their computational tool. Many faculty and graduate students frequently perceive that SPSS Window Version 10.0 or higher is very easy to use on students' thesis or dissertation research data. Without fully knowing the capabilities provided by the SAS software, these SPSS users usually feel the output is nice looking and the format can be changed according to their own interests and options.

This graduate-level course, Small Systems Computer Applications in Education, offered by the Department of Educational Foundations and Research is the only statistical analysis class integrated with SAS programming training available to the students at the University of North Dakota campus. This course is designed to prepare students who are just getting started using SAS. SAS Version 8.2, along with the SPSS Version 11.0, Excel 2000, and ACCESS software, is installed on all computers at the Education Computer Laboratory. The students in this class had a hands-on experience using SAS for statistics, graphics, and data management. They also learned how to convert between SAS and SPSS (or Excel or ACCESS) files. Statistical problems and applications encountered in educational research are emphasized.

Students in this course were taught with basic SAS System concepts such as creating SAS data sets with the DATA step and manipulating SAS data sets with the procedures in base SAS software, such as PROC SORT and PROC PRINT. After students demonstrated their familiarity in using SAS to read or write data in text, Excel, and SAS system files, they were taught to use PROC MEANS, PROC FREQ, and PROC TABULATE to report results in customized tables and to use SAS/GRAPH to create plots and histograms.

SAS System for Regression was then introduced to students for performing correlation and regression analysis. Most statistical analyses are based on linear models which can be performed by three SAS procedures: REG, ANOVA, and GLM. Students also benefited specifically from the interactive class website which included many examples and

tutorials the instructor had developed. This extra help session required the instructor a heavy investment in time to develop examples and write programs. Students, however, were able to utilize additional assistance and learn at their own pace. They hence developed the ability to translate quantitative data into a usable SAS data format and then use SAS as the statistical tool to carry out their thesis research and analysis. Knowing the SAS programming language will help graduate students majoring in Education not only in their research, but also help them to become more marketable.

SAS software is used at more than 38,000 university, government, and business around the world. At colleges and universities, the Office of Institutional Research has applied the talents of its staff to the development of a data warehouse, online fact books, an assessment warehouse, and, in general, to make a wealth of data available electronically to the public and to the college community. The institutional researcher therefore must have knowledge and experience in using SAS on data extraction, analysis, and reporting.

Because of their advanced academic background in higher education or educational leadership, critical skills with SAS software, ability to convert data between statistical software, and the experience applying innovative technical approaches to a relevant educational environment, graduates from the College of Education may have better qualifications upon entering a position as an institutional researcher, an evaluator of institutional effectiveness, or a decision-maker in an educational setting.

SAS is widely used for analyzing and reporting clinical trials because it is especially powerful for data manipulation. Graduates from the College of Education with an extensive training in research design and applied statistics along with substantial proficiency in the SAS programming may also be able to find their career paths in medical research and the pharmaceutical industry as well as in government agencies such as the Food and Drug Administration or the Department of Agriculture.

Overall, this introductory course provides a rich learning experience and tremendous analytical skills on SAS programming and its application for the graduate students in the College of Education. With the proven teaching and learning effectiveness of this course, the instructor has proposed to the Chairman of the Department of Educational Foundations and Research at the University of North Dakota to develop a new curriculum in which the SAS application will be incorporated into an advanced educational statistics course, Educational Testing and Measurements. In addition to the face-to-face classroom teaching style used in the course traditionally, a computer-based training (CBT) format for distance learning students was also proposed.

This presentation is intended to demonstrate the learning outcomes and teaching strategies to the target audience who will be developing and providing the training programs to the learners who are fairly new to SAS. Some of the examples used in the course will be presented.