

END-USER TRAINING AT A NEW SAS SITE

by
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As a Sociologist, and SAS analyst/programmer, who has been involved in the introduction of SAS at two different sites, my major questions are: what were the differences/similarities and why were the two outcomes so different? An examination of each of the sites in terms of the following variables may provide some insight into these reasons:

- A. TWO SITES - Purposes for Introducing SAS.
 - 1. Operating Environment;
 - A. Installation:
 - i. IBM;
 - ii. PC;
 - iii. Ease of Use.
 - B. Other Languages;
 - C. Place of SAS in the Structure;
 - D. What Else Was Going On.
 - 2. Role of Management
 - A. Management Structure;
 - B. Commitment of Management;
 - C. Background and History;
 - D. Position of Implementing Manager.
 - 3. Role of the Analyst/Programmer/Trainer;
 - A. Programmer;
 - B. Analyst;
 - C. Support/Help Desk
 - D. Documentation;
 - E. Applications Development/Testing/Installer;
 - F. Trainer.
 - 4. Role of the End-Users;
 - A. Personal Characteristics;
 - i. Programming/Analytical Skills;
 - a. The Programmer as Detective;
 - b. Knowledge of their data;
 - c. Knowledge of project development methodology;
 - d. Knowledge of the organizational structure.
 - ii. Commitment and Motivation.
 - B. Position in the Structure;
 - i. Importance of the data and analysis to the company/institution/agency;
 - ii. Expected Rewards;
 - iii. Time to PRACTICE, PRACTICE, PRACTICE.
 - 5. Types of Training;
 - A. Data Coordinator Workshops;
 - B. Introduction to SAS;
 - C. Hands-On Training;
 - D. SAS Users Group;
 - E. SAS Newsletter;
 - F. SAS Source Code Library;
 - G. Specific Programs and Documentation.
- B. TWO OUTCOMES - Recommendations

As a confirmed believer in SAS and all its power as a computer language, I have had two separate professional experiences in which I was hired specifically to introduce SAS System to end-users. At one installation (a data processing center for a state agency who acted as an overseer for the higher education institutions of the state), which was located at the state's largest state university, I was hired for the following reasons:

1. To re-write an entire data collection, editing, managing, and reporting system in SAS.
2. The major goal for this re-writing was to produce a portable system that could be shipped to each one of the state's higher education institutions, thus providing the schools with their own editing and reporting system.
3. To streamline and automate the data collection, editing, maintenance, and reporting system for the state agency.

At the second site, a large health insurance company information system, hereafter known as the HIC-IS, I was hired to perform two slightly different functions:

1. To "provide decision support for the upper-management level of the company, primarily the marketing, auditing, and actuarial departments."
2. To "provide end-user training in SAS for other departments as their needs become apparent."

I spent five years at the first installation; during that time, I was a programmer, analyst, and finally, project manager of the state agency's data support team, hereafter known as DST. During that time, the DST created an entirely new editing and reporting system that encompassed twelve different files. These files contained data concerning budgets, buildings and facilities, courses, students, degrees, faculty, financial aid, vocational education students, as well as a reporting system that included cost allocations, student tracking, enrollment verification for auditing purposes, and financial aid projections.

My success at the other site was much less spectacular; there were a few converts in a few selected departments; there were many more failures. In both instances, I experienced much personal and professional satisfactions as well as many disappointments; but have not lost my faith in the power of SAS as a resource for end-users who need INFORMATION, NOW.

OPERATING ENVIRONMENT

In the beginning, at the HIC-IS, there was IBM, on which SAS had just been installed. The SAS installation consisted of BASE SAS only; SAS/FSP, SAS/STAT, SAS/AF, ASSIST, SAS/ACCESS for the DATACOM DB files were all considered too expensive and too costly in terms of machine resources to acquire. There was no SAS link between the mainframe and PCs; the only means of mainframe-to-PC communication was through FTTERM - a mainframe-to-PC software that can move text or binary data from one to the other. The only SAS application was the Merrill Expanded System (MXG) for computer performance evaluation (CPE); two people in that department were responsible for learning how to use it and to produce reports for the IS manager.

