

# AT&T PERFORMANCE SUPPORT TOOL

*Training*

*Test*

*Consultant*



**AT&T**

# AT&T PERFORMANCE SUPPORT TOOL

*Training*

*Test*

*Consultant*

USER MANUAL



**AT&T**

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## **Acknowledgement**

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This is your copy of the **AT&T Training Test Consultant**, a *performance support tool* for the development and use of training tests. This program contains a great deal of important information and expert advice on the design and construction of tests, condensed from dozens of textbooks and articles on this important topic. It also contains information and advice gained from working with several subject matter experts in the field.

This software was developed jointly by the AT&T Corporate Training Support Group and the AT&T Sales and Technical Education Center. It is designed for use by course developers, instructional technologists, training managers and any one else who is interested in improving the validity and reliability of training tests.

The Training Test Consultant represents a significant advance in the area of testing and performance support. Now, information, practice and expert advice is available to practitioners such as yourself using an easy-to-use, cost-effective technology. The system allows you to access information the way *you* want it, *when* you want it.

Use the Training Test Consultant when you plan and design tests. Explore the many topics and techniques it contains. You'll find valuable information and statistical packages that will improve the quality of your training evaluation efforts. And, as you know, improved testing will enhance the Company's training and education programs, resulting in improved corporate performance.

This user manual provides all the information you need to install and use the Training Test Consultant. The program will run on any AT&T 6300 series personal computer. A feedback form and ordering information is provided in the back. If you have any questions on this product or performance support technology, call Marc Rosenberg on 201-898-8726 (AT&T Mail: !mjrosenberg) or Gerry Puterbaugh on 201-898-8732 (AT&T Mail: !gputerbaugh).

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# **Introduction to the User Manual**

This User Manual will assist you in getting the most out of the Training Test Consultant (TTC). It presents an overview of this performance support tool, information on how to install it on your personal computer, and a quick reference guide to all the keystrokes.

The manual also contains two views of the subject matter covered in the TTC. The first is a graphical representation of the knowledge embedded in the software, while the second is a complete outline of all the topics covered.

Also included are two short readings that will better prepare you to use the information in the TTC: the first explains instructional objectives; and the second covers the relationship of tests to training and the job.

Finally, because the TTC has several "statistical advisors" to help you improve the quality of your tests, the manual contains job aids and practice data to help you use this performance support tool better.

The manual concludes with a feedback form and ordering information.

# Overview

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The Training Test Consultant (TTC) is an integrated performance support tool that helps you develop more effective tests and enables you to quickly analyze your test results. The TTC is a testing expert that is always at your disposal.

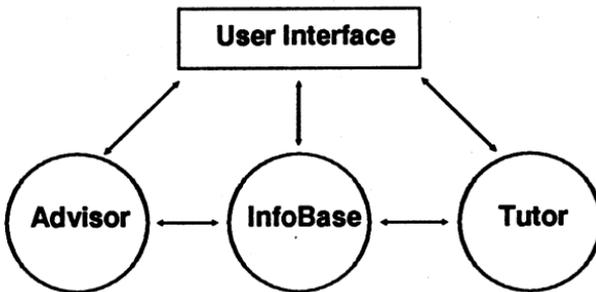
The TTC allows you to access any information in the system in a self-prescribed manner. Information on testing that was formerly scattered through various sources and was accessible by only a few people is now available to all.

The amount of time you spend in a classroom learning about testing will be reduced because the same information is contained in the TTC. You can use this tool to improve your tests, increase and reinforce your knowledge of test design theory, and quickly evaluate test data.

Before you use the TTC, you will want to view the User Orientation program, an introductory tutorial on a separate diskette, to become familiar with the functions of the system. You can then begin using the reference material in the InfoBase to expand your knowledge of testing theory. During this initial learning period, you will use Tutor modules to reinforce your understanding of the reference material.

After you have mastered the necessary material, you will be able to effectively use the Advisor to assist you with test development. Eventually, the majority of your time will be spent with the Advisor and you will probably only use the InfoBase to refresh your memory on specific topics.

The three components, InfoBase, Tutor, and Advisor, are linked together and comprise the TTC. You can move between the components to easily access the information you need (see figure 1).



**Figure 1:** *Training Test Consultant component architecture*

## **InfoBase**

The InfoBase contains reference information on testing organized in a tree-structure. You begin with general information on a topic and, as you move down the tree, the topic information becomes more specific. Each level is a single on-line page with a heading at the top and a menu at the bottom.

The InfoBase is roughly analogous to an on-line document, except you control what information will be viewed next. You can access information in the InfoBase in any of the following ways:

**Table of Contents** Use the Up and Down arrow keys to highlight the top-level page you want to see. Then, press RETURN to view that page.

**Expanded Table of Contents** Press Down arrow to move the cursor into the menu area. All the pages in the InfoBase are listed on this menu. Highlight the page you want to see. Then, press RETURN to view that page.

- 
- Lower Topic Level** Move the cursor to the menu at the end of the current page, highlight a topic, and press RETURN. The chosen topic elaborates on information contained in the level above. The lowest level on any given topic will not have a menu. Topics can have up to four levels.
- Upper Topic Level** Press the ESC key to peel away the current level and move up one level.
- Same Topic Level** With the cursor on the heading, press the right or left arrow keys to view another, related topic. The available topics are the same as the topic choices on the menu of the level above. An icon in the top-right corner of the page indicates the direction you can page.
- Inquiry** Type the word or phrase you want to find at the Inquiry prompt and press RETURN. A specific page will appear if there is a direct match for your phrase. If there are numerous matches, a near index of appropriate pages appears. If there is no match, a message is displayed at the bottom of the screen.
- Definition** To see a definition of a word or term, press ALT-D and type the word at the definition prompt. A short glossary definition will be displayed. Press F1 to return to the InfoBase.

---

**Search**

You can search for more information about any word or phrase in the text of the current page. Move the cursor to the first word of the phrase and press the F7 key. The word at the cursor will be highlighted in the text. Press the F7 key again to highlight each additional word. Then press RETURN. A specific page or a near index is then displayed.

**Page Search**

Type the page number you want displayed and press RETURN. The selected page is then displayed.

**Undo**

Press F6 to undo the last action and display the previous screen.

**Bookmark**

Press F4 to bookmark a page. You can then press F5 at any time during the current session to go to that bookmarked page. A window in the top-right corner of the screen reminds you which page is currently bookmarked. When you access Tutor or Advisor from InfoBase, the page you are currently viewing is set as the new bookmark. When you access the Main Menu, the bookmark is removed.

**Tutor**

The Tutor helps you master the subject matter in the InfoBase through structured practice sessions. Tutor modules are linked to specific InfoBase pages or you can access any Tutor module from the Tutor menu.

---

You press the F3 key from within the InfoBase to access Tutor. If a module is linked to the present page in the InfoBase, the title screen for the module is displayed. If there is no link, the Tutor menu is displayed when you press F3.

## **Advisor**

The Advisor is an expert system that helps you create more effective tests. Advisor modules are also linked to specific InfoBase pages or you can access any module from the Advisor menu.

You press F2 from within the InfoBase to access an Advisor module. If no module is linked to that page, the Advisor menu is displayed when you press F2.

Within Advisor, you are prompted to answer a series of questions that enables the Advisor to help you develop better tests and use them more effectively. All recommendations made by the Advisor reflect the thinking of experts in the testing field.

## **Keystrokes**

Wherever you are in the TTC you can press F9 to see a Quick Reference Screen which explains all the keystrokes available to you. These are also provided on the Quick Reference Card for your convenience.

The Quick Reference list of keystrokes is included in this User Manual.

# Quick Reference Card

## InfoBase Keys

- F2** Go to Advisor
- F3** Go to Tutor
- F4** Bookmark current page
- F5** Go to current bookmarked page
- F6** Undo last action
- F7** Search for current word
- F8** Print page/view/chapter/book/glossary
- F9** Go to Quick Reference screen
- F10** Return to InfoBase Top menu
- ESC** Peel off current page
- ALT-D** Enter glossary inquiry
- ALT-N** Go to next page
- ALT-P** Go to previous page
- Up arrow** Cursor up one line
- Down arrow** Cursor down one line
- Left arrow** Cursor one word left
- Right arrow** Cursor one word right
- PGUP** Cursor up one screen
- PGDN** Cursor down one screen
- HOME** Cursor to heading
- END** Cursor to page menu or last line of text

## Advisor Keys

- F1** Go to InfoBase
- F6** Undo (move back one screen)
- F10** Go to Advisor menu
- ALT-C** Calculate
- SPACEBAR** Move forward one screen

## Tutor Keys

- F1** Go to InfoBase
- F6** Undo (move back one screen)
- F10** Go to Tutor menu
- SPACEBAR** Move forward one screen

## Exit Key

- F10** Exit from Advisor menu, Tutor menu, or InfoBase Top menu

# **Hardware Requirements**

---

The Training Test Consultant will run on all models of the AT&T family of MS/DOS-based personal computers. The computers must be equipped and/or configured to have the following:

- 640K of memory
- DOS version 2.11 to 3.3
- a hard disk drive with at least 1MB ROM available
- CGA graphics adapter board
- color or composite monitor

In order to print, each computer must have a parallel printer capable of printing the IBM extended character set. Each printer must be:

- configured to print the IBM extended character set
- interfaced to LPT1

In addition, your CONFIG.SYS file should contain the following lines:

```
files = 20  
buffers = 20
```

If the above stipulations are not met, the Training Test Consultant may not perform as intended.

# **Installation Instructions**

---

You should receive five diskettes with your Training Test Consultant:

- TTC Diskette #1
- TTC Diskette #2
- TTC Diskette #3
- TTC Diskette #4
- User Orientation Diskette

Please make a copy of each of these diskettes using the DOS DISKCOPY command and store the originals in a safe place. Proceed with the installation using the backup copies you have made.

