Abstract

Many SAS® software installations are faced with a growing demand for training. You have two options to consider in meeting this demand: develop your own training materials or select training from a vendor. Developing your own training is time-consuming and costly. Purchasing or licensing off-the-shelf training from a vendor saves time and money.

Many vendors offer training on a variety of topics. You’ll also find courses in different media, such as instructor-led, video, and computer-based. With so many choices, how can you compare the offerings of different vendors and select the product that best meets your needs?

This paper outlines a method you can use for comparing different products (even those from different vendors) and suggests some criteria to aid your selection process.

What about developing your own training?

If you develop the training, you may be able to produce exactly the training needed by your company. You can use familiar company data and situations to help trainees focus on the tasks to be learned. You can ease trainees’ transition between applying new skills in classroom exercises and applying them on the job.

But, it takes time and skill to develop training materials. It has been estimated that it takes between 10 and 40 hours of development time to create 1 hour of instruction—depending on the medium. Even if you have the time, do you have the facilities you need to design a course in the appropriate medium?

For many people, a training course means classroom instruction. But there are many situations where other training media are better choices. Suppose you need to train one new SAS user per week. You’d probably offer an instructor-led course once every six to eight weeks, waiting until there are enough students to make the class worthwhile. Consider the person who has to wait six weeks for the training. That person could have spent the six weeks completing video or computer-based training and then productively putting the information to work on the job.

What about selecting vendor-produced training?

Granted, if you have the time and expertise, you can develop training that is exactly what you need and exactly suited to your situation. Vendors must develop generic training designed to suit the majority of their potential customers.

Vendor-produced training has many advantages, though. To remain competitive, vendors must update their courses quickly when software is enhanced. To produce high-quality training, many vendors employ instructional design specialists who are trained in learning theory and course development. To fit different situations, vendors create training in a variety of media.

What’s a reasonable compromise?

Developing your own training can give you exactly what you want. Vendors have many resources to create and update training in a variety of formats. How can you get the best of both worlds? Purchase or license training from a vendor and customize it to suit your situation.

One example of this solution was implemented by a SAS Institute customer. After studying her situation, the training coordinator concluded that her company needed two levels of introductory SAS training. She arranges for the Institute to teach a Fundamentals of the SAS® System course at her site every six months. Prior to the course, trainees must complete an exercise and attend a meeting to ensure that everyone is adequately prepared.

After the three-day Institute course, she holds a half-day workshop where trainees work on their own programming problems under the guidance of SAS experts. The training coordinator tries to have a ratio of one expert for every three or four trainees so that each trainee receives plenty of individual attention.

After the Fundamentals course, trainees contact the training coordinator when they feel they need additional training. Since these requests come one at a time, the coordinator handles them with the Institute’s SAS® Basics: Advanced Topics video course. To customize the video for her company, she prepared a 20-page supplement to the video training materials.

The supplement parallels the video segments and student workbook and explains any differences that may exist between her site’s standards and the information presented in the video. For the most part, the supplement contains information such as the names of corporate data files and where within the company trainees can obtain additional documentation mentioned in the video.

To develop the supplement, the coordinator took notes as she watched the videotapes and worked in the student workbook; it didn’t take much longer than it takes a student to complete the training. Then she polished her notes and had them printed in booklet form at her company’s copy center.

Each person who registers to take the video course receives an Institute-prepared student workbook and the customized supplement. The supplement explains where to view the course videotapes, how to access the data needed in computer exercises, and lists the phone number of the Help Desk where trainees call if they have questions or problems. Trainees can then work through the video course at their own pace.
Steps in selecting vendor-produced training

Once you’ve decided to get the training you need from a vendor, how do you determine exactly what you need, discover what vendors offer training, and make your selection from various options? Here are steps you can follow to accomplish your objectives.

Conduct a needs analysis. Determine what training is needed—and who needs the training; write a detailed description of the trainees. Although you may have been told to provide a course to train all users, your needs analysis may show that there are several distinct groups who need training. For example, for an introductory SAS course, you may have potential users with little or no prior computer experience, users with lots of experience with other software packages but no SAS experience, and beginning SAS users who can already perform a few tasks with the SAS System. A single training product may not satisfy the needs of all three groups.

Construct a criteria checklist. You will be comparing different courses with different content from different vendors. To smooth out potential apples-to-oranges comparisons, establish your selection criteria and prepare a checklist. Details on this activity are discussed below.