There was one PC with SAS installed on it, which was located in the Actuarial Department. One person in that department used SAS on the PC sporadically. These two department comprised the total SAS usage at that time.

The IBM SAS installation, Version 5, however, was very poor; for example, the first systems programmer in charge of the installation had hard-coded the work space - 25 cylinders - and so this parameter could not be over-ridden; it was almost impossible to get a job against a large data-file to run to completion; if there was a PROC SORT, it would not run at all. Fortunately, the two MXG systems people replaced this systems programmer; they were more willing to listen to me and SAS Institute concerning the installation of SAS. As a consequence of the lack of SAS/ACCESS, the DATACOM files had to be accessed through a VSAM transparency -- another road-block for many programmers and end-users. After much negotiation, many discussions with SAS Institute systems people, the IS systems people were able to improve the performance of the SAS installation. This fine-tuning of SAS was accelerated because I was able to help the next two systems people get MXG up and running, and show them how to produce the customized reports demanded of them.

In the beginning at the DST institution, SAS was already a part of the academic environment; many departments used it as a teaching and research tool; some quite extensively. A help-desk existed with two very good SAS support people. The installation of SAS had gone through several versions and so had been fine-tuned and was working very easily and efficiently. This crucial difference in the two new SAS sites influenced the outcomes considerably.

The PC/SAS software had not yet been perfected, but had been announced. This facility, along with the commitment by SAS Institute to multi-vendor architecture, were major reasons for selecting SAS as the software of choice by the state agency. PC/SAS could be transported to all of the higher education institutions (hereafter known as HEIs) and would be relatively easy to use and learn. This was essential for the state agency. The HEIs each had different types of operating systems - some had VAXs, some had IBMs, some had other lesser known means of providing data for the state agency's database, some still sent their data to us by means of cards, or paper listings.

ROLE OF MANAGEMENT

The fine-tuning mentioned above at the HIC-IS, however, did not occur over-night. My first training assignment was to train several of the HIC-IS programming staff, who would then become a SAS Team, who could provide production reports and information for the end-users. The difficulty of running even simple SAS jobs, however, led to much frustration on the part of the SAS Team. For this reason, along with a general resistance to learn a new language, and for other environmental reasons, led to the failure of this major goal.

At the time SAS was introduced and I started work as trainer and decision support person, the HIC had just become part of a larger health insurance corporation, a merger of three HIC plans from three states. The HIC-IS in Albuquerque became THE Information System for the HIC as a result of the merger. This merger and designation as THE IS brought about enormous technical and organizational changes for the HIC as a whole and especially for the IS staff. Purchase and installation of a new mainframe, design and implementation of a huge corporate database, standardization of data and definitions across three individual state entities, and increased hiring and relocation were only a few of the massive changes that occurred.

The introduction of SAS and training of the programming staff was only a small part of these disruptions and relocations. As a result, the programming staff adopted a "wait and see" attitude: other software, such as EZTrieve, had come and gone; why spend time learning another language which would also be gone in a short time. Being a COBOL shop, the programmers were also suspicious of SAS because they did not understand how it worked and so did not trust the language to provide the correct results.

The programming staff was also reluctant to buy into the use of SAS as a reporting language because the decision had been made rather arbitrarily by the top management of the IS. No discussions or requests for feedback had been part of the planning or implementation phase of the installation; many of the programming staff felt that the reason for introducing SAS was to provide management with a check of their work - a subversive movement employed to lower salaries or to bring about lay-offs. Only one member of the programming staff had ever used SAS before.

This "wait and see" attitude, and the huge backlog of projects already defined for the increasing numbers of the programming staff, led to a re-definition of goals by the management: train the end-users to use SAS to obtain information for themselves. SAS was easy to learn, it would be a simple matter to buy every user a PC, install SAS on it, let them download their own data sub-sets and do their own processing.