**NOTE:** You may install and run the TTC on drive C, D, E, or F if these are hard drives on your computer. If you use a drive other than C, follow the directions, replacing C with the appropriate drive letter.

## **Installing TTC**

To install the Training Test Consultant, you will need the TTC Diskettes 1, 2, 3, and 4.

1. Begin at Drive C (the hard or fixed drive of your computer). Be sure you are at the root directory (C:\) of Drive C. The installation program will create a subdirectory called C:\ttc at your root directory and copy all the necessary files and subdirectories to this C:\ttc subdirectory.
2. Check the config.sys file by typing "type config.sys" at the C:\ prompt and pressing RETURN. Be sure that files and buffers equal 20. Refer to your DOS manual for information on changing your config.sys file.

- 
3. Check the amount of disk space available by typing "chkdsk" at the DOS prompt. You will need approximately 1 MB (1,000,000 bytes) to install this program. If you do not have 1MB, do NOT attempt to install this program.
  4. Insert Diskette #1 in Drive A and close the door.
  5. Change the current drive from Drive C (hard drive) to Drive A (floppy disk drive) by typing "a:" at the DOS prompt. Press RETURN.

**NOTE:** You must begin the installation at Drive A. Do not attempt to install from Drive B.

6. Type "install c" at the DOS prompt and press RETURN.
7. The installation program will remind you how much space you need. Press any key to continue with the installation.

**NOTE:** If at anytime you wish to interrupt the installation program before it is complete, press CTRL- BREAK. The following message will be displayed:

"Terminate batch job: (Y/N)"

Type "y" to end the installation program.

8. You will be prompted to insert TTC Diskettes 2, 3, and 4 in sequence as they are needed. The installation program will prompt you for each diskette, check to make sure you have inserted the requested diskette, repeat the prompt, if necessary, and copy the files from the diskette to Drive C.
9. When all the files have been copied to the C:\ttc subdirectory, the installation is complete.

---

## **Removing the TTC**

A program which enables you to delete the TTC from your hard drive is provided on the first installation disk.

When you want to delete the TTC software, be sure you are at the root directory (C:\).

1. Insert Diskette #1 in Drive A.
2. Type "a:remove" and press RETURN.

## **Viewing the User Orientation Tutorial**

Before you begin using the TTC, you should view the User Orientation to become familiar with the functioning of the different components of the TTC. The User Orientation is contained on the Orientation diskette which is separate from the installation diskettes.

To view the User Orientation tutorial, insert the Orientation diskette in Drive A and type "learn" at the A:\ prompt.

## **Beginning TTC Immediately Following Installation**

The installation program will leave you at the C:\ttc subdirectory. You can begin using the Training Test Consultant by typing "ttc" at the DOS prompt.

---

You must have at least 350K of RAM memory to be able to begin the program. If you do not have sufficient memory, the program will not load and you will receive an error message. If this occurs, unload any unnecessary, memory-resident programs until you have at least 350K of memory free, then start the program again.

The Training Test Consultant is not a memory-resident program. So, after you exit, you will have as much memory available as when you started using the program.

## **Beginning TTC**

To run the Training Test Consultant, you must first:

- Change the current directory to the C:\ttc subdirectory by typing "cd ttc" at the root directory (C:\) each time you want to use the program.

or

- Include the C:\ttc subdirectory in your PATH. You can find information about DOS paths in any DOS reference book.

To begin the program, type "ttc" at the DOS prompt.

## **Ending TTC**

You can end the TTC program by pressing F10 until you are at the main menu. At the main menu, highlight the "Exit to DOS" option and press RETURN or press ESC. You will be at the C:\ttc subdirectory.

# **InfoBase Content Organization**

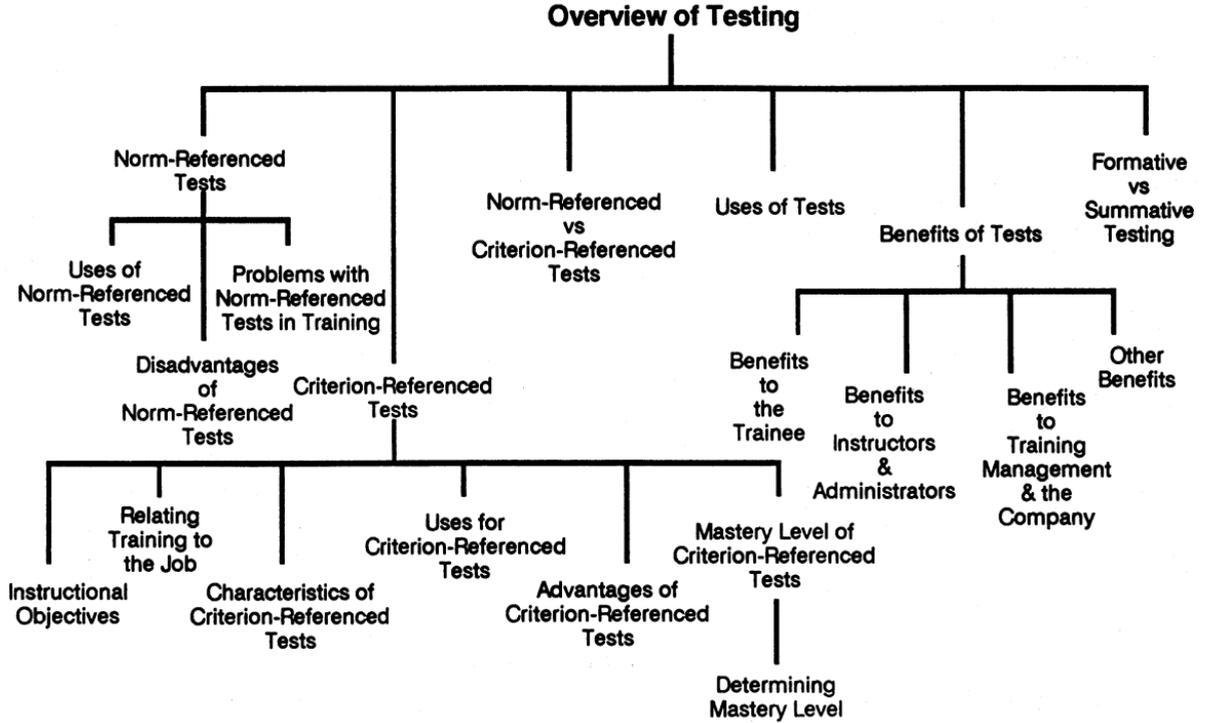
The information in the InfoBase is organized in a hierarchical structure which is presented in this section in two formats: content maps and a content outline.

## **InfoBase Content Maps**

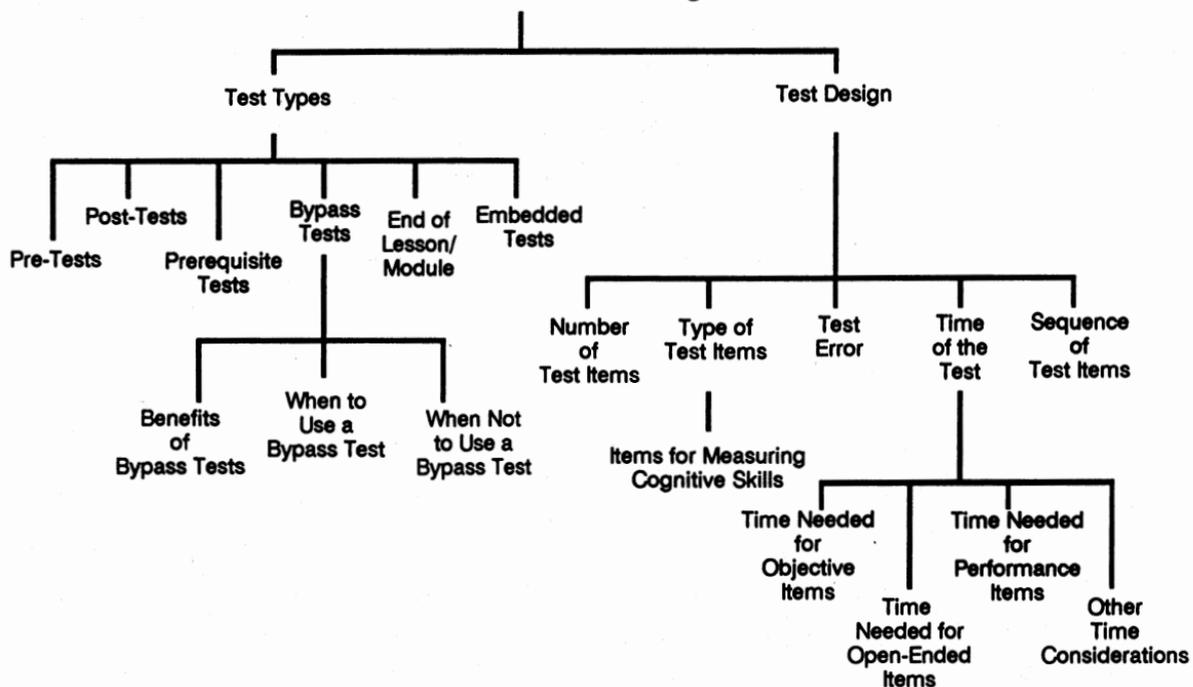
The information contained in the InfoBase has been mapped with a series of charts. The first chart contains all the top level items. Each top level item is then mapped on a separate chart.