Survey the available options. Determine what training products are currently on the market. If you aren’t aware of any vendors who offer training products, ask around. If the training is on a computer software product, the software vendor probably offers the most extensive and detailed training program about the software. There are also companies whose sole business is providing training. In specific areas, such as SAS training, you may find local or regional consultants who offer training and other services. Ask training coordinators at other companies or in local trainers organizations for their recommendations. You’ll also find advertisements in magazines targeted to training professionals. Contact vendors and ask for training information; discuss your specific needs and ask the vendor to recommend specific products to you.

Once you have information from the vendor, look over the available products and determine those that seem best suited to your needs. For those products, the vendor can supply more detailed information, such as a demonstration package or a trial of the actual product.

Evaluate the different options and select. Examine each training product individually. Using your criteria checklist, determine a score for each training product. Select the product that earns the highest score.

Customize your choice. Once the vendor has delivered the training to you, adapt it to your environment. (In the case of on-site instructor-led training, you should work with a vendor representative before the instructor comes to your location.) Preview the training (or delegate this task to someone who knows the information presented in the course). Make notes that will be helpful to the trainees. Note any sections that you want trainees to skip and any sections that you want to modify in any way.

Use your notes to customize the training. You have several choices on how to present your information to students. You can print a booklet that parallels the organizational structure of the vendor’s training materials. You can add transparencies to a trainer’s kit. You can even develop online lessons to accompany computer-based courses (although you probably cannot change the vendor’s online course content).

One of the Institute’s customers uses a SAS video course to conduct classroom training. A video segment is shown to the trainees, followed by a discussion and question and answer session. Then trainees work on that segment’s text and computer exercises as directed in the Institute’s student workbook while the course leader is available for assistance.

Make the training available to your users. By now, you have the best of both worlds: training developed by professionals customized to your situation. Use it to provide the needed training.

Evaluation criteria

There are hallmarks of well-designed training; look for these during your evaluation of each training product.

Do the course materials

- define the audience for whom the training is designed
- have specific, clearly stated course prerequisites
- have performance-oriented objectives
- contain advance organizers for each training segment
- present the tasks to be learned through sample problems drawn from typical trainee experiences
- contain user-oriented language
- serve as good reference materials after the formal training session
- use modular design for self-pacing and ease of review
- allow the trainee to select topics
- incorporate review of key points
- provide plenty of opportunity for practice on realistic problems
- provide specific feedback for practice sessions?

This checklist provides a set of evaluation criteria you can use for evaluating vendor offerings and selecting training best suited to your needs. You may not need or may not find a single training product that meets all these tests: see the section “Construct Your Criteria Checklist” for directions on using these points to create an evaluation tool. First, see the description below of the criteria in this list.
Audience specification. Look for training that has a clear statement of the intended audience and compare it to the specification you wrote during the needs analysis. You will probably find an audience profile at the beginning of the training materials or in the marketing literature provided by the vendor. Sometimes the profile may contain job titles of intended trainees. Beware—these titles can sometimes be misleading. An Information Manager in one company may be a Data Base Designer in another. If the audience specification is written in this form, pay close attention to the course prerequisites to evaluate the training.

Avoid training that claims to be effective for everyone, regardless of previous experience. Such training can be frustratingly slow for experienced users, but too fast-paced and detailed for beginners. Computer-based instruction or instruction contained on interactive videodisc may be an exception to this rule. Using these technologies, course developers can provide many different branches in the instruction so that it is possible for each trainee to have a unique path through the training.

Prerequisites. Prerequisites define the audience in greater detail by describing skills trainees should have prior to the training. Examine the course materials for clearly stated prerequisite skills presented as measurable, observable skills rather than conceptual understanding. Some training may include a protest so trainees can measure their abilities and avoid the frustration of taking a course for which they are unprepared.

Look for prerequisites that describe an observable behavior, as in “You should be able to create and store a column-aligned data file.” Too often, prerequisites are stated in a very general sense, such as “You should know how data is stored in a computer.”

How do potential trainees decide that they know enough about how data are stored to complete the training successfully?

Performance-oriented objectives. Clearly stated objectives describe new skills trainees acquire from the training. Again, these objectives should describe an observable behavior. You should be able to design a postcourse test simply by reading the course objectives.

Performance-oriented objectives state

- who does the learning
- what specific tasks the learner is able to perform after the training
- under what conditions the learner is able to accomplish that task
- to what level of performance the learner is able to accomplish the task.