This decision to get the users "off the mainframe and out of TSO" was made by the Director of the HIC-IS. He had previously worked in another IS where SAS was installed on the IBM mainframe under MVS and on a VAX using VMS. He could remember all the problems that existed at the other SAS site and insisted that "end-users definitely could not use TSO and JCL" and so they should now be confined to the PC. It was simply a matter of providing enough PCs and training.

At about this time, major changes were also occurring in the other two states. One state hired two additional SAS people: one was in the Market Research Department, the other in Business Systems and Planning. The SAS person in Market research had previous SAS experience in another HIC; the BS&P person had no knowledge of SAS. Consulting, training, and support for these additional people were now part of my job description.

As a result of bringing in an un-trained person in BS&P, a rumour started in that particular HIC that upper management really had not made a firm commitment to SAS and so were not willing to provide the support needed to help end-users. This rumour had additional verification from the fact that management was slow in obtaining PCs and PC/SAS software; at the end of my first year, only four more PCs had been purchased; further, only seven copies of BASE, STAT, and GRAPH, with one copy each of FSP and AF, had been licensed. To heap insult upon injury, one of the SAS/PCs was located in the locked programming area where no end-user was allowed. The by-word of IS management was "sharing the software." The director would walk by the PC in the locked area and see that no one was using SAS, so there really was no need to increase the number of PCs or SAS licenses. Finally, HIC management allowed end-users to take funds from their budgets to purchase PCs and SAS licenses.

The role of management at the DST was very different in many ways. The original decision to re-write everything in SAS was made by the state agency director and staff. They were totally committed to this project from the start. The old edits and report programs had been written in the early 1970's when COBOL and eventually, MARK IV, were all that existed. The programs and routines were costly in terms of maintenance, impossible to change, and did not fit the present data and informational needs of the state agency or the other HEIs. The state agency's need for timely information for planning and decision making was just as important as that of the HIC-IS.

The DST was isolated from the rest of the university's programming staff, so none of them felt threatened. The DST were technically employees of the university, but the state agency made all decisions concerning their work priorities, travel budget, allocation of time and staffing, as well as directing the purchase of new equipment. All of these resources were made available to make sure that the DST had what it needed to reach the HEIs goals of portable programs, automated data collection, and streamlined reporting systems. This eventually included data/report transfer by electronic network.

ROLE OF THE TRAINER

As the only well-trained SAS person at the HIC-IS, I became the major resource for SAS. I was named site co-representative and PC/SAS coordinator; I became trainer, consultant, keeper of manuals, help-desk person, and programmer. A few months after I was hired, an additional contract programmer who knew SAS was hired to assist me; however, he only lasted six months.

The major tasks of the PC/SAS coordinator were documentation, testing, and definition of standards, procedures, and policies. Creation of a PC/SAS dataset allowed tracking of the various PC/SAS license holders ensured proper allocation of license costs. Testing became a priority when the HIC-IS obtained Version 6 and a BETA-TEST version of the DATA STEP VIEW. A COBOL-2-SAS translator module won a few converts among the usually resistant COBOL programmers.

The STORM project, IS-wide in all three states, required specific documentation on procedures for obtaining a SAS license, as well as the vendor, JCL and other programming standards, and library information. A major problem faced in this STORM implementation, of course, was the unique structure and form of SAS JCL and programming syntax. These characteristics do not fit well into a COBOL format.

As part of my first tasks, I was attached to the Corporate DataBase Team (hereafter known as the CDB Team); as such I was required to provide listings of invalid data and short reports in order to show the value of the CDB and SAS. As soon as end-users became aware of the power of SAS and the speed of programming, I was swamped by hundreds of "small requests". The end-users were so desperate for information, which in some cases had been two years coming out of the IS department, they rushed to get me to do their reports.

