Selecting Training for End Users
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Abstract
No longer the private domain of data processing professionals, the computer is being used with increasing frequency by other professionals in their day-to-day jobs. These end users require training that is targeted toward their special needs and applications. Too often, the end user receives training designed for the DP professional. After all, if the course effectively trained our programmers, it should train the users, right?

Rising demand for computer services and a steady increase in the creation of information centers encourages end users to do more of their own data processing work. These changes within organizations have made end-user training an area of concern for many training coordinators. This paper defines and explores the special training needs of the end user. Suggestions are made to help training coordinators evaluate and select courses for end-user training. You might also incorporate these ideas into training you design.

Introduction
What do we mean by "end user" and "training"? End users employ the computer as a tool in the performance of their primary job. By contrast, a programmer's major responsibility is to develop computer programs or systems that meet organizational goals.

We might describe the programmer as a carpenter who builds program structures from the tools available in a software package. Like a carpenter, the programmer needs to know the function of each tool and how to use it. Programmers tend to learn new software by learning the individual tools. For example, a programmer might begin to learn the SAS® System by asking how to read packed decimal data from an external data file. From this starting point, the programmer learns the INFILE and INPUT statements and how to describe coded data with an informat.

If the programmer is compared to a carpenter, we could consider the end user as someone who wants to build a bird house. The user is only interested in the specific tools needed for bird house construction, not a whole workshop. The end user is interested in bird house designs, not plans for family homes. Someday, the user may have other plans and need other tools, but not today.

The end user's approach to the computer is usually problem-oriented, as in wanting to produce a plot of the twelve monthly sales totals for last year. When end users need or want training on a particular software product, they are usually driven by the problem they are trying to solve. For instance, an end user may say, "I know that the SAS System can produce a plot for me, but how do I request it?" The end users want training that is very specific to their applications. They generally do not want to wade through a lot of details to learn to invoke the PLOT procedure and request a plot of sales by month.

Training designed for end users should present information in a problem-oriented format. The learners should quickly understand, based on their own experiences, what the problem is, and why and how it should be solved. They should be able to concentrate their learning efforts on the solution and the process of creating it. In that way, end users can see the structures of the solutions and begin to apply the tools of the language in building solutions to their problems.

Training develops skills. Traditionally, we have thought of training as occurring in a classroom. Today, training may be in the form of a handout, computer-based courses, video courses, role-playing sessions, and simulations of the real work environment, as well as the traditional classroom experience. With the advent of information centers, training may now also be one-to-one tutorials or a combination of techniques previously mentioned.

Training for End Users
If you are responsible for selecting or designing training for end users, you might use the following checklist for evaluating your options and selecting the one that best suits the needs of your users and your requirements.

Does the training

* 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 learning material through sample problems drawn from typical trainee experiences

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• contain user-oriented language
• provide modular instruction for self-pacing and review
• allow the trainee to select topics
• incorporate plenty of review
• allow ample opportunity for practice
• provide specific feedback for practice sessions?

This checklist provides a set of evaluation criteria for selecting end-user training. You probably will not find a training program that meets all of these points, but the checklist provides a convenient means of evaluation. Each of the points on the checklist is described in more detail below.

Audience specification. In selecting training, look for a clear statement of the intended audience. Many times you find an audience profile listed in the front of the training materials. Frequently, the profile contains job titles of the intended trainees. These titles can sometimes be misleading; an “Information Manager” in one company might be a “Data Base Designer” in another. If the audience profile is written in this form, pay close attention to the prerequisites to evaluate the course.

Avoid training that claims to be effective for everyone, regardless of their levels of experience. This type of training is frustratingly slow for programmers, too fast paced and detailed for end users. Look for training that is targeted to the specific needs of your trainees.

Prerequisites. Prerequisites define the audience in greater detail by describing specific skills of potential trainees. Examine the course materials for clearly-stated prerequisite skills. Be certain that the prerequisites are stated as measurable skills rather than conceptual understanding. Some end-user training includes an entry skills test so trainees can measure their abilities and avoid the frustration of taking a course for which they are not adequately prepared.

