

## **DEVELOPING AN IN-HOUSE SAS® TRAINING PROGRAM FOR AN ACADEMIC ENVIRONMENT**

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### **ABSTRACT**

Over a period of three years Memphis State University has developed a SAS training program at the university that addresses the needs of the novice computer user as well as experienced SAS users with specific problems and interests. Current training includes introductory sessions for SAS language and for the available modules, and topic specific sessions for academic departments such as Geography, English, Math, and Finance. All training materials are developed in-house by the Statistical Services staff of Academic Computer Services.

### **INTRODUCTION**

Memphis State University acquired SAS software for the first time in the summer of 1989 to run on academic VAX nodes. Potential SAS users included a faculty of 750 and over 3,000 graduate students. Modules licensed at that time were SAS/STAT®, SAS/ETS®, and SAS/GRAPH®, in addition to the Base module. SAS/IML® was licensed shortly afterward. Less than two weeks after installation of the software, the first training session was held.

That first session, a two hour introduction to SAS, evolved over the next three years into an organized and well received SAS training program including twelve different regularly scheduled seminars and eighteen available handouts. The training sessions and the handouts are offered to the users free of charge. Training sessions are attended by many SAS users in the Memphis community outside of the university.

Memphis State now also licenses SAS/ASSIST®, SAS/AF®, and SAS/FSP® software and has budgeted for the addition of SAS/EIS® when that software is available for the VMS operating system.

### **GETTING THE WORD OUT**

The first step for a SAS training program was to let the faculty and graduate students know that SAS was available for their use. This meant providing information about what SAS is, what it does, what modules are available at Memphis State, and how it can be accessed. Five methods of information dissemination were employed: (1) Training sessions were scheduled at the Computer Services Training Center; (2) a demonstration was scheduled for computer services staff and student workers, (3) an article was published in the Computer Services newsletter describing the software and providing basic access information; (4) paper handouts were prepared providing more detailed, system specific information for the available modules; and (5) online miniguides and catalog entries were written for the VAX local help section.

Video training and the use of SAS prepared materials were considered, but were rejected due to cost. Because of the large number of potential users, instructor based training by SAS personnel was not a possibility. Although, we still hope to someday develop CBT/CAI materials for SAS, the original five methods of information dissemination quickly became the standard for the SAS training program at Memphis State:

- Formal Training Sessions
- Demonstrations
- Newsletter Articles
- Handouts
- Online miniguides

The recent licensing of SAS/ASSIST could add another dimension to training at Memphis State. At present, it is being utilized as a tool for other types of training and introduced in SAS Basics and SAS/GRAPH short courses, but could be developed into a separate training method.

## **FORMAL TRAINING SESSIONS**

The major part of the SAS training effort is through formal hands-on training sessions. These sessions are usually taught in the Training Center, a room with a professional overhead projection system and 39 VT terminals (12 graphics terminals), but are occasionally taught in remote terminal sites. Four types of sessions are held:

- Scheduled seminars
- Seminars offered by request
- Customized seminars
- Round tables

Scheduled seminars are those training sessions that are offered at least once a year, and are scheduled at least a semester in advance. They are for general users with an audience from a variety of academic backgrounds. These include introductory topics such as SAS Basics and common applications such as Regression Analysis With SAS. These sessions are taught in the Computer Services Training Center. Special training accounts are available only at this location that allow identical files and specifications for all the students. In addition, an overhead color graphics projection system is available to the instructor, as well as other audiovisual equipment. These training sessions are also offered free of charge to members of the greater Memphis community on a space available basis.

Seminars offered only by request are often abbreviated versions of regular seminars, or special topics offered once to a particular audience. An example would be Using Proc Datasource to Access COMPUSTAT® data. These are also offered in the Computer Services Training Center when available, but are also often taught in the remote terminal sites. No special accounts are available in the remote sites; users use their own accounts and no projection system is available. These sessions are not open to the public.

Customized seminars are prepared for a particular group or class. Rather than the usual, generic examples and exercises, those used for these sessions are taken from the discipline of the use, or often utilize the actual data or type of data that will be used by the attendees in their research. Topics applicable to the needs of the group will be addressed. An example would be Creating Pie

Charts With Nutritional Data for a Home Economics Class. These are usually scheduled in advance for each semester and utilize the Computer Services Training Center, but are not open to the public.