## Training Test Consultant

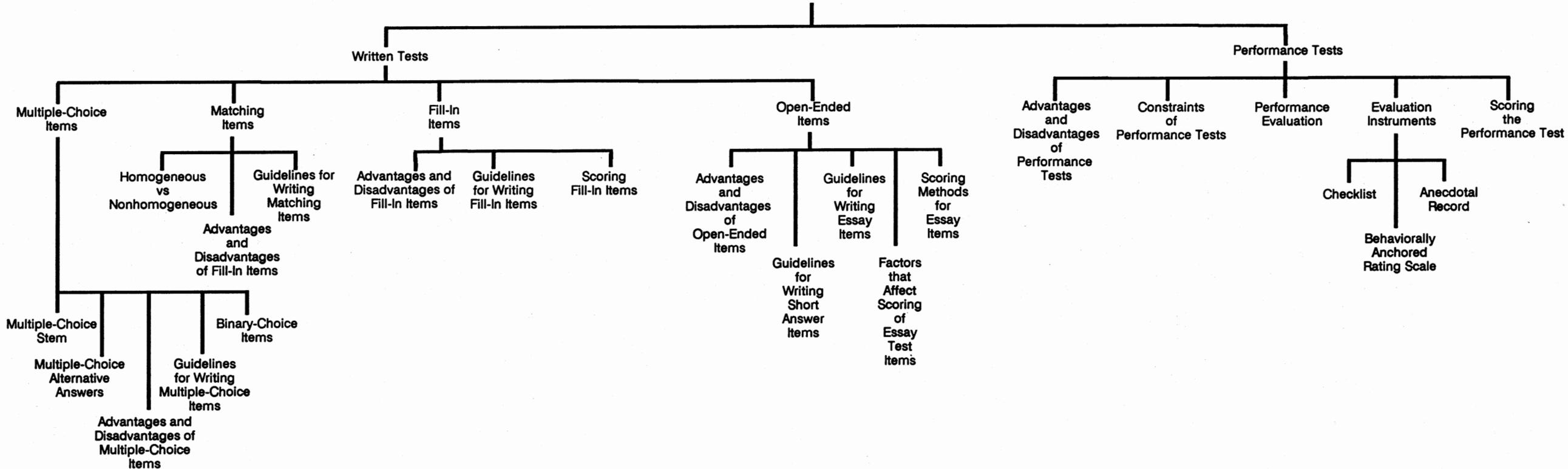




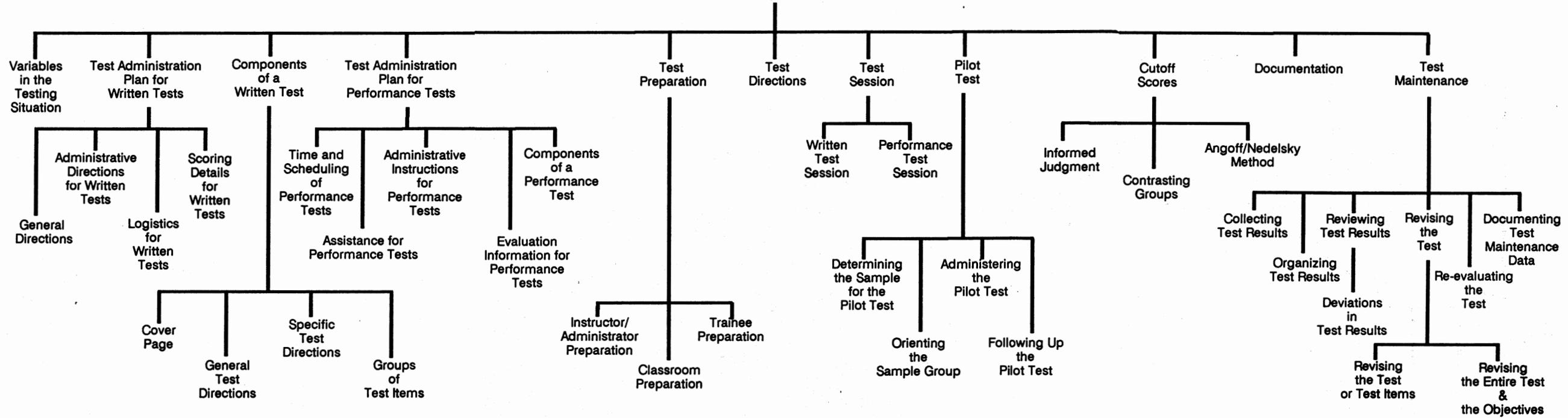
## Test Selection and Test Design



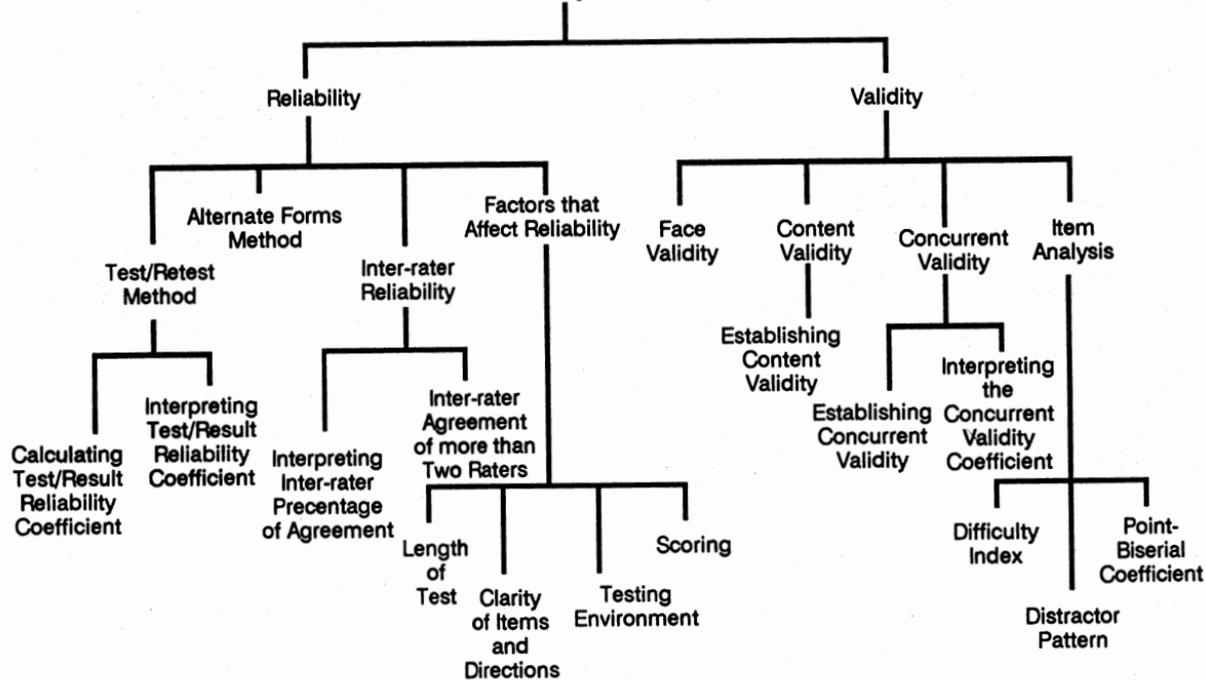
# Test Item Construction

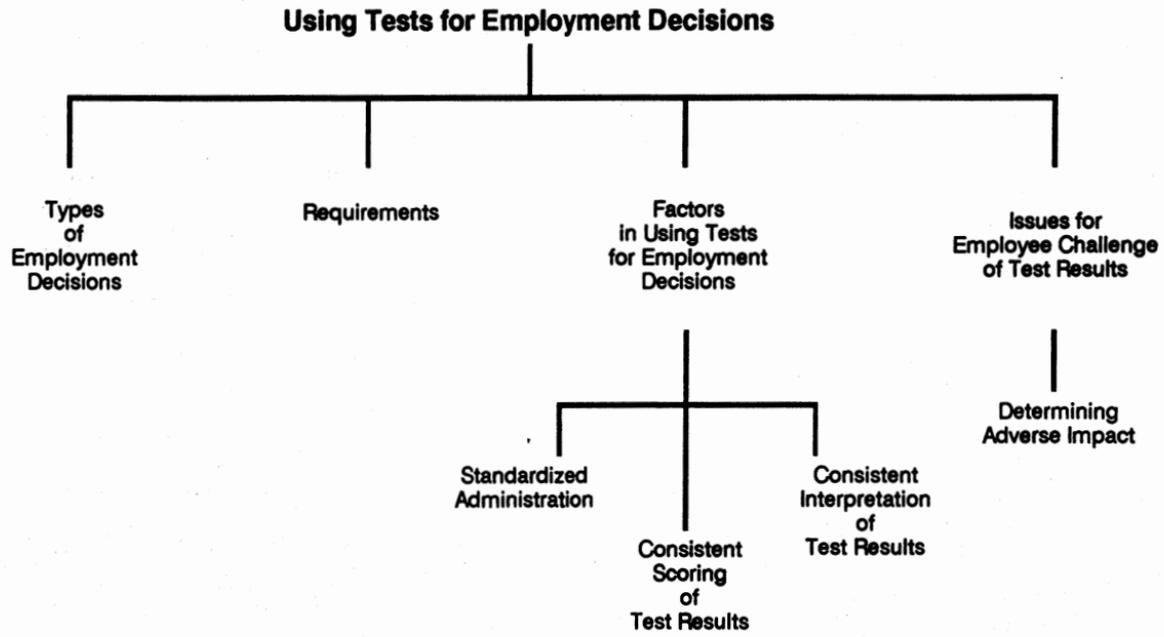


# Test Administration

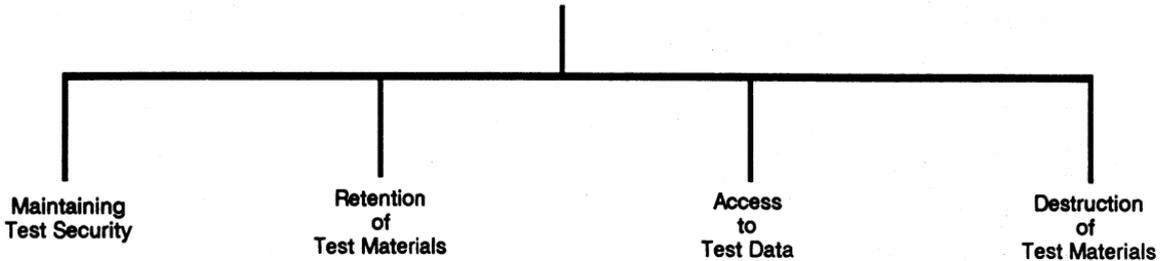


# Test Reliability & Validity





## Test Security



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## **InfoBase Content Outline**

The Content Outline is a linear presentation of all the topics and subtopics contained in the InfoBase. You will also find this listing on the Quick Reference Card. The same list is contained in the Expanded Table of Contents (Page 1) of the TTC InfoBase.