I found myself in a major dilemma: these reports were needed to show end-users the ease, speed, and flexibility of SAS programming, and worked very well as a selling point; but the more sold on SAS end-users became, the more requests I received.

Further, most of the end-users did not have enough information about their data and about the specific structures of the data files. Many did not even know where the specific information or data could be found. As a consequence of many of these "small requests", I spent vast amounts of time analysing some of the problems and researching the data structures of the entire HIC-IS information base. Then came the negotiations always necessary in a user/programmer relationship. The more information an end-user received, the more they wanted.

The final result of this dilemma was partially resolved in one more re-organization: I was moved from the CDB Team to a newly organized Quality Incentives Group; my only duties are testing, training, and consulting. This has left many of the "small requests" un-finished, and imposed an old IS project request system on my priority listing, but it has freed up my time to be used more effectively.

The role I played at the DST was different in some ways, but very similar in many others. I was not alone there; the project manager was a SAS expert, one other programmer had some SAS experience, and the third programmer was committed to learning SAS. As a team, we all became consultants, trainers, help-desk staff, documentation experts, as well as analysts and programmers.

The first major task we faced was that of documentation. The old programs were poorly documented; many were nothing more than "spaghetti code" and black boxes. There was a tremendous amount of oral history, taken-for-granted definitions of data elements, lost programs, and other mysterious work-flows and undefined tasks. The data collection, editing, and processing was three years in arrears when I came on board.

The next task was that of training the data coordinators at each of the thirty HEIs in the state. We instituted data coordinators workshops - three-day conferences, held twice a year at first, to provide training in the collection and submittal of data to the DST for editing, processing, correcting, and reporting. These workshops consisted of working through all the database files, clarifying definitions, re-defining coding schemes, standardizing submittal and edit/correction procedures, and best of all, supplying the end-user HEIs with a support base -- someone to call on for help. The workshops were another key variable in the success of the DST and HEI switch-over to SAS.

The final portion of the training scheme at the DST was that of one-on-one interaction between the DST and the HEIs data coordinators. By assigning each of the files to one of the DST members, each DST member became a responsible resource for helping the data coordinator, or HEI person, responsible for that file, who was then required to provide correct data for that file by the deadlines. This worked very well. When I became project manager, I acted as liason between all the HEIs and the state agency staff, often running interference for them when the state agency became unreasonable; on the other hand, I cajoled the most unruly data coordinators into getting their data in on time for processing.

ROLE OF THE END-USER

The skills of the end-users at the HIC-IS varied from that of an expert in the Market Research Department to a nurse/computer novice in the Health Information Resources Department. As I said before, many of the end-users knew nothing at all about their own data or the relationship of their particular area of the entire information systems database. A few of the end-users had some knowledge or felt they knew where to go to obtain the information about their particular data file; in many cases, the user knew programmer who had written the original report. The problem then became one of locating the documentation for the original report program, a task which often proved to be impossible. Many knew nothing about programming structure, PCs, or even computers in general. Most of the end-users had no knowledge of project or application development methodology; they had no completed report specifications or, in the few cases where the specs existed, somehow changes were in order. To make matters even worse, many were new in their positions and so were not even aware of what particular information they needed.

Some of the end-users had come from other HIC-IS departments and were already confirmed believers in COBOL and so shared the traditional programmers mis-trust in SAS. This user mis-trust combined with lack of knowledge about the data files on both our parts led to many programming disasters. Every user had a dead-line of TODAY, but wanted reports that involved very complex data files, such as the claims files, or involved intricate data manipulations to arrive at a specific statistic or calculation. All of these further deepened the mis-trust and suspicion of SAS.

An allied problem associated with this mis-trust arose due to the nature of HIC data in general. Most of the files were enormous; the membership record was 796 bytes long; the claims record contains a header record and many detail records per claim; the personnel record is almost 5000 bytes long. When a user wants summary data of combined subscriber/member/income/claims paid for a year, this involves extremely large numbers and many variables: long and wide files. To process data for a situation like this is impossible to do on a PC; summary work and data manipulation must first be done on the mainframe. Due to the aforementioned policy - "No End-Users on TSO", this means someone else must pre-process for later downloading to the PC. This required a production process by which data could be accessed, pre-processed, and put into a binary dataset for downloading.