Look for objectives written with action verbs such as know or understand, how will trainees demonstrate that they have acquired a new skill?

Consider this example objective:

Upon completion of this lesson, you will be able, in no more than two attempts, to write SAS programming statements to an existing disk file by issuing the display manager FILE command.

From this objective, it is clear who will do the learning (you), what will be done (write programming statements to a file), under what conditions (the file already exists and using display manager) and the level of performance (no more than two attempts).

The objective stated above is written to a level of detail you generally do not see. In particular, the level of performance is usually not noted. At the Institute, our instructional design specialists write objectives to this level of detail as part of our course development and review process.

Advance organizers. Advance organizers are like road signs; they prepare the trainee for what lies ahead. These organizers may be a list of topics, a menu screen, or a statement of objectives for the training segment. With this information, trainees can begin building a mental structure for storing information they will gain in the upcoming material.

Sample problems from life experiences. We learn best by example, but the examples must be realistic and related to our experiences and needs. Trainees should not have to concentrate on understanding what problem is being solved in the examples, but how the problem is solved. Look for training that poses problems trainees experience in their daily lives (such as balancing a checkbook) or encounter in their jobs (such as extracting data from a database).

User-oriented language. Technical language can be a major stumbling block for some trainees, especially beginning users. Too often, training materials are full of technical jargon that is meaningless to potential trainees. Of course, one of the trainee’s goals is to learn the jargon, and training should help meet that goal. Look for training materials that are written in everyday language and include definitions of technical terms. The text should use color or a change of typestyle to set technical terms apart from regular text. These terms should be defined within the text, in a footnote, or in a glossary.

In advanced training, the language should be designed for the minimum level of prerequisite skill required for the course. This is a rule of thumb the Institute uses in course descriptions. If you don’t understand the jargon we use to describe our courses, the course is probably not right for you.

Check for circular definitions, that is, new terms that define each other and still have no meaning to the trainee. For example, if the term command is defined as “a computer instruction” and the term instruction is defined as “a computer command,” someone who truly
doesn't understand the meaning of either term has learned nothing.

Reference materials. Check to see if the training materials will serve as a valuable reference for trainees once the formal training program is complete. Do the materials contain a table of contents and a detailed index? What about reference cards, lesson summaries, or general forms of syntax? Nothing is more frustrating than thumbing through several hundred pages trying to find the example that showed how to specify the REPLACE option on the FILE command.

Modular design. People learn best when training is presented in organized units, each with some form of advance organizer. The training needs logical and frequent stopping points so that trainees can mentally assimilate information through practice. Each course segment should present a complete topic that revolves around a single concept. Topics may be reviewed or covered in greater depth later in the training. Modular design usually results in greater flexibility for the trainee, especially in self-paced courses such as video and computer-based training.

Topic selection. One benefit of modular design is that users can select topics of particular and immediate interest, and defer other topics for later study. In some training, such as introductory courses, trainees may have to progress in sequence through the material. Do the training materials distinguish between pick-and-choose topics and take-in-sequence topics? Topic selection may not be an appropriate goal in all types of courses or training media. For example, a trainee may need to complete, in sequence, all segments of an introductory course. An instructor-led seminar covers many topics, some of which may not interest all trainees at the time they attend the course. In these cases, look for training that has a broad range of topics and that is designed to serve as a reference once the training is completed. If you are evaluating on-site instructor-led training, look for the option of customizing courses by adding or deleting topics.

Review. Look for training that allows ample opportunity for trainees to review new concepts. Review sections serve a function parallel to advance organizers; they serve as road signs that show "where we've been," helping learners mentally organize and assimilate information. Not everyone learns at the same pace or retention level. You might look for training that has optional review sections so that fast learners are not frustrated. In Institute CBT courses, for example, each course lesson (perhaps as many as 70 instructional frames, question-and-answer frames, and 3 online practice sessions) contains a lesson summary (perhaps 20 frames without questions or practice). Some trainees work through the lesson and then go through the summary. Other trainees may complete only the lesson and feel the summary is unnecessary. Or trainees may opt to go through the summary first to determine whether they need to take the full lesson.

Look for training that has two levels of review: frequent reviews of individual concepts and overall review that ties several concepts together. The overall review helps ensure that trainees learn the interrelationships of concepts and can select the appropriate solution to a multifaceted real-world problem. Overall review may be in the form of a case study exercise at the end of a major section or the entire course.