# **InfoBase Content Outline**

---

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# **An Instructional Objectives Primer**

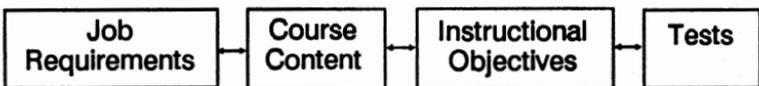
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*The ability to develop and use designed instructional objectives is critical to the design and use of effective training tests. The following material is provided as background for those who would like a better understanding of objectives before using the Training Test Consultant.*

A key element in the development of quality criterion-referenced training tests is accurate and comprehensive instructional objectives on which the tests are based.

Instructional objectives (also referred to as behavioral or performance objectives) are statements of desired student performance (or mastery) to be achieved at the conclusion of the associated training.

To be effective, tests, like the training itself, must reflect the job. Objectives help crystallize this relationship by providing a bridge between the skills and knowledge associated with particular jobs (i.e., the content of the course) and the measures you will use to determine how much the trainee has learned (i.e., tests). This relationship is depicted in the following figure:



**Figure 2:** *Relationship between job requirements and instruction*

---

Criterion-reference tests measure the trainees achievement of the instructional objectives and, therefore, the ability to demonstrate performance required by training. A critical first step in constructing criterion-referenced tests is to specify the criteria which the test items measure. These criteria are provided by the instructional objectives.

## ***Developing Instructional Objectives***

Instructional objectives consist of three major components:

- Statement of the desired or expected performance (accomplishments or outputs)
- Conditions under which the performance is to take place
- Criteria by which the performance is measured

**Desired or Expected Performance:** The statement of the expected or desired performance reflects what the trainee will be able to do or accomplish. The most critical aspect of this part of an instructional objective is that the accomplishments or outputs are observable and measurable. An instructional objective which specifies that the trainee "will be able to list three effective strategies for selling telephones" is appropriate because the trainee will produce a list that can be evaluated.

On the other hand, an objective which states the trainee "will understand the concept of telephone sales" is not appropriate. You can observe and measure the trainee's ability to list three selling strategies; however, you cannot directly observe or measure "understanding." This is not to say that cognitive (thinking) abilities are not an important part of training. It does mean that, as training developers and test designers, you need to clearly specify how those cognitive abilities will be manifested.

---

Here are some examples of observable and measurable performance statements that can be used in instructional objectives:

<i>assemble</i>	<i>build</i>	<i>complete</i>
<i>compute</i>	<i>configure</i>	<i>construct</i>
<i>create</i>	<i>demonstrate</i>	<i>describe</i>
<i>design</i>	<i>develop</i>	<i>differentiate</i>
<i>direct</i>	<i>disassemble</i>	<i>enter (as in "enter data")</i>
<i>evaluate</i>	<i>explain</i>	<i>identify</i>
<i>jump</i>	<i>list</i>	<i>locate</i>
<i>point to</i>	<i>produce</i>	<i>respond</i>
<i>run</i>	<i>state</i>	<i>write</i>

Here are some examples of inappropriate performance statements which should not be used in instructional objectives:

<i>appreciate</i>	<i>enjoy</i>	<i>feel good</i>
<i>know</i>	<i>like</i>	<i>remember</i>
<i>think about</i>	<i>understand</i>	<i>truly understand</i>
<i>value</i>	<i>want</i>	<i>desire</i>

As you can probably tell, a well-defined performance statement can be an important source of information for the test designer.

**Conditions:** The conditions part of the instructional objective specifies the circumstances under which the performance will occur, including tools, constraints, and the situations in which the performance is demonstrated.

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For example, if you were training in the use of a personal computer, the condition statement might specify that the trainees will use an actual computer (you might even specify the type of computer to be used). On the other hand, if you were training new airline pilots, the condition statement might specify the performance to occur in a training simulator as opposed to an actual airplane.

Here are some sample condition statements:

Equipment and tools:

- *Given a terminal and a UNIX system...*
- *At an assigned Remote Work Station dial-up terminal...*

Documents and job aids:

- *Given a FASC Reference Manual...*
- *Given a trouble-shooting checklist...*

Inputs from others:

- *Given instructions from the Supervisor...*
- *Given access to a typical customer...*

Other:

- *Without looking at the keyboard...*
- *In the Training Lab set-up...*

Condition statements can be very helpful to test designers because they provide important information on establishing the proper testing environment.

---

**Criteria:** The criteria by which the performance is measured is the third component of an instructional objective. This part of the objective is answering the question, "How will I know when the performance is acceptable?"

If you are teaching typing, how do you know when typing has been learned at a prescribed level of mastery of competence? Usually, you specify the criteria to be so many words per minute at some error level. For example, a complete instructional objective might be the following:

*Given a typewriter and printed text, the trainee will be able to type text material at an average of 60 words per minute with fewer than 5 errors for a 5-minute period.*

This objective specifies the accomplishment or output (typed text), the conditions (typewriter, printed text, 5 minutes), and the criteria (average of 60 words per minute, fewer than 5 errors).

Here are some sample criteria statements:

Time limit:

- *....within five minutes.*
- *....within a week.*

Error limit:

- *...with 100 percent accuracy.*
- *...within a five percent tolerance.*

---

Product features:

- *...type a complete command. The command should contain an acceptable action, object, and qualifier.*
- *...all three bumps on the piece of drywall should have been smoothed so that they are flush with the surrounding surface.*

Procedural requirements:

- *...observing all required safety procedures.*
- *...maintaining confidentiality of the data and observing all security precautions.*

Other:

- *...to the satisfaction of a panel of experts.*
- *...to meet all OSHA requirements.*

Criteria statements are key components of objectives for the test designer because they provide critical information on what constitutes mastery performance. The criteria thus become the basis for setting the cutoff score for the test.

## **Types of Instructional Objectives**

There are different types of instructional objectives designed for different uses within the systematic instructional development process. It's important to be familiar with these types because it will give you a better understanding of the complexity of the performance and the types of tests that should be developed.

---

Generally speaking, instructional objectives can be written to meet three basic needs:

- To define different levels of instruction
- To define different levels of performance
- To define different levels of detail

**Different Levels of Instruction:** There are basically three different levels of instruction: course, lesson (or unit), and sub-lesson.

An end-of-course objective describes what the trainee will be able to do upon completing the course. For example:

*The trainee will be able to make appropriate use of personal computer applications software in more efficiently carrying out managerial tasks.*

A Lesson objective describes what the trainee will be able to do upon the completion of a lesson (or unit). Lesson objectives are usually tied to one or more end-of-course objectives. For example:

*The trainee will be able to appropriately use spreadsheets in making market decisions.*

---

A sub-lesson objective describes what the trainee will be able to do upon the completion of an instructional segment. Sub-lesson objectives are usually tied to one or more lesson objectives. For example,

*The trainee will be able to move a column of figures on a spreadsheet to a new location.*

or

*The trainee will be able to create, modify, store, and print a simple spreadsheet table.*

**Different Levels of Performance:** There are two levels of performance that should be considered: terminal performance and enabling performance.

A terminal performance (as specified in a "terminal objective") specifies the performance as the highest level of complexity, related to a discrete task or job. For example:

*Using a personal computer with a hard disk drive, the trainee will load applications software programs from the floppy disks provided in the software product to the hard disk so that all programs can be accessed directly from the hard drive.*

---

An enabling performance (as specified in an "enabling objective") specifies a simpler performance at a lower level which contributes to the achievement of the terminal objective. For example:

*The trainee will be able to correctly insert and lock the floppy disks in the personal computer.*

or

*The trainee will properly execute the "install" programs for each application software package .*

In many cases, terminal objectives are also end-of-course objectives. Likewise, enabling objectives are often lesson (or sub-lesson) objectives.

**Different Levels of Detail:** There are two levels of detail for writing instructional objectives: developmental and student.

Developmental objectives are written for the use of course developers and test designers. They have the most comprehensive details. For example:

*Given a personal computer with dual floppy disk drives, disk drive locks, and any type of monitor, the trainee will be able to load a spreadsheet program and access data files within a minute, without access to any documentation. During the process, the trainee will observe necessary precautions regarding handling of the disk and disk drives.*

---

A student objective is written to provide a preview to the trainees with only the essential information. For example:

*Load a spreadsheet program and data files on a PC.*

The student objective gets to the “heart” matter quickly and makes it easier for the trainees to orient themselves to the key competencies required by the instruction.

The developmental objective, on the other hand, is essential to the test developer because it provides the most complete information of the performance requirements for mastery. If comprehensive developmental objectives are included in the course design, not only is the test designer’s job made easier, but the resulting tests will probably be more valid.

## **Conclusion**

As you may well imagine, for a typical training course there will be many objectives needed to specify the skills and knowledge to be trained. Why do you need to go to all this effort? Well, there are a couple of reasons.