Those end-users who had the knowledge of data, and the background to become SAS programmers often were in managerial positions; this group did not have the other element crucial to success a SAS programmer: TIME. To become proficient in SAS, one must practice, practice, and practice. This group simply could not afford the time to analyse, design, and code the programs needed to acquire the needed information. This group was more likely to detail the "small requests" and did not want a SAS trainer, but a SAS programmer on call.

In many other cases, the management of a department would provide lip service to SAS; they would like very much for their programmers or clerks to learn to use SAS and so provide their own reports, but when it came to allowing the clerk or programmer the time to really learn to use SAS it was a different matter.

The skills of the end-users at the different HEIs also varied greatly; while some might have the skills, they had no equipment. The state agency made funds available to these HEIs so they could purchase needed PCs or otherwise improve their data collection process. Paper and cards were no longer acceptable for processing. Data could be submitted only over network, or on tape or diskette. Standardization of the data submittal process was a major step in the overall improvement of the processing flow. When it was necessary, the DST made site visits to install SAS for pre-editing or provided training on the PCs or tape preparation. All these extras gave the data coordinators added incentives and motivation for being on time. Also, there was always the influence of the state agency and its power to sanction the late comers; this was a major factor in the overall improvement of the total learning curve of the data coordinators.

TYPES OF TRAINING

This variety of end-user types at the HIC-IS required a wide variety of training techniques. I developed an Introduction to SAS - a broad, very general overview of the entire SAS System. This training session was primarily for managers and department heads. I designed specific reports and a SAS/GRAPH demonstration using the specific department's data files. This session was intended to give the managers some insight into the potential uses for SAS.

Once the managers had been given the Introduction to SAS overview, I asked them to determine specific people in their department for further training. These training sessions were held often, on a regular basis, with specific detailed tasks to perform. These training sessions included TSO basics, JCL routines, introduction to the SAS Source Code Library and SAS Sample Library, and an introduction to PC/SAS where appropriate. In many cases, it included a basic introduction to PCs. These users formed the basis for the internal SAS Users Group.

The Users Group met once a month to discuss the various data files used in common and share programming tips. This provided a forum for helping each other; other contacts were available besides the one trainer. I also provided extra training on special topics, such as TABULATE and the MACRO language at these meetings. A similar Users Group was formed in one other state; SAS has not yet been introduced in the third state.

A SAS Newsletter written and distributed by me, also provided a means for recognition of the various SAS users from the two major states. Whenever a SAS programmer wrote a particularly good or useful program, this was included in the SAS Newsletter. The Newsletter also provided a forum for little-known quirks in the HIC-IS Database schemes.

A major success at the HIC-IS has been the construction of the SAS Source Code Library. This library is open for all to browse and copy code as needed; it also provides examples of the standard coding structures which have been mandated by the standards and procedures. It contains the SAS INPUT statements of all the files I have been able to identify. Many of these INPUT statements were created by the COB-2-SAS software or take advantage of the DATA STEP VIEW technique; some are PROC SQL routines; others are specific programs that have been written by the end-users.

As stated before, the major training techniques at the DST/HEIs were the data coordinator workshops and the one-on-one interactions between DST and the data coordinators. These workshops were not just SAS training sessions, but dealt with many other issues: how to copy data onto tape, record layouts, discussions of data dictionaries, how to install SAS on a PC, documentation structures, and a lot of just fun get-togethers. The social interaction of the DST, data coordinators, and state agency staff led to much better working relationships and made it easier to force deadlines, as well as give the data coordinators a feeling of responsibility for their data submissions. When the end-users realized that someone out there really looked at their data when submitted and that serious use was made of it (submittal to the state legislature for allocations decisions), they were much more inclined to care about the quality and integrity of the data.

