SUPPORTING SAS* IN AN ACADEMIC ENVIRONMENT
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ABSTRACT
This paper is intended to share the problems and solutions of educating computer users of the SAS* system in an academic environment. Briefly the problems were the obvious of how to educate students, faculty and staff with various levels of SAS knowledge. The range of instruction needed was wide, from what is the SAS system and why should it be used, to how to deal with large data sets on tape, to the specific problems of using the SAS system on the DEC* (Digital Equipment Corporation) VAX* computer. Our problems were further complicated since we were not only new SAS users but also had new computer equipment and new operating system (VMS*).

The solutions involved the development of short seminars and workshops, various information handouts, DCL command files, as well as a staff person available for consultation with research and teaching faculty.

INTRODUCTION

When many members of a large organization use a software package, training and support are serious concerns. In a university environment support of computer software is more difficult since many of the users are students. This population of computer users is constantly changing, as new students are added each semester and the trained, knowledgeable, senior students leave. The faculty and staff, though more permanent, present a different set of problems. These are often sporadic users of the computer. Their research involves many steps, just one of which involves computer research.

The University of Arkansas at Little Rock is a commuter university with a student population of 10,453 drawn from the Greater Little Rock area with a population of 519,000. The faculty consists of 430 full time and 233 part time. At UALR, the SAS and SAS/GRAPH* software are running on a VAX 11/780 clustered with three other VAXes. Both the SAS system and the VAX equipment have been installed at UALR for less than three years. The professional staff of Academic Computing Services has grown over that period of time from two to six full time staff members. Students have access to the VAX computer system in two computer labs on campus containing a total of 40 terminals. Twenty-four dial-in lines are available to students who have the necessary equipment. The computer labs are staffed at all times by student workers and are open generally from 8 a.m. until 12 p.m.

THE PROBLEM

How do you go about educating and supporting a population of users, the majority of which are new to the SAS system and the computer system? There are several directions available but manpower and money are as always restrictions. It is also important to have solutions available in a reasonable amount of time. At UALR, one staff consultant is available to support all of the users of statistical packages. Money was allocated for photo coping, printing, and purchasing manuals.

The users and prospective users of the SAS system at UALR can be separated into two groups with very different needs. The first group includes undergraduate and graduate students in classes requiring simple research. The second group are faculty, staff, and graduate assistants involved in more extensive research.

The first group includes undergraduate students in the Social Sciences such as Psychology, Sociology, Gerontology, or related fields of Economics, Management, and Political Science. The majority of graduate students in this group come from the masters program in Health Services Administration. These students are generally required to do one or two projects using the SAS system. This project is often the first exposure the student has to using the computer as well as using the SAS system. In addition, they are often presented with their first taste of research methods and statistics in general, which increases their problems and their anxiety. These users need to have some understanding of the basics of the SAS data step and a working knowledge of two or three procedures. They also need instruction in the mechanics of executing a SAS program on the VAX.

The second group of SAS users, the faculty, staff, and graduate
assistants, are the main researchers on campus and much heavier users. They are interested in more involved SAS programming. Their data sets are larger and require more manipulation. They are interested in a variety of procedures and how the results are displayed. In general they need a broader knowledge of the SAS system.

Another characteristic of this second group of users is the wide levels of knowledge. Some are first time users, some have limited experience with the SAS system, some have experience with other statistical packages, and some are experienced users with special one-time problems.

In summary the problem is to effectively support a population of new and experienced SAS users with limited financial and human resources.

THE PROBLEMS CONFRONTED

The solution was partly planned and partly evolved from need. The first concern was to define the areas of need. A general survey was sent to all faculty members to gather information. Unfortunately, what we found was that experience working with the various users was the best method of identifying groups of problem areas. Some problems were recognized as common to both groups. For example a simple way to execute a SAS program as a batch job was needed by both groups. Other problems were unique to each group of users, for example the varying level of education.

Solutions Applicable to all SAS Users

Although the two groups have different support needs they are all computer users. They all need good documentation and access to manuals. For the most part, they are not "computer programmers" and so need help dealing with the computer system to enter data and coding, to execute SAS programs and get results printed.

Fact Sheets. As questions were asked repeatedly of the new Academic Computing Services department, fact sheets were developed. These sheets were developed for a variety of topics related to using the computer. It was a natural step to develop separate sheets for various problems for SAS users. Most of the sheets contain example SAS coding. The fact sheets are used as handouts for classes and seminars and to address specific problems. A list of SAS Fact Sheets currently available are listed below.

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<th>Fact Sheet</th>
<th>Description</th>
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<tr>
<td>SAS-001</td>
<td>SAS Statistical Analysis System</td>
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<tr>
<td>SAS-002</td>
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Manuals. A complete set of SAS manuals are available for reference in each computer lab and in the consultants office. Another set of the most often used manuals are available to be checked out by faculty and staff for short periods of time.