First, if you have done a good job of analysis, the instructional objectives provide the best vehicle for translating the course content (skills and knowledge) into performance-based instruction.

Second, the instructional objectives lay the foundation for the way the training will be structured and how it will look.

---

But most important for our purposes, instructional objectives define precisely what constitutes mastery. They specify the critical level of performance required to be successful in the course and on the job. This relationship between performance on the job and performance in training is the essential element in the design and use of quality training tests.

For more information on this topic, refer to the following book:

**Preparing Instructional Objectives**

by Robert F. Mager

David S. Lake Publishers

500 Harbor Blvd.

Belmont, CA 94002

You should also read the next section: "Matching Tests to Training and The Job: Quality Considerations."

# Matching Tests to Training and the Job: Quality Considerations

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*The quality of training depends, to a great extent, on the match between the test, the training and the job itself. When such a match is weak, not only will the training be ineffective, but the trainee might challenge the results of the test. The following reading provides several perspectives on this issue.*

The effectiveness of a test to certify that a trainee has mastered selected, job-related skills and knowledge is the single most important quality aspect of that test. And, since tests usually measure the effectiveness of the related training, it is important to assure that the test covers what was trained and that the training covers the job.

In effect, it is critically important that the domain of test (i.e., the content covered by the test) matches the domain of the training, which, in turn, matches the domain of the job.

The relationship between these domains is shown in figure 3 (the domains are indicated by circles).



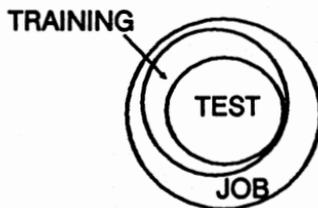
**Figure 3:** *The relationship between test, training and job domains*

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## The Desired Relationship

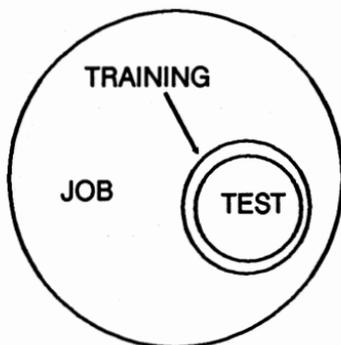
Ideally, the three domains should overlap each other. In such cases, the test and the training specifically cover the job, i.e., the test and the training are highly job related.

Figure 4 shows an example of a reasonably good test-training-job match. The domain of the test is entirely within the domain of the training, so the test is training relevant. And, since the training is entirely within the domain of the job, the training is job relevant. It follows, therefore, that the test is job relevant.



**Figure 4:** *A good test-training-job match*

A test and its associated training do not, however, have to cover all of the job. Take sales training, for example. It is possible to divide sales training into selling skills and product knowledge. If a course were developed to cover a single product like a PBX, but not generic selling skills, it might cover only part of the job. If, as shown in figure 5, the test were related to the training and related to a specific part of the job, there would still be a good test-training-job match.

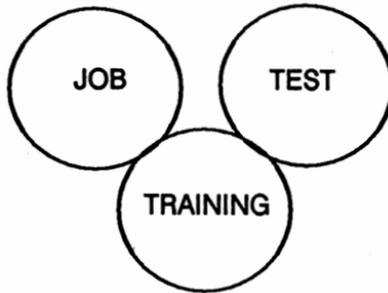


**Figure 5:** *A test and its associated training are highly related and cover a specific segment of the job*

### **Poor Relationship: Several Cases**

There are a variety of cases that occur where the test, the training and the job requirements are, to some extent, not related to each other. The results can be wasted training efforts as well as lower productivity and work quality.

Clearly, the worst case scenario occurs when the job, the training, and the test do not match each other, as illustrated in figure 6.



**Figure 6:** *No match between the job, the training, and the test*

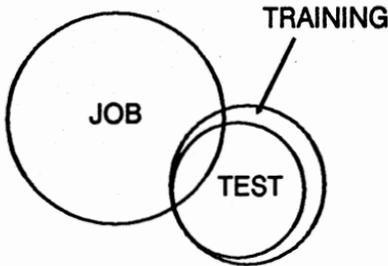
In this situation, each of the three domains covers a completely different set of skills and knowledge. Not only is the training not job-relevant, the test neither certifies mastery of the training or job competence.

This situation usually stems from an inadequate analysis of the job requirements resulting in ineffective training. And the test was probably designed without any knowledge of either the job requirements or the content of the course. Cases such as this can cost the Company a great deal of money in poor job-related training and inaccurate assessment of trainee skills.

There are also situations where either the test or the training is job relevant, but not both.

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Throughout the Company, there are many cases where the test covers the training, but the training itself is not job relevant. This is shown in figure 7.



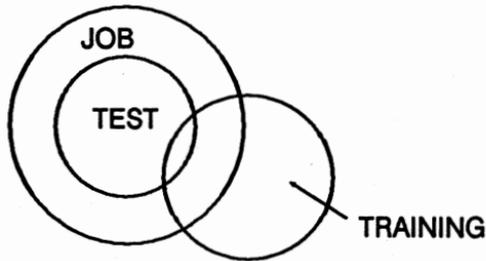
**Figure 7:** *The test and the training are related, but neither job is relevant*

Again, this situation is usually the result of a poor job analysis. Training was based on an incorrect description of the job and a test was designed to measure the resulting training. This often happens when the training department and the job designers (or methods personnel) do not work closely together, or when the job changes and the training fails to adjust accordingly.

Trainees who pass the course-related test may assume that they have the skills and knowledge to competently perform the job, only to discover that too many required skills and knowledge were not covered in the training or the test.

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It is also possible for a test to be highly job relevant, but the training is not. This situation is depicted in figure 8.



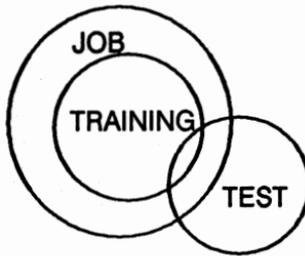
**Figure 8:** *A job-relevant test but inappropriate training*

In this situation, the test was probably based on an accurate assessment of the job requirements, but somehow, that information failed to get incorporated into the training. In fact, the training appears to be substantially based on skills and knowledge unrelated to the job. Thus, the test covers much job-related material that is not covered in the training.

Trainees who pass this test will probably do well in the job. However, they're likely to complain that they didn't learn what they needed from the course, which will probably be viewed as a waste of time. If, as it would appear, the trainees are not getting what they need from the course, but are still passing the test, it is important to determine how they're actually learning the skills and knowledge necessary to perform the job. In cases such as this, a redesign of the training, to make it more job-relevant, is warranted.

---

This situation is often reversed as well. Sometimes, the training is job-relevant, but the test is not. As depicted in figure 9, the test covers little of what is included in the job or the course.



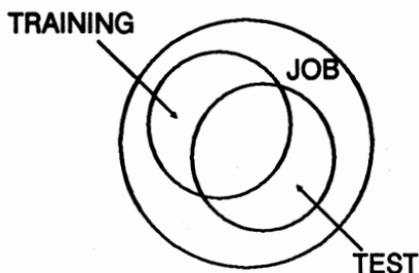
**Figure 9:** *Job relevant training but inappropriate test*

Here, the training was probably based on an accurate assessment of the job requirements, but for some reason, the test covers skills and knowledge unrelated to either. The problem here is clearly in the design of the test, since many of the test items are inappropriate. It is important for the test designer to take another look at the critical skills and knowledge essential to the job and covered by the training, and incorporate them into the test.

Trainees who take the course and find it useful for their jobs will question the test as being irrelevant. Since the test covers little of the job or training, it is likely that most trainees will not attain mastery on the test, even though they probably can perform the job competently. Thus, such a test is a highly inaccurate determiner of what was learned or who can perform on the job.

---

Finally, as shown in figure 10, both the test and the training can be job relevant, but they can have little relationship to each other.



**Figure 10:** *Training and test are related to the job but not to each other*

This situation may arise when the developers of the test are not the same as the developers of the training, and when these two groups do not work together. In such cases, a different viewpoint of the critical job skills and knowledge caused the test and the training to cover different domains of the same job.

In this case, the test does not cover all the objectives of the course but does cover some job-related content that is not in the training. Since both the test and the training are job relevant, the differences between the two may be difficult to spot. In such a situation, a review of the match between the instructional objectives of the training and the test items is in order.

---

## **Conclusion**

When a test is not relevant to the job and/or the related training, trainees may be inadequately prepared to perform in a competent manner. Furthermore, a non-relevant test lulls the trainee (and the training program) into a false sense of success. This can be extremely costly, both for the trainee's own professional development and for the Company's bottom line.

It is clear that while the design of a test might be technically correct, its effectiveness is equally dependent on how well it covers the essential job requirements and how well those job requirements are covered in the training. To assure a high degree of overlap of these three domains, follow this basic rule:

Training, through its instructional objectives, must accurately and completely reflect the essential requirements of the job (i.e., the skills and knowledge necessary to perform competently). Once this has been accomplished, tests must be constructed to accurately reflect those objectives. In this way, the job relatedness of the training and the tests is assured.

# **Calculating the Percentage of Inter-rater Agreement: Advisor 3**

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The percentage of inter-rater agreement is a value used to determine the reliability of performance tests. This value shows the extent to which two or more raters agree in their assessment of competency demonstrated on a performance test. When determining the percentage of inter-rater agreement, all raters should be:

- Subject-matter experts
- Trained in observation
- Trained in using the evaluation instrument
- Representative of the type of raters who will be rating the performance

Advisor #3 is designed to calculate the inter-rater percentage of agreement for your performance test. You will need data from two raters who have observed the performance of the same group of trainees. There can be three to ten trainees in the sample group. For the purposes of establishing inter-rater agreement, video recordings of trainee performances can be used.

