A GUIDE TO MODIFYING AN INTRODUCTORY SAS® COURSE

Laura Ray-Wilson, University of Texas Medical Branch
Christine Stroup-Benham, University of Texas Medical Branch

ABSTRACT
This paper covers both the explanation of the process involved in developing and teaching an introductory course to the SAS® System for Personal Computers and the results of this restructured course. Historically, the course had been taught by instructors who were not regular SAS system users. Much emphasis was placed on teaching the SAS® Display Manager thus reducing the amount of time available to teach the principles of the SAS system. In the process of restructuring the course, certain questions had to be answered: 1) can the course be shortened; 2) who should teach the course; and 3) can the course be targeted to certain groups? The course was rewritten, with the OM being optional (as time permits), tested on 6 people from one office and taught by a SAS system user of 12 years.

INTRODUCTION

Much has been discussed regarding the teaching of the SAS® system in business settings, but very little has been said about the non-business environments. This paper explains the process of writing and teaching a course at a university teaching hospital.

The University of Texas Medical Branch has a medical school, a nursing school, a school of allied health sciences, and a graduate school of biomedical sciences. It is also situated in the center of several hospitals. The Office of Academic Computing handles much of the computer training for the entire university. Our students come from all disciplines and include such faculty members as physicians and PhD’s, administrators, graduate students and office staff.

1. CAN THE COURSE BE SHORTENED?

The previous SAS® System for Personal Computers (SAS/PC) course was taught across 3 afternoon sessions consisting of approximately 3 hours each. Often, because of such conflicts as surgery, course work, meetings etc., students could not make all 3 sessions. The instructor was often asked to schedule a makeup class. Scheduling problems arose both for the instructor (room availability or time conflict) and for the students with their schedules. It became apparent that the course needed to be more streamlined to meet these scheduling needs.

One of the first aspects of the course which I (LRW) felt needed to be eliminated or taped down was the teaching of the SAS® Display Manager (DM). I also noted that students often had conceptual problems distinguishing between the DM and their program. Many believed they were submitting their program when they saved the program file with the "FILE" statement.

There is so much to be covered in this introductory SAS/PC course that it becomes very near to impossible to reduce the length. A decision must be made to prioritize the contents of the course, possibly eliminating those items with a lower priority.

In all cases, the one item that appeared to consume the most time and contributed the least to the learning and using of SAS software was the DM. My decision was to write the course such that the students could submit their programs via the batch method and offer the DM as an option, teaching it when time constraints allowed.

The elimination of the DM evoked a new question: "What editor to use?". Because the Office of Academic Computing teaches several courses, most of the main word processors are available on our classroom computers. As long as a non-document mode is used, the SAS system can read the program. One important point to note is that using an editor/word processor that is familiar, cuts down drastically on the learning curve and removes some of the fear of the "unknown" for students.
2. WHO SHOULD TEACH THE COURSE?

For years SAS/PC was taught by the SAS Coordinator. The course has been taught with the same format for several years and was taught quite well, but students were beginning to ask more difficult questions. Someone with a more practical knowledge of the SAS system was needed to teach or co-teach the course. Shortly thereafter, I joined the Office of Academic Computing and most of the SAS system support began to be forwarded to me.

There is a strong feeling among employees in the Office of Academic Computing that if you teach a course, you should support it and be a regular user of that product. I have used the SAS system for the past 12 years. I basically structured the course around the order in which you place statements in a program. For example, the LIBNAME and FILENAME statements were presented first along with their relationships to the DOS path statement.

3. CAN THE COURSE BE TARGETED TO CERTAIN GROUPS?

In a given classroom situation, a class is comprised of interested pupils of various backgrounds. Besides the basic requirement to have some DOS knowledge, there are no other prerequisites. The students may have some familiarity with the SAS system. Their needs may be to perform statistics, generate reports or to manage data.

The instructor must do his/her best to cover all the bases with a class such as this one. With so many diverse possibilities, it is difficult to structure a SAS/PC class, especially a full capacity class (in our case, 12 students). I can suggest a couple of methods to solve this problem: a) have a smaller class size; b) survey the students prior to the class; or c) contract with an individual department.

All of these solutions are improvements. A smaller class size eliminates some of the diversity easing the problem of addressing so many individual students, allowing a one-to-one relationship with these students.

A pre-course survey is a good tool no matter what type of class you have. In a survey you can obtain such information as what their computer skills are, what they want to do with the SAS system and also what type of word processor/editor they use.

When I first came to work for this office, I was given the task of teaching an introductory SAS/PC course. I was given most of the materials from the previous instructor and a full class of students. The material was not in the order of a BASE SAS software program. The display manager took up at least half of the allotted course time. Information such as that requested in the pre-course survey would have helped me out. As it turned out, most of the students had some knowledge of BASE SAS and were particularly interested in learning how to use several of the procedures used for descriptive statistics and a few other statistical procedures such as PROC CORR and PROC REG (found in SAS/STAT*).