Communication. One thing common to all computer users is a need to be kept informed about changes to the system. This is also true for SAS users. Two methods are used to keep SAS users informed about new versions of the SAS system, new methods of execution, line printers available, schedules of classes, etc. The first is the Computer Services Newsletter. This twelve page newsletter is distributed twice a semester by way of a mailing list. The mailing list includes all academic department heads, users who have attended Computing Services seminars or any user who has requested a copy. Copies of the newsletter are also available in student labs. The second method to facilitate communication is an online message board called VAXNEWS. VAXNEWS is interactive and available immediately to the user. Old message may be re-read at any time.

Batch Execution. Very soon it was recognized that an easy way to execute a SAS program as a batch job was needed. Most SAS users were not interested in the various options available to execute a SAS program. They simply wanted a painless and dependable method. With a command file written in Digital Command Language the batch execution is an interactive session. The user is prompted for information concerning the naming of the file containing the SAS program, the amount of CPU time required and whether the results should be printed or saved to disk. Options to allow data to be read directly from tape and delayed execution were added later to accommodate the heavy research users. Some heavy users do elect to write their own command file tailored to their specific needs to execute a SAS program.
program as a batch job rather than use this general system wide SAS batch command.

Another feature of batch execution using this command file is hidden from the user. On the VAX, a student has a limited amount of disk space but can gain access to unlimited disk space for a short period of time on a temporary "scratch" disk. Since the SAS system creates several large working files as it processes the data set it is not uncommon for the student users to exceed their limit of disk space. To avoid this problem the batch command actually processes the data on the temporary disk space and then copies all relevant files back to the students disk space.

Graphics Devices. With money restrictions, graphics devices are scarce. Some departments have equipment located in their area which is not available for general use. One HP7475A plotter and one VT241 terminal is available for general use. It is located in a small student lab near the offices of Academic Computing Services. The plotter is used primarily for SAS/GRAPH applications. The plotter is currently connected directly to a VT241. The manpower necessary to change paper and monitor the plotter's use prohibited designating the plotter as a batch queue.

Support of Students

As described earlier, this group of users are generally very inexperienced computer users and are interested in only the basics of the SAS system. It was assumed that the instructor would use class time to explain the SAS commands necessary to complete the assignment. The support needed from Academic Computing Services includes the instruction necessary to enter and execute a simple SAS program. Two hour long classes were developed to give this instruction. Follow-up support to answer questions on an individual basis for this large group of users was impossible for one staff consultant. Additional support for this group of SAS users involves a combination of good documentation and help from other students.

Classes. This first hour is spent in the Computer Lab learning the skills necessary to use the computer. This instruction includes the use of an editor and some elementary command language (Fact Sheet SAS-006). These classes are usually taught by student computer lab assistants, since knowledge of the SAS system is not required.

The second hour is conducted in either the computer lab or in the classroom by the SAS consultant from Academic Computing Services. This hour is used to give the students a brief overview of the SAS system by using an example program (Fact Sheet SAS-002). Directions for the use of the batch command are also explained (Fact Sheet SAS-007).

The classes have been a success, judging from the class evaluation forms. Most student responses have been very positive. The major complaint is that too much material is given in one class. Since many students have never touched a terminal, have never used a statistical package and never done any research, this a valid complaint. It is possible that two sessions or one longer session would be more effective. However, most faculty resist giving up additional class time for computer instruction.

Additional Support. Help with problems during the semester for this large group of users has been a problem. The computer lab assistants are generally computer science majors and not familiar with the SAS system. They are encouraged to attend the free seminars during their on-duty time. That is, they are paid to attend the seminars. However, only a few have been interested in learning any statistical package.

The general policy is that questions and problems the students encounter be directed to the course instructor. If the instructor is unable to resolve the problem, the instructor then contacts the consultant in Computing Services. In reality as the population of SAS users increases, students in the lab help each other. A graduate student in Health Services Administration wrote a manual directed toward these non-technical users as a course project. This manual is a good supplement to the Introduction to the VAX/VMS System Users Guide published by Academic Computing Services. This same student has recently competed a program in Basic that is a simplified CAI. It will be available to computer users for the first time this semester.

Support of Heavy Researcher

This group of users is the hardest to effectively support. The wide range of experience with the SAS system and the computer in general was the first
problem. The second was the need to work around the researchers' class schedules. Most research is done during the late afternoon and night during the semester or during months of school breaks. Finding a time that the faculty could attend seminars is a problem. Classes were only part of the answer since many of the researcher needed very specific kinds of help. Solutions were developed that were tailored to the individual users needs.