You can duplicate the form that follows to use as a job aid in collecting reliability data for your performance test. This form will make it easier for you to enter the data for the Advisor calculation.

---

In most situations, the percentage of agreement for two raters is sufficient, and Advisor #3 is designed to calculate percentage of agreement for two raters. However, in some highly critical situations it may be advisable to look at the percentage of agreement of more than two raters. In these cases, three or four raters can be used.

When more than two raters are used, the percentage of agreement must be calculated for each pair of raters. You will therefore need to complete several forms and do the Advisor calculation for each set of data.

The percentage of agreement for each pair of raters should then be carefully examined to identify a trend in the level of agreement.

If the percentage of agreement for some of the pairs seems very different than the percentage of agreement for others and no trend can be identified, there is probably a problem with the performance test, the evaluation instrument, the training of one or more raters, or the environment. Each of these should be examined carefully.

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## **Percentage of Agreement — Inter-rater Reliability**

### **Data Collection Form**

Course: \_\_\_\_\_

Instructor: \_\_\_\_\_

Test Developer: \_\_\_\_\_

Date(s) of Observation: \_\_\_\_\_

Rater #1: \_\_\_\_\_

Rater #2: \_\_\_\_\_

**Directions:** Please enter **M** for master or **N** for nonmaster to indicate each rater's assessment for each trainee. A cutoff score should be established prior to the observations.

TRAINEE	RATER #1	RATER #2
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Percentage of Inter-rater Agreement = \_\_\_\_\_ %

NOTES: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

---

## **Sample Reliability Data for Calculating Inter-rater Reliability**

You may want to practice using Advisor #3 with some sample data.

When you reach instructional screens press SPACEBAR until you reach the next question screen.

### **Sample #1:**

1. Select Advisor #3 from the Advisor Menu.
2. Type "B" (Assess specific competencies).
3. Type "A" (Performance Test).
4. Type "A" (Yes, content validity has been established).
5. Type "A" (No level of inter-rater reliability has been calculated).
6. Type "A" (Yes, necessary data is available).
7. Enter 10 (number of trainees) and press RETURN.
8. Enter data so the matrix on the screen matches the following form.

---

TRAINEE	RATER #1	RATER #2
1	M	M
2	N	N
3	N	M
4	M	N
5	M	M
6	M	M
7	M	M
8	N	N
9	N	N
10	N	N

9. When the data has been entered, press ALT-C to calculate.
10. You should have a percentage of agreement of 80% for 10 trainees.

### **Sample #2:**

When you reach instructional screens press SPACEBAR until you reach the next question screen.

1. Select Advisor #3 from the Advisor Menu.
2. Type "B" (Assess specific competencies).
3. Type "A" (Performance Test).
4. Type "A" (Yes, content validity has been established).
5. Type "A" (No level of inter-rater reliability has been calculated).

- 
6. Type "A" (Yes, necessary data is available).
  7. Enter 7 (number of trainees) and press RETURN.
  8. Enter data so the matrix on the screen matches the following form.

TRAINEE	RATER #1	RATER #2
1	M	M
2	N	N
3	N	M
4	M	N
5	M	M
6	M	M
7	M	M

9. When the data has been entered, press ALT-C to calculate.
10. You should have a percentage of agreement of 57% for 7 trainees.

## **Calculating the Test/Retest Reliability Coefficient: Advisor 3**

---

The test/retest method is used for determining the reliability of written tests. This method requires that the same test be given to the same group of test takers on two occasions, with no intervening instruction. The interval between test administrations should be relatively short (24 to 72 hours).

The scores from the first administration are compared with the scores from the second administration. If a trainee has very different scores on each, the reliability is considered low; if the trainee receives the same score or similar scores on each administration, the reliability is considered high.

Advisor #3 can be used to calculate the test/retest reliability coefficient for this written test.

You will need two sets of test data from the same group to calculate the test/retest reliability coefficient. To obtain this data first establish a cutoff score for your test, then administer your test to a group of between 7 and 33 trainees. This group should consist of both well known\* masters and nonmasters as equally balanced as possible. That is, if you have five masters in your test group, you should try to have approximately five nonmasters in the group as well. The more trainees in your group the more accurate the test/retest reliability coefficient will be. Indicate whether these trainees were certified as masters (m) or nonmasters (n) by the test.

\* By "well known", we mean people whose performance obviously qualifies them as either masters or nonmasters.

---

**Then, administer the test again to the same group 24 to 72 hours after the first administration with no additional instruction or practice. Assemble the data as you did for the first test.**

**You can duplicate the form on the next page to use as a job aid in collecting reliability data for your written test. This form will make it easier for you to enter the data for the Advisor calculation.**

---

## **Test/Retest Reliability—Phi Coefficient**

### **Data Collection Form**

Course: \_\_\_\_\_

Instructor: \_\_\_\_\_

Test Developer: \_\_\_\_\_

Date of Test #1: \_\_\_\_\_ Date of Test #2: \_\_\_\_\_

**Directions:** Please enter M for master or N for nonmaster to indicate the results of each test for each trainee in the sample group. A cutoff score should be established prior to administering the test.

TRAINEE	TEST #1	TEST #2	TRAINEE	TEST #1	TEST #2
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		

Test/Retest Reliability Coefficient = \_\_\_\_\_%

---

## **Sample Reliability Data for Calculating Test/Retest Reliability**

You may want to practice using Advisor #3 with some sample data.

When you reach instructional screens press SPACEBAR until you reach the next question screen.

### **Sample #1:**

1. Select Advisor #3 from the Advisor Menu.
2. Type "B" (Assess specific competencies).
3. Type "B" (Written Test).
4. Type "A" (Yes, content validity had been established).
5. Type "A" (No test/retest reliability coefficient has been calculated).
6. Type "A" (Yes, necessary data is available).
7. Enter 30 (numbers of trainees) and press RETURN.
8. Enter data so the matrix on the screen matches the following form.

TRAINEE	TEST #1	TEST #2	TRAINEE	TEST #1	TEST #2
1	M	M	16	N	N
2	M	M	17	M	M
3	N	M	18	M	M
4	M	M	19	M	M
5	N	N	20	N	M
6	M	M	21	N	N
7	M	M	22	M	M
8	N	M	23	M	M
9	M	N	24	N	N
10	N	N	25	M	M
11	M	M	26	N	N
12	M	M	27	N	N
13	N	N	28	N	M
14	N	N	29	M	M
15	M	M	30	N	M

9. When the data has been entered, press ALT-C to calculate.
10. You should have a test/retest reliability coefficient of .61.

**Sample #2:**

When you reach instructional screens press SPACEBAR until you reach the next question screen.

1. Select Advisor #3 from the Advisor Menu.
2. Type "B" (Assess specific competencies).
3. Type "B" (Written Test).

- 
4. Type "A" (Yes, content validity has been established).
  5. Type "A" (No test/retest reliability coefficient has been calculated).
  6. Type "A" (Yes, necessary data is available).
  7. Enter 22 (number of trainees) and press RETURN.
  8. Enter data so the matrix on the screen matches the following form.

TRAINEE	TEST #1	TEST #2	TRAINEE	TEST #1	TEST #2
1	N	N	12	N	N
2	M	M	13	N	N
3	M	M	14	M	M
4	M	M	15	M	M
5	N	N	16	N	N
6	M	M	17	N	N
7	M	M	18	M	M
8	N	N	19	N	N
9	N	N	20	N	N
10	M	M	21	M	M
11	M	M	22	N	N

9. When the data has been entered, press ALT-C to calculate.
10. You should have a test/retest reliability coefficient of 1.00.

# **Calculating the Concurrent Validity Coefficient: Advisor 4**

---

Concurrent validity is the extent to which the test can correctly classify masters and nonmasters on the competencies it seeks to measure.

Establishing concurrent validity is a process requiring considerable time and expense. It is generally not used for all tests, but only for those that are used to establish mastery in critical areas.

Advisor #4 can be used to calculate the concurrent validity coefficient for this written test.

You will need two groups of test-takers to calculate the concurrent validity coefficient. To obtain the data, first identify a group of known masters and a group of known nonmasters. Each group should have the same number of test-takers (between 7 and 33 test-takers). That is, if you have ten masters you should try to have approximately ten nonmasters. The more test-takers in each group the more accurate the concurrent validity coefficient will be.

Establish a cutoff score for your test. Then, administer the test to both groups to determine if the test can accurately classify the master from the nonmasters.

You can duplicate the form on the next page to use as a job aid in collecting validity data for your written test. This form will make it easier for you to enter the data for the Advisor calculation.

---

## Concurrent Validity—Phi Coefficient

### Data Collection Form

Course: \_\_\_\_\_

Instructor: \_\_\_\_\_

Test Developer: \_\_\_\_\_

Date of Test #1: \_\_\_\_\_ Date of Test #2: \_\_\_\_\_

**Directions:** Please enter **M** for master or **N** for nonmaster to indicate the known status, as well as the results, of each test for each trainee in the sample group. A cutoff score should be established prior to administering the test.

TRAINEE	KNOWN STATUS	TEST RESULTS	TRAINEE	KNOWN STATUS	TEST RESULTS
1			18		
2			19		
3			20		
4			21		
5			22		
6			23		
7			24		
8			25		
9			26		
10			27		
11			28		
12			29		
13			30		
14			31		
15			32		
16			33		
17					

Concurrent Validity Coefficient = \_\_\_\_\_ %

---

## **Sample Validity Data for Calculating Concurrent Validity**

You may want to practice using Advisor #4 with some sample data.

When you reach instructional screens press SPACEBAR until you reach the next question screen.