An example of a specific prerequisite is:

You should be able to create a SAS data set from a column-formatted external data file.

Too often prerequisites are stated in a very general sense, such as "you should be familiar with entry-level data processing," or worse, "you should have three months data processing experience." Three months experience doing what? Executing the same program over and over?

Performance-oriented objectives. Clearly-stated objectives describe new skills learners attain from the training. The objectives should be stated as a measurable performance so that you could design a test from the objectives.

Performance-oriented objectives state

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

Look for objectives written with action verbs such as "write," "demonstrate," or "describe." Objectives that use passive verbs such as "understand" do not state how trainees will demonstrate they have achieved the desired level of mastery of the subject.

As an example, consider this objective:

Upon completion of this lesson, the trainee, in no more than three attempts, can use the SAVE command of the SAS Display Manager System to write SAS programming statements to an existing disk file.

From this objective, you see who will do the learning (the trainee), what will be done (use the SAVE command to write to a disk file), under what conditions (a disk file already exists to contain the written lines), and the level of performance (three or less attempts).

The objective stated above is written to a level of detail you often do not find. In particular, you may not see the level of competence noted. If the objectives of the training you are evaluating are not this detailed, look for action verbs rather than passive verbs. Also look for a listing of specific tasks trainees learn, such as issuing the SAVE command to write statements into a disk file. If objectives are task-oriented and written with action verbs, you can evaluate whether the training is appropriate for the experience level of your users.

If the objectives do state that the learner will understand some concept, it should also define how you could measure the learner's understanding of that concept. For example, an objective may state:

The learner will understand the step-by-step structure of SAS jobs.

If other objectives state that the learner will be able to write and successfully execute SAS jobs which build SAS data sets from raw data files and invoke SAS procedures to analyze the data, then you might feel comfortable that the learner will also understand the structure of SAS jobs.
Advance organizers. Advance organizers serve as road maps for each training segment. They prepare the trainee for what lies ahead. Advance organizers may be a list of topics at the beginning of each segment. With advance organizers, the learner is provided a skeletal structure for building concepts. By having a total picture of the upcoming topics, the trainee can fill in the structure while progressing with the lesson.

Sample problems from life experiences. End users learn by example. They want to see problems related to their experiences and programming needs. They should not have to concentrate on understanding what problem is being solved in the examples, but rather how the problem was solved and the process of creating the solution. Look for training that relates new concepts to typical experiences trainees have in their daily lives or work environment. Too often, training for computer software relates new techniques to data processing concepts. These relationships may be understood by programmers but not end users.

Consider the UPDATE operation in SAS software for example. In a course for programmers, the UPDATE topic might be introduced as “handling transaction file processing to update a master file.” Programmers generally understand that language based on their experiences with writing programs that do similar updates. For end users, that description of UPDATE is meaningless. The end user would understand this description of UPDATE:

The UPDATE statement can be used in a bank to update the account balances from yesterday with the checks received and deposits made today, producing new balances.

That statement can be understood by most people in our society. The trainee sees that objective and immediately realizes that UPDATE can be a useful thing to know.

User-oriented language. The technical language of data processing is a major stumbling block for many end users. Too often, training materials are full of technical jargon that is meaningless to the trainee. One of the trainee’s goals is to learn new technical terminology. Training should help meet that goal, not hinder it. Look for training materials that are written in everyday language and include definitions of technical terms.

As an example, consider this definition of “default” as used in data processing:

The automatic action performed by the software unless you issue an instruction to change that action.

If this definition is included in an introductory course, you might expect to find definitions for “software” and “instruction.” When technical terms are first introduced in training materials, they should be clearly defined. The definitions should use only general English words and other technical terms that have been previously defined. Good end-user training materials include a glossary and a detailed index. For reinforcement, the learner needs to look up terms that were previously defined in the materials.

Modular design. People learn best when instruction is presented in organized units. Particularly in self-paced courses, the trainee needs logical stopping points. 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 allows easy location of individual topics for review, as well as flexibility for the trainee.