If the situation allows it, a contract with an individual department is the best choice. Of course, this is a university/hospital setting and may not work elsewhere. Usually, an office or department has certain needs that must be met as a group. The course can be taught as it normally is, but with emphasis on those areas in which they require the most knowledge.

A few months ago I was contracted by the Office of Educational Development to teach a private class in our classroom for 6-8 of their employees, both faculty and staff. In preparation for this class I began the rewriting of the introductory course and created the pre-course survey (see Appendix B).

The pre-course survey covered such items as their equipment, type of word processor, and both their DOS and SAS system knowledge. The director requested that they not spend time on the DM. The entire office uses WordStar 6.0 so it was decided to use that as our editor. They wanted the
class to be limited to 2 afternoon sessions. This meant a lot of streamlining to squeeze in as much as I could in just 6 to 7 hours of class.

As I mentioned previously, the objectives of the course must be prioritized. Then, a decision regarding what should be kept, can be made. The method of prioritization began with a review of the old course and any associated instructor notes, followed by a review of the teaching and guide books from SAS Institute Inc. (SAS Views: SAS Processing and Course Notes). I then combined what I felt was the most necessary information from all sources (including my on personal experience) and began typing it up. It is our policy to create exercises and allow the students as much hands on experience as possible. The exercises had to be tested out and answers prepared. After I had this working first draft of the course, I met with my co-author who is also a SAS/PC user and the contact person for this office. We discussed how this course could best be tailored to their needs. We evaluated the results of the survey and found they needed to be able to transport data between SAS software and other products such as dBASE III+ or IV. Transporting data was added to the course.

My first fear was that instead of cutting down the length of the course, I had made it longer. The workbook was longer, but I found I had included both the exercises and in the back, their answers. The former instructor passed the exercises out during the class. Even with the added length, the course was structured so that we were able to complete the course in the 2 afternoon sessions as requested. I must point out, that having an assistant who knows the SAS/PC is an asset. Helping 6 people with the hands on exercises can be difficult alone. A copy of the course outline is found in APPENDIX A.

Because Christine is both co-author of this paper and a member of our test class, she will respond following this section from the "user" side with any comments.
enables one to type in text, save it and modify it (much simpler than EDLIN). Anyone who has used WordStar or dBASE III+ will recognize the few commands needed to work within EDIT. The solution to the editor dilemma is to either use EDIT or in the case of a group which has a common word processor (such as our test class OED), use that.

THE "USER"

Different groups of individuals or offices have varying needs with respect to instruction in the SAS system. These needs are based on several elements. One of the first items to consider is computer skill level. Typically within an office or group of individuals there is at least some degree of variability in users' skills and level of computer knowledge. For example, within our office, those staff members participating in the course had a wide range of computer abilities, ranging from a basic knowledge of DOS and word processing to a sophisticated understanding of SAS/PC, dBASE, and programming. The majority, however, were somewhere in the middle of this continuum, being comfortable with word processing packages and DOS as well as having some knowledge of BASE SAS software or dBASE.

A second issue to consider is usage -- what types of data will be handled. In our case, we deal primarily with dBASE IV files, ASCII files from scanned data, some Lotus 1-2-3 worksheets and other SAS system .ssd files. In addition, we wanted to be able to import SAS system output into Harvard Graphics 3.0 to create bar and line charts. Therefore, our staff members needed to be able to transfer data between all of these mediums and understand such concepts as fixed and free form data.

A third point to decide about concerned data analysis. For the most part, data analyses performed by non-professional staff members will not be very sophisticated: PROC FREQ, PROC MEANS, PROC CORR, etc. Thus, instruction did not have to include time-intensive training on the more complex procedures such as PROC REG found in SAS/STAT.

Another element that was considered was learning the DM. In order to reduce the learning curve involved and to maintain some degree of familiarity, it was decided that staff members would not learn it. In this way, they could use the word processor program with which they were familiar (WordStar 6.0), to create their programs and then submit them via batch mode. This also enabled the course director to spend more time on actual SAS system concepts and not on teaching an editor.

Our particular situation -- which may be unique -- was one in which a person from the client's department (myself) was very familiar with the SAS system and the abilities of those taking the course. This proved to be a great advantage for several reasons. One, during the hands on portion of the course, there were 2 of us able to assist the students. Two, since I know the abilities of our staff members, I had an idea of what concepts/procedures were probably going to be more difficult for particular individuals. Therefore, I was able to focus on those individuals while the instructor focussed on the remainder of the class. Three, I was able to stand at the back of the classroom and survey everyone's monitors to make sure all were able to perform the tasks during the hands on sessions which were explained by the instructor using a projection panel at the front of the room. If more than one person was having difficulty, I could ask the instructor to reiterate her instruction or to provide a more detailed explanation so that the students were able to perform the hands on task. If only one person appeared to be having problems at one particular time, I was able to assist that person without having to interrupt the class for the rest of the students.