### **Sample #1:**

1. Select Advisor #4 from the Advisor Menu.
2. Type "B" (Assess specific competencies).
3. Type "B" (Written Test).
4. Type "A" (Yes, content validity has been established).
5. Type "B" (Master/nonmaster distinction is critical).
6. Type "A" (No concurrent validity coefficient has been calculated).
7. Type "A" (Yes, necessary data is available).
8. Enter 10 (number of masters) and press RETURN.
9. Enter 10 (number of nonmasters) and press RETURN.
10. Enter data so the matrix on the screen matches the following form.

TRAINEE	KNOWN STATUS	TEST RESULTS	TRAINEE	KNOWN STATUS	TEST RESULTS
1	N	N	11	M	M
2	N	N	12	M	M
3	N	N	13	M	N
4	N	N	14	M	M
5	N	M	15	M	M
6	N	N	16	M	M
7	N	N	17	M	M
8	N	N	18	M	N
9	N	N	19	M	M
10	N	N	20	M	M

11. When the data has been entered, press ALT-C to calculate.

12. You should have a test/retest reliability coefficient of 0.70.

### **Sample #2:**

When you reach instructional screens press SPACEBAR until you reach the next question screen.

1. Select Advisor #4 from the Advisor Menu.
2. Type "B" (Assess specific competencies).
3. Type "B" (Written Test).
4. Type "A" (Yes, content validity has been established).
5. Type "B" (Master/nonmaster distinction is critical).

- 
6. Type "A" (No concurrent validity has been calculated).
  7. Type "A" (Yes, necessary data is available).
  8. Enter 10 (number of masters) and press RETURN.
  9. Enter 10 (number of nonmasters) and press RETURN.
  10. Enter data so the matrix on the screen matches the following form.

TRAINEE	KNOWN STATUS	TEST RESULTS	TRAINEE	KNOWN STATUS	TEST RESULTS
1	N	N	11	M	M
2	N	M	12	M	M
3	N	N	13	M	M
4	N	N	14	M	M
5	N	N	15	M	N
6	N	N	16	M	M
7	N	N	17	M	N
8	N	M	18	M	N
9	N	N	19	M	N
10	N	N	20	M	N

11. When the data has been entered, press ALT-C to calculate.
12. You should have a test/retest reliability coefficient of 0.31.

## **The Angoff-Nedelsky Method: Advisor 5**

---

The Angoff-Nedelsky method is used to obtain a cutoff score by having subject-matter experts examine each test item and estimate the probability that a minimally competent test-taker will answer the item correctly.

Advisor #5 can be used to calculate the cutoff score using the Angoff-Nedelsky method.

You will need to identify three to five judges who are subject-matter experts. These judges should be familiar with both the competencies covered by the test and with the level of competency required for mastery.

Then, ask each judge to review each test item and estimate the probability that a **minimally competent** person will answer the item correctly. The probability should be expressed as a percentage of 1.00 (e.g. .25, .50, .66).

You can duplicate the forms on the next two pages to use as a job aid in collecting cutoff score data for your written test. This form will make it easier for you to enter the data for the Advisor calculation.

---

## **Angoff-Nedelsky Method—Cutoff Scores**

### **Data Collection Form**

Course: \_\_\_\_\_

Instructor: \_\_\_\_\_

Test Developer: \_\_\_\_\_

Date(s) of Observation: \_\_\_\_\_

Judge #1: \_\_\_\_\_

Judge #2: \_\_\_\_\_

Judge #3: \_\_\_\_\_

Judge #4: \_\_\_\_\_

Judge #5: \_\_\_\_\_

**Directions:** The following page has a form for recording your cutoff score data. There is space for recording data for 19 items and 5 judges. Duplicate this form to accommodate the data for all items on your test. If you have 50 items, you will need to make 2 copies of this form.

Number the boxes in the left vertical row for each item.

For each item, ask each judge to estimate the probability that a **minimally competent** test-taker will answer that item correctly. These estimates should be expressed as a percentage of 1.00.

For example, if Judge #1 estimates that there is a 50/50 chance that a minimally competent person will answer item #1 correctly, you should enter .50.



---

## **Sample Data for Calculating a Cutoff Score Using the Angoff-Nedelsky Method**

You may want to practice using Advisor #5 with some sample data.

When you reach instructional screens press SPACEBAR until you reach the next question screen.

### **Sample #1:**

1. Select Advisor #5 from the Advisor Menu.
2. Type "B" (Written test).
3. Type "A" (Test data on both known masters and nonmasters).
4. Type "A" (Master/nonmaster distinction is critical).
5. Type "B" (Angoff-Nedelsky).
6. Enter 3 (number of judges) and press RETURN.
7. Enter 10 (number of items) and press RETURN.
8. Enter data so the matrix on the screen matches the following form.

---

ITEM NUMBER	JUDGE #1 PROBABILITY	JUDGE #2 PROBABILITY	JUDGE #3 PROBABILITY
1	.50	.60	.50
2	.70	.75	.80
3	.90	.70	.90
4	1.00	1.00	.90
5	.25	.30	.60
6	1.00	1.00	.95
7	.50	.60	.70
8	.40	.70	.75
9	.20	.20	.25
10	1.00	1.00	1.00

9. When the data has been entered, press ALT-C to calculate.

10. You should have a cutoff score of 6.88.

---

## **Sample #2:**

When you reach instructional screens press SPACEBAR until you reach the next question screen.

1. Select Advisor #5 from the Advisor Menu.
2. Type "B" (Written test).
3. Type "A" (Test Data on both known masters and nonmasters).
4. Type "A" (Master/nonmaster distinction is critical).
5. Type "B" (Angoff-Nedelsky).
6. Enter 5 (number of judges) and press RETURN.
7. Enter 5 (number of items) and press RETURN.
8. Enter data so the matrix on the screen matches the following form.

ITEM NUMBER	JUDGE #1 PROBABILITY	JUDGE #2 PROBABILITY	JUDGE #3 PROBABILITY	JUDGE #4 PROBABILITY	JUDGE #5 PROBABILITY
1	.50	.60	.50	.60	.55
2	.75	.75	.80	.75	.80
3	.30	.25	.10	.40	.30
4	1.00	1.00	.90	.95	.90
5	.60	.70	.60	.65	.60

9. When the data has been entered, press ALT-C to calculate.
10. You should have a cutoff score of 3.17.

# **The Contrasting Groups Method: Advisor 5**

---

The Contrasting Groups method is a method used to obtain a cutoff score by plotting frequencies for two groups of test-takers: masters and nonmasters and determining the score at the point at which the two distributions intersect.

Advisor #5 can be used to calculate the cutoff score using the Contrasting Groups method.

You will need to administer your test to a group of masters and a group of nonmasters.

You can duplicate the forms on the next page to use as a job aid in collecting cutoff score data for your written test. This form will make it easier for you to enter the data for the Advisor calculation.

---

## **Contrasting Groups Method—Cutoff Scores**

### **Data Collection Form**

Course: \_\_\_\_\_

Instructor: \_\_\_\_\_

Test Developer: \_\_\_\_\_

# Masters: \_\_\_\_\_ # Nonmasters: \_\_\_\_\_

Highest Raw Score Possible: \_\_\_\_\_

**Directions:** Enter the raw score for each master (up to 30).  
Then enter the raw score for each nonmaster (up to 30).

MASTER	SCORE	MASTER	SCORE
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

NONMASTER	SCORE	NONMASTER	SCORE
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

Cutoff Score = \_\_\_\_\_

---

## **Sample Data for Contrasting Groups**

You may want to practice using Advisor #5 with some sample data.

When you reach instructional screens press SPACEBAR until you reach the next question screen.

### **Sample #1:**

1. Select Advisor #5 from the Advisor Menu.
2. Type "B" (Written test).
3. Type "A" (Test data on both known masters and nonmasters).
4. Type "A" (Master/nonmaster distinction is critical).
5. Type "A" (Contrasting Groups).
6. Enter 20 (number of masters) and press RETURN.
7. Enter 20 (number of nonmasters) and press RETURN.
8. Enter 100 (maximum score) and press RETURN.
9. Type "A" (It is critical that you do not certify any nonmasters as masters).
10. Enter data so the matrix on the screen matches the following form.

MASTER	SCORE	MASTER	SCORE
1	87	11	90
2	78	12	86
3	83	13	94
4	88	14	92
5	76	15	83
6	89	16	79
7	100	17	77
8	78	18	84
9	92	19	91
10	67	20	89

NONMASTER	SCORE	NONMASTER	SCORE
1	67	11	62
2	55	12	70
3	45	13	75
4	75	14	60
5	42	15	39
6	62	16	44
7	35	17	36
8	44	18	72
9	73	19	66
10	45	20	78

11. Press ALT-C to perform the calculation.

12. The cutoff score should be 79.

### **Sample #2:**

When you reach instructional screens press SPACEBAR until you reach the next question screen.

1. Select Advisor #5 from the Advisor Menu.
2. Type "B" (Written test).
3. Type "A" (Test data on both known masters and nonmasters).
4. Type "A" (Master/nonmaster distinction is critical).
5. Type "A" (Contrasting Groups).
6. Enter 20 (number of masters) and press RETURN.

- 
7. Enter 20 (number of nonmasters) and press RETURN.
  8. Enter 100 (maximum score) and press RETURN.
  9. Type "B" (It is critical that you do not certify any masters as nonmasters).
  10. Enter data so the matrix on the screen matches the following form.

MASTER	SCORE	MASTER	SCORE
1	92	11	87
2	88	12	68
3	73	13	74
4	78	14	92
5	86	15	73
6	79	16	89
7	80	17	97
8	66	18	84
9	82	19	91
10	77	20	69

NONMASTER	SCORE	NONMASTER	SCORE
1	57	11	52
2	65	12	44
3	45	13	57
4	65	14	70
5	62	15	29
6	62	16	54
7	55	17	66
8	34	18	52
9	73	19	46
10	75	20	38

11. Press ALT-C to perform the calculation.
12. The cutoff score should be 68.

## ***Item Analysis: Advisor 6***

---

Item analysis is the statistical process by which responses to a multiple-choice test item can be evaluated to determine the quality of the item.