Seminars. Free SAS seminars are scheduled once each semester. The classes meet two hours a day, three times a week for two weeks. The classes are generally scheduled mid-semester in the afternoons. The afternoon time was chosen since the majority of the academic classes at UALR are held in the morning. This helped avoid a conflict with the researchers' schedules. The first week of the class is designed for users who have no experience with a statistical software package. It was expected that the user be able to create and edit files. The classes are taught using example SAS programs. The rules for each command are referenced by page number to the SAS Basics manual. Each student receives a handout that contains an example program followed by the output that the program generates. The topics covered include: an overview, the Data Step, documenting SAS data sets, working with formats, sorting data sets and simple descriptive statistics. At least an hour is reserved to discuss the options involved in the execution of a SAS program and how to access data stored in various formats.

The second week of class covers more complex programming including arrays, do loops, conditional execution and splitting and merging files. One day is spent giving an overview of SAS/GRAPH and using the plotter.

Tailored Solutions. For this diverse group of researchers with very specific problems, effective support requires some individual consulting from the SAS consultant in Academic Computing Services. However, it is important to keep in mind that for efficiency, education should be done in as large a group as possible to avoid repetition. Also properly documenting solutions to specific problems will save time when the problem is encountered by another user. Using these guidelines will maximize the number of people the staff consultant can help.

Department meetings were used in several situations when a majority of the users in the department were working on the same project or were at the same level of knowledge. It was remarkably easy to get the faculty to attend these "educational" meetings rather than the open seminars!

The Fact Sheets pertaining to tapes and transport data sets were prepared after users had questions about these two areas. After the documentation was prepared, complete with examples, the next user could simply pick up a handout and forego an appointment with the SAS consultant. The documentation also helps the consultant remember solutions previously discovered and avoid solving a problem twice!

On-Call Consultant. Some questions are best answered on an individual basis. For example how a user deals with a large data set depends on how often they will use it, how much disk space they have available, what type of analysis is needed, etc. Heavy users also need information about more efficient ways to process information. The SAS consultant is available from 8 to 5 by appointment. Many questions are handled by phone or though VAX MAIL.

WHAT DIDN'T WORK

Some ideas sounded great on paper but in practical use, just didn't work for us. Attendance at the free two week long seminars was a problem. We felt that there were basically two reasons for low attendance. First was getting the word out to the people interested. Announcements to advertise the classes in various campus publications increased registration for classes. A phone call the day before the classes to remind those registered increase attendance. The second reason for low attendance was that many users were not convinced that the classes were worth their time. As various users have attended the class and had a good and useful experience the word is gradually spreading. Sending each attendant an outline for the lecture series is helpful in attracting them to the sections of interest to them.

Another idea that seemed to be a solution to the problem of helping students in the main computer lab was to have a staff consultant on duty to answer SAS questions at specific times of day. This had very little success. Since UALR is a commuter school, many of our students are employed, leaving them limited and often inflexible time
schedules. What grew from this idea and has had some success is allowing the students to send questions to the SAS consultant through the VAX MAIL utility. This causes a minimum increase in work for the consultant and gives the student a source of additional information.

SAS Example programs are available on disk to any user. It was thought that a user who wanted to use a specific procedure could use the on-line examples as a guide. Unfortunately, very few users were interested in looking through the examples. They prefer to use the manuals or ask the staff consultant personally. The examples were, however, very helpful for a few advanced users as well as the SAS consultant.

IN THE FUTURE AT UALR

SAS PC. We have recently obtained a site licence for the PC version of the SAS system. We predict the use to be low for at least a 6 month period since very few users have equipment that will support the use of the SAS system on the PC. In that time we plan to develop a short workshop to help users with the transition of their SAS skills to the SAS system on the PC.

SAS Computer Aided Instruction. We have always been interested in the SAS Computer-based training but with budget restrictions, purchase from SAS Institute was not possible. However, a graduate student in Health Services Administration at UALR wrote a Computer Based Instruction program as part of an assignment. This "home grown" tutorial CAI will be available to the computer users for the first time this semester. We have hope that it will be an aid to all of the SAS users. The CAI is written in BASIC and can be accessed in modular form so that specific topics can be reviewed. Examples of the most common PROCs are given along with some explanation.

SUMMARY

The support of SAS users at UALR has required that the department of Academic Computing Services be flexible and willing to try various combinations of solutions. Users have different needs depending upon their current knowledge and purpose for using SAS. The support staff has to identify the needs and devise the most effective and efficient method to fill the gap for the user.

Important lessons learned include the value of good documentation for both the user and consultant, good communication with the users and use of a combination of classes, meetings and handouts that fill the gap between what the SAS user knows and what they need to know.

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