The capability of having a SAS software course tailored to our office's specific needs was very beneficial. Our staff members were able to focus on learning material that was pertinent to their duties, such as
learning to transfer data between dBASE, the SAS system and ASCII files, merging different types of files, and doing elementary data analysis. We were also able to avoid areas that were deemed unnecessary, such as learning the OM. The ability to have an active role in structuring the class allowed us to get the most out of the time and money our office put into attending the class.

CONCLUSION

We feel this newly structured course not only flows much more smoothly but also touches upon as many of the SAS system principles as is possible in such a short time period (6 hours). As previously stated, the overall flow of the course follows the order of statements if one were writing a BASE SAS software program. The students finish the course with a better foundation to go back and begin applying what they have learned. We have found, however, that those students who come to the class with limited DOS knowledge and no familiarity with other computer software, such as dBASE III+ or IV, have a far more difficult time grasping some of the concepts in the SAS system. It is strongly recommended that if at all possible, another experienced SAS system user should be available to help with individual questions and a strong emphasis should be placed on having the required DOS background. When the instructor must pause for those who are having more difficulty, the entire class is slowed down.

Appendix A

COURSE OUTLINE

I. DOS

II. LIBNAME Statement

III. FILENAME Statement

IV. OPTIONS

V. DATA STEP
   a. infile
   b. input
   c. Variable types
   d. Calculating new variables
      1. operators
      2. functions
      3. conditional statements
   e. Subsetting data sets
      1. output
      2. merge
      3. concatenate
      4. file statement

VI. PROC Statement
   a. sort
   b. freq
   c. means
   d. format
   e. contents

VII. Miscellaneous Statements
   a. label
   b. proc datasets
   c. arrays
   d. comments

VII. Transferring Data between SAS and Other Packages
   a. proc dbf (SAS <-> dBASE)
   b. proc dif (SAS <-> LOTUS 123)
   c. SAS output to HARVARD GRAPHICS

APPENDICES
   a. answers to exercises
   b. SAS DISPLAY MANAGER
SAS* PRE-COURSE PREPARATION SURVEY

This survey is intended to supply the Office of Academic Computing and the PC/SAS instructor(s) with an overview of our students to better enable us to prepare the class materials. Please answer the following questions to the best of your ability. If you have any questions, please contact Laura Ray at extension 28429.

1. Type of computer SAS is/will be running on:
   - IBM PC/XT or compatible
   - IBM PC/AT - 286 or compatible
   - IBM PC/AT - 386 or compatible
   - IBM PC/AT - 486 or compatible
   - Other, please specify __________

2. Memory (ram):
   - 512 or 640kb (minimum required)
   - 1 megabyte
   - 2 megabytes or more (preferred)

3. Hard disk size:
   - less than 20mb (barely large enough)
   - 20 - 40 megabytes
   - 40 - 60 megabytes
   - 60 - 80 megabytes
   - greater than 80 megabytes

4. Math coprocessor present
   (speeds up calculations)
   - Yes
   - No

5. Editor:
   - SAS' Display Manager
   - WordPerfect Program Editor
   - WordPerfect
   - Wordstar
   - Microsoft Word
   - Other, please specify __________

6. Environment:
   - What DOS version used
     (ver 2.0 or higher required)
     - Yes
     - No
     - Working within Windows
   - Other, please specify __________

7. Other software SAS may need to export to or import from:
   - dBASE (SAS accepts releases II, III, IV)
   - dBASE compatible (eg. Clipper, dbx1)
   - Lotus 1-2-3
   - Other (eg. Harvard Graphics), please specify __________

8. Types of applications:
   - reports or listings
   - statistics
   - graphics
   - other, please specify __________

9. Computer knowledge - to better understand some of the concepts in SAS we encourage all those who wish to take the class to have a working knowledge of DOS.
   - No knowledge of DOS
   - Some knowledge of DOS by knowing:
     - what a root directory is
     - what a subdirectory is
     - what your current drive is
   - Working knowledge of DOS by knowing
     - all of the above plus:
     - how to change directories
     - how to make directories
     - what a path is
     - how long the name of a file may be

11. SAS knowledge
   - NONE
   - Beginner (used SAS a couple of times)
   - Former (used SAS years ago on Mainframe or PC)
   - Intermediate (regular user of SAS)

WE APPRECIATE YOUR COOPERATION!