HELPING YOU SELECT THE BEST METHOD FOR TRAINING EMPLOYEES IN THE SAS SOFTWARE

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The SAS® system software has become extremely powerful and varied in recent years. While these expanded capabilities have been hailed as improvements, they have resulted in a more complex language, and consequently a more complex training challenge. In addition, the diversity of student backgrounds, the complexity of the IBM TSO/SPF environment, and the cost of training increase the training challenge. These factors, combined with the various methods that are available for training employees in the SAS software language, make it imperative for trainers and managers to have some guidelines by which to select the best method for training their personnel in the use of the SAS software.

This paper provides some guidance for these decision-makers. It begins by identifying some of the widely accepted characteristics of adult learners. Then, it compares and contrasts various methods used to train students in the SAS software on the basis of their strengths and weaknesses and on the basis of cost. It concludes by offering suggestions for resolving this training dilemma and provides suggestions for further research.

Most SAS trainers have already experienced some of the difficulties of training students in the SAS software language. Some of these difficulties are listed below:

1. SAS is broad, varied and complex.
2. Students have diverse DP backgrounds and training needs.
3. In an IBM environment (with TSO/SPF) you need some experience with the IBM Job Control Language (JCL), TSO/SPF, and an IBM 3270 series terminal.
4. User resistance to training and preconceived ideas about SAS.
5. Students may be unwilling to identify training as a priority and/or their supervisors may be unwilling to afford them adequate time for the training that they need.
6. Employers may think that training costs too much.

7. It is difficult to know whether to use computer-based training, video tape training, SAS Institute live training courses, self-developed live training courses, consultants, or some other method for accomplishing the training.

In order to determine which training method is the best one for you, a rating system must be established. Table 1 lists sixteen widely accepted adult learning characteristics and reflects our rating of the five most commonly used training methods. A rating of "1" would indicate that this method of training is highly effective in the area identified by this adult learning characteristic. A rating of "5" indicates that this training method is least effective in fulfilling this training characteristic.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>RATING OF TRAINING METHOD BY ADULT LEARNING CONCEPT</th>
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<tbody>
<tr>
<td></td>
<td>TRAINING WHEN NEEDED</td>
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<tr>
<td>Method</td>
<td>Training is available when I need it</td>
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<td></td>
<td>Need to know why we do it this way</td>
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<td></td>
<td>Learn best with practice or continued use</td>
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<td></td>
<td>Variety of methods and varying experiences improves learning</td>
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<td></td>
<td>Real life experiences improve learning</td>
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<td></td>
<td>Learners build upon previous learning</td>
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<td></td>
<td>Informal environment is helpful</td>
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<td></td>
<td>Self-direction is important</td>
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<td></td>
<td>Learners need feedback on progress</td>
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<td></td>
<td>Once motivated, learners will attempt to get the most out of their training</td>
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<tr>
<td></td>
<td>Solving job related problems rather than simply gathering new information</td>
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<td></td>
<td>Relate training to knowledge base</td>
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<tr>
<td></td>
<td>Level of involvement</td>
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<tr>
<td></td>
<td>Has professional interest</td>
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<td></td>
<td>Allowances for differences in the group</td>
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<td></td>
<td>Motivation of the desire to learn</td>
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<tr>
<td>Average</td>
<td>3.6</td>
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*Least = Most Effective
The averages shown at the bottom of Table 1 indicate that a consultant-based training would be the most highly effective, and the SAS Institute live training courses and videotapes (although very well done) are the least effective. This finding is understandable as an internal company consultant can make the training highly personalized, while the SAS Institute training must be much more generic and applicable to a number of computer operating systems.

While the results of this rating are very interesting, there are other factors which need to be considered also. These factors include the following:

1. Number of students to be trained.
2. Availability of instructors.
3. DP background of students.
4. The bigness of the SAS software.
5. Differences in learning styles.
6. How many students will actually go on to use the SAS software?
7. Urgency of the need for the training.
8. Is the training up-to-date?

