INTRODUCTION

The Information Center at AT&T in Reading, Pennsylvania was started in 1984 in an effort to promote end user self-sufficiency in data analysis, data manipulation and reporting from existing data files. The specific mission of the center is to provide training, support and consultation to the non-data processing community at our location. Our services are available for everyone from clerks right up through managers.

The scope of the IC's services is limited to mainframe software. There is a PC located in the center, but the Reading Works has a separate user support group for personal computers.

SAS TRAINING - THE BEGINNING

Requests for training and support of the SAS System increased in early Fall of 1985. The interest originated from the engineering universe and the quality control organization, as well as some programmers. Our users wanted a software package for statistical analysis of their data - some basic and some quite advanced. Since my first experience with SAS software was in August of 1985 when I took the SAS Basics for Mainframes course at the Institute in Cary, I was virtually unprepared to teach a course, let alone design one.

I once read, "Success means meeting customer needs, on a schedule responsive to the market, at the right cost and with high quality". Our market consists of the users we have already trained and all other personnel who are potential users. Their needs were for immediate instruction in the use of SAS software. Since the Information Center could not provide a quality course at that time and the cost of sending approximately twenty people to the SAS Institute in Cary, North Carolina to attend two courses was prohibitive, an alternate solution was required. The result was to have Institute personnel teach the course in-house at our facility in Reading.

In October 1985, two training courses were offered on-site: (a) SAS Basics for Mainframes and (b) SAS Color Graphics. Seventeen people attended the Basics course and twenty-one attended the Graphics course. The students' backgrounds were essentially either engineering or information systems. Only one student was neither a programmer nor an engineer, but he did have extensive experience using software packages on our mainframe. A prerequisite for registration in either of the courses was some experience using a computer. The students were accepted into the classes based on this requirement and their degree of need. The combined courses ran for one week - three days of Basics and two days of Graphics. The training was supplemented by two sessions, taught by myself, instructing the students how to access SAS software on our system. Also covered were the SAS Display Manager, the use of PF keys and the editing commands.

The courses were well received. The only major complaints were that there was too much material to cover in the time period and there was not enough time to finish the exercises. One student suggested that it would be easier to absorb the material if we had shorter courses with less content. Utilizing this suggestion, and other comments received on the evaluation forms, the design work for an introductory course on the SAS System was initiated.

At this point, my concentration was on the outline for the proposed course. A critical question was, "What should be included and what should not?". Furthermore, the length of the course had to be set as short as possible, while still incorporating enough material to make it worthwhile for the users to attend. The general intent was to introduce the SAS System to end users with varying levels of computer experience. In other words, it had to be simple enough so that new users would understand it, but not so elementary that those with experience would be bored. Using the evaluations of the on-site course as a guideline, it was decided that only base SAS software would be covered - no other SAS software product would be taught in this course. During the design stage, the SAS Introductory Guide, SAS User's Guide: Basics and SAS ViewS: SAS Basics served as invaluable reference materials.
TRAINING ENVIRONMENT

From the initiation of the design phase, there were a number of factors that were always under consideration. The first, and probably most critical, was to speak and write in END USER language. The majority of the Reading Information Center users (and for that matter, most if not all IC users) are not interested in hearing about "bits and bytes". They want to learn how to use a computer and how to access and manipulate their data "when they want to and how they want to" in the simplest manner possible. They are users, not programmers!!! This is an extremely important point that all instructors and consultants should commit to memory. Although the level of computer literacy among members of the user community has increased tremendously over the past few years, most users are not computer scientists.

Conducting your own course provides an opportunity which is usually unavailable with instructor training - teaching half day sessions. The class is scheduled as half days for a number of reasons. Many of our users cannot leave their responsible areas for two or three days at busy times. By offering the course as four half days, they can attend class in the morning and "on the job" in the afternoon. Moreover, this system seems to have a positive effect on student retention of the material. They have enough time to absorb the information before a new section is begun. Also, some actually practice on their own in the afternoons!

A binder containing all the viewgraphs used while teaching is given to each student. This promotes concentration on learning the material instead of spending time writing voluminous notes. Any additional points the student needs to remember can be written in the margins. The viewgraphs are also a valuable source of reference once the class is completed.

While teaching, every effort is made to personalize the course to the extent possible. This entails utilizing examples of how SAS software can be employed in the students' daily work environments. The examples are changed each time the class is taught based on the student backgrounds. The SAS coding on the viewgraphs uses files that contain data familiar to the students.

Another key to our success, in my opinion, is the use of workshops that consist of practice problems based on the material covered in each section. Each workshop is divided into multiple parts so that students have the opportunity to use many of the options available. Frequent breaks from the lecture is then given to provide ample time to work on the lab problems. If possible, only one student is assigned per terminal. This practice allows each student to receive hands on experience through meaningful applications of the material just taught in class. Students tend to retain more if they can actually do something as opposed to just listening to prepared lectures. When each workshop has been completed, a solution is distributed and reviewed. For those who had errors, this provides a beneficial method for understanding their mistakes by comparing their solution to the correct one. It can also show an alternate solution, exhibiting the fact that usually there is more than one correct answer.

There are two additional features which enhance the positive aspect of teaching your own SAS course. The first is that the data files used in the workshops are available for the students after class completion. Students can practice with these files whenever they choose. The other contributing factor is that upon class completion, the instructor will still be there for consultation and support.

THE COURSE

Following is the table of contents of the course with a brief description of each section.

TABLE OF CONTENTS

1. INTRODUCTION
   This section covers a general introduction to the SAS system and an explanation of the various software products resident on our mainframe. It also contains some definitions of words that are used frequently throughout the course. The final portion of Section 1 is an overview of SAS processing.