Topic selection. Most end users want training that allows them to select topics of particular and immediate interest. The user should not have to wade through an entire graphics course just to learn to create a vertical bar chart. Ideally, the user should be able to learn quickly about the CHART procedure and, optionally, learn about enhancing output from SAS/GRAPH procedures. Modular instruction (see above) usually has this feature.

This goal may not be appropriate to all methods of instruction or types of courses. For example, a learner may need to complete, in sequence, all segments of an introductory course. A seminar led by an instructor covers many topics, some of which may not be of interest to all learners when they take the course. In these cases, look for course materials that have a broad range of topics and are designed to serve as a reference after the course has been completed. If you are evaluating on-site instructor-led training, look for the option of customizing courses.

Review. Look for training that allows ample opportunity for the learner to review new concepts. For later reference, the materials should contain a good index and a descriptive table of contents. Trainees should be able to locate major topics easily and review selected portions of the course materials for refreshing their memories later.

Some review sessions may be optional so that faster learners are not frustrated. But, be certain that each new concept is reviewed. As the learner advances through the course, look for fewer prompts in the review and greater reliance on the trainee’s abilities.

Look for training that incorporates reviews after each course segment. Too often, review sessions are included at the end of major sections. Frequent reviews allow learners to master concepts as they are presented. Delaying reviews until several topics have been covered leads to confusion and frustration.
Many end-user training programs use two or more levels of review, one to review individual concepts and another to tie several concepts together. This helps ensure that the trainee understands the interrelationships of the concepts and selects the appropriate solution for a particular problem. This second level review may be in the form of a case study presented at the end of a major section or at the end of 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 designed for end users. Look at the types of problems that are posed and the language in which the problems are written.

Be certain that practice sessions occur frequently. Like review, practice needs to be timed closely with the introduction of new concepts. End-user training materials usually follow the pattern of learn, review, and then practice.

Feedback on practice sessions. Look for training that provides immediate feedback for all practice sessions. In self-paced instruction, look for discussions of both correct and incorrect answers. Trainees need to know why a given answer was incorrect. In an instructor-led course or tutorial, 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.

Conclusion

Many training courses will not have everything discussed here and may still provide excellent training for end users. When you are considering several training alternatives, the following checklist provides a means for rating the courses and selecting the one best suited to your needs.

Point values have been assigned to the items you should look for while evaluating end-user training. These point values are subjective and you may feel that other values are more appropriate for your situation. By rating the training materials on each item and finding a total score, you can compare the relative effectiveness of different courses. As shown, a total of 100 points is the best possible score. A score of less than 65 points indicates that the training is not likely to be successful.
# A Checklist for Selecting End-User Training

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<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Points</th>
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<tr>
<td><strong>Audience Specification</strong></td>
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<td>15</td>
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<td>Does the audience description fit your trainees?</td>
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<td><strong>Prerequisites</strong></td>
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<td>Do the training materials list specific prerequisite skills that are met by your end users?</td>
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<td><strong>Performance Objectives</strong></td>
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<td>Are there performance-oriented objectives that describe new skills your trainees need?</td>
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<tr>
<td><strong>Advance Organizers</strong></td>
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<tr>
<td>Are there advance organizers for course segments to serve as road maps for the learner?</td>
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<td>Are the sample problems drawn from typical trainee experiences?</td>
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<td><strong>User Language</strong></td>
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<td>Do the training materials contain everyday language and good definitions?</td>
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<td>Is the course designed in modules or segments, thus increasing flexibility for learning and review?</td>
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<td>Does the design of the course allow the trainee to select specific topics?</td>
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<td>Does the training incorporate plenty of review?</td>
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<td><strong>Practice</strong></td>
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<td>Is there practice for each new skill? Are practice sessions frequent?</td>
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<td><strong>Feedback</strong></td>
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<tr>
<td>Does the training provide specific feedback for all practice sessions?</td>
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Total Point Value: 137