To investigate the problem further, a cost comparison of the various SAS software training alternatives was done. The estimated costs per student-hour are shown in Table 2. Video-based training courses and computer-based training courses become considerably less expensive per student-hour as more students complete them. The other forms of training shown in this table do not appear to experience this same effect.

**NOTE** - The costs shown below are based upon some assumptions and approximations that may not hold true at your company. Also, the costs do not include the costs of the students' salary while taking training, the cost of the SAS software installed at your site, or the administrative costs associated with taking training. The courses taught by the SAS Institute include the cost of the "SAS Introductory Guide", the "SAS User's Guide: Basics," and the "SAS Views." Other course costs include the cost of student handouts, but not the cost of the SAS manuals.

Public course costs are estimated at $1000 to take a three-day Basics class. The $1000 includes tuition, air fare, meals, and lodging. The same estimate is used whether the student takes the course at SAS Institute or at some other location such as Chicago or Dallas. However, in reality it is recognized that the air fare to Chicago (from Minneapolis) usually would be considerably less than it would be to some other, more distant, city. The hourly cost is the result of dividing $1000 by the length of the course. e.g., $1000 / 20 hours = $50 per hour.

On-site courses are defined as those courses where a SAS Institute instructor teaches a class at your location. With a full class of 20 students the cost for this type of course will be somewhere between $250 and $300 per student. Therefore, $300 / 20 hours = $15 per hour.

SAS produced video courses are available for $2000 for the first year and $1500 per year thereafter. This course includes video tapes and a workbook. The course takes about ten hours to complete. If 15 students take the course each year, the course cost will be approximately $13 per hour. ($2000 / 15 students * 10 hours.)

CBT (Computer-Based Training) Courses for SAS are produced by CRWTH Computer Coursewares of Los Angeles, California and SAS Institute. In this example, the cost is based upon an annual site license for the CRWTH SAS CBT Course and the pro-rated cost for the $360 monthly cost for the IBM IIS driver software that is needed to present the CRWTH CBT classes. The $4200 site license plus the $500 annual pro-rata cost equals $4700. The figure must be divided by the average time to complete the course (15 hours) and again by the 15 students used in the example. Thus, the cost per student becomes $4700 / 225 hours = $21 per hour.

Self-developed courses are costed out at a charge of $100 per hour for the instructor. This $100 is based upon an overhead cost of $25 per hour to maintain the instructor on the staff, and an estimated four hours of work for the instructor outside of the classroom for every hour in the classroom. Also, it is based upon the assumption that the company did not have to train the
instructor from scratch. Assuming an average of 8 students per class, the cost is $100 / 8 = $12.50.

The $30 per hour for consultant time is based upon the estimated cost of salary and other overhead associated with maintaining a consulting staff.

Based on all of the considerations discussed so far, let’s look at the SAS training curriculum for Minnesota State employees.

SAS TRAINING CURRICULUM FOR MINNESOTA STATE EMPLOYEES

Often State employees enter the SAS training program by signing up to attend the regularly scheduled "Introduction to SAS." This class introduces students to basic SAS terminology, some basic SAS procedures, JCL, TSO, and the IBM 3270 series terminals. The class lasts four hours and includes over an hour at the terminal submitting sample SAS programs.

Following this class, if the student asks "What do I take next?" the instructor will work with the student to determine his or her DP background and which part of SAS that the student wants to use. If his or her background is weak and the student wants to do some moderately difficult SAS programming, the next step would be to enroll the student in some of our CBT courses. These include learning about the keyboard for the terminal: TSO/SPF; and the basic SAS language. Then, we would encourage the student to come back to see us to obtain help in doing the SAS exercises that are part of the CRWTH CBT course, and would even encourage them to start their actual SAS application while still in SAS training.