Practice. All training materials should include practice or exercise sessions. The practice may be in the form of text questions and answers or exercises at the terminal. Most learners like a variety of exercises. Examine the sample problems to determine that they are appropriate and realistic for your users. Look at the types of problems posed and the language used.

Be certain that practice sessions occur frequently. Like review, practice needs to be timed closely with the introduction of new concepts. Most training materials follow the pattern of inform, review, then practice.

Feedback on practice sessions. Look for training that provides immediate feedback for all practice sessions. In self-paced instruction, such as video or computer-based courses, look for discussions of both correct and incorrect answers. Trainees need to know why a given answer was incorrect. In an instructor-led course, trainees get this feedback by questioning the instructor. With self-paced training courses, look for feedback on all choices presented to the learner.

When software coding techniques are being practiced, look for answers that describe several alternatives. For example, if the trainee has been learning the IF ... THEN/ELSE statements, look for efficient problem solutions with discussions that point out why the given answer is a good solution to the problem.

Other factors to consider

The items listed above deal with the instructional content of the training, but there are still other factors to consider. Does the training product

• fit your budget
• have a delivery date that suits your schedule
• fit your trainees' timeframe
• meet your anticipated demand?

Include these criteria in your checklist as well.

Budget. It can be misleading to consider only the actual cost of different training products. A better comparison can be made by looking at the per student cost of each product. For example, suppose you are evaluating an instructor-led on-site course at $5,000 for 20 students with two computer-based courses at $2,550 each. (In this example, assume that it takes two CBT courses to have equivalent content to the instructor-led course and that your users need all of the instruction.) At first glance, it appears that the two CBT courses at $5,300 are more expensive, but consider the cost per student.

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If you train 20 users, the instructor-led course has a lower per student cost of $250 ($5,000/20), compared with the two CBT courses at $265 per student ($5,300/20). But, if you train 40 users, you'll need to schedule the instructor-led course twice ($10,000) for a per student cost of $250. The overall cost of the CBT courses does not change, but the cost per student goes down to $132.50.

**Training delivery.** How soon do you need the training? If you need the training immediately, most vendors can deliver self-paced courses such as video and CBT quickly. If you choose instructor-led courses, the timing of delivery is dependent on the availability of instructors.

**Trainees' time.** Instructor-led courses are typically delivered in two to five full days of instruction. In self-paced courses, trainees typically complete one to two hours of instruction per day over several days (or perhaps a week or two). Consider whether it is better for trainees to be away from their jobs for several consecutive days or for shorter periods of time over a longer period.

**Training demand.** Consider the flow of the demand for training. Do requests come in clusters (such as an entire department needing training at once) or do the requests dribble in one at a time? To be cost effective, you want a full class for instructor-led training (20 students by Institute standards), so some trainees may have to wait until enough people want training. Self-paced courses are available on demand; a new trainee can begin the course at any time.

**Construct Your Criteria Checklist**

Most training courses will not have everything discussed here, but may still provide excellent training. When you are considering several training alternatives, develop a checklist to rate the courses and select the one best suited to your needs.

First, review the criteria checklist suggested here and decide which items are pertinent to your current training needs. Add any items that are important to you but not listed here. List all of your criteria.

Assign point values to the items, weighing the point values based on your needs. These point values are subjective. You may feel that some items are "absolutely must have" while others are "nice to have." Now your checklist is complete.

Take each training product under consideration. Review the product (or the demonstration package) and determine a score for each item. If the item's point value is 10, you may determine that this product deserves a 7, for example. When you've finished, total the points for each product, compare scores, and select the product with the highest total. Here's a sample checklist.

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<th>A Checklist for Comparing Training Products</th>
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<tr>
<td><strong>Category</strong></td>
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<td>Audience Specification</td>
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<td>Prerequisites</td>
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<td>Performance Objectives</td>
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<td>Advance Organizers</td>
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<td>Sample Problems</td>
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<td>User Language</td>
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<td>Reference materials</td>
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**Total point value = = = >**

**Conclusion**

The task of providing instruction to trainees is not a clear-cut, easily resolved one. Time constraints, facilities, budget, and the demand for immediate training may make it impossible for you to develop an effective training program yourself. Vendor-produced training may be too generic to address your specific needs, but it offers good basic information. By melding the best features of vendor-produced training with your own site-specific information, you can offer your trainees professional quality training quickly and efficiently.

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