There are three phases of item analysis:

- The difficulty index is the percentage of test-takers who answer an item correctly.
- The distractor pattern shows which distractors are being selected and how often each is selected.
- The point-biserial coefficient correlates the performance on a single test item with the total test score.

Advisor #6 can be used to perform an item analysis for the multiple-choice items on your written test.

**WARNING:** To use Advisor 6, your printer must be connected, online, and ready to print.

You will need the correct alternative answer for each multiple choice item and the alternative selected for each item by each student. You can duplicate the form on the next page to use as a job aid in collecting this data for your written test. This form will make it easier for you to enter the data for the Advisor calculation.

---

## **Item Analysis**

### **Data Collection Form**

Course: \_\_\_\_\_

Instructor: \_\_\_\_\_

Test Developer: \_\_\_\_\_

Number of Trainees: \_\_\_\_\_

Number of Items: \_\_\_\_\_

Number of Alternatives (2, 3, 4, or 5): \_\_\_\_\_

All items must have the same number of alternatives.

Highest Raw Score Possible: \_\_\_\_\_

**Directions:** The following page has a form for recording your item analysis data. There is space for recording data for 20 students and 11 items. Duplicate this form to accommodate the data for trainees and items on your test. For example, if you have 50 items and 25 trainees, you will need to make 3 copies of this form.

Number the boxes in the top horizontal row for each item; number the boxes in the left vertical row for each trainee.

Enter the correct alternative for each multiple-choice question at the "Correct Answer" line at the top of each form.

Then enter the alternative chosen by each trainee for each item.



---

## **Sample Data for Performing an Item Analysis**

You may want to practice using Advisor #6 with some sample data.

When you reach instructional screens press SPACEBAR until you reach the next question screen.

### **Sample #1:**

1. Select Advisor #6 from the Advisor Menu.
2. Type "A" (Yes, the test is comprised of all multiple choice items).
3. Enter 10 (number of trainees) and press RETURN.
4. Enter 20 (number of test items) and press RETURN.
5. Type "A" (Letters).
6. Enter 4 (maximum number of distractors) and press RETURN.
7. Enter data so the matrix on the screen matches the following form.

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Correct Answer	B	A	C	B	D	D	A	B	A	B	C	B	C	A	A	D	C	B	D	C

Student	Item→	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1		B	C	C	C	D	D	A	B	A	B	C	C	C	A	A	D	C	B	D	A
2		B	A	C	B	D	C	A	B	A	B	C	B	C	A	A	D	C	B	D	A
3		B	A	A	B	C	D	A	C	A	B	C	B	C	A	A	D	C	B	D	A
4		B	A	C	B	D	D	A	B	A	B	C	B	C	A	D	D	C	B	D	A
5		B	A	C	B	D	D	B	B	A	B	B	B	C	A	D	D	C	B	D	A
6		B	A	C	B	A	B	C	B	D	C	C	B	C	A	D	D	A	D	D	A
7		B	B	B	B	B	D	D	D	C	C	C	A	A	A	B	B	B	C	C	C
8		B	A	C	B	D	D	A	B	A	C	C	B	C	A	A	D	C	B	D	C
9		B	C	B	C	D	D	A	B	A	C	C	A	C	A	C	D	C	B	D	A
10		B	B	C	B	A	D	A	B	A	C	C	B	C	A	A	B	C	B	D	A

**WARNING:** To use Advisor 6, your printer must be connected, online, and ready to print.

8. Press ALT-C to perform the calculation.

9. You will get a printout that looks like the following.

ADVISOR 6  
ITEM RESPONSE FREQUENCY DISTRIBUTION

Item	Dif. Index	Pt.- Biserial	RESPONSE VALUES				
			A	B	C	D	E
1	1.00	0.00	0	10*	0	0	0
2	0.60	0.48	6*	2	2	0	0
3	0.70	0.57	1	2	7*	0	0
4	0.80	0.06	0	8*	2	0	0
5	0.60	0.58	2	1	1	6*	0
6	0.80	0.06	0	1	1	8*	0
7	0.70	0.68	7*	1	1	1	0
8	0.80	0.52	0	8*	1	1	0
9	0.80	0.84	8*	0	1	1	0
10	0.70	0.85	1	7*	2	0	0
11	0.90	-0.09	0	1	9*	0	0
12	0.70	0.57	2	7*	1	0	0
13	0.90	0.78	1	0	9*	0	0
14	1.00	0.00	10*	0	0	0	0
15	0.50	0.57	5*	1	1	3	0
16	0.80	0.52	0	2	0	8*	0
17	0.80	0.84	1	1	8*	0	0
18	0.80	0.84	0	8*	1	1	0
19	0.90	0.78	0	0	1	9*	0
20	0.20	-0.26	8	0	2*	0	0

Asterisk (\*) indicates keyed response

---

## **Sample #2:**

When you reach instructional screens press SPACEBAR until you reach the next question screen.

1. Select Advisor #6 from the Advisor Menu and press CONTINUE until you reach the first question screen.
2. Type "A" (Yes, the test is comprised of all multiple choice items).
3. Enter 12 (number of trainees) and press RETURN.
4. Enter 10 (number of test items) and press RETURN.
5. Type "A" (Letters).
6. Enter 3 (maximum number of distractors) and press RETURN.
7. Enter data so the matrix on the screen matches the following form.

---

Item	1	2	3	4	5	6	7	8	9	10
Correct Answer	C	C	A	B	A	A	C	A	B	B

Student	Item →	1	2	3	4	5	6	7	8	9	10
1		B	C	C	C	A	A	A	B	A	B
2		C	C	A	B	A	A	C	D	A	B
3		C	C	A	B	A	A	C	D	A	B
4		C	A	A	B	A	B	C	D	A	B
5		C	A	A	B	A	A	B	D	A	B
6		C	C	C	B	A	A	C	B	A	C
7		B	B	B	B	B	A	D	D	B	B
8		C	C	C	B	A	A	C	B	A	B
9		C	C	B	B	A	A	C	A	A	B
10		B	B	A	B	A	A	C	D	A	B
11		B	A	C	B	A	A	B	B	A	B
12		B	A	C	B	A	B	C	B	A	B

**WARNING:** To use Advisor 6, your printer must be connected, online, and ready to print.

8. Press ALT-C to perform the calculation.

9. You will get a printout that looks like the following.

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**ADVISOR 6**  
**ITEM RESPONSE FREQUENCY DISTRIBUTION**

Item	Dif. Index	Pt.- Biserial	RESPONSE VALUES				
			A	B	C	D	E
1	0.58	0.83	0	5	7*	0	0
2	0.50	0.59	4	2	6*	0	0
3	0.42	0.48	5*	2	5	0	0
4	0.92	0.37	0	11*	1	0	0
5	0.92	0.37	1*	1	0	0	0
6	0.83	0.26	10*	2	0	0	0
7	0.67	0.65	1	2	8*	1	0
8	0.08	0.40	1*	5	0	6	0
9	0.08	-0.37	11	1*	0	0	0
10	0.92	-0.02	0	11*	1	0	0

Asterisk (\*) indicates keyed response

# **Training Test Consultant User Feedback Form**

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**Directions:** Use this form (pages 85-89) to evaluate your experiences with this performance support tool. Your confidential feedback will help improve this software. Return this completed form to:

M. J. Rosenberg, Project Manager  
Training Test Consultant  
AT&T Corporate Training Support Group  
100 Southgate Parkway, Room 3C09  
Morristown, NJ 07960

Read each of the following statements and consider the degree to which you agree or disagree with it. Circle one response per item. Please include comments and suggestions where appropriate.

	Strongly Agree		Strongly Disagree		
	5	4	3	2	1
1. The "Training Test Consultant" has helped me to develop better training tests.					

Comments:

continued . . .

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	Strongly Agree			Strongly Disagree		
2. The "Training Test Consultant" was easy to use.	5	4	3	2	1	

Comments:

3. The "Training Test Consultant" contains the information I need to do my test development job.	5	4	3	2	1	
--	---	---	---	---	---	--

Comments:

continued. . .

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	Strongly Agree		Strongly Disagree		
	5	4	3	2	1
4. The "User Orientation" helped me learn how to use the software.					

Comments:

5. The print materials supplemented and enhanced the on-line program.	5	4	3	2	1
---	---	---	---	---	---

Comments:

continued. . .

- 
6. Please list any specific problems you encountered while using the "Training Test Consultant" (e.g., misdirected searches, unclear information, need for additional content):

Comments:

7. I would be interested in using additional performance support tools in instructional technology (circle one).      YES      NO

Comments:

continued . . .

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Please provide the following information to help us in our analysis:

Did you first use the "Training Test Consultant" \_\_\_\_\_

Your Job Function/Responsibility \_\_\_\_\_

Your Training Organization Name \_\_\_\_\_

Your Division (4th Level) Manager \_\_\_\_\_

How long in you current training assignment (yrs/mths)? \_\_\_\_\_

Your Name\* \_\_\_\_\_

Telephone\* \_\_\_\_\_

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\*Confidential, for follow-up purposes only.

Thank you for your cooperation.



## **Ordering Information**

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Members of the AT&T Training Community may order the Training Test Consultant by calling 201-898-8115 (Cornet 921). Allow two weeks for delivery.

The Training Test Consultant is not for distribution outside AT&T.

For additional information regarding other products, courses and services provided by the Corporate Training Support Group, request our catalog by calling the number above.