Round tables provide an opportunity for SAS users to get together to share problems and ideas about a topic without a specific advance agenda. They also provide an opportunity for advanced users to learn each others strengths. Topics include: Problems with Tabulate, Random Number Generation, and SAS Changes and Enhancements.

## **DEMONSTRATIONS**

Demonstrations provide a useful method of introducing new features, new releases, new platforms, or new products to a non-participatory audience. These demonstrations have been conducted by in-house personnel as well as by SAS personnel. Although usually open to the general public, these demonstrations have had audiences as diverse as a Memphis State microcomputer user group and a technical writing class interested only in the hierarchical nature of the SAS help facility.

SAS Institute has provided product information as handouts for these demonstrations, as well as door prizes for one demonstration.

## **NEWSLETTER ARTICLES**

When SAS was first licensed, Computer Services issued a monthly newsletter. This provided a forum for providing "how to" answers for users for common problems as well as introducing little known features such as the SAS spell checker.

Budget cuts have forced the newsletter to be published only five times a year, thus sacrificing the timeliness of articles. In addition, a change of focus away from technical articles to a more newsy approach, has for the most part eliminated the "how to" articles most useful for training.

The newsletter still serves as a good source of general information about new products and releases. From time to time we still manage to sneak in some syntax. Recent SAS newsletter articles include:

"Using BMDP® System Files With SAS", "SAS Version 6.07 Installed on MSUVX2", "SAS Interfaces Provide Menu Access", and "ZCLEANUP Facility Available in SAS".

### **HANDOUTS**

The approach that we have taken toward handouts is to not just be informational, but to provide examples with working code in a step by step approach so that the user can take the handout and make something happen. These handouts customize the examples for using SAS with VAX/VMS and are reviewed or updated at least once a year. They range in length from 2 to 25 pages. Although most are available in paper copy only, some of the more popular handouts are also available online as an ASCII file.

Separate handouts have been written for each module of SAS. Handouts also provide information about subjects such as using the SAS sample library, recommended documentation, random number generation, and other specialized topics.

### **ONLINE MINIGUIDES**

When SAS was first licensed, local help was available on the academic VAX nodes through a user written utility called MSUHELP. Topical SAS miniguides were written for this utility and included such information as the location of documentation, and an index to the SAS sample library, in addition to much of the information in the paper handouts. All miniguides were in ASCII for easy downloading and/or printing.

MSUHELP was replaced by VTX. VAX VTX (Video Text) is a menu driven system designed to aid in information distribution. VTX operates on key words. A request such as VTX SAS will bring up a menu containing only SAS items. Information on such topics as SAS syntax, SAS modules, SAS procedures, and how to access SAS are available from a menu system and can be sent to a system printer.

The miniguides that were originally available under MSUHELP were reformatted and also placed under the VTX menu system. All VTX SAS information is reviewed and/or updated at least once a year.

## **MEMPHIS STATE SAS TRAINING SESSIONS AND DESCRIPTIONS**

### **Introductory Seminars:**

(no SAS experience required)

#### **1. SAS Basics: 6 hours**

This is a two-part session designed to help participants create SAS data sets, control and modify data items, and use SAS procedures to sort, merge, summarize, print and plot data. Included is a general discussion of the SAS system. Procedures utilized in exercises include Proc Print, Proc Means, Proc Sort, Proc Plot, Proc Chart, and Proc Format.

#### **2. SAS/GRAPH Workshop I: 3 hours**

This workshop introduces the procedures available under the GRAPH module of SAS. Hands-on experience includes basic charts, graphs, maps, and 3-D plots. Output will be prepared for postscript printers and GML plot devices.

#### **3. Introduction to Proc SQL in SAS: 3 hours**

Structured Query Language (SQL) is a standardized, widely used language that retrieves and updates data in relational tables and databases. The emphasis will be on the syntax to perform SQL operations in SAS using Proc SQL.

#### **4. Introduction to SAS/IML: 3 hours**

This basic seminar teaches attendees how to perform matrix operations and data manipulations using SAS's compact matrix syntax. The instructor will emphasize accessing IML in different modes, entering and editing raw data and SAS data sets, and saving and retrieving worksheet results.

#### **5. Mapping With SAS (Proc GMAP): 3 hours**

This workshop provides an introduction to data representation in the form of maps. Hands-on experience includes setting up response data sets and mapping them on choropleth as well as on 3-D maps. Output is prepared for GML and HPGL 8-pen plotters and for postscript files.

**Intermediate Seminars:****1. Regression Analysis With SAS**

This seminar provides an introduction to the techniques available in SAS for linear, multiple, non-linear, auto-regressive, and logistic regression analysis. Syntax for graphics options and for regression diagnostics is also presented.

**2. SAS/ETS I - Introduction to Time Series Processing: 3 hours**

This session investigates data-handling techniques and data processing methods used with time series data. Topics will include univariate and multivariate time domain models, frequency domain analysis and seasonal adjustments.

**3. SAS/ETS II - Introduction to Time Series Modeling and Forecasting: 3 hours**

This session introduces the use of the new SAS interactive Forecast Menu system for time series data. Topics will include graphically examining time series, model selection and diagnosis of model fit, comparisons of different models and their forecasts, and saving the results.

**Advanced Seminars:****1. SAS/GRAPH Workshop II: 3 hours**

This three hour workshop is designed to assist the SAS/GRAPH user in customization of graphics. Emphasis is on the use of the Annotate and Greplay facilities and the new Data Step Graphics Interface (DSGI). Exercises will include these as well as importing CGM (computer graphics metafile) files into SAS/GRAPH.

**2. Introduction to Proc Calis in SAS/STAT: 3 hours**

This is a brief introduction to writing SAS programs to perform structural analysis of multivariate data. Proc Calis is capable of estimating Mth-order COSAN and other moment structure models. Emphasis will be on SAS syntax and conceptual differences between RAM (Reticular Action Model), LISREL® (Linear Structural Relations), and Bentler-Weeks (EQS®) models.

**3. Advanced SAS Programming: 3 hours**

This workshop introduces SAS users to some of the more advanced features of the SAS programming language including using "do" loops, array processing, creating and using macro variables, reading non-standard data, and transposing data. Using tape data is also discussed.

**4. Introduction to Macro Processing With SAS: 3 hours**

This introduction to SAS macros will include a discussion of macros and macro variables, macro expressions and functions, the creation of a macro library, and tips and techniques for using macros with SAS. Hands-on experience will include both the use of macro variables and the creation of SAS macros as replacement for repetitive code. Debugging SAS macro code will also be discussed.

**Topical Seminars that Include SAS:****1. Dichotomous and Polychotomous Logistic Regression**

Basic concepts of logistic regression models are discussed. Special attention is given to the relationship between loglinear estimates and logistic/polychotomous regression estimates. Program examples using SAS, SPSS®, and BMDP are presented and discussed.

**2. Loglinear Models in BMDP, SAS, and SPSS**

Loglinear concepts and various types of loglinear models are discussed. Emphasis is on how to program models in BMDP4F, Proc Catmod in SAS, Loglinear and Hiloglinear in SPSS.

**3. Tapes and Statistical Packages**

This seminar provides instruction for reading VAX/VMS and non-VAX/VMS tapes using SAS, SPSS, and BMDP. The instructor also covers how to read and write SAS, SPSS, and BMDP data sets or system files as well as export files from each of the above software to and from tapes. DCL necessary for tape work is also presented.

## **SAS HANDOUTS AVAILABLE FROM MEMPHIS STATE**

1. Introduction to SAS
2. The SAS Display Manager System
3. What is SAS/STAT?
4. Running SAS/IML
5. What is SAS/ETS?
6. Running SAS/GRAPH on the VAX
7. Using the SAS BMDP and SPSS Engines
8. Spell Checking With SAS
9. The SAS Macro Facility
10. Using SAS Proc SQL
11. SAS/IML Sample Terminal Session
12. Introduction to SAS/AF
13. Introduction to SAS/FSP
14. Introduction to SAS/ASSIST
15. SAS Screen Control Language
16. Modulus Transformation Using SAS/IML
17. Box & Cox Transformation Using SAS/IML
18. Random Number Generation Using SAS

## **SUMMARY**

SAS training at Memphis State began with very general offerings designed to attract new users to the software. As our users and their applications have become more sophisticated so has our training program. By relying on a variety of methods of information dissemination and training, the needs of a diverse group of users can be met.

For more information contact Barbara Okerson, Academic Computer Services, Memphis State University, Memphis, TN 38152.

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