TWO OUTCOMES

The differing outcomes at these two SAS sites were the result of many differing factors, but the major issues were: the operating environment, the role of the initiating management, the perceptions of the end-users, and the role of the trainer.

The long history of SAS processing at the DST/HEI site was a crucial factor in the successful outcome at this site. Hope still springs in this trainer's heart that when more time has passed at the HIC-IS, major successes will also occur there.

The total commitment on the part of the state agency staff to the use of SAS and the importance of the purpose for using SAS were key factors in the overall outcome at the DST/HEI. The staff never waived; all possible speed in obtaining PCs, new SAS software modules, and providing support for training and SUGI travel costs were major plusses at that site. This commitment continued through a reorganization at the university and also through a change in staffing at the state agency.

The isolation of the DST as SAS programmers was beneficial at the DST site; I not sure what the total effects of this isolation will be at the HIC-IS. So far, the results of this isolation have been ambiguous; because SAS users are isolated from the traditional programming structure and project request process, training and production of reports have been expedited. On the other hand, the SAS arm is seen as somehow temporary, not real, and not valid as a means of accomplishing particular goals. When a new major application was needed, SAS was the first choice of the requesting department; HIC-IS management and programming staff made the decision to go with COBOL. At this point, I just do not know what the future of SAS at that site will be.

There have been major successes at the HIC-IS site. One department has just entered the world of end-user processing and have SAS on four PCs in their office. Intensive one-on-one training should provide them with the skills they need to develop applications and reporting routines. Routinely, requests for ad-hoc reporting programs come to me; I am just not allowed to produce code for these requests anymore. In some ways that is beneficial to the end-users; they are forced to do their own analysis and SAS source code for the report.

It may be that five years in the future, introduction of SAS at the HIC-IS will be viewed as a major successful outcome, also.

RECOMMENDATIONS FOR IMPLEMENTING SAS AT A NEW SITE.

Based on my years of experience in two different new SAS installations, the following recommendations seem in order:

Make sure that all the problems in the installation have been worked out before you introduce SAS to end-users. Make sure that you as the trainer are the one to suffer the frustrations of testing and not the end-users. Make use of the Technical Support Staff at the SAS Institute; occasionally, I have called only to find that the problem was a stupid mistake on my part, however, more often it is a problem with the manual's wording or some unknown little quirk. In any case, the Tech Support Staff are extremely helpful.

Make all possible use of the sales support at SAS Institute; if the SAS Institute marketing and sales departments were always on the door-step (as is the case with IBM, FOCUS, and CASE), selling their product and pushing the advantages of the SAS System, we who are located in the trenches would not have such a hard time selling new enhancements, such as EIS, and better use of machine resources to the upper management. We are not salesmen; we are the workers and as such have no real voice in the decision making process.

Make the end-users investigate, analyse, determine the end products, and sign-off on a request before you begin coding; investigation and analysis can be part of the training, but do not write a word of code or prepare any output until the user knows everything there is to know about the data and what he/she wishes to obtain from it. Occasionally, first looks at the data may be mandatory, but keep these to a minimum -- nothing more than listings or frequencies of particular fields.

Determine the organizational structure of the installation site. Who are the key decision makers? What is their background and history in terms of software and computer applications? Where are there trouble spots? How can you win these people over to SAS?

Decide which side you are on -- the side of management, or the side of the end-user. I was a liason person at the DST/HEI site; I acted as negotiator and mediator, bringing about conflict resolution when needed - sometimes compromise, sometimes helping to sway the management or user to go more than half-way to get the job done. I tend to be on the side of the users at the HIC-IS site; they are so desperate for information; there is an incredible database of information there, much of it un-touched and un-analysed. They seem to be fighting a monstrous, immovable bureaucracy, trying to obtain what they need from data they provided, their side seems the more charitable, more honorable, and perhaps, the most disasterous for me.