2. FUNDAMENTALS
   In this section, file structures (external vs. SAS) are discussed. Variables (numeric vs. character), naming conventions and general syntax for SAS statements are also covered.
3. DATA STEP
Section 3 deals with the key concepts of the Data Step. The first workshop is given upon completion. Included are the following areas: (a) Data Step syntax; (b) the DATA statement and options; (c) three types of INPUT statements; and (d) the INFILE and CARDS statements. The LIST statement and the OBS= option are also described.

4. PROC STEP
A general overview of procedure steps is presented. This section covers the syntax of the PROC statement, the DATA= option and some selected statements that are common to most or all SAS procedures.

5. PROC PRINT
The first procedure described is PROC PRINT. Some options for the PROC statement are defined. Following this are explanations of additional procedure step statements.

6. PROC SORT
As might be expected, this section handles the SORT procedure. The concept of the BY statement being used without sorting the data first is discussed. Collating sequences and the DESCENDING option are explained, in addition to the OUT= option on the PROC statement.

7. UTILITIES
Section 7 contains descriptions of PROC CONTENTS and PROC PDS, together with options and additional statements. The process for obtaining printed output is also explained.

8. ADVANCED DATA STEP
In this section, the student learns some of the more powerful capabilities of the Data Step. The first part demonstrates how to create new variables using the assignment statement. Arithmetic operators and constants are explained. Next, the conditional statements are discussed: (a) the IF..THEN; (b) the IF..THEN..ELSE; and (c) the subsetting IF. In conjunction with the subsetting IF, the DELETE statement is also explained. For conditions that require multiple statements to be processed, the DO...END is used. The final points covered in this section are the SUM statement and selected SAS functions.

9. ADDITIONAL FEATURES
Section 9 contains some miscellaneous features. First, the concept of statements appearing in the Data Step vs. the Proc Step is explained. Next is the LABEL statement. Following this, informats, formats and the INFORMAT and FORMAT statements are discussed. The section ends with a demonstration of the two ways to enter comments into your SAS job.

10. ADDITIONAL PROCEDURES
The last Section of the course covers a brief overview of the PROC FREQ, PROC MEANS, PROC CHART and PROC PLOT. In order to cover these in any detail, the length of the course would have had to be extended. Instead of doing this, the students are only introduced to these procedures and if more assistance is required, individual instruction will be provided.

A. FRONT END
This appendix was added for instructional purposes, as well as a reference guide for the students. The Front End consists of a series of screens written by AT&T personnel that are used to provide easier access to SAS software on our system. This section begins with a demonstration of the logon procedures. Once logged onto the system, the next step the student must take is to access the Front End. The first menu screen that is displayed requires the user to enter a one letter code associated with the software package he/she wishes to access. After the user chooses the SAS System option, another menu is displayed offering various options, such as the FILE SELECT screen. This option allows the user to allocate a file and assign either a libref or a fileref, with little or no knowledge of JCL or TSO commands. Another screen is the ROUTE screen, used to enter information required by the JCL in order to print output. As in the previous case, the user need not know any JCL. There is also an option which enters the SAS Dialog Manager.

In addition to discussing AT&T's Front End, features of the SAS Dialog Manager are also covered. Included are the "three screen" concept, PF key assignments and the commands to save and retrieve
SAS programs. Next, the editing commands available are explained. Finally, the procedure for ending a SAS session, leaving the Front End and logging off the system is described.

EVALUATIONS

An evaluation process is beneficial for everyone in their private lives, as well as in their working environments. This is especially true for those who are instructors, since conveying information is the key to their success. For this reason, a course evaluation form was designed using the SAS Institute's form, along with others, as models. At the end of each training session, the forms are distributed and each student is encouraged to contribute honest constructive criticism.

The first portion of the form consists of rating eight areas on a scale of one to ten. The topics include the actual course and workshops, as well as the instructor. The responses in this section reveal the general opinion of the students. For summarization purposes, a numeric scale is convenient. Next, are a series of questions to which the students respond. The generated comments, positive or negative, are usually helpful. When good points are given, it is apparent that this aspect of the course is successful. On the other hand, when an improvement is suggested, it will be implemented if it enhances the course material or improves the instructor's approach to teaching the subject matter.

Some of the comments received are listed below:

STRONG POINTS
- small class size - individual attention and access to terminals
- good examples and workshops
- half day sessions
- good class for the basics
- instructor well versed in the material

WEAK POINTS
- cover more procedures - graphics and statistics
- show output for examples and workshops
- more instruction on the system, i.e. TSO, Front End

CONTINUED SUPPORT

Two keys to a successful information center are training and support. Formal courses or individual instruction must be offered so that the user community can access their data, in the form they require and in a timely fashion, thus becoming more productive.

But training is NOT enough!! The second essential area required for success is support and consultation. Once the user has been trained in the SAS System and starts using it in his daily work, he/she is bound to have questions or difficulties. Someone must be there to provide this needed service. At our location, two people staff the IC, responding to phone and in-person inquiries. OUR USERS ARE THE TOP PRIORITY!! As stated in the second section of this paper, success, in any business, is based on customer satisfaction. Since users are our customers, when one comes to us with a problem, everything else becomes secondary until the situation is resolved.

As well as training and consultation in SAS software, we also provide support for the operating environment (TSO). Many times the users have more problems with the system than they actually have with coding their SAS job.

CONCLUSION

This paper was intended to describe the method we are currently using to provide training and support for the SAS System at our location. The format of the specified course has been modified based upon the comments and evaluations received from students. This is not to say that it has been designed and taught perfectly, but we are responding to our user community's needs as closely as possible. If I were asked to name the most important point of this paper, it would be that it is critical to the success of an information center that good training and support are provided to the users when they need it.

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