Following the completion of Parts One and Two of the CRWTH Course, the student would be encouraged, as applicable, to attend one or more of the three SAS demos that we offer: SAS/FSP*, SAS/FSCAL*, or SAS/GRAPH*. Also, they would be encouraged to continue to come back for additional assistance (consulting) as often as needed for their specific application.

Occasionally, students will come directly to the Information Center to ask for assistance in SAS programming without first going through the "Introduction to SAS" class. When this situation occurs, we interview the student to determine their training needs, and work with them to develop a training plan. Depending on the needs of the student, the plan could include formal and informal training, or if the student already has a strong DP background) information about how to obtain the SAS manuals and a short introduction to the use of SAS at our installation.

The following examples discuss how two particular students were trained, and serves to illustrate the time and costs involved in the process.

Example 1:

A secretary with little DP background asked for assistance in setting up a file of State Assessors and printing an alphabetical listing of them. She had another end user in her office with some SAS knowledge help her with some of the basics of the SAS Full Screen Product (SAS/FSP). The Information Center staff worked with her to set up a permanent disk file for storage of her files, a data entry screen in SAS/FSP; a program to print her report; and a program to back up her files to tape. The only formal training that she completed was the keyboard familiarization course for the IBM 3270 series terminal, and the SAS/FSP demo. Her training costs are shown in Figure 1.

Example 2:

Another employee wanted to automate the totally manual system for maintaining the Department of Health's restaurant inspection reports. There are more than ten thousand of these reports covering the last three years. She elected to put them on a SAS file and access them through SAS/FSP. She completed a number of courses including Keyboard Familiarization for the IBM 3270 series terminal, "TSO/SPF For End Users", JCL, SAS CBT parts One and Two, and the SAS/FSP demo. In addition, she required considerable consulting time as she had no one else in her immediate area to turn to for assistance. Her training costs are shown in Figure 2.
CONCLUSION

To capitalize on the strengths of the various training alternatives and still remain cost effective, our SAS training curriculum:

- Attempts to be timely
- Has built-in flexibility
- Explains 'why' something needs to be done a certain way
- Builds on the learner's base of established knowledge
- Blends a variety of presentation methods and sensory experiences, and
- Makes training available when the student needs it.

In addition, our curriculum approach results in personalized training in SAS for the end user or DP professional through the following:

- "Hands-on" experiences with the terminals are provided in all SAS classes and demos and with "real life" type exercises where possible.
- Class limit of eight in "Intro to SAS" and a limit of four in demos.
- Development of training curriculum (live classes, CBT, and SAS demos) specifically for each student considering their DP background, TSO or JCL experience, use of other mainframe or microcomputer packages, and unique SAS needs.
- Includes emphasis on developing the user's own SAS application during the training.
- Uses Information Center Consultants to work with students individually as needed during their training.
- Breaks down big SAS training problems into smaller, more manageable ones.
- Adapts classes to the needs of the students, when possible.

In summary, we think that our curriculum approach has resulted in a solid, yet cost-effective training for Minnesota State employees.

Suggestions for Further Research

This paper has compared and contrasted the effectiveness of various training methods in light of some of the things that have been discovered about how adults learn. While each training method can be shown to encompass certain strengths and weaknesses, there is a need for further research. Specifically, control groups of students who want to learn SAS could be established. Assuming that these students have various degrees of computer and business experience, they could be grouped as closely as possible by type of background, and then they could be taught SAS through a variety of training methods: live classes, CBT, video, and combinations thereof. Then, if a measurement instrument (test or practical exercise) could be devised to determine the level of proficiency attained by each student at various checkpoints, i.e., 20 hours, 40 hours, and 60 hours, a more complete comparison could be made of the actual costs of the training required to bring a student up to a predetermined level of proficiency in SAS. Then, it would be possible to more authoritatively determine the most cost-effective method of training students in the SAS software language.

*SAS, SAS/FSP, SAS/GRAPH, and SAS/FSCLC are registered trademarks of SAS Institute Inc., Cary, NC USA

References for further Study: