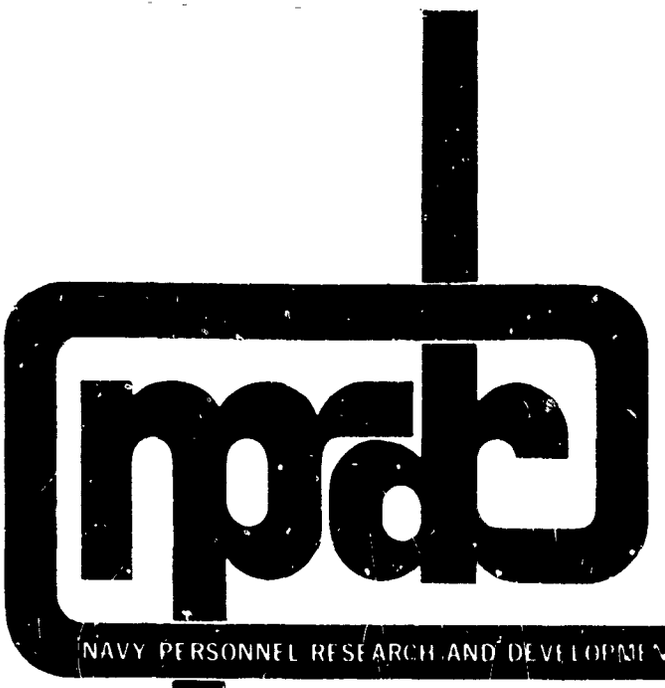
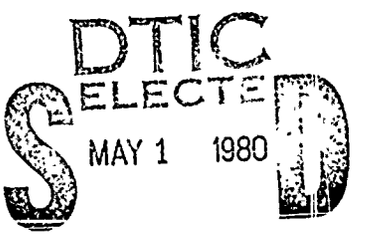


NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER SAN DIEGO CALIFORNIA 92152

NPRDC SR 79-24

AUGUST 1979

THE INSTRUCTIONAL QUALITY INVENTORY
II. USER'S MANUAL



SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: NPRDC-SR-79-24	2. GOVT ACCESSION NO.: AD-A083678
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): THE INSTRUCTIONAL QUALITY INVENTORY, II. USER'S MANUAL	5. TYPE OF REPORT & PERIOD COVERED
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): John A. Ellis; Wallace H. Wulfeck, II; Patricia S. Fredericks	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Navy Personnel Research and Development Center, San Diego, California 92152	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: Z1175-PN
11. CONTROLLING OFFICE NAME AND ADDRESS: Navy Personnel Research and Development Center, San Diego, California 92152	12. REPORT DATE: August 1979
	13. NUMBER OF PAGES: 139
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

Special Repts Z1175 PN

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

PE 62703N PE [illegible] N

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Instructional Systems Development
Instructional Design
Quality Control of Instruction
Instructional Diagnosis
Instructional Quality Inventory (IQI)
Instructional Strategies Diagnostic Profile (ISDP)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Instructional System Development (ISD), a systematic method for developing military instruction, is used by the military services to develop or revise a large portion of the training courses. The Instructional Quality Inventory (IQI) was developed to provide quality control/evaluation procedures for ISD. This report provides complete documentation for all the IQI procedures.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Special Report 79-24 August 1979

THE INSTRUCTIONAL QUALITY INVENTORY
II. USER'S MANUAL

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FOREWORD

The Instructional Quality Inventory (IQI) was developed in support of Navy Decision Coordinating Paper, Education and Training Development (NDCP-Z0108-PN), under subproject P.30A, Adaptive Experimental Approach to Instructional Design, and the sponsorship of the Deputy Chief of Naval Operations, Manpower, Personnel, and Training (OP-01). The overall objective of the subproject is to develop an empirically-based instructional design support system to aid developers in deciding on instructional alternatives based on cost/benefits and specified resource limitations. The purpose of the IQI is to provide quality control and/or evaluation procedures for instructional development.

This report is the second in a series of four on the IQI procedures. It provides a user's manual for the IQI process, and includes annotated examples of all IQI procedures. The other three reports are:

1. The Instructional Quality Inventory: Volume I, Introduction and Overview (NPRDC Special Report 79-3).

2. The Instructional Quality Inventory: Volume III, Training Workbook, which will provide additional examples and practice on the IQI procedures (to be published in 1979).

3. The Instructional Quality Inventory: Volume IV, Job Performance Aid, which contains brief versions of the procedures contained in this volume. (NPRDC Special Report 79-5).

When these four reports have been published, previous training manuals (NPRDC Special Report 77-14 and Technical Note 78-5) will have been superseded.

The IQI is intended for use by the Chief of Naval Education and Training; the Chief of Naval Technical Training; the Commander Training Command, Atlantic; the Commander Training Command, Pacific; and all other Navy activities concerned with the development, revision, or acquisition of instructional programs. Prospective users of the IQI are invited to contact this command for assistance in implementation.

DONALD F. PARKER
Commanding Officer

CONTENTS

INTRODUCTION

The Instructional Quality Inventory

The Instructional Quality Inventory (IQI) is a set of procedures for quality control of instructional development, designed to parallel and supplement the ISD process. The IQI procedures can also be used to evaluate existing instruction, and can be used as evaluation or acceptance tools for instructional programs obtained through contract.

There are four volumes in the IQI series:

1. Volume I (NPRDC Special Report 79-3) provides an introduction and overview of the IQI.

2. Volume II (this volume) includes a complete description of all IQI procedures, and gives examples of their use.

3. Volume III (to be published in 1979) provides additional examples and practice on the IQI procedures.

4. Volume IV (NPRDC Special Report 79-5) is a Job Performance Aid. It contains a brief version of each IQI procedure.

Volume I should be read prior to reading this volume. Also, each of the procedures from Volume IV is reproduced in this volume.

About this Manual:

This manual contains five chapters. Chapter 1 contains information on classification which is necessary for the other chapters. Chapters 2 through 5 contain the main IQI procedures. The chapters are as follows:

1. Classification. The IQI procedures are based on a system for classifying objectives, test items, and instructional components. Classification is determined according to (a) what the student is required to do with the information to be learned, and (b) what type of information the student is learning.

2. Objective Adequacy. Since good instruction depends on careful specification of learning objectives, the first IQI procedure is to assure the adequacy of objectives. This is done by classifying each objective, and judging whether or not it accurately reflects the intended student performance after training.

Procedure for Classification

Step 1. Determine the TASK LEVEL.

a. Determine whether the student is to REMEMBER or USE information.

b. If the student is to USE information, determine whether the task level is USE-AIDED or USE-UNAIDED.

Step 2. Determine the CONTENT TYPE.

a. If the student must recall or recognize names, parts, locations, functions, dates, places, etc., then the content type is FACT.

b. If the student must remember characteristics of similar objects, events, or ideas, OR if the student must sort or classify objects, events, or ideas according to characteristics, then the content type is CATEGORY.

c. If the student must remember a sequence of steps which apply to a single situation, OR if the student must apply the steps to a single piece of equipment or a single situation, then the content type is PROCEDURE.

d. If the student must remember a sequence of steps and decisions which apply in a variety of situations, OR if the student must apply the sequence across a variety of situations or types of equipment, then the content type is RULE.

e. If the student must remember how or why things work the way they do, or cause-effect relationships, OR if the student must use his knowledge to explain how things work, or predict effects from causes, then the content type is PRINCIPLE.

This procedure is explained in more detail on the following pages.

Explanation for STEP 1, Determine Task Level.

The first step in the classification procedure involves deciding whether the student is required to remember information, or whether the student must use information to perform some task. The remember-use distinction is a simple one. The determination can usually be made by looking at the ACTION in the objective or test item. Typical action verbs are listed below. The ones on the left usually indicate remember tasks, while the ones on the right usually indicate use-level tasks.

REMEMBER	*USE*	
name	*apply*	*operate*
state (from memory)	*classify*	*repair*
list (from memory)	*analyze*	*adjust*
recall	*derive*	*calibrate*
remember	*demonstrate*	*remove*
relate	*discriminate*	*replace*
write (from memory)	*evaluate*	*assemble*
recognize	*solve*	*disassemble*
explain (from memory)	*prove*	*calculate*
describe (from memory)	*sort*	
	explain (on the basis of other knowledge)	
	maintain	
	compute	*troubleshoot*
	predict	*load*
	perform	*unload*
	determine	
	.	
	.	
	. *(there are many other USE actions.)*	

If the task level is USE, the next step is to determine whether an AID is given. This can be done by looking at the "conditions" part of the objective or test or practice item. Anything that replaces the need for MEMORY counts as an AID.

AIDS include:

- *a list of procedure steps from a tech. manual or MRC card,*
- *a formula for solving problems,*
- *a list or table or chart of characteristics*
- *a statement of a principle.*

Normal tools, materials, etc., are NOT aids.

Explanation for STEP 2, Determine Content Type.

STEP 2a: *FACTS. Facts are what you think they are. They are simple associations between objects, events, names, parts, functions, locations, dates, etc. Facts don't have to come in pairs; there may be three or four or more pieces of information that go together. For example, a student might have to remember the name, location, and function of each of the parts in some piece of equipment.*

Key words or phrases that may help identify FACT-level objectives or test items are listed below:

The student will give the symbol for each ....

match each ... with its ....

list the names of each ....

recall the dates of ....

recall the location and function of each ....

give the ... associated with each ...

STEP 2b: *CATEGORIES. Categories refer to groups of similar objects, events, or ideas. They are similar, or are grouped together, because they have characteristics in common. Category tasks nearly always involve classification or sorting on the basis of these critical characteristics. At the REMEMBER level for categories, the student is required to remember these characteristics, and how they go together. At the USE level, the student is required to identify, sort, or classify things according to these characteristics.*

Key words or phrases that may help identify CATEGORY-level objectives or test items are listed below:

REMEMBER LEVEL:	*recall* *list*		*characteristics* *features*	*type of ...* *kind of ...*
The student will	*name* *describe* *give*	*the*	*definition* *attributes*	*of each* *category of ...* *classification* *situation*
USE LEVEL:	*sort* *classify*			*type* *kind*
The student will	*categorize* *identify* *recognize* *choose* *select*	*each ... according to*		*characteristics* *definition* *features*

STEP 2c: PROCEDURES. *A procedure is a sequence of steps that must be performed in order. Procedures are always applied in the same way, on situations or equipment that do not change. At the REMEMBER-level for procedures, the student is required to remember the steps and their order. At the USE-level, the student is to perform the procedure.*

Key words or phrases:

REMEMBER LEVEL:					
The student will	*recall* *list* *name* *state* *give*	*the*	*steps* *process* *procedure* *sequence*	*for*	*operating* *performing* *maintaining* *lighting off* *etc.*

USE LEVEL:		
The student will	*apply* *operate* *repair* *adjust* *calibrate*	*remove* *replace* *assemble* *produce* *destroy*
	etc.	

STEP 2d: RULES. *A rule, like a procedure, is a sequence of steps. However, rules can be applied in a variety of situations or on a variety of different equipments. Because they apply in a variety of situations, rules sometimes have complicated decision steps.*

Formulas and mathematical calculations always involve the use of rules, unless the student has a calculator or computer that does it for him.

Key words or phrases:

REMEMBER LEVEL:					
The student will	*recall* *name* *state* *give* *remember*	*the*	*formula* *rule* *law* *process* *steps*	*for*	*solving* *deriving* *proving* *calculating* *determining* *etc.*

USE LEVEL:		
The student will	*solve* *derive* *prove* *calculate* *determine*	*find* *translate* *program* *add* *subtract*
	etc.	

STEP 2e: PRINCIPLES. *Principles involve explanations of why/how things work the way they do, or predictions about "what would happen if ...." Principles are based on cause-effect relationships, theoretical statements, statistical associations, or physical or scientific "laws." At the REMEMBER-level, the student must recall reasons, causes and effects, theoretical statements, etc. At the USE-level, the student must use his knowledge to give a prediction or explanation about how something works, or what is likely to happen, or why something isn't working the way it should.*

Key words or phrases:

REMEMBER LEVEL:		
The student will	*recall*	*the principle of*
	remember	*the explanation of*
	state	*how ...*
	describe	*why ...*
	discuss	*the reasons for*

USE LEVEL:	
The student will	*analyze*
	evaluate
	explain
	diagnose
	troubleshoot
	predict

NOTE: It is sometimes difficult to determine whether a PRINCIPLE objective is REMEMBER or USE. Look at the following example objective:

"The student will explain the operation of a rotary-gear pump."

This objective could be either USE or REMEMBER. It would be USE if the student had not been taught about rotary-gear pumps and was required to use his knowledge of hydraulic principles to explain their operation. If the instruction had dealt with rotary gear pumps specifically, then the objective would be REMEMBER.

If you encounter an objective of this type, you must determine if the information has been taught (if you are evaluating an existing course) or if the information is to be taught (if you are evaluating the objectives of a course under development). If the information is or will be included in the instruction, then the task level is REMEMBER. If the student is required to use principles to explain things he has not been taught specifically, then the task level is USE.

Actually, it is best to make the objective precise in the first place. For example:

"The student will recall the explanation of the operation of a rotary-gear pump."

Additional Explanation for STEP 2, Determine Content Type.

On the preceding pages, we have given definitions and key words for each content type; however, determining content type can still be difficult. In the following sections, we will give a schematic representation of each content type, and further guidelines for distinguishing among content types.

FACTS

Facts are simple associations between names, objects, etc. The task is always for the student to recall them or, given one part of the fact, to recall the other parts.

fact 1: 0—0—0—0

fact 2: 0—0—0—0

.

.

.

fact n: 0—0—0—0

Example:

"The student will recall in writing the name, location, and function of each dial on the front panel of ...."

Dial 1: name—location—function

Dial 2: name—location—function

.

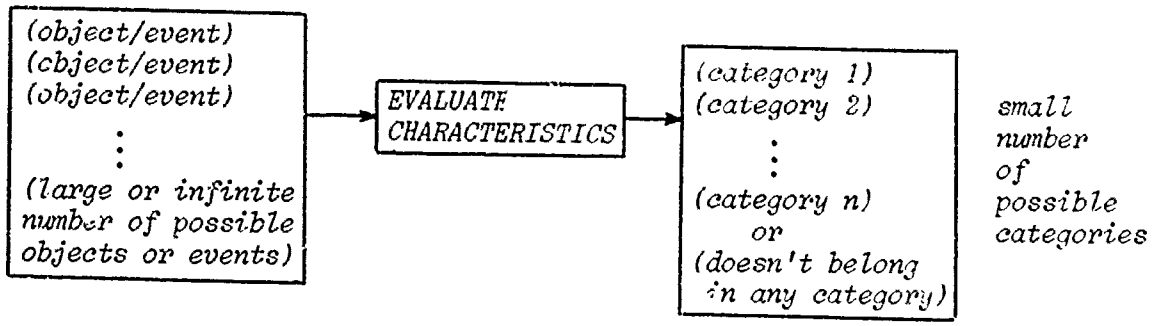
.

.

Dial n: name—location—function

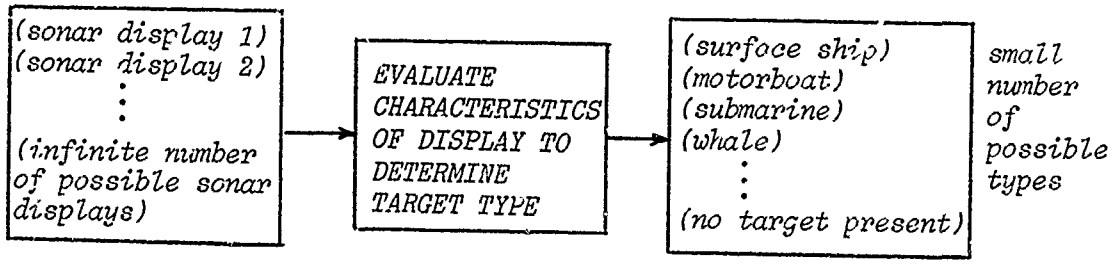
CATEGORIES

Category tasks involve sorting or classifying objects or events according to their characteristics or features. At the REMEMBER level, the student must remember the characteristics and how they go together. At the USE level, the student must identify, sort, or classify things according to these characteristics.



Example:

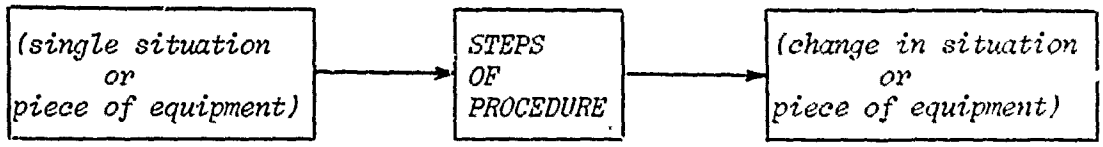
"Given a series of sonar scope displays, the student will classify them according to type of target."



For categories at the REMEMBER LEVEL, the student must remember the characteristics. (The middle box above.)
at the USE LEVEL, the student gets "inputs," evaluates the characteristics, and determines the appropriate category or type.

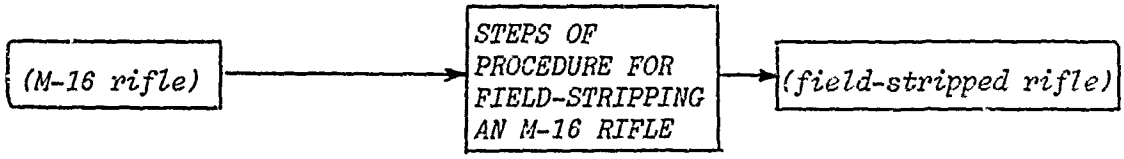
PROCEDURES

A procedure is a sequence of steps, performed in order, on a single piece of equipment or in a single situation. At the REMEMBER level, the student must remember the steps in order. At the USE level, the student is given a piece of equipment or a situation, and must perform the steps.



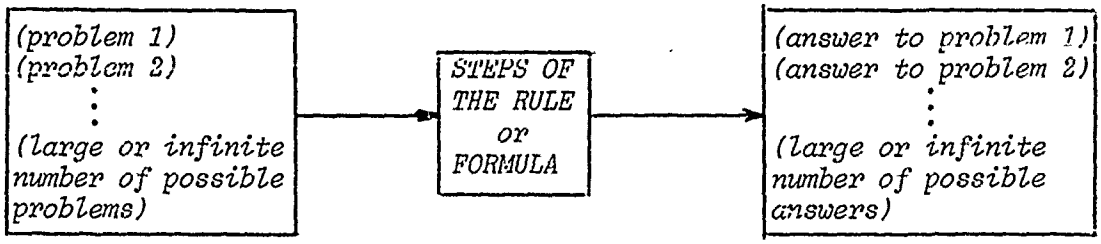
Example:

"The student will field-strip an M-16 rifle."



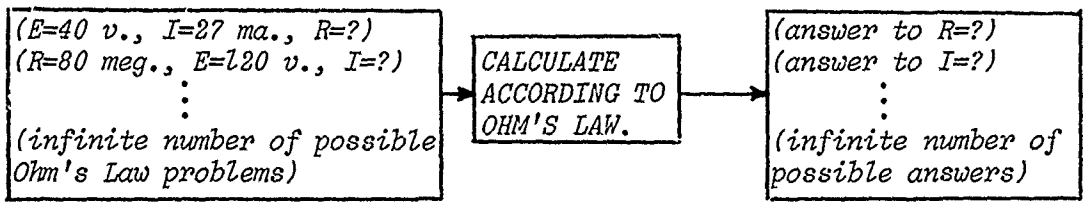
RULES

A rule, like a procedure, is a sequence of steps and decisions. However, rules can be applied in a variety of situations or on a variety of equipments. At the REMEMBER level, the student must remember the steps and decisions. At the USE level, the student is given problem situations, and must apply the steps of the rule to solve the problem or come up with the answer.



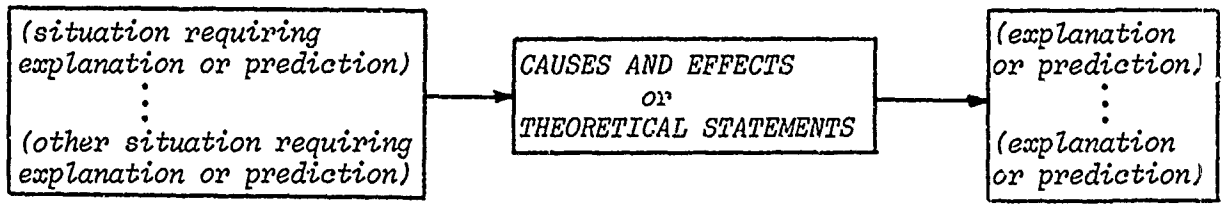
Example:

"Given any two values of current, voltage, or resistance in a circuit, the student will use Ohm's Law to solve for the third value."



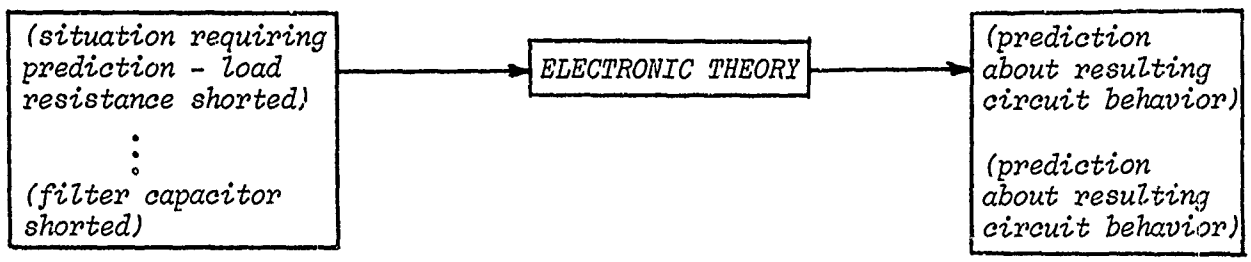
PRINCIPLES

Principles involve explanations of why or how things work the way they do, or predictions about "what would happen if ...." At the REMEMBER level, the student must recall reasons, causes and effects, theoretical statements, etc. At the USE level, the student uses his knowledge of causes and effects, or theories, to explain or predict.



Example:

"Based on his knowledge of electronic theory, the student will predict the effect in the circuit shown below if the load resistance, or the filter capacitor, were shorted."



Note: The reason that principles are taught is that they apply in a variety of situations. They allow the student to make a variety of "what would happen if..." predictions.

However, if the student is only required to remember one cause and one effect, then it should be classified as a fact. For example, if a particular symptom in a piece of electronic equipment always means that a particular part is damaged, that's a fact.

For Categories, Procedures, Rules, and Principles at the REMEMBER level the student has to remember whatever is in the middle box on the diagrams above. At the USE level, the student has to perform the whole task.

Further Guidelines for Classification.

Remember the Job. The most important thing to remember when attempting to classify objectives is the job. The classification scheme was designed so that classification depends on the job requirements. The most important requirement to consider is whether or not the student will have to deal with objects or situations he has not seen or encountered during training. For the FACT and PROCEDURE content types, this does not occur. Facts by definition must be presented during training. The job requirements for procedures involve single pieces of equipment or single situations, and the student does not have to "generalize" to new equipments or situations. In other words, everything the student needs to know is presented during training.

On the other hand, there are some job situations that require the student to deal with so many possible objects, events, ideas, problems, or situations, that it would be impossible to include all of them during training. In this case, the training program is designed so that the student will be able to deal with new cases. CATEGORIES, RULES, and PRINCIPLES are used in the classification scheme to cover this situation.

The CATEGORY content type is used when the job requires that a large number of possible objects, events, etc. be classified into, or identified as a member of, one of a small number of particular categories. Instead of having to remember each object and its classification, the student is given characteristics for each category, which allow him to classify objects, etc., he has not seen before.

The RULE content type is used when the job requires that a large number of problems be solved or that a complicated sequence of steps be performed on a large number of different objects, events, etc. Instead of having to remember each problem or go through the steps on each object, the student is taught a RULE which allows him to deal with problems, objects, and events he has not seen before.

The PRINCIPLE content type is used when the job requires prediction or interpretation of a large number of possible situations, events, effects, etc. Instead of having to remember each possible situation or event and its effects, the student is given a PRINCIPLE which summarizes the "how" or "why" of general situations or which allows the student to predict what is likely to occur in a variety of situations.

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Problems in Classification. *Sometimes classification can be tricky. There can be confusion between FACTS and CATEGORIES, and between PROCEDURES and RULES. The way to resolve problems is to "REMEMBER THE JOB"; that is to consider carefully what the student must be able to do after instruction.*

Again, the most important thing to consider is whether the student will have to deal with objects or situations that he has not seen during training. For example, if the student were required to sort or classify things according to their characteristics, and if the student on the job were going to be dealing with things not seen during training, then the objective would be a CATEGORY. However, suppose instead that there were only seven objects the student would ever see. Then, it would be more efficient to teach each object and its category name as a fact (seven facts total).

Similarly, RULES are taught so that the student can apply his knowledge to situations he won't have seen in training. However, suppose the situations are so similar that "if you've seen one, you've seen them all." This would be more efficiently taught as a PROCEDURE.

On the other hand, some tasks look at first like PROCEDURES, but turn out to be more complicated. An expert who really knows the job can help you make the decision.

Example: FACT vs. CATEGORY

"Given a variety of metal fasteners, the student will sort them according to type (bolts, screws, studs, or rivets)."

This could be taught as a CATEGORY: the student could be taught the characteristics of bolts (fine threads, blunt end, etc.), the characteristics of screws (coarse threads, pointed end, etc.), the characteristics of studs (no head, fine threads, etc.), and the characteristics of rivets (no threads, etc.). However, one bolt is pretty much the same as any other bolt, and the same for screws, studs, and rivets, except that they come in different sizes. Therefore, it might be more efficient to teach these as four FACTS: bolt - appearance, screw - appearance, etc. The confusion here can be solved if the job requirements are determined. If there are lots of different metal fasteners, and the student will see new bolts, etc., on the job, then the content type is CATEGORY. If there are only a few, and they're all nearly alike, then the content type is FACT.

Example: PROCEDURE vs. RULE

"Given a word in print, correctly spelled, the student will look up the word in a dictionary, and state its definition orally."

This might appear to be a RULE: There are a large number of possible words (inputs), and a large number of possible definitions (outputs). However, since the spelling is given, its easy to look up the word: Find the first letter of the word, find that chapter in the dictionary, find the second letter, find that section of the chapter, etc. This is most efficiently taught as a PROCEDURE.

However, suppose the word was given orally and not spelled. This would then be a fairly complicated RULE, involving listening skills, phonemic translations, etc.

Why do we need a classification scheme at all?

The classification scheme is essential for two reasons: First, it makes consistency judgments between objectives, test items, and instructional presentations possible. If we didn't classify objectives and test items, all we could say is "This is an objective and this is a test item, and they don't look too different." The classification scheme allows us to be more precise about what objectives, test items, and instruction are asking the student to do or learn.

Second, the classification scheme makes adequacy judgments about objectives, test items, and instructional presentations possible. In fact, the classification scheme was designed so that the classification of an objective has implications for the way the instruction for that objective should look. For example, the instruction for a Use-unaided Rule should be different than the instruction for a Remember-Category objective. The most important differences occur between the Remember and Use task levels, and between the content types that do not require generalization (Facts and Procedures), and those that do (Categories, Rules, and Principles). When generalization is required, there will be more examples and practice items covering a wider range of difficulty.

In the rest of this chapter, several example objectives are given, together with their classifications, and some explanation about each classification. In Volume III, Chapter 1, there are sample objectives you can classify yourself for practice.

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In the rest of this chapter, several example objectives are given, together with their classifications, and some explanation about each classification. In Volume III, Chapter 1, there are sample objectives you can classify yourself for practice.

EXAMPLES

In this section, sample objectives and sample test items are given. They are classified according to the scheme presented in the first part of this chapter, and explanation about the classification is given.

Some of the objectives and test items given below will be difficult to classify. There are three reasons for this. First, many of them are not "good" ones; they are written in such a way that it may not be clear what behavior is required or what content is to be taught. (They are, however, fairly typical.) Second, all of them are taken out of context and may deal with unfamiliar topics. Therefore, they are difficult to classify, because information about the job is not provided. Third, some examples were chosen deliberately to be hard to classify, so that classification problems could be illustrated.

For the reasons given above, the reader should not expect to be able to classify perfectly these objectives and test items (or any others) immediately. In fact, it is better not to attempt immediate classification. Instead, since the most important step in classification is REMEMBER THE JOB, the reader should learn to ask the "right" questions of job experts, so that bad objectives can be revised, and so that unfamiliar topic areas can be classified reliably. The examples are intended to illustrate this "question asking" process.

In this section, we are concerned only with the classification of each example. In the next chapter, we will deal with the adequacy of objectives.

1. OBJECTIVE: "The student will state the rule for finding total inductance in a series circuit."

Task Level? REMEMBER

Does the student have to remember something, or perform a task? In this case, the student simply has to recall the correct rule for finding total inductance. Therefore, the task level is Remember.

Content Type? RULE

The student must remember a rule for SOLVING for total inductance. "SOLVE" is a keyword for RULE. The formula for total inductance involves a series of mathematical operations applicable in any series circuit having inductors with various possible values. The process, then, is a series of steps which apply across situations.

It is possible to confuse a piece of information taught at the Remember level for Categories, Procedures, Rules, or Principles, with Remember-Fact information. The difference is that Facts cannot be used immediately. In this case, the student could use the rule to solve inductance problems.

2. OBJECTIVE: "Given pictures of the collar devices for different ranks of Naval officers, the student will identify the ranks they represent."

Task Level? REMEMBER

The task here is "I give you a picture of a collar device, and you tell me the rank." Because there is a limited number of different collar devices, the student can learn each device and its name. The task is Remember.

Content Type? FACT

The content type is Fact, because the student has to memorize pairs of symbols and names.

Suppose instead that there were a large number of different ranks and collar devices, but that different groups of them had similar characteristics. If the student's task were to look at a collar device and identify which group it belonged to, then this objective would be Use-unaided Category.

3. OBJECTIVE: "Given any resistor with four color bands, the student will state the ohmic value indicated by the color bands."

Task Level? USE-UNAIDED

If there were only a limited number of resistors the student would ever have to deal with, he could memorize each resistor's colors and their values, and the task level would be Remember. However, there are many different resistors with many different color patterns. Therefore, the student must be given a scheme for determining ohmic value from the color pattern. When the student applies this scheme to any particular resistor, he is USING the scheme. If he has no memory aid, then the task level is Use-Unaided.

Content Type? PROCEDURE

In order to make the content type decision, we need to know more about the content than is given in the objective. In particular, we need to know what the scheme for determining ohmic value from the colors is. This is a good time to consult a subject-matter expert. It turns out that the scheme is a fairly simple sequence of steps: the first two color bands indicate the first two significant figures of the ohmic value; the third band is the number of zeros to add. (The fourth band determines tolerance, not value.) If the scheme were more complicated, and involved complex calculations, the content type would be Rule. This one is simple enough to be a Procedure.

This objective should not be confused with simply learning the meanings of the colors. Those are Facts which the student must remember. Those facts support this Use-level objective.

This objective is a good example of why it is a good idea not to attempt immediate classification. More detail about the job the student will perform is needed. For example, the word "state" in the objective is misleading; the student really has to use a procedure to determine the value before he can state it. "Determine" or "calculate" would be a better action verb, but that's the subject of the next chapter.

4. TEST ITEM: "What are the steps involved in message reception and duplicate checking, as listed in the current edition of NTP-4?"

Task Level? REMEMBER

The student is asked to recall the steps, not to do anything with them.

Content Type? PROCEDURE

"Steps" is a keyword for Procedure, and in this case the task described in the test item appears to be procedural. It would be a good idea; however, to check with a subject matter expert to make sure.

5. OBJECTIVE: "The student will describe the principles of operation of a rotary gear pump."

Task Level? REMEMBER or USE-UNAIDED

It is difficult to determine whether this objective is Remember or Use-unaided without further information. If the objective had said "The student will recall the principles ...," then it would clearly be Remember. On the other hand, if the objective had said "The student will use his knowledge of hydraulic theory to explain how a rotary gear pump works," then it would be Use-unaided. It is necessary to determine what the student must do after training, and write the objective appropriately.

Content Type? PRINCIPLE

This objective requires the student to explain how or why the pump works. The content type is Principle.

6. TEST ITEM: "Disassemble and reassemble the globe valve using your MRC job program card. The valve, rags, prussian blue, gasket material, packing, and tools are on the workbench."

Task Level? USE-AIDED

The MRC job program card gives the steps to be followed, so the student does not have to remember them.

Content Type: PROCEDURE

This is a series of steps performed on a single piece of equipment.

7. TEST ITEM: "For each of the call signs listed below identify whether it is a Navy ship call sign, a Navy shore call sign, an indefinite call sign, a voice call sign, a task organization call sign, or not a valid Navy call sign."

Task Level? USE-UNAIDED

The task level of this test item depends on complexity of the task. If there were just a few call signs, then it would be easy to memorize their types, and the task would be Remember. Here, though, it turns out that there are several thousand call signs, and the student must use some classification scheme to identify their type. This test item requires the student to use the scheme with no memory aid.

Content Type? CATEGORY

In this case there is a large number of call signs which can be classified into a small number of categories or types.

8. OBJECTIVE: "Given the formula for Ohm's Law, and two values, the student will solve for the third value."

Task Level? USE-AIDED

The student must use Ohm's Law to solve for a value. In this case, he is given the formula as a memory aid. He does not have to remember it. The task level is Use-aided.

Content Type? RULE

"Solve" is a keyword for Rules. When the student is asked to solve something, he must perform a series of mathematical operations which result in unique solutions depending on the values used.

9. OBJECTIVE: "The student will recall the duties of a gun captain."

Task Level? REMEMBER

"Recall" is a keyword for the Remember level. The student does not have to perform the duties, only remember what they are.

Content Type? FACT or PROCEDURE

The content type is Procedure if the student is expected to remember a specific sequence of steps which the gun captain must perform. However, if the student is to recall only the general functions of a gun captain, the objective would be a Fact. Again, it is necessary to consult a subject-matter expert to make this decision.

10. OBJECTIVE: "In a classroom exercise, the student will file thirty drill messages representing Top Secret, Secret, special category, readdressed general messages, and other classified and unclassified messages in the correct files."

Task Level? USE-UNAIDED

The student must perform the task, with no memory aid. The task level is Use-unaided.

Content Type? CATEGORY OR PROCEDURE

If the student must inspect each message and determine category membership according to its critical characteristics, then the content type is Category. If, however, the classification of the message is obvious (e.g. the classification is printed on the top line of the message), then this is a procedural task involving filing. Once again, the services of a subject-matter expert are required.

11. TEST ITEM: "Give the names of the components represented by the following schematic symbols..."

Task Level? REMEMBER

In order to answer this test item, the student would have had to memorize the names of the schematic symbols; therefore, the task level is Remember.

Content Type? FACT

The key phrase in this test item is "Give the names." Simple associations between objects or symbols and their names are Facts.

12. OBJECTIVE: "Given the explanation of the principle of supply of a military force from the text, the student will discuss how this principle applies in Hitler's atack on Russia, the Battle of Midway, the Battle of the Bulge, and Sherman's march through Georgia."

Task Level? USE-AIDED

The student is given an explanation of the principle; therefore the task is Aided. The task is Use because the student must apply the principle to explain specific battles. It is assumed that these battles are not discussed in the text and have not been described in class. If they had been, the task level would be Remember and there would be no reason to give the student an Aid.

Content Type? PRINCIPLE

The student is given a principle and asked to interpret the outcome of specific battles. The key words here are "principle" and "discuss."

13. OBJECTIVE: "The student will recall in writing the lofargram characteristics for the following types of contacts: merchant ship, aircraft carrier, destroyer, whale diesel submarine, nuclear submarine."

Task Level? REMEMBER

The student does not have to do anything with the characteristics except recall them; therefore, the task level in Remember.

Content Type? CATEGORY or FACT

The student is asked to memorize characteristics of several categories of contacts presumably because he/she will later have to look at lofargrams and determine what the contact type is. Therefore, the content type is either Fact or Category depending on whether or not this identification requires generalization. If the lofargrams within each category are pretty much identical, then the content type would be Fact. If not, then the content type is Category. The guidance of a subject-matter expert is required.

14. OBJECTIVE: "The student will solve for inductive reactance in a circuit, given frequency and inductance."

Task Level? USE-UNAIDED

The task level is Use because the student is required to solve problems. It is not aided because he/she is not given the formula.

Content Type? RULE

The word "solve" is a keyword for Rule. Here the student must remember the formula for inductive reactance and then use it to solve problems.

15. OBJECTIVE: "The student will perform the steps required to accept, verify, and log messages to be transmitted via teletype tape."

Task Level? USE-UNAIDED

The student must "perform the steps," so the task level is Use. The student has no memory aid, so the task is Unaided.

Content Type? PROCEDURE

The word "steps" is a keyword for Procedure or Rule. If accepting, verifying, and logging is complicated enough so that doing one or two does not mean that the student could do any new message, then the content type would be Rule. In this case, though, the steps are the same for every message, so the content type is Procedure.

16. OBJECTIVE: "The student will state the principles of operation of a jet pump as described in *Propulsion Engineering*, Mod 6, Lesson 2."

Task Level? REMEMBER

The student simply has to recall how a jet pump works, as described in his training manual.

Content Type? PRINCIPLE

The student is asked to remember "how" something works. Explanations of how things work are Principles.

17. OBJECTIVE: "The student will use the principle of electromagnetic induction to describe the operation of an AC generator."

Task Level? USE-UNAIDED or REMEMBER

The task level depends on what the student will be taught during the course; that is, on what the other objectives are. If the student must use his knowledge of electromagnetic induction to describe something not yet taught, then the task is Use-unaided. If the student had been taught the principles of operation of an AC generator on the basis of electromagnetic induction, then all the student would have to do is Remember.

Content Type? PRINCIPLE

The student must explain "how" an AC generator works.

18. OBJECTIVE: "Given the guidelines for determining message security classification, the student will determine the security classification (Top Secret, Secret, Confidential, or Unclassified) for outgoing messages."

Task Level? USE-AIDED

The student must perform a task: determine appropriate security classifications for a variety of messages. The task level is Use. To the extent that the given guidelines provide sufficient information to determine classifications for varied messages, the task is Aided.

Content Type? CATEGORY

It is expected that the student could take any message and determine which of the four security classifications it belongs in. On the job, he will be required to apply the guidelines to messages he has not seen before. Presumably the messages will be varied enough so that doing one is not like doing them all. The given guidelines should contain characteristics of messages that help determine the type of classification.

From the examples above, it should be clear that the key to classification is REMEMBER THE JOB. Whenever there is doubt about the classification of an objective or test item, a subject-matter expert or technical manual should be consulted, so that information about the job can be obtained.

Chapter 2

OBJECTIVE ADEQUACY

Introduction

Why are objectives used in instructional development? The reason is communication. Objectives communicate to everyone involved in an instructional program--managers, designers, writers, instructors, and the students themselves--what the program is meant to accomplish. Each objective should specify something the student must be able to do at the end of the course that he couldn't do at the beginning. If the objective does not communicate this clearly, or if it specifies something inappropriate for the intent of the instructional program, then it is not adequate.

For an objective to communicate clearly, it must contain three parts. First, it must specify the CONDITIONS under which the student is to perform. Second, it must specify what STANDARDS the performance must meet. Third, it must specify what the performance is; that is, what ACTION the student is to perform. These three parts are the minimum; additional information might have to be provided to make the objective clear. Remember, the objective must communicate to test developers and to instructional developers. How could a test developer write an item if the standards were not known?

A good check on whether or not an objective is clear is to try to classify it according to the classification scheme in chapter 1. If an objective is hard to classify (if it is hard to decide which box it goes in), this means that the ACTION is unclear; we don't know exactly what the student must do.

An objective may be clear, but be inappropriate for the intent of the instructional program. In this case, the objective is still inadequate. To be appropriate, an objective must prepare the student for what he will be required to do or know following the instructional program. This following duty could be anything from job performance, to on-the-job training, to another formal follow-on school; these are all "jobs" after a training program. To determine appropriateness of an objective, the key is to "REMEMBER THE JOB."

On the next two pages, the OBJECTIVE ADEQUACY procedures from Volume IV are reproduced. These procedures correspond to the criteria discussed above. After the procedures, additional explanation is given. Finally, the procedures are applied to example objectives.

INSTRUCTIONAL QUALITY INVENTORY

CARD 1

OBJECTIVE ADEQUACY

STEP 1: ENTER the COURSE TITLE and OBJECTIVE NUMBER at the top of the form.

STEP 2: Determine whether or not the OBJECTIVE is CORRECTLY STATED.

2a: Are the CONDITIONS under which student performance is expected specified?

ENVIRONMENT: PHYSICAL (weather, time of day, lighting, etc.)
SOCIAL (isolation, individual, team, audience, etc.)
PSYCHOLOGICAL (fatigue, stress, relaxed, etc.)

INFORMATION: GIVEN INFORMATION (scenario, formula, values, etc.)
CUES (signals for starting or stopping)
SPECIAL INSTRUCTIONS

RESOURCES: JOB AIDS (cards, charts, graphs, checklists, etc.)
EQUIPMENT, TOOLS
TECHNICAL MANUALS

2b: Are the STANDARDS which the student performance must meet specified?

PERFORMANCE: COMPLETENESS (how much of the task must be performed)
ACCURACY (how well must each task be performed)
TIME LIMIT (how much time is allowed)
RATE (how fast must task be done)

PRODUCT: COMPLETENESS (what must finished product contain)
QUALITY (what objective standard must product meet)
JUDGEMENT (what subjective opinions must product satisfy)

2c: Is the ACTION the student must perform specified?

Is an action verb used to specify what the student must do?

Is only one action stated in the objective?

STEP 3: Determine whether or not the OBJECTIVE is CLASSIFIABLE? Does the OBJECTIVE fit in one and only one cell of the table below?

	FACT	CATEGORY	PROCEDURE	RULE	PRINCIPLE
REMEMBER	RECALL OR RECOGNIZE NAMES, PARTS, DATES, PLACES, VOCABULARY DEFINITIONS, ETC.	REMEMBER THE CHARACTERISTICS OF EACH CATEGORY AND THE GUIDELINES FOR CLASSIFICATION.	REMEMBER THE STEPS OF THE PROCEDURE.	REMEMBER THE FORMULA OR THE STEPS OF THE RULE.	REMEMBER THE CAUSE AND EFFECT RELATIONSHIPS OR THE STATEMENT OF THE PRINCIPLE.
USE UNAIDED		CLASSIFY OR CATEGORIZE OBJECTS, EVENTS, IDEAS, ACCORDING TO THEIR CHARACTERISTICS, WITH NO MEMORY AID.	APPLY THE STEPS OF THE PROCEDURE IN A SINGLE SITUATION OR ON A SINGLE PIECE OF EQUIPMENT, WITH NO MEMORY AID.	APPLY THE FORMULA OR RULE TO A VARIETY OF PROBLEMS OR SITUATIONS, WITH NO MEMORY AID.	USE THE PRINCIPLE TO INTERPRET OR PREDICT WHY OR HOW THINGS HAPPENED OR WILL HAPPEN, WITH NO MEMORY AID.
USE AIDED		GIVEN CATEGORY CHARACTERISTICS AND GUIDELINES, CATEGORIZE OBJECTS, EVENTS, IDEAS, ACCORDING TO CHARACTERISTICS.	GIVEN STEPS OF THE PROCEDURE, APPLY THE PROCEDURE IN A SINGLE SITUATION, OR ON A SINGLE PIECE OF EQUIPMENT.	GIVEN THE FORMULA OR RULE STEPS, APPLY THE FORMULA OR RULE TO A VARIETY OF PROBLEMS OR SITUATIONS.	GIVEN A STATEMENT OF THE PRINCIPLE, INTERPRET OR PREDICT WHY OR HOW THINGS HAPPENED OR WILL HAPPEN.

STEP 4: Determine whether or not the OBJECTIVE is APPROPRIATE?

4a: Are the CONDITIONS appropriate for the work to be performed on the job or for later training?

4b: Are the STANDARDS appropriate for the work to be performed on the job or for later training?

4c: Is the TASK LEVEL of the ACTION appropriate for the work to be performed on the job or for later training?

4d: Is the CONTENT TYPE of the ACTION appropriate for the work to be performed on the job or for later training?

4e: If this objective is REMEMBER, is there a later USE objective?

4f: If this objective is USE-UNAIDED, is there a previous REMEMBER objective?

4g: If this objective is USE-AIDED, is the aid adequate, or are other objectives on the aid included?

Note, if the answer to 4d, 4e, or 4g is yes, and if the associated objective is be taught in the present course, evaluate that objective next and keep the related objectivee together throughout the IQI evaluation.

Additional Explanation for the OBJECTIVE ADEQUACY procedures.

STEP 1: *This step refers to the Objective Adequacy Form on page 1 of volume IV. It must be emphasized that this form is not required; the procedures can be used without any form. This form is only a suggestion, and users of the IQI may use it, or design their own, or use no form at all.*

STEP 2: *Steps 2a and 2b refer to the CONDITIONS and STANDARDS parts of an objective. Several categories of conditions and standards are given. Obviously, no objective will require all of these. Each objective should be reviewed with these categories in mind, and a decision should be made about whether or not they are applicable. If you are unsure about whether or not a particular condition or standard should be included in an objective, a good rule is "when in doubt, stick it in."*

As experienced instructional developers know, many objectives contain "implicit" conditions or standards, like "Given paper and pencil, ..." or "with 100% accuracy." It is up to each organization using the IQI to decide whether or not to include these obvious conditions and standards. Whatever the policy, though, it should be explicit.

Step 2c refers to the ACTION part of an objective. Obviously, the action part should use an action verb. It is usually best that there be only one action per objective; if there is more than one action, the objective should probably be split up into several objectives.

The action verb deserves special attention. It should always be an action which is observable and measurable. This means you should be able to tell whether the student did it or not. Action verbs like "appreciate" or "understand" are garbage words; who knows what they mean?

STEP 3: *Refer back to chapter 1 for classifying objectives. If you can't classify an objective, the objective needs to be fixed.*

If the objective fits in more than one box, it probably needs to be split up into more than one objective.

STEP 4: *Steps 4a, 4b, 4c, and 4d all mean "REMEMBER THE JOB." The intent of any course is to prepare the student to do something after he finishes the course. This "something" is the JOB. The word JOB incorporates a wide range of activities, including on-the-job training, another more advanced course, or actual job performance. Therefore, the CONDITIONS, STANDARDS, TASK LEVEL, and CONTENT TYPE should be carefully evaluated, to make sure they are appropriate for the "job."*

Steps 4e, 4f, and 4g are a partial check on the task analysis that led to the objectives.

Step 4e means that there is no point teaching someone to REMEMBER something if it will never be USED later. Note that "later" may be on the job or in a later course.

This is just as true for FACTS as it is for the other content types, but FACTS are not "used" in quite the same way. The information taught at the REMEMBER level for CATEGORIES, PROCEDURES, RULES, and PRINCIPLES can be directly USED, but FACTS cannot. Instead, FACTS provide information to support all the other task/content types. The classification scheme has been redrawn in the chart below to show this.

	FACTS RECALL OR RECOGNIZE NAMES, PARTS, DATES, PLACES, VOCABULARY DEFINITIONS, ETC.			
REMEMBER	REMEMBER THE CHARACTERISTICS OF EACH CATEGORY AND THE GUIDELINES FOR CLASSIFICATION.	REMEMBER THE STEPS OF THE PROCEDURE.	REMEMBER THE FORMULA OR STEPS OF THE RULE.	REMEMBER THE CAUSE AND EFFECT RELATIONSHIPS OR THE STATEMENT OF THE PRINCIPLE.
USE UNAIDED	CLASSIFY OR CATEGORIZE OBJECTS, EVENTS, IDEAS, ACCORDING TO THEIR CHARACTERISTICS, WITH NO MEMORY AID.	APPLY THE STEPS OF THE PROCEDURE IN A SINGLE SITUATION OR ON A SINGLE PIECE OF EQUIPMENT, WITH NO MEMORY AID.	APPLY THE FORMULA OR RULE TO A VARIETY OF PROBLEMS OR SITUATIONS, WITH NO MEMORY AID.	USE THE PRINCIPLE TO INTERPRET OR PREDICT WHY OR HOW THINGS HAPPENED OR WILL HAPPEN, WITH NO MEMORY AID.
USE AIDED	GIVEN CATEGORY CHARACTERISTICS AND GUIDELINES, CATEGORIZE OBJECTS, EVENTS, IDEAS ACCORDING TO CHARACTERISTICS.	GIVEN STEPS OF THE PROCEDURE, APPLY THE PROCEDURE IN A SINGLE SITUATION, OR ON A SINGLE PIECE OF EQUIPMENT.	GIVEN THE FORMULA OR RULE STEPS, APPLY THE FORMULA OR RULE TO A VARIETY OF PROBLEMS OR SITUATIONS.	GIVEN A STATEMENT OF THE PRINCIPLE, INTERPRET OR PREDICT WHY OR HOW THINGS HAPPENED OR WILL HAPPEN.
	CATEGORY	PROCEDURE	RULE	PRINCIPLE

Step 4e for FACTS therefore means "Is there some later objective which requires that the student know that fact information?"

Step 4f is the reverse of 4e. If an objective is USE-UNAIDED, this means that the student must remember what to do, and then do it. Therefore, there should be a previous objective at the REMEMBER level. Note that "previous" may be in an earlier course, or may even be an entry behavior for the student.

If the task level is REMEMBER, special care must be taken to make sure that the ACTION is appropriate. The reason for this is that there are really two kinds of remembering -- recognition and recall. Recognition involves selecting or choosing from given alternatives, or matching given pieces of information, or judging the accuracy of a given statement. In recognition, all the information is given; the student only has to make a decision about it. Recall, on the other hand, involves reproducing from memory some piece of information. Recognition and recall are different because recall involves more learning than recognition.

To make decisions about the appropriateness of recognition or recall, you must REMEMBER THE JOB. Most job situations require recall. For example, the steps of a USE-UNAIDED procedure must be recalled so they can be performed. The same is true for using categories, rules, and principles. Many facts also have to be recalled.

There are two situations in which recognition can be appropriate at the REMEMBER level. The first occurs with FACTS, when a selection must be made from a group of objects, locations, etc. For example, the task "go to the tool box and get a ball-peen hammer" is a REMEMBER-FACT recognition task.

The second situation can occur for any content type at the REMEMBER level when the job only requires the student to be generally familiar with the remember level information. This situation only happens when the student is being prepared for later on-the-job or formal training, and even then, only when the student will be closely supervised. This is because the supervisor can take care of memory failure. For example, a student performing the steps of a maintenance procedure on a piece of equipment may not need to have memorized the steps if his supervisor was available to correct any errors or to tell him what to do next. Even in this situation, it would have been more efficient and more consistent with the job if the student had been required to recall the steps of procedure during training. If training time is limited, the recall performance criterion may be lowered when the job only requires "general familiarity." That is, students may be permitted to perform at less than 100%.

The distinction between recognition and recall is important, because the type of testing to be done later, and the type of instruction to be provided, depends on whether the student is being trained to the recognition or the recall level.

Step 4g is a check on the quality of the Job Performance Aid. There are a lot of terrible Job Performance Aids in the world of work. Also, Job Performance Aids may be hard to find, or hard to use, or may use different technical vocabulary. In these cases, you may want to include objectives on how to use the aids, or how to find them, or additional fact objectives on the vocabulary. In the worst case, the Aid may be so bad that the objective must be rewritten as USE-UNAIDED. (Then you would also need a previous REMEMBER objective.)

Objectives Must Communicate

At the beginning of this chapter, we said that objectives must communicate to test developers, instructional developers, instructors, etc. This communication purpose must always be kept in mind when reviewing objectives, especially when subject-matter expertise is not readily available. It is often desirable to include very specific, detailed descriptions of conditions, standards, and actions, so that later misunderstanding or errors do not occur.

For example, a complete objective may have to include not just a concept, but a complete list of critical characteristics; all steps of a procedure or rule might have to be shown; a detailed description of a principle might be necessary. This could be accomplished by including references to documents that contain this information.

The reason this might be necessary is that misunderstandings may occur if the instructional development team does not have sufficient subject-matter expertise. For example, a test developer may have to see all steps of a procedure to write a good test item on it, or to specify good scoring criteria.

EXAMPLES

In this section, the sample objectives from chapter 1 are repeated in the same order. This time, they are rated for objective adequacy. For each objective, we will first determine whether or not it is correctly stated, then whether or not it is classifiable (we will refer to chapter 1), and finally whether or not it is appropriate. The examples are formatted as shown below, and our assumptions about conditions, standards, and appropriateness are indicated.

OBJECTIVE: _____

Correctly Stated? Conditions? _____

As we mentioned earlier in this chapter, many objectives contain "implicit" or implied conditions and standards. Unless otherwise stated in the objective, we will assume that the student is to perform under normal classroom conditions, is given paper and pencil, and is given appropriate instructions.

Standards? _____

Unless otherwise stated, we will assume that the student will write all responses, and that the responses must be "100% correct." Therefore, when an objective says "state" or "recall," we will assume this means "write from memory with 100% accuracy."

Action? _____

Classifiable? Task Level? _____

Content Type? _____

For these decisions, we will often refer to chapter 1.

Appropriate? Conditions? _____

Standards? _____

Action? _____

In these examples, we have collapsed steps 4c (task level of action appropriate?) and 4d (content type of action appropriate?) into one step, "is the ACTION appropriate?"

Previous Remember? *or* Later Use-Unaided? *or* Aid Adequate?

These objectives are taken "out of context." Therefore, some of the appropriateness decisions will be difficult to make. In general, we will assume that these objectives are from apprentice-level courses.

1. OBJECTIVE: "The student will state the rule for finding total inductance in a series circuit."

Correctly Stated?

Conditions? IMPLIED

Standards? IMPLIED

In this objective, our assumptions about implied conditions and standards apply. We are assuming that the student will state in writing from memory, with 100% accuracy.

Action? O.K. - ONE ACTION

This objective uses an action verb, "state." There is only one action.

Classifiable? Task Level? REMEMBER

Content Type? RULE

See Chapter 1. This objective is clearly Remember Rule.

Appropriate? Conditions? O.K.

For nearly all Remember-level objectives, the performance expected is some written or oral response under fairly normal classroom conditions. Occasionally, other conditions might apply, such as fatigue, noisy environment, etc. These conditions would have to be stated. The key is REMEMBER THE JOB.

Standards? O.K.

For nearly all Remember-level objectives, the implied standard of 100% accuracy is appropriate. There is no point in having someone remember something unless it really has to be remembered. The only exception is in a familiarization situation, where for cost reasons the standard may be slightly relaxed.

Action? O.K.

Later Use-Unaided? ?

This objective is out of context. For a whole course, we would expect to see a later Use-unaided objective which requires the student to calculate total inductance in series circuits.

REVISED OBJECTIVE: *This objective is O.K. If implicit conditions and standards were not allowed, the objective would be: "The student will write from memory without error the rule for ...."*

2. OBJECTIVE: "Given pictures of the collar devices for different ranks of Naval officers, the student will identify the ranks they represent."

Correctly Stated? Conditions? INCOMPLETE

Some conditions are necessary and cannot be implicit, because the student must be given something to identify. The problem here is that we don't know what the pictures contain. Is there a single collar device in each picture? Are the collar devices pictured by themselves, or are they attached to a uniform? Are the devices from the U.S. Navy, or other navies? Are they hard to see on the pictures? Are there any other cues as to rank?

Standards? IMPLIED

Action? O.K. - ONE ACTION

The implied standard is 100% accuracy. The action is "identify."

Classifiable? Task Level? REMEMBER

Content Type? FACT

See Chapter 1. The student must learn each collar device and the rank it stands for.

Appropriate? Conditions? ?

What is the JOB? Ultimately, the student will have to identify Navy officers' ranks by looking at their uniforms. Rank can be identified by collar devices, sleeve stripes, and shoulder boards, not all of which appear on any one uniform. All of these should be included in the objective. Next, for this training situation, are pictures appropriate? They can be, if they are similar to situations that will be encountered on the job. Therefore, they should contain collar devices, sleeve stripes, or shoulder boards, on actual officers' uniforms, and should be taken from the point of view of the student. They should portray typical situations involving interactions with officers.

Standards? O.K.

100% accuracy is appropriate.

Action? UNCLEAR

"Identify" is fuzzy. It would be better to put either "write from memory" or "state orally from memory" the rank associated with each ....

Later Use-Unaided ?

REVISED OBJECTIVE: "Given a separate picture for each U.S. Navy officer uniform, showing collar devices, shoulder boards, or sleeve stripes, in a typical job environment, the student will state orally from memory the rank associated with each collar device, shoulder board, or sleeve stripe."

3. OBJECTIVE: "Given any resistor with four color bands, the student will state the ohmic value indicated by the color bands."

Correctly Stated?

Conditions? SPECIFIED

Standards? IMPLIED

Action? O.K. - ONE ACTION

The condition is "given any resistor," the standard is implied-100% accuracy, and the action is "state the ohmic value."

Classifiable?

Task Level? USE-UNAIDED

Content Type? PROCEDURE

See Chapter 1.

Appropriate?

Conditions? O.K.

The job involves determining the ohmic value of resistors; therefore, the conditions are appropriate. If resistors were not available, pictures might be substituted, if they were representative of the job.

Standards? O.K.

The standards could be less than 100% if putting the wrong value resistor in a circuit is not dangerous or costly; however, this is not the case.

Action? UNCLEAR

The verb "state" is misleading for the reasons discussed in Chapter 1.

Previous Remember ?

This objective is out of context. Again, we would expect to see an objective on recall of the procedure for calculating ohmic value either earlier in this course, or in an earlier course.

REVISED OBJECTIVE: "Given any resistor with four color bands, the student will follow the procedure for determining ohmic value as indicated by the color bands."

4. OBJECTIVE: "The student will write from memory the steps of the procedure for message reception and duplicate checking as listed in the current edition of NTP-4."

Correctly Stated?	Conditions?	IMPLIED
	Standards?	SPECIFIED
	Action?	O.K. - ONE ACTION

The standard is "as listed in the current edition of NTP-4."

CLASSIFIABLE?	Task Level?	REMEMBER
	Content Type?	PROCEDURE
APPROPRIATE?	Conditions?	O.K.
	Standards?	O.K.
	Action?	O.K.
	Later Use-Unaided?	?

There should be a later objective requiring the student to receive messages and check for duplicates.

REVISED OBJECTIVE: *O.K.*

5. OBJECTIVE: "The student will describe the principles of operation of a rotary gear pump."

Correctly Stated?

Conditions? IMPLIED

Standards? INCOMPLETE

With Principle objectives, particular care must be given to specifying the standards. In this case, the implied standard is "accurately," but we don't know what "accurately" means. The solution to this problem is to specify completely what information the student's description must contain. This can be done either in the objective, or by reference to some other document.

Action? O.K. - ONE ACTION

Classifiable? Task Level? ?

Content Type? PRINCIPLE

In chapter 1, we discussed the reasons why this objective is difficult to classify. The main problem with the "describe" action verb is that it is not precise enough to determine the task level. At this point in the objective adequacy procedure, the action should be revised.

Appropriate? Conditions? O.K.

Standards? ?

The standards should be revised as discussed above, and care should be taken to make sure that they are appropriate for the "job."

Action? ?

The revised action should also be appropriate for the "job." Let's assume that recall of the principle is required.

Later Use-Unaided? ?

If this objective is Remember, then there should be a later objective requiring the student to use the principle to predict something about the pump's operation.

REVISED OBJECTIVE: "The student will write from memory the principles of operation of a rotary gear pump, as described in Tech. Manual XXX."

6. OBJECTIVE: "Given a globe valve, rags, prussian blue, gasket material, packing, tools, and an MRC job program card, the student will disassemble and reassemble the globe valve."

Correctly Stated? Conditions? SPECIFIED

Standards? INCOMPLETE

The reason the standards are incomplete is that there may be a time limit for performing the task. If there is, then it should be specified in the objective. If time is not important, then the implicit standards are O.K.

Action? O.K.

Although there are two action verbs, assemble and disassemble, the action is all right because the verbs refer to different steps in a procedural task.

Classifiable? Task Level? USE-AIDED

Content Type? PROCEDURE

See Chapter 1.

Appropriate? Conditions? O.K.

It is assumed that all the materials listed in the objective will be available on the job.

Standards? ?

Standards are O.K. if no time limit is required.

Action? O.K.

Aid Adequate? ?

If the MRC card has unfamiliar terms or instructions on it, then there should be additional objectives to clarify the aid.

REVISED OBJECTIVE: *This objective is O.K. unless a time standard needs to be specified. A subject-matter expert should be consulted to make this decision.*

7. OBJECTIVE: "The student will classify any call sign according to one of the following types -- international U.S. Navy ship, international U.S. Navy shore, indefinite task organization, voice, or not a valid Navy call sign."

Correctly Stated? Conditions? UNCLEAR

It is not clear whether or not the student will be given the names of the types of call signs during the classification.

Standards? IMPLIED

Action? O.K. - ONE ACTION

Classifiable? Task Level? USE-UNAIDED

Content Type? CATEGORY

Appropriate? Conditions? ?

On the job, does the student have to classify call signs without having the names of the types available? Also, the conditions should specify any special situations that are typical of the job.

Standards? O.K.

Action? O.K.

Previous Remember? ?

There should be a previous Remember objective that requires the student to memorize the definitions or critical characteristics of each type of call sign.

REVISED OBJECTIVE: "The student will classify any call sign according to one of the following types -- international U.S. Navy ship, international U.S. Navy shore, indefinite, task organization, voice, or not a valid Navy call sign. Type names will not be provided during classification."

8. OBJECTIVE: "Given the formula for Ohm's Law and two values, the student will solve for the third value."

Correctly Stated? Conditions? INCOMPLETE

The conditions should specify the type and difficulty of the problems to be solved. In addition, because Ohm's Law can be written in several different ways, the conditions should specify which form or forms of the formula will be given.

Standards? INCOMPLETE

The number of decimal places should be specified.

Action? O.K. - ONE ACTION

Classifiable? Task Level? USE-AIDED

Content Type? RULE

See Chapter 1.

Appropriate? Conditions? ?

The type and difficulty of the problems should be representative of the job.

Standards? ?

The number of decimal places should be typical of what is required on the job.

Action? O.K.

Aid Adequate? ?

The symbols used in the formula should have been defined previously. This would have been most effectively covered in a fact-level objective.

REVISED OBJECTIVE: "Given the formula for Ohm's Law, E=IR, and any two values typical of the values encountered on the job, the student will solve for the third value correct to two decimal places."

9. OBJECTIVE: "The student will recall the duties of a gun captain."

Correctly Stated?	Conditions?	IMPLIED
	Standards?	IMPLIED
	Action?	O.K. - ONE ACTION
Classifiable?	Task Level?	REMEMBER
	Content Type?	?

As discussed in chapter 1, this could be either Fact or Procedure. The objective must be rewritten to clarify exactly what the duties involve.

Appropriate?	Conditions?	O.K.
	Standards?	O.K.
	Action?	*See Above*
	Later Use-Unaided?	?

There should be a later Use-unaided objective which requires the student to perform the "duties."

REVISED OBJECTIVE: "The student will recall in the proper order the procedures performed by a gun captain while firing during general quarters."

10. OBJECTIVE: "In a classroom exercise, the student will file thirty drill messages representing Top Secret, Secret, special category, readdressed general messages, and other classified and unclassified messages in the correct files."

Correctly Stated?

Conditions? SPECIFIED

Standards? INCOMPLETE

The standard given is "thirty messages...in the correct files." There should, however, be a time standard for those thirty messages. Furthermore, rate standards like this really should be written as "time allowed per message."

Action? O.K. - ACTION

Classifiable?

Task Level? USE-UNAIDED

Content Type? ?

As discussed in chapter 1, the could be either Category or Procedure. The objective should be rewritten to clarify this.

Appropriate?

Conditions? ?

If the classroom exercise situation is similar to the job, then the conditions are appropriate. If this is not true, the objective should be revised.

Standards? ?

The revised standards should correspond to the job situation.

Action? ?

The revised action should reflect what is done on the job.

Previous Remember? ?

There should be a previous objective for this task at the Remember level.

REVISED OBJECTIVE: "In a classroom exercise simulating shipboard working conditions, the student will file drill messages identified as Top Secret, Secret, special category, readdressed general messages, and other classified and unclassified messages, in the correct files, at the rate of one message every 60 seconds."

11. OBJECTIVE: "Given schematic symbols for common electronic components, the student will write from memory the name of the component represented by each symbol."

Correctly Stated?	Conditions?	SPECIFIED
	Standards?	IMPLIED
	Action?	O.K. - ONE ACTION
Classifiable?	Task Level?	REMEMBER
	Content Type?	FACT
Appropriate?	Conditions?	O.K.

We will assume that the "common electronic components" are ones that are typical of the equipment the student will be trained to maintain or repair. If there were special components or symbols that the student had to know, then these should be included.

	Standards?	O.K.
	Action?	O.K.
	Later Use-Unaided?	?

There should be a later Use objective for which the student must be able to recall component names given component symbols.

REVISED OBJECTIVE: *O.K.*

12. OBJECTIVE: "Given the explanation of the principle of supply of a military force from the text, the student will discuss how this principle applies in Hitler's attack on Russia, the Battle of Midway, the Battle of the Bulge, and Sherman's march through Georgia."

Correctly Stated?

Conditions? SPECIFIED

Standards? IMCOMPLETE

The implied standard is "correctly" but with principle objectives it is often difficult to tell what correctly means. Therefore, either the correct explanation should be included in the objective, or a document containing the correct explanation should be referenced.

Action? O.K. - ONE ACTION

Classifiable? Task Level? USE-AIDED

Content Type? PRINCIPLE

See Chapter 1.

Appropriate? Conditions? ?

Standards? *See above.*

Action? ?

The appropriateness questions depend on how the student is going to use the principle on the job. If the job is to plan military operation given reference materials, then the conditions are probably appropriate. If, however, the job involves making quick decisions on the battle field, then reference materials would not be appropriate, and the task level should then be Use-Unaided.

The action of discussing how the principle of supply applied in previous battles may or may not be appropriate, depending on whether or not the principle still holds in modern warfare.

Aid Adequate? ?

Is the explanation given in the text sufficient to allow the student to give a correct discussion, or should other objectives on the aid be included?

REVISED OBJECTIVE: *The standard should be revised as indicated above. Other revision would depend on answers to the appropriateness questions we have raised.*

13. OBJECTIVE: "The student will recall in writing the lofargram characteristics for the following types of contacts: merchant ship, aircraft carrier, destroyer, whale diesel submarine, nuclear submarine."

Correctly Stated?	Conditions?	IMPLIED
	Standards?	IMPLIED
	Action?	O.K. - ONE ACTION
Classifiable?	Task Level?	REMEMBER
	Content Type?	CATEGORY
Appropriate?	Conditions?	O.K.
	Standards?	O.K.
	Action?	O.K.
	Later Use-Unaided?	?

There should be a later Use-unaided objective which requires to categorize lofargrams according to the characteristics to determine type of contact.

REVISED OBJECTIVE: *O.K.*

14. OBJECTIVE: "The student will solve for inductive reactance in a circuit, give frequency and inductance."

Correctly Stated? Conditions? UNCLEAR

Is the student given the circuit, or just the values for frequency and inductance? If he is given the circuit, is it the actual equipment, or a schematic?

Standards? IMPLIED

Action? O.K. - ONE ACTION

Classifiable? Task Level? USE-UNAIDED

Content Type? RULE

Appropriate? Conditions? ?

The revised conditions should be appropriate for the job.

Standards? O.K.

Action? O.K.

Previous Remember? ?

There should be a previous objective requiring the student to recall the formula for solving for inductive reactance.

REVISED OBJECTIVE: "Given a circuit schematic with values of frequency and inductance specified, the student will solve for inductive reactance."

15. OBJECTIVE: "The student will perform the steps required to accept, verify, and log messages to be transmitted via teletype tape."

Correctly Stated? Conditions? INCOMPLETE

The conditions should specify the equipment the student will use and the environmental conditions.

Standards? INCOMPLETE

A time or rate standard may be required. A subject-matter expert should be consulted.

Action? ? - MULTIPLE ACTION

If accept, verify, and log are all steps of a procedure for transmitting messages, then the action is O.K. If, however, one or more of the action verbs involves a different content type, then additional objectives should be written.

Classifiable? Task Level? USE-UNAIDED

Content Type? PROCEDURE

See Chapter 1.

Appropriate? Conditions? ?

Standards? ?

Action? ?

Any revisions made to the conditions, standards, and action should be representative of the job.

Previous Remember? ?

There should be a previous remember objective that requires the student to memorize the steps of the procedure.

REVISED OBJECTIVE: "In a classroom laboratory simulating a ship radio room, the student will perform the steps required to process (accept, verify, log) messages to be transmitted via teletype tape, at the rate of 5 minutes per message."

16. OBJECTIVE: "The student will state the principles of operation of a jet pump as described in *Propulsion Engineering*, Mod 6, Lesson 2."

Correctly Stated?	Conditions?	IMPLIED
	Standards?	?

There is a subtle problem with the standard. This objective is for the propulsion engineering course, and will be used to develop the lesson material -- mod 6, lesson 2. Therefore, the standard does not really exist yet. Pre-existing publications can be used in standards, but material that has not yet been developed cannot.

	Action?	O.K. - ONE ACTION
Classifiable?	Task Level?	REMEMBER
	Content Type?	PRINCIPLE
Appropriate?	Conditions?	O.K.
	Standards?	*See Above*
	Action?	O.K.
	Later Use-Unaided?	?

There should be a later objective requiring the student to use his knowledge of how the pump works to give explanations or predictions about pump operation.

REVISED OBJECTIVE: "The student will state the principles of operation of a jet pump as described in Technical Manual A-xxx."

17. OBJECTIVE: "The student will use the principle of electromagnetic induction to describe the operation of an AC generator."

Correctly Stated?	Conditions?	IMPLIED
	Standards?	INCOMPLETE

The standard must specify what the student's description must contain in order to be correct.

	Action?	O.K. - ONE ACTION
Classifiable?	Task Level?	USE-UNAIDED
	Content Type?	PRINCIPLE
Appropriate?	Conditions?	O.K.
	Standards?	*See Above.*
	Action?	?

On the job, will the student ever have to use his knowledge of electromagnetic induction to describe the operation of equipment? If so, then this objective is appropriate. On the other hand, if the intent was just to have the student learn the principles of operation of the AC generator, then the objective should be to "Remember" the principles of operation. As it stands, the objective might be appropriate if the student will be required to troubleshoot new AC generators.

	Previous Remember?	?

There should be an earlier objective requiring the student to remember the principle of electromagnetic induction.

REVISED OBJECTIVE: "The student will use the principle of electromagnetic induction to describe the operation of an AC generator. The description must contain the following points..."

18. OBJECTIVE: "Given the guidelines for determining message security classification, the student will determine the security classification (Top Secret, Secret, Confidential, or Unclassified) for outgoing messages."

Correctly Stated?	Conditions?	SPECIFIED
	Standards?	IMPLIED
	Action?	O.K. - ONE ACTION
Classifiable?	Task Level?	USE-AIDED
	Content Type?	CATEGORY

See Chapter 1.

Appropriate?	Conditions?	O.K.
	Standards?	O.K.
	Action?	O.K.
	Aid Adequate?	?

The guidelines should be checked to make sure they are complete, and are detailed enough so that the student can use them to perform the task.

REVISED OBJECTIVE: *This objective is probably O.K. if the aid is adequate.*

Chapter 3

TEST CONSISTENCY and TEST ADEQUACY

Introduction

At this point, the objectives for the instructional program have been checked for adequacy and revised if necessary. The next step is to check the test items, to make sure they are consistent with objectives, and are adequate.

In any instructional program, each test item should be tied or "referenced" to a specific objective. Since each objective is a statement of a "criterion" for student performance, tests for the objectives are called "criterion-referenced" tests.

A test item is "referenced" to an objective (criterion), when it is consistent with the objective. Consistency means that the conditions and standards in the objective must be maintained in the testing situation. Also, the task/content of the test item must match the task/content of the objective. Finally, the format of the test item must be appropriate for the task/content classification of the objective.

A test item can be consistent with an objective but still be a bad item. An adequate item is one which is clear, unambiguous, well-constructed, and free of "hints." Also, for an objective, there must be enough items to test the objective adequately, and the student must be given the opportunity on the test to make errors that are commonly made on the job.

On the following pages, the TEST CONSISTENCY and TEST ADEQUACY procedures from Volume IV are reproduced. Additional explanation about the procedures is given. Later, the procedures are applied to example test items.

TEST CONSISTENCY

CARD 2

STEP 1: ENTER the COURSE TITLE and OBJECTIVE NUMBER at the top of the form.

STEP 2: ENTER the TEST ITEM NUMBERS for the items associated with this objective on the form.

STEP 3: DETERMINE whether or not the CONDITIONS in each item, or the CONDITIONS under which the items are administered, match the conditions in the objective.

STEP 4: DETERMINE whether or not the STANDARDS in each item, or the STANDARDS for scoring each item, match the standards in the objective.

STEP 5: DETERMINE whether or not the ACTIONS in each item match the action of the objective.

STEP 5a: Determine the TASK LEVEL and CONTENT TYPE of each test item.

STEP 5b: Determine whether these match the TASK LEVEL and CONTENT TYPE of the objective.

STEP 6: DETERMINE whether or not each item is typical of the job to be performed after training, or is a necessary qualification for later training.

STEP 7: DETERMINE whether or not the FORMAT of each item is APPROPRIATE for the TASK LEVEL and CONTENT TYPE. Use the table below:

		CONTENT TYPE			
TASK LEVEL	FACT	CATEGORY	PROCEDURE	RULE	PRINCIPLE
REMEMBER	*for RECOGNITION:* matching true-false multiple choice *for RECALL:* short answer fill-in listing	short answer fill-in listing	short answer fill-in listing	short answer fill-in listing	short answer fill-in listing
USE-UNAIDED		performance matching true-false multiple choice short answer fill-in	performance true-false multiple choice short answer fill-in	performance true-false multiple choice short answer fill-in	performance true-false multiple choice short answer fill-in
USE-AIDED		performance matching true-false multiple choice short answer fill-in	performance true-false multiple choice short answer fill-in	performance true-false multiple choice short answer fill-in	performance true-false multiple choice short answer fill-in

TEST ADEQUACY

CARD 3

STEP 1: DETERMINE whether or not each item is CLEAR. *Instructions for completing the item must specify what response the student is expected to make.*

STEP 2: DETERMINE whether or not each item is UNAMBIGUOUS. *Each item must have one and only one correct response, and the item must be interpretable in only one way. That is, items must not be confusing.*

STEP 3: DETERMINE whether or not each item is WELL CONSTRUCTED. *Different criteria apply to different item formats:*

TRUE-FALSE items:	*An item should include only one statement to be judged true or false.* *Negative statements should be avoided.* *Don't use words like "never," "always," etc.* *Item statements should be short.*
MULTIPLE CHOICE items:	*All alternatives should be plausible.* *Negatives in the item stem should be highlighted.* *Repetitive phrases should be placed in the stem, not in the alternatives.* *Alternatives like "all of the above," "A and B only," should be avoided.*
MATCHING items:	*Instructions should explain the contents of each column, and explain the basis for matching.* *Instructions should specify how many times each answer may be used.* *The choice column should include extra answers unless answers may be used more than once.*
FILL-IN items:	*The blank should be at or near the end of the sentence.* *One and only one phrase should correctly complete the item.* *Multiple blanks should be avoided.* *Blanks should require key words.*
SHORT ANSWER items:	*The required answer should be kept short.* *The directions to the student should specify how the item will be scored.* *The scoring key should identify allowable synonyms or alternatives.*
LISTING items:	*The directions should specify the number of things to be listed (if appropriate for the objective, and if the number of things is not a hint).* *The directions should specify whether or not order is important. If so, the scoring key should score sequence separately.* *The scoring key should identify allowable synonyms or alternatives, and should specify different weights if appropriate.*
PERFORMANCE items:	*The directions should clearly explain what the student is to do and how the item will be scored.* *The scoring key must specify all criteria the performance must meet, such as completeness, accuracy, quality, time limit, rate, etc. If steps in the performance are scored, a checklist should be provided.*

STEP 4: DETERMINE whether or not each item is FREE of HINTS. *An item should not give away the answer to itself or to any other item on the test. The grammar of multiple-choice and fill-in items should not give hints to answers.*

STEP 5: DETERMINE whether or not the items allow for COMMON ERRORS to be made.

STEP 6: For USE-level objectives, DETERMINE whether or not there are ENOUGH ITEMS to test the objective adequately, and to reflect the range of performance required on the job.

Additional Explanation for the TEST CONSISTENCY procedure.

STEP 1: *This step refers to the Test Consistency and Adequacy Form on page 2 of Volume IV. Again, this form is not required; users of the IQI may design their own form, or use no form at all.*

STEP 2: *The Test Consistency procedure should be applied "objective by objective." This means that if there are several test items for a single objective, they should all be checked at once.*

STEP 3: *The conditions in the test item, or the conditions under which the item is administered, should match the conditions specified in the objective. Naturally, there are some situations when, for reasons of safety or practicality or cost, testing conditions cannot be exactly the same as the conditions required in the objective or on the job. In these cases, it is important to simulate the conditions as closely as possible. Again, it is important to REMEMBER THE JOB; the testing situation must be close enough to the job situation or later training situation, so that you can be sure that the student has achieved the objectives.*

STEP 4: *The standards in the test item, or the standards for scoring the test item, must match the standards in the objective. In criterion-referenced testing, standards are not arbitrarily selected. It makes no sense, for example, to require a student to get 80% of the items right, if he needs to recall all the information. On the other hand, for some tasks, a 70% or 80% criterion may be reasonable. In all cases, though, the standard specified in the objective should be used.*

STEP 5: *The task/content level of the test item should match the task/content level of the objective. This means that the action verb in the test item should be the same as the action verb in the objective, or at least the same behavior must be required. If it isn't, the test item is measuring something different than was required in the objective.*

STEP 6: *The steps above help to ensure that the item is consistent with the objective. Here, we want to ensure that the item is representative of the kinds of situations encountered on the job, and is about the same level of difficulty. When in doubt, consult a subject-matter expert.*

STEP 7: *There are a number of different test item formats, and these may be more or less appropriate depending on the task/content level of the objective. The chart on the bottom of the previous page shows the acceptable formats for each task/content level.*

Item formats at the REMEMBER level

In the chart for step 7, notice that at the REMEMBER level, recognition items (multiple-choice, matching, true-false) are usually not appropriate. This is because they don't test recall, only recognition. Most REMEMBER level objectives require recall because of the nature of the job.

Chapter 2 discussed some situations in which recognition was appropriate for REMEMBER level objectives. For these objectives, multiple-choice, matching, or true-false test items may be appropriate, even if the content type is category, procedure, rule, or principle. These do not appear on the chart for step 7, because even though they can be used, they are not the best choice. In this situation, it is also a good idea to recheck a recognition objective to make sure it is appropriate for the job.

Item formats at the USE level

Multiple-choice, matching, and true-false items can be appropriate, if carefully designed, for many USE-level tasks. For example, a category classification is often a true-false judgment. If the student must solve a math problem (Use-Rule), a multiple-choice item in which all alternatives are reasonable is appropriate. Also, some Use-Principle predictions involve a limited set of possible alternatives; again, multiple-choice is appropriate.

Why is format important?

The reason why test item format is important is that students are not dumb! The first thing most new students do in a course is find out how they will be tested. Then, they study just enough to pass the tests. If the objective requires a student to memorize something, multiple-choice tests should not be used, because students will learn just enough to recognize, not to recall. From your own experience, it should be clear that students study less carefully for a multiple-choice or true-false test, than for a completion or short-answer test. The test items and the format should be like the tasks the student will do on the job.

Additional Explanation for the TEST ADEQUACY procedure.

The information on the previous page is self-explanatory. However, three points need emphasis:

First, instructions to the students are important. Students need to know what they are expected to do, and how they will be scored. This is particularly important for fill-in, short-answer, listing, and performance test items.

Second, scoring criteria should be very carefully specified, especially for short-answer and performance items. There should be explicit criteria or steps for an instructor to use for scoring. These should be as objective as possible, and should not depend on individual judgment.

Third, steps 5 and 6 often require consultation with a subject matter expert. That person can tell you about common errors, and can usually help determine whether or not there are enough items.

For some types of tasks, there are methods for generating test items to cover the task thoroughly. Also, there are statistical techniques for determining if enough items have been given. However, these methods can be complicated and costly.

EXAMPLES

In this section, we have repeated the "revised objectives" from chapter 2, and have given at least one test item for each. For the test items, we will first determine whether or not the item is consistent with its objective, and then whether or not the item is adequate.

1. OBJECTIVE: "The student will state the rule for finding total inductance in a series circuit."

TEST ITEM: "Which of the following is the correct rule for finding total inductance in a series circuit?

A. $E=IR$
B. $\lambda_C=2\pi fRL_C$
C. $R=IE$
D. None of the above.

Consistent? Conditions Match? NO

In the objective, the student is not given anything except instructions to state the rule. In the test item, however, the student is given several rules, one of which might be the right one.

Standards Match? YES

The implied standard in both the objective and the test item is "100% correct."

Actions Match? NO

The task/content classification of both the objective and test item is Remember-Rule. The action in the objective, however, is "state" while the action in the test item is really "select" or "choose."

Typical? NO

The student will probably never have to choose a correct formula from a bunch of alternatives on the job. The reason the objective requires recall is because the job presumably requires recall. Therefore, the test should require recall too.

Format O.K.? NO

In the chart for step 7, multiple-choice is not a good format for Remember-Rule. It is obvious why the format is bad; the multiple-choice format changes the conditions and action.

Adequate? *Not Applicable. If the item is not consistent, there is no point in rating adequacy. An inconsistent item can never be adequate. At this point, the item would be rewritten to be consistent.*

Even if the item were consistent, it is not adequate because "none of the above" is not a good alternative to use in multiple-choice questions.

REVISED TEST ITEM: "In the space below, write the correct rule for finding total inductance in a series circuit."

2. OBJECTIVE: "Given a separate picture for each U.S. Navy officer uniform, showing collar devices, shoulder boards, or sleeve stripes, in a typical job environment, the student will state orally from memory the rank associated with each collar device, shoulder board, or sleeve stripe."

TEST ITEM: "Column A below shows the collar devices for different ranks of naval officers. Column B gives different ranks. Match each item in column A with the correct rank in column B."

A.	1.
B.	2. (etc.)

Consistent? Conditions Match? NO

The item should give pictures of entire uniforms in typical job situations, showing shoulder boards or sleeve stripes in addition to collar devices. Column B should not be given at all, because the objective does not say that the student is given the ranks.

Standards Match? YES

Actions Match? NO

Both are Remember-Fact, but the objective says "state orally" while the test item says "match." These are different actions.

Typical? NO

See the comment above for conditions.

Format O.K.? NO

In the chart for step 7, matching is not a good format for Remember-fact when recall is required. This objective requires recall.

Adequate? *Not Applicable.*

REVISED TEST ITEM: "These pictures show Navy officers in uniform. Tell me the rank of the officer in each picture."

3. OBJECTIVE: "Given any resistor with four color bands, the student will follow the procedure for determining ohmic value as indicated by the color bands."

TEST ITEM: "For each of the resistors pictured below, determine the value in ohms, and the tolerance, as indicated by the colors."

Consistent? Conditions Match? ___?___

The objective says the student will be given resistors, while the test item gives pictures. This might be close enough if the pictures are life-size and in color.

Standards Match? ___YES___

Both require 100% accuracy.

Actions Match? ___NO___

The test item requires the student to determine the tolerance as well as the value. Although one of the color bands does indicate tolerance, this was not required in the objective.

Typical? ___?___

See the conditions question above. Another question concerns what resistors are given in the test item. Obviously, not all resistors can be tested. Are the ones which are tested typical of those encountered on the job, or are they "easy" ones?

Format O.K.? ___YES___

Adequate? *Not Applicable.*

REVISED TEST ITEM: "For each of the resistors pictured below, determine the valuc in ohms, and write the value in the space next to each resistor."

4. OBJECTIVE: "The student will write from memory the steps of the procedure for message reception and duplicate checking as listed in the current edition of NTP-4."

TEST ITEM: "Use the current edition of NTP-4 to receive the following message and check for duplicates."

Consistent? Conditions Match? NO

In the objective, the student is not given anything. In the test item, the student is given a message and is given NTP-4.

Standards Match? YES

Actions Match? NO

The objective is Remember-Procedure. The test item is Use-Aided-Procedure.

Typical? NO

The Remember objective implies that there is a later Use-Unaided objective requiring the student to perform the procedure with no memory aid. The job, therefore, must require the same performance with no memory aid. This test item is not typical because it gives the memory aid.

Format O.K.? *Not Applicable.*

Adequate? *Not Applicable.*

REVISED TEST ITEM: "In the space below, write the steps of procedure for message reception and duplicate checking. You will receive full credit if you list all steps exactly as stated in NTP-4 in the correct order."

5. OBJECTIVE: "The student will write from memory the principles of operation of a rotary gear pump, as described in Tech. Manual XXX."

TEST ITEM: "In the space below list the part names and functions of a rotary gear pump."

Consistent? Conditions Match? YES

The implied conditions for this objective are "given a paper and pencil." The test items indicates that the student will have a paper and pencil available.

Standards Match? NO

The standards for the objective are provided in Tech. Man. XXX. It is not clear whether this manual has the information required by the test item.

Actions Match? NO

The task/content level of the objective is remember-principle, while the task/content level of the test item is remember-fact.

Typical? YES

The student will probably have to know the part names and functions of a rotary gear pump in order to operate and maintain it.

Format O.K.? YES

Adequate? *Not Applicable.*

REVISED TEST ITEM: "In the space below write the principles of operation of a rotary gear pump, as they were described in Tech. Manual XXX."

6. OBJECTIVE: "Given a globe valve, rags prussian blue, gasket material, packing, tools, and an MRC job program card, the student will dissassemble and reassemble the globe valve (within 30 minutes)."

TEST ITEM: "Which of the following materials are required for dissassembling and reassembling the globe valve?"

A. rags
B. prussian blue
C. gasket material
D. All of the above.

Consistent?

Conditions Match? NO

Standards Match? NO

Actions Match? NO

Typical? NO

Format O.K.? NO

It should be obvious that this test item does not address the objective at all.

Adequate? *Not Applicable.*

REVISED TEST ITEM: "Dissassemble and reassemble your globe valve using the MRC card. Tools and materials are on the workbench. You have 30 minutes."

7. OBJECTIVE: "The student will classify any call sign according to one of the following types -- international U.S. Navy ship, international U.S. Navy shore, indefinite, task organization, voice, or not a valid Navy call sign. Type names will not be provided during classification.

TEST ITEM: "For each of the call signs listed below, write the type in the space provided.

NTQT _____

T2RA _____

(etc.)

Consistent?

Conditions Match? YES

Standards Match? YES

Actions Match? YES

Typical? ?

We will assume that the call signs to be classified are typical of those the student will see on the job.

Format O.K.? YES

Adequate?

Clear? YES

Unambiguous? YES

Well Constructed? ?

The overall test directions should specify how the items will be scored. The scoring key should specify to the instructor how to score the items.

Free of Hints? YES

Common Errors? ?

Enough Items? ?

The items should be reviewed by a subject-matter expert to determine if there are common errors which should be tested, and to determine whether or not there are enough items so that we are sure the student will be able to perform well on the job.

REVISED TEST ITEM: *This test item is probably O.K., assuming that test directions and scoring are clear, and that common errors and enough items are present.*

8. OBJECTIVE: "Given the formula for Ohm's Law, E=IR, and any two values typical of the values encountered on the job, the student will solve for the third value correct to two decimal places."

TEST ITEM: "Ohm's Law is E=IR. If I=200 ma., and R=47K ohms, then E=_____."

A. . . .
B. . . .
C. . . .
D. . . .

Consistent? Conditions Match? YES

Standards Match? ?

The item should specify that accuracy to two decimal places is required.

Actions Match? YES

The student has to solve the problem to answer the test item.

Typical? ?

We will assume the numbers given are typical of the job.

Format O.K.? YES

Adequate? Clear? YES

Unambiguous? YES

Well Constructed? ?

We will assume that all the alternatives are plausible.

Free of Hints? ?

This item gives Ohm's Law. There had better not be another item on the test which asks the student to recall Ohm's Law.

Common Errors? ?

The alternatives should be designed so that they include answers that the student might choose if he did the problem wrong.

Enough Items? ?

There should be enough items of this type so that we are sure the student can solve any new Ohm's Law problem he might see.

REVISED TEST ITEM: *The item is probably O.K.*

9. OBJECTIVE: "The student will recall in the proper order the procedures performed by a gun captain while firing during general quarters."

TEST ITEM: "List the duties performed by a gun captain."

Consistent?	Conditions Match?	YES
	Standards Match?	YES
	Actions Match?	YES
	Typical?	?

It is assumed that the student needs to know this to do the job.

	Format O.K.?	YES
Adequate?	Clear?	NO

The test item should specify what duties.

	Unambiguous?	NO

If gun captains perform various duties under different conditions, then there could be more than one correct answer to this item.

	Well Constructed?	YES
	Free of Hints?	YES
	Common Errors?	*Not Applicable*
	Enough Items?	*Not Applicable*

REVISED TEST ITEM: "In the space below write in the proper order the procedures . gun captain performs while firing during general quarters."

10. OBJECTIVE: "In a classroom exercise simulating shipboard working conditions, the student will file drill messages identified as Top Secret, Secret, special category, readdressed general messages, and other classified and unclassified messages, in the correct files, at the rate of one message every 60 seconds."

TEST ITEM: (Instructor) "O.K., guys, the next drill is message filing. You will file the next thirty messages you get."

Consistent? Conditions Match? ___?___

We will assume that this drill will be conducted as a classroom exercise simulating shipboard conditions, and that all the different messages in the objective are part of the test.

Standards Match? ___?___

The standard is not given in the item, but could be part of the scoring system.

Actions Match? ___YES___

Typical? ___YES___

If the drill simulates shipboard conditions, then it is typical of the job.

Format O.K.? ___YES___

Adequate? Clear? ___YES___

Unambiguous? ___YES___

Well Constructed? ___NO___

The student is told what to do, but he is not told how he will be scored. He should be told the "60 sec. per message" standard, and the accuracy requirements.

Free of Hints? ___YES___

Common Errors? ___?___

Enough Items? ___?___

Message types that are commonly misfiled should be included in the exercise. Thirty messages is probably enough; ask a subject-matter expert.

REVISED TEST ITEM: *O.K., except add the standards: "You have 30 minutes, and all messages must be in the correct files."*

11. OBJECTIVE: "Given schematic symbols for common electronic components, the student will write from memory the name of the component represented by each symbol."

TEST ITEM: "_____ is the symbol for resistor."

Consistent? Conditions Match? NO

The objective says that the student is given symbols. The test item does not give a symbol.

Standards Match? YES

Actions Match? NO

The objective says "write the name." The test item asks the student to draw the symbol.

Typical? ?

Does the student have to draw schematic symbols on the job?

Format O.K.? YES

Adequate? *Not Applicable.*

REVISED TEST ITEM: "Several schematic symbols for common electronic components are shown below. Write the name of the component represented by each symbol in the space provided."

12. OBJECTIVE: "Given the explanation of the principle of supply of a military force from the text, the student will discuss how this principle applies in Hitler's attack on Russia, the Battle of Midway, the Battle of the Bulge, and Sherman's march through Georgia. This discussion should include the following points. . ."

TEST ITEM: "Using the explanation of the principle of supply of a military force given in your book, discuss how these principles apply in Hitler's attack on Russia, the Battle of Midway, the Battle of the Bulge, and Sherman's march through Georgia."

Consistent?

Conditions Match? YES

Standards Match? ?

The scoring standards would include the discussion points given in the objective.

Actions Match? YES

Typical? YES

Format O.K.? YES

Adequate?

Clear? YES

Unambiguous ?

Well Constructed? ?

There are probably many ways that students could answer this question. The scoring standards must be as objective as possible in specifying how students' responses will be scored. Also, more instructions to the student about what his answer should contain would help reduce the variability of answers. More instructions, however, might also be too much of a hint.

Free of Hints? ?

The book that gives the principle of supply had better not give away any answers to this question.

Common Errors ?

Enough Items? ?

Ask a subject-matter expert.

REVISED TEST ITEM: *Add: "You will receive full credit if your discussion includes the following points. ...."*

13. OBJECTIVE: "The student will recall in writing the lofargram characteristics for the following types of contacts: merchant ship, aircraft carrier, destroyer, whale, diesel submarine, nuclear submarine."

TEST ITEM: "In the spaces below, write the lofargram characteristics you would expect for each of the types of contacts.

Merchant ship: _____

(etc.)"

Consistent?	Conditions Match?	YES
	Standards Match?	YES
	Actions Match?	YES
	Typical?	YES
	Format O.K.?	YES
Adequate?	Clear?	YES
	Unambiguous?	YES
	Well Constructed?	?

The instructions should tell the student how the answers will be scored. Will partial credit be given for partial answers?

Free of Hints?	YES
Common Errors?	YES
Enough Items?	*Not Applicable*

REVISED TEST ITEM: *Add instructions which specify how the answers will be scored.*

14. OBJECTIVE: "Given a circuit schematic with values of frequency and inductance specified, the student will solve for inductive reactance."

TEST ITEM: "In the circuit below, the frequency and inductance are given. Calculate the inductive reactance."

Consistent?	Conditions Match?	YES
	Standards Match?	YES
	Actions Match?	YES
	Typical?	?

We will assume that the circuit, and the values of frequency and inductance, are typical of those encountered on the job.

	Format O.K.?	YES
Adequate?	Clear?	YES
	Unambiguous?	YES
	Well Constructed?	YES
	Free of Hints?	YES
	Common Errors?	?
	Enough Items?	?

Check with a subject-matter expert to determine if common errors have been tested, and if enough items have been given.

REVISED TEST ITEM: *O.K.*

15. OBJECTIVE: "In a classroom laboratory simulating a ship radio room, the student will perform the steps required to process (accept, verify, log) messages to be transmitted via teletype tape, at the rate of 5 minutes per message."

TEST ITEM: "The following message will be transmitted via teletype tape. Accept it, verify it, and log it. You will receive full credit if you perform these steps accurately within 30 seconds."

Consistent? Conditions Match? ___?___

We will assume that the student is in the classroom laboratory.

Standards Match? ___NO___

The objective says 5 minutes per message. The test item says 30 seconds.

Actions Match? ___YES___

Typical? ___?___

The test item is typical to the extent that actual job situations are accurately simulated.

Format O.K.? ___YES___

Adequate? Clear? ___YES___

Unambiguous? ___YES___

Well Constructed? ___YES___

Free of Hints? ___?___

Do the words "accept," "verify," and "log" give away the procedure to be followed?

Common Errors? ___?___

Enough Items? ___?___

Again, a subject-matter expert should be consulted.

REVISED TEST ITEM: "The following message will be transmitted via teletype tape. Process it according to the procedure you have learned. You will receive full credit if you perform the steps accurately within 5 minutes."

16. OBJECTIVE: "The student will state the principles of operation of a jet pump as described in Technical Manual A-xxx."

TEST ITEM: "List the names of the parts of a jet pump."

Consistent? Conditions Match? YES

Standards Match? NO

The standards for the objective are provided in Tech. Man. A-xxx. It is not clear whether this manual has the information required by the test item.

Actions Match? NO

The task/content level of the objective is remember-principle, while the task/content level of the test item is remember-fact.

Typical? YES

Student will probably have to know the parts of a jet pump.

Format O.K.? YES

Adequate? *Not Applicable.*

REVISED TEST ITEM: "In the space below, write the principles of operation of a jet pump as they were described in Tech. Man. A-xxx."

17. OBJECTIVE: "The student will use the principle of electromagnetic induction to describe the operation of an AC generator. The description must contain the following points...."

TEST ITEM: "In the space below, describe how an AC generator works."

Consistent? Conditions Match? YES

Standards Match? ?

The scoring standards for the item must match the objective.

Actions Match? YES

Typical? ?

On the job, will the student have to give new explanations of the operation of equipment based on his knowledge of theory. Does the knowledge of the principle of electromagnetic induction contribute to better job performance?

Format O.K.? YES

Adequate? Clear? ?

Unambiguous? ?

Well Constructed? ?

Is it clear what response the student is expected to give? The instructions to the student should explain exactly what the student should do to answer the question, and should explain how the answer will be scored. The scoring key should also specify how the "points" mentioned in the objective will be assessed.

Free of Hints? YES

Common Errors? ?

Enough Items? ?

This is a Use-unaided Principle. Therefore, we expect that the student will have to use the principle to explain how new or unfamiliar equipment operates. There must be enough items so that we are sure the student can apply his knowledge of electromagnetic induction in job situations.

REVISED TEST ITEM: "In the space below, describe in terms of the principle of electromagnetic induction how an AC generator works. Your answer should include the following points ...."

18. OBJECTIVE: "Given the guidelines for determining message security classification, the student will determine the security classification (Top Secret, Secret, Confidential, or Unclassified) for outgoing messages."

TEST ITEM: "List the four types of security classifications."

Consistent? Conditions Match? NO

Standards Match? YES

Actions Match? NO

The conditions and action in the objective are different from those in the test item. The task/content level of the objective is Use-Aided Category, while the task/content level of the test item is Remember-Fact.

Typical? ?

The job probably requires the student to know the four types of security classifications. This information should have been covered in a previous objective.

Format O.K.? YES

Adequate? *Not Applicable.*

REVISED TEST ITEM: "Several sample outgoing messages are given below. For each message, use the guidelines for message security classification to determine the appropriate security classification."

Chapter 4

PRESENTATION CONSISTENCY

Introduction

At this point, the objectives and test items for the instructional program are consistent with each other, and are adequate. The next step is to make sure that the instructional presentation is consistent with the objectives and test items.

The term "instructional presentation" covers all the ways instruction can be presented. This includes printed self-study materials, lectures, computer-assisted instruction, films or videotapes, tape-slide presentations, audio tape, videodisc, one-on-one tutorials, and any combination of these.

For a presentation to be consistent with an objective/test item, it must teach to the task level and content type of the objective/test item. This means that the presentation must contain certain components, depending on the task/content level. There are four main presentation components:

Statement	The student is given a statement of a fact, a category definition, the steps of a procedure or rule, or a statement of a principle.
Example	The student is told or shown how a statement of a category, procedure, rule, or principle applies in a specific case.
Practice Remembering	The student is asked to supply part or all of a fact statement, category definition, the steps of a procedure or rule, or a statement of a principle. The student is also given feedback about the correctness of his answer.
Practice Using	The student is asked to use a category definition, procedure, rule, or principle on a specific case to which it applies, and is given feedback about the quality of his performance.

Different combinations of these components are required, depending on the task level of the objective.

A component is counted as present in the instruction only if it is complete. This depends on the content type of the objective, and simply means that everything that needs to be included is included.

On the following page, the PRESENTATION CONSISTENCY procedure from Volume IV is reproduced. Then, additional explanation is given and example are provided.

PRESENTATION CONSISTENCY

STEP 1: ENTER the COURSE TITLE and OBJECTIVE NUMBER at the top of the form.

STEP 2: LOCATE the section of the presentation related to this objective.

STEP 3: DETERMINE if the required PRESENTATION COMPONENTS are present for the task level of the objective. (Use the table below).

	REQUIRED PRESENTATION COMPONENTS			
TASK LEVEL	STATEMENT	PRACTICE REMEMBERING	EXAMPLES	PRACTICE USING
REMEMBER	*required*	*required*	*not required*	*not required*
USE-UNAIDED	*required unless the associated REMEMBER objective was taught recently*		*required*	*required*
USE-AIDED	*the aid replaces statement*	*not required*	*required with aid*	*required with aid*

STEP 4: DETERMINE whether or not each required PRESENTATION COMPONENT is COMPLETE for the content type of the objective (Use the table below). Examples and practice items must also match the task level of the objective.

PRESENTATION COMPONENT	CONTENT TYPE OF THE OBJECTIVE				
	FACT	CATEGORY	PROCEDURE	RULE	PRINCIPLE
STATEMENT	complete fact presented	all critical characteristics and their combination are given	all steps are given in the correct order	all steps and branching decisions are given in the correct order	all causes, effects, and relationships are given
PRACTICE REMEMBERING	recall or recognition required	recall of category definition required	recall of all steps in correct order required	recall of all steps and branch decisions in correct order required	recall of all causes, effects, relationships required
	For all content types: Practice Remembering items must be the same as the test item. They must be the same format as the test item. All practice items must include feedback.				
EXAMPLES	*not applicable*	examples show all critical characteristics required for classification, non-examples show absence of critical characteristics	application of the procedure must be shown and steps must be shown in the correct order	application of each step or branching decision must be shown in the correct order	interpretation or prediction based on causes, effects, and relationships must be shown
PRACTICE USING	*not applicable*	classification of both examples and non-examples is required	all steps must be performed in the correct order	all steps and branching decisions must be performed in the correct order	explanation or prediction based on the principle is required
	For all content types: Practice Using items must reflect what is to be done on the job or in later training. The task/content level, conditions, and standards must match the test item and objective. The practice item format must be the same as the test item format. All practice items must include feedback.				
	For CATEGORIES, RULES, PRINCIPLES: Some practice items should be different than either the test items or the examples. *(Common error items might be the same.)*				

Additional Explanation for the PRESENTATION CONSISTENCY procedure.

STEP 1: *This step refers to the Presentation Consistency and Adequacy Form on page 3 of Volume IV. Again, this form is not required.*

STEP 2: *Presentation consistency should be done objective-by-objective, or on groups of related objectives. In either case, the instruction should be reviewed to locate the section(s) related to the objective(s). In printed materials, the components may not always be in the same place. For example, practice may be in a separate workbook, or at the end of a chapter. For lectures, films, etc., the entire presentation may have to be reviewed. However, instructor guides or lecture notes or film scripts may help in locating the appropriate section.*

STEP 3: *The table on the previous page shows which presentation components are required for each task level. These required components apply across all content types for the REMEMBER level, and all except facts for the USE level.*

The table is mostly self-explanatory. However, notice the USE-UNAIDED level. Step 4f of the Objectives Adequacy procedure requires that there be a previous Remember objective for a Use-unaided objective. If this previous Remember objective is covered in the same presentation, then a statement and some practice remembering will be required. Therefore, it is not necessary to repeat the statement and the practice remembering.

STEP 4: *A presentation component is not present unless it is <u>complete</u>. Some completeness guidelines are shown in the table, and are generally self-explanatory. However, the role of practice questions in both REMEMBER and USE level instruction needs more explanation.*

Practice questions or exercises are included in instruction because they (1) focus on, and call attention to, information or tasks that must be learned, (2) inform the student about what the test will be like, and (3) allow the student to monitor his own learning.

For these reasons, Practice Remembering items must (1) test the same information as the test, (2) be the same format as the test so the student is not "tricked," and (3) must have feedback.

For the same reasons, Practice Using items or exercises must (1) reflect what is to be done on the job, and match the task/content level, conditions, and standards in the objective, (2) be the same format as the test, and (3) include feedback so the student can monitor his learning. It is important to emphasize that Practice Using items for concepts, rules, and principles must be different than the test items and examples (even though they're the same format). They must be different because these content types require the student to be able to deal with problems or situations that are <u>new</u>. (For procedures, nothing new is required, so the practice is the same as the test.)

There are two exceptions to the rules above. First, practice is sometimes graded in difficulty, because the final task is too difficult for a beginner to perform. In this situation, early practice items are simplified, and are therefore not identical with job performance.

The second exception can arise when a decision has been made to use an inappropriate test item format for time and cost reasons. For example, the multiple-choice format is often used to test at the remember level, even though it is not appropriate. In this situation, the practice item format should be the appropriate format, not the inappropriate format of the test item.

The best way to do steps 3 and 4 above is to:

a. *Determine the task/content level of the objective.*

b. *Use the task level of the objective and the chart for step 3 to determine what presentation components must be present. Write them down.*

c. *Use the content type of the objective and the chart for step 4 to determine the completeness requirements for each component you have written down. Write these down too, in terms of the subject-matter topic you are dealing with.*

d. *Using what you've written down as a guide, go through the presentation to check it for consistency.*

e. *Save your written notes, and the locations of the presentation components, for the Objectives Adequacy procedure (in the next chapter).*

EXAMPLES

In this section, we will present three examples of instructional presentations, along with their associated objectives and test items. The first page of each example will give the objective and test item, and the analysis procedure for consistency as described on the previous page. On the next page or pages, the instruction will be presented and consistency will be evaluated. Our comments about consistency will be given *in italics* in the margins.

In the next chapter, the same examples will be repeated and checked for adequacy. Then, revised versions of the examples, which will be consistent and adequate, will be given.

Example 1.

OBJECTIVE:	"Given a line drawing of a basic reciprocating pump, the student will write the correct part names in the spaces provided. Parts to be labeled are: cylinder, piston, valve, connecting rod, handle."
TEST ITEM:	"A line drawing of a basic reciprocating pump is shown below. Label the parts in the spaces provided."
Task/Content Classification:	Remember - Fact
Required Presentation Components:	Statement of the facts to be recalled (names of the pump parts, and their locations on the line drawing). Practice Remembering the facts (names of the pump parts, and their locations).
Completeness Requirements:	Statement: All part names in the objective should be given, and their locations on the line drawing should be indicated. Practice Remembering: Recall of the correct part names, as in the test item, is required. Feedback must be present, or else this component is not complete.

The instructional presentation is given on the next page. We will try to find the required presentation components, and then determine whether or not they are complete.

Instruction:

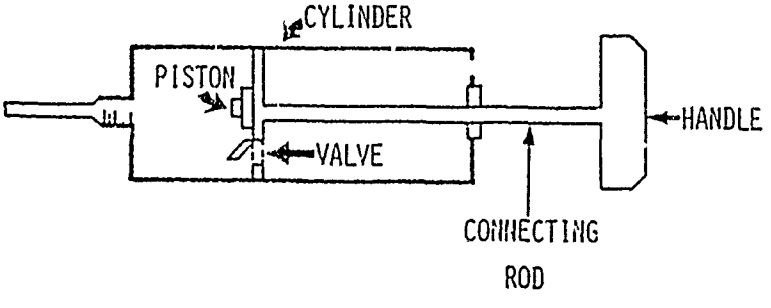
Pumps

Pumps provide the force required to move fluids. They do this by establishing and maintaining a difference in pressure between the inlet and (discharge) outlet of the pump. Did you know that you carry a pump around with you? All the time? Just like your own heart, the "heart" of most fluid transfer systems is a pump.

Aboard ship, pumps are used to move water, oil, fuel, and air. These fluids and gases are moved by pumps into and out of storage tanks, piping systems, and machinery to move the ship, make electricity, and keep the crew safe and comfortable. Without its pumps, a steam or diesel-powered ship couldn't even get underway.

There are many different kinds of pumps. A basic reciprocating pump is a pump which is used to push air into various receptacles such as a basketball or a bicycle tire. This is accomplished by having the connecting rod (which connects the piston to an outside energy source) push the piston (plunger-shaped mechanism) down, forcing air out of the cylinder (which acts as the encasement for the piston and air) and through a valve. The purpose of the valve in a basic reciprocating pump is to enable gas (e.g., air) to enter and escape from the cylinder.

Presented below is a diagram which illustrates the major parts of basic reciprocating pumps.



The STATEMENT is given in the picture at the bottom, and in paragraph 3.

There is no PRACTICE REMEMBERING.

Example 2.

OBJECTIVE:	"The student will sharpen a pocket knife using prescribed procedures, given oil, a sharpening stone, and a pocket knife."
TEST ITEM:	"Sharpen your pocket knife. Your instructor will watch and evaluate your performance."
Task/Content Classification:	Use-unaided - Procedure

Since this objective is Use-unaided, we have included a previous Remember objective, as required in step 4f of the Objectives Adequacy procedure.

Previous Remember Objective:	"The student will write from memory the steps of procedure for sharpening a pocket knife."
Test Item:	"List the steps of procedure for sharpening a pocket knife in the space below."

In this simple situation, the previous Remember objective (and test item) could possibly be omitted, because if the student can do the task, we can infer that he remembers. In situations that are complicated, or involve safety or expensive equipment, previous Remember objectives must be included.

Required Presentation Components:	Statement of the steps of procedure for sharpening the pocket knife.
	Practice Remembering the steps of procedure.
	Example showing the procedure being used.
	Practice Using the sharpening procedure. The student practices sharpening according to the procedure.
Completeness Requirements:	Statement: All steps must be given in the correct order.
	Practice Remembering: This must be like the test item for the Remember objective. Feedback must be given.
	Examples: Each step of the procedure should be illustrated or demonstrated.
	Practice Using: The student should practice sharpening his knife. The instructor should supervise, and must provide feedback.

Instruction:

Sharpening a pocket knife

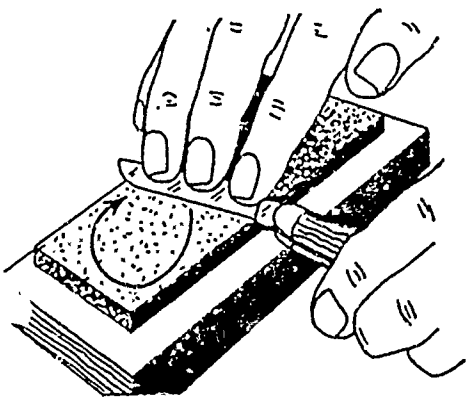
on a sharpening stone:

Most pocket knives may be sharpened on a medium or fine grade sharpening stone with a few drops of oil spread on the surface. Hold the handle of the knife in one hand, and place the blade across the stone. Press the blade down with the fingers of the other hand, and stroke the blade in a circular motion as shown below. After several strokes, reverse the blade and stroke the opposite side with the same type of motion. Use a light even pressure. The wire edge or burr that may be left on a knife blade after whetting may be removed by stropping both sides on a soft block of canvas or leather.

Practice

Why is it important to remove the burr after whetting?

Now sharpen your knife and check with your instructor.



SHARPENING A POCKET KNIFE

The STATEMENT of the steps of the procedure is given in the first paragraph, but is NOT complete. The angle between the knife blade and the sharpening stone is critical, but is not even mentioned.

The PRACTICE REMEMBERING is not present. The "practice" here is the wrong task/content, and has no feedback.

The picture at the bottom of the page might be an EXAMPLE, but it does not illustrate each step.

If the student sharpens his knife, and gets feedback from the instructor, this would count as PRACTICE USING.

Example 3.

OBJECTIVE:	"The student will classify any call sign according to one of the following types -- international U.S. Navy ship, international U.S. Navy shore, indefinite, task organization, voice, or not a valid Navy call sign. Type names will not be provided during classification."
TEST ITEM:	"For each of the call signs listed below, write the type in the space provided. If it is not a valid Navy call sign, write 'invalid'." NTQT _____ T2RA _____ (etc.)
Task/Content Classification:	Use-unaided - Category
Previous Remember Objective:	"The student will write from memory the names and characteristics of each of the following types of call signs: international U.S. Navy ship, international U.S. Navy shore, indefinite, task organization, and voice."
Test Item:	"In the space below, write the names and defining characteristics of each of the types of call signs."
Required Presentation Components:	Statement of the defining characteristics of each call sign type. Practice Remembering the characteristics. Examples showing call signs actually being classified according to type. Practice Using the characteristics to classify call signs according to type.
Completeness Requirements:	Statement: All characteristics must be given for each type of call sign. Practice Remembering: Recall of characteristics is required, just as in the Remember test item. Feedback must be given. Examples: Classification of call signs according to characteristics must be shown. Practice Using: Actual call signs must be given for the student to classify. Feedback must be given.

Instruction:

Note: This instruction continues over the next 11 pages.

Call Signs

One of the most used address designators is the call sign. Every ship and station has its own "sign" that is used when communicating. Like the other kinds of address designators, call signs are used for two purposes, calling and addressing messages.

(continued on following pages)

There are six types of call signs; each one has its own purpose and form. These are:

1. International call signs
2. Indefinite call signs
3. Task organization call signs
4. Collective call signs
5. Net call signs
6. Voice call signs

Notice that the six call sign types listed here are not the same as in the objective.

International Call Signs

By international agreement, each nation is assigned a block of letters to assign to its own ships and stations (civilian as well as military). The U.S. is assigned the first half of the A's and all the K's, W's, and N's for use as call signs.

The Army and Air Force begin their call signs with "A." Commercial and private stations, along with merchant ships, use the K's and W's. The Navy and Coast Guard use the N's to begin their call signs. That means that the first letter of all international call signs assigned to the Navy is the letter "N." It is an easy matter to determine whether a Navy international call sign is assigned to a ship or a shore radio station--all shore radio stations use three-letter calls and all ships use four-letter calls.

The STATEMENTS for international U.S. Navy Ship, and international U.S. Navy Shore, are in this paragraph.

Ship = "N" + 3 letters
Shore= "N" + 2 letters

PRACTICE * * * * * * * * * * * * *

Circle each of the international call signs listed below that could be assigned to the U. S. Navy.

1.	ABDR	6.	A1E3
2.	NQJI	7.	WOWL
3.	NABD	8.	TTEW
4.	NPW	9.	NMA
5.	QRTW	10.	MOS

* * * * * * * * * * * * *

No EXAMPLES

No PRACTICE REMEMBERING, but it could occur later.

The PRACTICE USING is not the same format as the final test items.

This is FEEDBACK for the PRACTICE USING on the previous page.

FEEDBACK

1.	ABDR	6.	A1E3
2.	(NQJI)	7.	WOWL
3.	(NABD)	8.	TTEW
4.	(NPW)	9.	(NMA)
5.	QRTW	10.	MOS

Any three or four letter group that begins with the letter "N" could be an international call sign for the U.S. Navy. Navy ships are assigned four-letter call signs and Navy shore radio stations are assigned three-letter call signs. For example, in exercise 2, NQJI and NABD are international call signs for ships--NPW and NMA are international call signs for shore radio stations.

Indefinite Call Signs

Indefinite call signs are used whenever the need arises to conceal the identities of the sending or receiving stations. To accomplish this, the codress form of message is used.

This is the STATEMENT for indefinite call signs.

Instead of using call signs in the headings of codress messages, an indefinite call sign is inserted. This call is composed of two letters for Navy ships--NA through NZ (except for NR which is not used for this purpose). The address portion of a codress message is encrypted in the text. This means that the message must be decoded in order to identify the sending and receiving commands.

"N" + 1 letter except "R."

"NA through NZ" might be considered an EXAMPLE.

PRACTICE * * * * * * * * * * * * *

No PRACTICE REMEMBERING, but it might occur later.

Circle the indefinite call signs in the list below that could be used by naval commands.

The PRACTICE USING is the wrong format.

1.	NKVD	6.	NL
2.	NR	7.	OL
3.	TN	8.	NT
4.	NB	9.	NOP
5.	NAL	10.	P2N3

* * * * * * * * * * * * *

FEEDBACK

1. NKVD	6. (NL)
2. NR	7. OL
3. TN	8. (NT)
4. (NB)	9. NOP
5. NAL	10. P2N3

This is FEEDBACK for the PRACTICE USING on the previous page.

Any two-letter group beginning with the letter "N," except for NR, may be used as an indefinite call sign.

Task Organization Call Signs

Task organization call signs are assigned to commands for temporary use during tactical situations. During a tactical situation, ships communicate as one task organization. When the operation is completed, these call signs are no longer needed because the ships may be reassigned to another force which uses its own call signs.

Task organization call signs are listed in ACP 112(B), and ACP 112 U.S. SUPP(A)-1, both titled "Task Organization Call Sign Book." The latter contains the call signs assigned to the United States. These books are classified Confidential; be sure that you treat them properly.

Remember that international call signs are composed of letters only. However, task organization call signs are made up in the following manner: letter-number-letter-letter.

This is the STATEMENT for task organization call signs.

For example, task organization call signs could be P7OR, or A2CD. There are no characteristics for identifying task organization call signs other than this letter-number-letter-letter arrangement.

Here are some EXAMPLES.

PRACTICE * * * * * * * * * * * * *

No PRACTICE REMEMBERING, but it might occur later.

Circle the task organization call signs in the list below that could be assigned to Naval commands.

1. P2Q4	6. U4RD
2. KWLH	7. Y8ZL
3. NE	8. NOP
4. Q2NY	9. BLUE SMOKE
5. NOPQ	10. KOU

* * * * * * * * * * * * *

The PRACTICE USING is the wrong format.

FEEDBACK

1. P2Q4
2. KWLH
3. NE
4. (Q2NY)
5. NOPQ
6. (U4RD)
7. (Y8ZL)
8. NOP
9. BLUE SMOKE
10. KOU

The basic pattern for task organization call signs is letter-number-letter-letter.

Note: This instruction continues over a few more pages, but at this point we have some comments.

Up to now, there has not been any PRACTICE REMEMBERING. At this point, four types of call signs have been introduced. Some start with "N," some have four letters, some have different patterns of letters and numbers -- all of them are easily confused. Because of this, Practice Remembering should have occured by now. It should be just like the remember-level test item; that is, "write the names and characteristics of the types of call signs that you have read about." Feedback would be provided.

Notice also, that while there is practice and feedback at the use level, that practice is not the same format and does not have the same conditions as the objective and test item, and therefore is NOT CONSISTENT.

Collective Call Signs

Collective call signs are used whenever a message needs to be sent to several commands or ships instead of just one. To save the time and effort that would be needed to prepare a message addressed to each command, a collective call sign is used. This call sign is one that automatically addresses a particular group of commands. For example, the collective call sign NABT means "All ships assigned Greenland patrol duty."

Some collective call signs assigned to the Navy look exactly like international call signs--in fact, they are international call signs that have been designated as collective call signs. These are listed in ACP 113, "Call Sign Book For Ships." In section 4 of ACP 113, you will find the collective call signs listed, and you will find the same call signs listed in the section of ACP 113 that lists international call signs for Navy ships. Just remember that a collective call sign is an international call sign that has been given a special meaning--that of addressing a specified group of commands.

The Navy uses fewer collective call signs than other types of call signs. As they are mostly assigned to ships operating in a certain geographic section of the world, not many are needed.

Just as radiomen must learn the call sign for their ship, they must also learn the collective call sign for the area in which their ship is operating. This comes rather quickly since much of the traffic sent to a ship is addressed with a collective call sign and the radioman normally sees it often.

PRACTICE * * * * * * * * * * * * *

Circle the collective call signs in the list below that could be used by the Navy.

1.	NPE	6.	W2Z8
2.	P2ZN	7.	NOMV
3.	BUCKLE ON	8.	KRLE
4.	NPDJ	9.	ND
5.	NA	10.	NTLQ

* * * * * * * * * * * * *

Collective call signs are not in the objective, and therefore should not be in this lesson.

If you read this page, you'll find that collective call signs are really international call signs, and you can't tell them apart except by looking them up in ACP 113. There is a later objective on the use of ACP 113, and this information should be postponed until the instruction for that objective. Here, it just confuses the student.

We don't need this, because it is on collective call signs.

FEEDBACK

1. NPE	6. W2Z8
2. P2ZN	7. (NQMV)
3. BUCKLE ON	8. KRLE
4. (NPDJ)	9. ND
5. NA	10. (NTLQ)

International collective call signs are call signs that have been designated for the specific purpose of addressing a group of commands in a geographic location. They look exactly like international call signs and you need to use ACP 113 in order to tell a collective call from an individual call.

Net call signs are not in the objective either.

Again, if you read this, you'll find that net call signs are either international call signs, or voice call signs (which we haven't seen yet).

All this should be deleted, and there should be a later objective on net call signs.

Net Call Signs

Net call signs are used to address all commands/stations that are using a particular radio net. A net is a group of stations (not necessarily on different ships) that are in direct communication over one radio network. That is, each station can hear the calls of all the others and each station can call any, or all, of the others. One example of a net call sign is NQN. This means, "All U.S. Navy Radio Stations guarding the ship-shore high frequency calling series." An example of the use of this call sign would be when a station desired to communicate with all of the stations at the same time.

Net call signs are also used on voice circuits. An example of a voice net call sign is OVERWORK. This call sign means: "All U.S. Navy ships on this circuit." Again, a net call sign would be used when the calling station wishes to talk to all the other stations at once.

These two examples are similar to other types of call signs. This is because they are listed along with other types. NQN is found in the listing of international call signs and OVERWORK is listed with the voice call signs.

Net call signs should not be confused with collective call signs. Net calls always specify the particular circuit over which they are used. A collective call designates certain commands by name or location (geographic area). Net call signs are either international call signs or voice call signs so designated for this use.

PRACTICE * * * * * * * * * * * * *

Check (✓) the two items below that describe a net call sign:

____ a. A call sign represents a group of stations in direct communication with each other on a common channel.

____ b. A call sign always begins with the letter "N."

____ c. A call sign may be composed of three letters or pronounceable words.

____ d. A call sign is used when a message is in codress form.

* * * * * * * * * * * * *

This is practice for net call signs, so it should be deleted.

Notice that this is a funny kind of practice remembering. It requires recognition, not recall. It should have been: "In the space below, write the characteristics of a net call sign," if it was to be included at all.

FEEDBACK

We put this here to save space. It really appears on a separate page.

The two items you should have checked which describe a net call sign are:

✓ a. A call sign represents a group of stations in direct communication with each other on a common channel.

✓ c. A call sign may be composed of three letters or pronounceable words.

Remember, a net call sign may be an international or a voice call sign that has been assigned for special use. Net call signs look like internacional or voice call signs, and their use can be determined only by consulting the proper publications.

Voice Call Signs

Voice call signs, as the name implies, are used over voice radio circuits. These consist basically of words or combinations of words that can be easily pronounced. For example, the Navy ship USS Jason is assigned the voice call sign INKSTAND. This is a word that is easily pronounced, and like the call signs discussed earlier, it is only assigned to one command/ship.

Just as there are collective international call signs, there are also collective voice call signs. There is no difference in the way collective voice call signs and those for a single command look. However, you need the same publication, JANAP 119(F), "Joint Voice Call Sign Book" in order to decode and encode both types.

JANAP 119(F) is classified Confidential because the disclosure of some call signs and the commands they address is a violation of security.

This is the STATEMENT for voice call signs.

All voice call signs fall into four types, each of which is listed in JANAP 119(F). These are:

1. Word (or words)
2. Word (or words) plus a letter
3. Word (or words) plus a digit
4. Digit and word (or words)

Here are some EXAMPLES.

Some examples are: INKSTAND, END RUN A (ALPHA), HAMLET 8 (EIGHT), and 6 (SIX) WATERSHED. (Note that letters and digits are pronounced as words). Of these four types the last one (digit and word or words) is a special type that is reserved for special use; you may seldom have a chance to use it.

No PRACTICE REMEMBERING.

PRACTICE * * * * * * * * * * * * *

This PRACTICE USING is the wrong format.

Circle the voice call signs in the list below.

1.	BLUE BOTTLE	6.	DSWN
2.	RUWSADF	7.	SEA BOY A
3.	USS RONKARIS	8.	AIG 402
4.	NCCD	9.	SEX APPEAL 1
5.	P7QR	10.	NA

* * * * * * * * * * * * *

FEEDBACK

1. BLUE BOTTLE
2. RUWSADF
3. USS RONKARIS
4. NCCD
5. P7QR
6. DSWN
7. SEA BOY A (ALPHA)
8. AIG 402
9. SEX APPEAL 1 (ONE)
10. NA

Voice call signs are always made up of words, digits, or letters that are pronounceable (letters are always pronounced phonetically, alpha, bravo, charlie, etc.).

FINAL PRACTICE

* * * * * * * * * * * * *

You should now be able to identify by their appearance, the five types of call signs listed below. Match each type of call sign in column A with the call signs in column B. Note that there is more than one type of some call signs and that some items in column B are not valid call signs.

A		B
1. International (U. S. Navy ships)	_____	A. ROBINHOOD 3
	_____	B. NG
2. International (U. S. Navy shore radio stations)	_____	C. NPO
	_____	D. DESRON FOUR
	_____	E. S3BR
3. Task Organization	_____	F. NEAC
4. Indefinite	_____	G. N7GL
5. Voice	_____	H. NBRA
6. This is not a valid call sign.	_____	I. NPQL
	_____	J. NL
	_____	K. WAY OUT PAPA
	_____	L. COMNAVAIRPAC TWO
	_____	M. NGA
	_____	N. NAPD
	_____	O. OVERLOAD

* * * * * * * * * * * * *

This final practice is supposed to be PRACTICE USING. It is similar to the use-level test items, except that it is also the wrong format.

This item is a matching item, and gives away, in column A, the category names.

It should have been: "For each of the call signs listed below, write the type in the space provided. If it is not a valid Navy call sign, write 'invalid'."

This is the FEEDBACK for the final practice.

FEEDBACK

5	A.	ROBINHOOD 3	1	I.	NPQL
4	B.	NG	4	J.	NL
2	C.	NPO	5	K.	WAY OUT PAPA
6	D.	DESRON FOUR	6	L.	COMNAVAIRPAC TWO
3	E.	S3BR	2	M.	NGA
1	F.	NEAC	1	N.	NAPD
3	G.	N7GL	5	O.	OVERLOAD
1	H.	NBRA			

Two of these are not valid call signs; items D and L are plain language addresses. Before you continue with the lesson be sure that you understand the pattern for each type of call sign:

This is a pretty good summary of the STATEMENTS for each type of call sign.

* Voice calls--pronounceable word(s), digit(s), and letter(s)

* International call signs

  (ships)--four letters beginning with "N"

  (shore radio stations)--three letters beginning with "N"

  (indefinite)--two letters beginning with "N" (except NR)

* Task organization call signs--letter-number-letter-letter pattern

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CONSISTENCY SUMMARY

STATEMENTS: *Statements were present and complete for each of the five types of call signs given in the objective.*

PRACTICE REMEMBERING: *No Practice Remembering anywhere.*

EXAMPLES: *Examples were given for two of the types--task organization and voice. The examples were not really complete, because they did not illustrate how the defining characteristics were used to classify.*

PRACTICE USING: *Practice Using cannot be counted as present or complete, because the wrong format was used throughout. The practice did have feedback, however.*

Chapter 5

PRESENTATION ADEQUACY

Introduction

In the last chapter, the consistency of the instructional presentation with objectives and test items was assessed. That is, the presentation was checked to make sure that the right combination of instructional components was present. This chapter is concerned with the adequacy of the instructional components.

Instruction can be consistent, but still not teach as effectively as it could. The adequacy procedures incorporate a number of instructional design principles which have been shown to promote student learning. These include guidelines for formatting information so students can find it, for communicating it clearly and effectively so students can understand it, and for including additional explanation. so students can better learn and remember the information.

On the next two pages, the PRESENTATION ADEQUACY procedures from Volume IV are presented. Then additional explanation and examples are given.

PRESENTATION ADEQUACY

CARD 5

STEP 1: DETERMINE whether or not each required PRESENTATION COMPONENT meets the general ADEQUACY criteria below.

SEPARATED: Statements, Examples, or Practice must be SEPARATED from the rest of the instruction. *There are different ways components may be separated:*

a. *Set off the component with a box.*
b. *Use a different color or type face, or underline.*
c. *Place on a separate page, or in a special place on the page.*
d. *For audio, movies, or lectures, pause before introducing the component.*

IDENTIFIED: Statements, Examples, and Practice must be IDENTIFIED so the student knows what they are, and can locate them. *Labels can be used to identify different components:*

Definition of ...	*Example*	*Practice*
Procedure for ...	*Demonstration*	*Test Yourself*
Key Point:		

CLEARLY STATED: Statements, Examples, and Practice must be CLEARLY STATED so the student can understand them. *The following criteria should be used:*

a. *The READING LEVEL must be appropriate for the students.*
b. *The presentation should not be confusing, vague, or too wordy.*
c. *All essential information should be present; the student should not be referred to other places to obtain information.*
d. *All presentations should be PERFORMANCE-ORIENTED, not topic-oriented.*

STEP 2: DETERMINE whether or not each required PRESENTATION COMPONENT meets the specific ADEQUACY criteria below:

STATEMENTS:

HELP: In addition to the statement, the instruction should include something to help the student better understand and remember the statement. *Methods of providing help include:*

a. *Giving a MNEMONIC (memory trick) or other memory aid.*
b. *Representing the statement with pictures, symbols, flowcharts, etc.*
c. *Explaining how the statement relates to something the student already knows, how it fits in the course, why it is important.*
d. *Giving more explanation about what the statement means.*

CLEARLY STATED: In addition to the criteria above, statements for different content types must meet the criteria below:

CATEGORIES:	Give a decision rule or search strategy for classification.
PROCEDURES:	Each step should have only one action.
RULES:	If a formula is used, symbols must be defined.

(Continued on other side)

EXAMPLES:	HELP:	Examples should include additional information to help the student understand. *Some types of HELP for different CONTENT TYPES are given below:* *HELP for CATEGORIES: Highlight critical characteristics. Explain the reasons for classification. Illustrate the use of the decision rule or search strategy.* *HELP for PROCEDURES or RULES: Explain the steps. Give more information on how to perform each step. Give a demonstration of each step. Give flowcharts, tables, etc.* *HELP for PRINCIPLES: Highlight important causes, effects, relationships. Give additional information about how the principle applies, or why it doesn't.*
	MATCHING: (categories only)	Examples should be matched with non-examples according to the presence and absence of each critical characteristic.
	EASY to HARD:	Early examples should be simplified. Conditions and standards may be relaxed on early examples so the student can learn gradually.
	ENOUGH EXAMPLES:	There should be enough examples to cover the content area thoroughly. For CATEGORIES: At least one example-nonexample pair for each critical characteristic. For PROCEDURES or RULES: One example for each important step. examples for all possible branches or decisions.
	COMMON ERRORS:	Examples should show why common errors are wrong.
PRACTICE REMEMBERING or PRACTICE USING:	FREE OF HINTS:	The practice items should not include anything that won't appear on the test, or on the job.
	EASY to HARD:	(USING only) Early practice items may be simplified, or conditions and standards may be relaxed. Final practice items should be typical of the job.
	COMMON ERRORS:	(USING only) Practice should include the opportunity for common errors, so they can be corrected.
	ENOUGH PRACTICE:	There should be enough practice so the student has an adequate opportunity to learn. For CATEGORIES: Practice for presence or absence of all critical characteristics. For PROCEDURES or RULES: Practice for all possible branches or decisions.
	FEEDBACK:	The FEEDBACK must be SEPARATED and IDENTIFIED.
	FEEDBACK HELP:	The FEEDBACK should include HELP like the help for examples.

Additional Explanation for the PRESENTATION ADEQUACY Procedure.

During the Presentation Consistency procedure, the locations of each of the required presentation components for each objective should have been noted. The ADEQUACY procedure should be applied to each of these presentation components.

STEP 1: The criteria in step 1 should be applied to all presentation components.

The "separated" and "identified" criteria are formatting requirements. The student needs to be able to find each presentation component, and to know what he is looking at.

The "clearly stated" criteria are among the most important in the IQI:

a. *There are several "reading level" formulas that can be used to judge reading ease, but they don't indicate how well material can be understood. The best way to see if reading material is appropriate is to consider the material from the student's point of view.*

b. *At the same time, consider whether or not the components are confusing, vague, or too wordy.*

c. *Essential information, like charts, tables, or explanations, should be presented in conjunction with the related component. The student should not have to interrupt his study to go find information.*

d. *All presentations should be performance oriented in two ways. First, a presentation should be directly related to what the student will do after the course; again, REMEMBER THE JOB. All too often presentations take the form of "everything you wanted to know about ...," with no information about what the job is really like, or why the information is important. Instead, presentations should be written in terms of the job to be done. Orienting instruction to job performance is done differently for different presentation components. Statements give essential information, and are not job oriented by themselves. The job orientation, therefore, is given by providing additional information about the job context in which the statement will be applied. (See "Statement Help" under step 2 below.) Examples and practice items are job oriented if they are taken from actual job situations.*

Second, a presentation should also orient the student to the performance expected during the instruction. This means that the student must be told what is in the instruction, how best to study it, and what the tests will be like. This is often accomplished

by giving the objective(s) at the beginning of the presentation. Unfortunately, objectives are not usually written to communicate directly to the student. They can be confusing, because they contain unfamiliar words and topics, and complicated sentences. Instead, the instructional orientation should tell the student what is in the presentation, what he should do with the information (e.g., memorize it), and how he will be tested.

STEP 2: The criteria in step 2 apply to each different presentation component individually.

STATEMENTS: Help: Several types of "help" for statements are described in step 2. Mnemonics are most often used with Remember-Fact information, but they should also be used for other content types at the Remember level. Methods of constructing mnemonics are described in TAEG Report #60, Use of Mnemonics in Training Materials: A Guide for Technical Writers, by Braby and Kincaid (1978).

Since different people learn in different ways, it is often desirable to include more than one representation of a statement. Pictures, symbols, flowcharts, tables, etc., can be used.

Again, a job-relevant context must be provided for a statement. This context should include a description of the job environment, how the information will be applied on the job, and reasons why it is important to learn the information. This additional context helps motivate the student.

Clearly Stated: For difficult Category tasks, it is often desirable to include not only the Category characteristics, but also a decision strategy or rule for making classifications. For example, in chapter 1 on task/content classification, we gave characteristics of task levels and content types, and we also gave a decision strategy: "First decide if its Remember or Use; then if its Use, decide if its aided or unaided; then decide on the content type."

For Procedures, each step should have only one action. If there is more than one, the step should be broken up. Also, explicit safety precautions should be included as separate steps.

EXAMPLES:

Help: Again, examples should be taken from situations typical of the job to be performed after training, so that the presentation is performance oriented. Help for the examples can also maintain the performance orientation.

Matching: Matching can be used with the CATEGORY content type to illustrate why one object, event, or idea is a member of the category and a similar one is not. Matching is usually helpful when the category has a large number of critical characteristics, or when things that are members of the category are easily confused with things that are not. Matching is done by changing only one critical characteristic at a time. This method demonstrates why something is a member of the category when the characteristic is present and why it is not a member when it is changed.

Easy to Hard: In order to teach someone how to perform a complex task, it is often necessary to make it easier to do at the beginning of learning. To do this, the conditions or standards can be relaxed. The action, however, should never be changed.

For example, the task "field-strip an M-16 rifle in total darkness" is taught initially in the light.

Enough Examples: Some guidelines for examples are given in step 2. The decision, however, is usually a matter of judgment, and the advice of a subject-matter expert should be obtained.

When generalization is required (categories, rules, principles), more examples need to be given. Furthermore, the examples should have a range of difficulty typical of the job.

Common Errors: If there are errors that are typically made on the job, examples on these should be included. An explanation of how the errors can be avoided should also be included.

PRACTICE REMEMBERING or PRACTICE USING	*Free of Hints:*	*The practice items should be like the test. Hints should be included in the feedback for the practice items, not in the items themselves.*
	Easy to Hard:	*The same criteria given for examples apply to practice items. Again, the conditions or standards may be relaxed on early practice items, but the action should not be changed.*
	Common Errors:	*Practice items should include the opportunity for students to make common errors. The feedback should then clearly show why the error is wrong, and how to avoid it.*
	Enough Practice:	*The same criteria given for examples apply to practice.*
	Feedback:	*As a minimum, students must be told whether they were right or wrong on each practice item, and, if wrong, what the correct answer is. For performance tasks in which a step-by-step process is required, feedback should be given for each step.* *The purpose of feedback is to help the student learn the material. Therefore, the feedback should be designed so that the student is led to restudy the information to determine the correctness of his answer.*
	Feedback Help:	*Students sometimes make errors because they did not learn from the original presentation. Therefore, when possible, feedback should include additional information or a different version of the information than was originally presented.* *Finally, once feedback is given for a practice using item, it becomes an example. Therefore, all of the criteria given above for examples also apply here.*

General Comments about Consistency and Adequacy:

The criteria given in this chapter, and the previous one, apply as well to nonprinted instruction. Lectures, slide-tape presentations, movies, videotapes, and computer-assisted instruction lessons must also be consistent with the objectives and test items, and must be adequate.

For example, a good lecture will contain the appropriate combination of presentation components, and they will all be complete. The lecturer will separate and identify the components, match his presentation level to his audience, make his presentation performance oriented, give enough examples and practice, and provide appropriate feedback. Therefore, the IQI can be used to rate instructors on how consistent their instruction is, and how adequately they deliver it.

EXAMPLES

The example instructional presentations from the last chapter are repeated in this section. This time, they are rated for adequacy. For each example, we will determine whether or not (1) the presentation components are separated, identified, and clearly stated, (2) help is given, and (3) examples and practice are adequate. Again, our comments about adequacy will be given *in italics* in the margins.

After the examples, we have included a revised version of each of the instructional presentations. The revised versions will be consistent and adequate.

The objectives and test items for these examples are given in the previous chapter, and are not repeated here.

EXAMPLE 1.

Instruction:

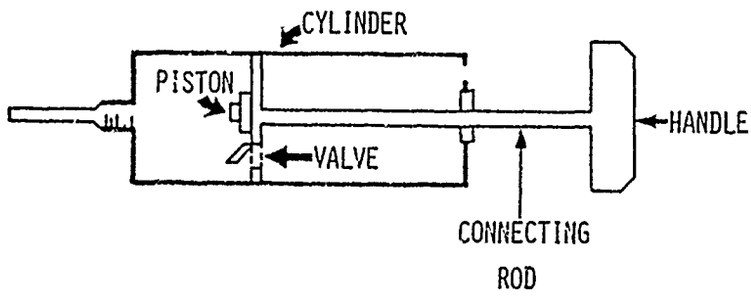
Pumps

Pumps provide the force required to move fluids. They do this by establishing and maintaining a difference in pressure between the inlet and (discharge) outlet of the pump. Did you know that you carry a pump around with you? All the time? Just like your own heart, the "heart" of most fluid transfer systems is a pump.

Aboard ship, pumps are used to move water, oil, fuel, and air. These fluids and gases are moved by pumps into and out of storage tanks, piping systems, and machinery to move the ship, make electricity, and keep the crew safe and comfortable. Without its pumps, a steam or diesel-powered ship couldn't even get underway.

There are many different kinds of pumps. A basic reciprocating pump is a pump which is used to push air into various receptacles such as a basketball or a bicycle tire. This is accomplished by having the connecting rod (which connects the piston to an outside energy source) push the piston (plunger-shaped mechanism) down, forcing air out of the cylinder (which acts as the encasement for the piston and air) and through a valve. The purpose of the valve in a basic reciprocating pump is to enable gas (e.g., air) to enter and escape from the cylinder.

Presented below is a diagram which illustrates the major parts of basic reciprocating pumps.



The STATEMENT in the picture at the bottom of the page is separated, but not identified.

The reading level is probably too difficult.

The presentation is topic oriented, not oriented to the job the student will do.

The presentation does not give the student any "how-to-study" information. How is the student to know what is important to remember in this presentation? The student should be told what he will have to learn or memorize for the test.

There is no real help for the statement. A mnemonic could have been given to make the part names easier to remember.

There is no Practice Remembering, so the student has no way to determine what to study, or how well he is learning.

EXAMPLE 2.

Instruction:

Sharpening a pocket knife

on a sharpening stone:

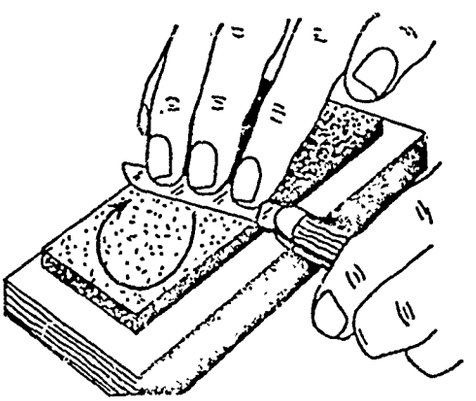
Most pocket knives may be sharpened on a medium or fine grade sharpening stone with a few drops of oil spread on the surface. Hold the handle of the knife in one hand, and place the blade across the stone. Press the blade down with the fingers of the other hand, and stroke the blade in a circular motion as shown below. After several strokes, reverse the blade and stroke the opposite side with the same type of motion. Use a light even pressure. The wire edge or burr that may be left on a knife blade after whetting may be removed by stropping both sides on a soft block of canvas or leather.

Practice

Why is it important to remove the burr after whetting?

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Now sharpen your knife and check with your instructor.



SHARPENING A POCKET KNIFE

The STATEMENT is separated and identified, but is not clearly stated. It would be better to list each step on a separate line, and each step should have only one action. There is no help for the statement, and there are no instructions to the student about what to learn.

There is no Practice Remembering, so adequacy cannot be evaluated.

The EXAMPLE is separated and identified, but is not adequate because it does not illustrate each important step of the procedure. There is no help in the example. A better example would have been either a demonstration of each step by the instructor, or at least a separate picture for each important step.

The PRACTICE USING is not identified as practice. Also, its adequacy really depends on how the instructor supervises and provides feedback.

For performance orientation for this instruction, we would expect to see some information about why sharp knives are important, and how they are used on the job. Also, the student should be told what he will have to do to score well on the test.

EXAMPLE 3.

Instruction:

Note: This instruction continues over the next 11 pages.

Call Signs

One of the most used address designators is the call sign. Every ship and station has its own "sign" that is used when communicating. Like the other kinds of address designators, call signs are used for two purposes, calling and addressing messages.

(continued on following pages)

There are six types of call signs; each one has its own purpose and form. These are:

1. International call signs
2. Indefinite call signs
3. Task organization call signs
4. Collective call signs
5. Net call signs
6. Voice call signs

These six types are not the same as in the objective. This misleads the student. Orientation information should tell the student what to study, and how he will be tested.

International Call Signs

By international agreement, each nation is assigned a block of letters to assign to its own ships and stations (civilian as well as military). The U.S. is assigned the first half of the A's and all the K's, W's, and N's for use as call signs.

This is all topic oriented, rather than performance oriented. The student should be told what he needs to learn, and how it will be used on the job.

The Army and Air Force begin their call signs with "A." Commercial and private stations, along with merchant ships, use the K's and W's. The Navy and Coast Guard use the N's to begin their call signs. That means that the first letter of all international call signs assigned to the Navy is the letter "N." It is an easy matter to determine whether a Navy international call sign is assigned to a ship or a shore radio station--all shore radio stations use three-letter calls and all ships use four-letter calls.

The STATEMENTS for international U.S. Navy Ship and Shore call signs are buried in this paragraph. They are not even in clear sentences, let alone separate and identified.

PRACTICE * * * * * * * * * * * * *

Circle each of the international call signs listed below that could be assigned to the U. S. Navy.

1.	ABDR	6.	A1E3
2.	NQJI	7.	WOWL
3.	NABD	8.	TTEW
4.	NPW	9.	NMA
5.	QRTW	10.	MOS

* * * * * * * * * * * * *

EXAMPLES should have been used to show the category characteristics. For example:

"NABD" starts with "N" and has 3 more letters after the N, so it is a U. S. Navy Ship.

There is no PRACTICE REMEMBERING and the PRACTICE USING, although separate and identified, is not consistent and, therefore, cannot be evaluated for adequacy

The FEEDBACK is separate and identified and includes HELPS.

FEEDBACK

1.	ABDR	6.	A1E3
2.	(NQJI)	7.	WOWL
3.	(NABD)	8.	TTEW
4.	(NPW)	9.	(NMA)
5.	QRTW	10.	MOS

Any three or four letter group that begins with the letter "N" could be an international call sign for the U.S. Navy. Navy ships are assigned four-letter call signs and Navy shore radio stations are assigned three-letter call signs. For example, in exercise 2, NQJI and NABD are international call signs for ships--NPW and NMA are international call signs for shore radio stations.

Indefinite Call Signs

The STATEMENT for indefinite call signs is in the middle of the second paragraph. It is clearly not separate and identified. Again, the sentences, are not clear and the reading level is probably too high.

Indefinite call signs are used whenever the need arises to conceal the identities of the sending or receiving stations. To accomplish this, the codress form of message is used.

Instead of using call signs in the headings of codress messages, an indefinite call sign is inserted. This call is composed of two letters for Navy ships--NA through NZ (except for NR which is not used for this purpose). The address portion of a codress message is encrypted in the text. This means that the message must be decoded in order to identify the sending and receiving commands.

PRACTICE * * * * * * * * * * * * *

Again, the EXAMPLES don't show category characteristics.

Circle the indefinite call signs in the list below that could be used by naval commands.

There is no PRACTICE REMEMBERING and, again, the PRACTICE USING is not consistent.

1.	NKVD	6.	NL
2.	NR	7.	OL
3.	TN	8.	NT
4.	NB	9.	NOP
5.	NAL	10.	P2N3

* * * * * * * * * * * * *

FEEDBACK

1. NKVD	6. (NL)
2. NR	7. OL
3. TN	8. (NT)
4. (NB)	9. NOP
5. NAL	10. P2N3

Any two-letter group beginning with the letter "N," except for NR, may be used as an indefinite call sign.

The FEEDBACK is separate and identified and contains some HELPS.

Task Organization Call Signs

Task organization call signs are assigned to commands for temporary use during tactical situations. During a tactical situation, ships communicate as one task organization. When the operation is completed, these call signs are no longer needed because the ships may be reassigned to another force which uses its own call signs.

Task organization call signs are listed in ACP 112(B), and ACP 112 U.S. SUPP(A)-1, both titled "Task Organization Call Sign Book." The latter contains the call signs assigned to the United States. These books are classified Confidential; be sure that you treat them properly.

Remember that international call signs are composed of letters only. However, task organization call signs are made up in the following manner: letter-number-letter-letter.

For example, task organization call signs could be P7OR, or A2CD. There are no characteristics for identifying task organization call signs other than this letter-number-letter-letter arrangement.

Like the previous two call signs, the STATEMENT for task organization call signs is buried in the presentation.

The EXAMPLES aren't separate or identified but there is an attempt to restate the category characteristics.

Again, there is no PRACTICE REMEMBER and the PRACTICE USING is not consistent.

PRACTICE * * * * * * * * * * * *

Circle the task organization call signs in the list below that could be assigned to Naval commands.

1. P2Q4	6. U4RD
2. KWLH	7. Y8ZL
3. NE	8. NOP
4. Q2NY	9. BLUE SMOKE
5. NOPQ	10. KOU

* * * * * * * * * * * * *

The FEEDBACK is separate and identified and represents the STATEMENT.

FEEDBACK

1. P2Q4	6. U4RD
2. KWLH	7. Y8ZL
3. NE	8. NOP
4. Q2NY	9. BLUE SMOKE
5. NOPQ	10. KOU

The basic pattern for task organization call signs is letter-number-letter-letter.

Collective Call Signs

Collective call signs are used whenever a message needs to be sent to several commands or ships instead of just one. To save the time and effort that would be needed to prepare a message addressed to each command, a collective call sign is used. This call sign is one that automatically addresses a particular group of commands. For example, the collective call sign NABT means "All ships assigned Greenland patrol duty."

Some collective call signs assigned to the Navy look exactly like international call signs--in fact, they <u>are</u> international call signs that have been designated as collective call signs. These are listed in ACP 113, "Call Sign Book For Ships." In section 4 of ACP 113, you will find the collective call signs listed, and you will find the same call signs listed in the section of ACP 113 that lists international call signs for Navy ships. Just remember that a collective call sign is an international call sign that has been given a special meaning--that of addressing a specified group of commands.

Collective call signs were not in the objective. Since this material is irrelevant, we will not rate it for adequacy.

The Navy uses fewer collective call signs than other types of call signs. As they are mostly assigned to ships operating in a certain geographic section of the world, not many are needed.

Just as radiomen must learn the call sign for their ship, they must also learn the collective call sign for the area in which their ship is operating. This comes rather quickly since much of the traffic sent to a ship is addressed with a collective call sign and the radioman normally sees it often.

* * * * * * * * * * * * *

Circle the collective call signs in the list below that could be used by the Navy.

1.	NPE	6.	W2Z8
2.	P2ZN	7.	NOMV
3.	BUCKLE ON	8.	KRLE
4.	NPDJ	9.	ND
5.	NA	10.	NTLQ

* * * * * * * * * * * * *

1. NPE
2. P2ZN
3. BUCKLE ON
4. NPDJ
5. NA
6. W2Z8
7. NOMV
8. KRLE
9. ND
10. NTLQ

International collective call signs are call signs that have been designated for the specific purpose of addressing a group of commands in a geographic location. They look exactly like international call signs and you need to use ACP 113 in order to tell a collective call from an individual call.

Net call signs were not in the objective either, so we will not rate this section for adequacy.

Net Call Signs

Net call signs are used to address all commands/stations that are using a particular radio net. A net is a group of stations (not necessarily on different ships) that are in direct communication over one radio network. That is, each station can hear the calls of all the others and each station can call any, or all, of the others. One example of a net call sign is NQN. This means, "All U.S. Navy Radio Stations guarding the ship-shore high frequency calling series." An example of the use of this call sign would be when a station desired to communicate with all of the stations at the same time.

Net call signs are also used on voice circuits. An example of a voice net call sign is OVERWORK. This call sign means: "All U.S. Navy ships on this circuit." Again, a net call sign would be used when the calling station wishes to talk to all the other stations at once.

These two examples are similar to other types of call signs. This is because they are listed along with other types. NQN is found in the listing of international call signs and OVERWORK is listed with the voice call signs.

Net call signs should not be confused with collective call signs. Net calls always specify the particular circuit over which they are used. A collective call designates certain commands by name or location (geographic area). Net call signs are either international call signs or voice call signs so designated for this use.

* * * * * * * * * * * * *

Check (✓) the two items below that describe a net call sign:

This is also irrelevant.

____ a. A call sign represents a group of stations in direct communication with each other on a common channel.

____ b. A call sign always begins with the letter "N."

____ c. A call sign may be composed of three letters or pronounceable words.

____ d. A call sign is used when a message is in codress form.

* * * * * * * * * * * * *

The two items you should have checked which describe a net call sign are:

✓ a. A call sign represents a group of stations in direct communication with each other on a common channel.

✓ c. A call sign may be composed of three letters or pronounceable words.

Remember, a net call sign may be an international or a voice call sign that has been assigned for special use. Net call signs look like international or voice call signs, and their use can be determined only by consulting the proper publications.

Voice Call Signs

Voice call signs, as the name implies, are used over voice radio circuits. These consist basically of words or combinations of words that can be easily pronounced. For example, the Navy ship USS Jason is assigned the voice call sign INKSTAND. This is a word that is easily pronounced, and like the call signs discussed earlier, it is only assigned to one command/ship.

This paragraph is irrelevant.

Just as there are collective international call signs, there are also collective voice call signs. There is no difference in the way collective voice call signs and those for a single command look. However, you need the same publication, JANAP 119(F), "Joint Voice Call Sign Book" in order to decode and encode both types.

JANAP 119(F) is classified Confidential because the disclosure of some call signs and the commands they address is a violation of security.

This STATEMENT is separated, but not identified.

All voice call signs fall into four types, each of which is listed in JANAP 119(F). These are:

1. Word (or words)
2. Word (or words) plus a letter
3. Word (or words) plus a digit
4. Digit and word (or words)

These EXAMPLES are identified, but not separated. There is a little explanation of how letters and digits are pronounced.

Some examples are: INKSTAND, END RUN A (ALPHA), HAMLET 8 (EIGHT), and 6 (SIX) WATERSHED. (Note that letters and digits are pronounced as words). Of these four types the last one (digit and word or words) is a special type that is reserved for special use; you may seldom have a chance to use it.

PRACTICE * * * * * * * * * * * * *

This PRACTICE USING is separated and identified, but not consistent.

Circle the voice call signs in the list below.

1. BLUE BOTTLE	6. DSWN
2. RUWSADF	7. SEA BOY A
3. USS RONKARIS	8. AIG 402
4. NCCD	9. SEX APPEAL 1
5. P7QR	10. NA

* * * * * * * * * * * * *

FEEDBACK

1. BLUE BOTTLE
2. RUWSADF
3. USS RONKARIS
4. NCCD
5. P7QR
6. DSWN
7. SEA BOY A (ALPHA)
8. AIG 402
9. SEX APPEAL 1 (ONE)
10. NA

Voice call signs are always made up of words, digits, or letters that are pronounceable (letters are always pronounced phonetically, alpha, bravo, charlie, etc.).

FINAL PRACTICE

* * * * * * * * * * * * *

You should now be able to identify by their appearance, the five types of call signs listed below. Match each type of call sign in column A with the call signs in column B. Note that there is more than one type of some call signs and that some items in column B are not valid call signs.

A		B
1. International (U. S. Navy ships)	_____	A. ROBINHOOD 3
	_____	B. NG
2. International (U. S. Navy shore radio stations)	_____	C. NPO
	_____	D. DESRON FOUR
	_____	E. S3BR
3. Task Organization	_____	F. NEAC
4. Indefinite	_____	G. N7GL
5. Voice	_____	H. NBRA
6. This is not a valid call sign.	_____	I. NPQL
	_____	J. NL
	_____	K. WAY OUT PAPA
	_____	L. COMNAVAIRPAC TWO
	_____	M. NGA
	_____	N. NAPD
	_____	O. OVERLOAD

* * * * * * * * * * * * *

Again, this final practice is misleading, because it is not consistent with the final test.

Remember, the student builds expectations about what the test will be like as he does the practice. Here, the student expects to get a similar test item on the final test. That is, he expects to be given column A. Therefore, he might not attempt to memorize the different category names.

FEEDBACK

5	A.	ROBINHOOD 3	1	I.	NPQL
4	B.	NG	4	J.	NL
2	C.	NPO	5	K.	WAY OUT PAPA
6	D.	DESRON FOUR	6	L.	COMNAVAIRPAC TWO
3	E.	S3BR	2	M.	NGA
1	F.	NEAC	1	N.	NAPD
3	G.	N7GL	5	O.	OVERLOAD
1	H.	NBRA			

Two of these are not valid call signs; items D and L are plain language addresses. Before you continue with the lesson be sure that you understand the pattern for each type of call sign:

* Voice calls--pronounceable word(s), digit(s), and letter(s)

* International call signs

  (ships)--four letters beginning with "N"

  (shore radio stations)--three letters beginning with "N"

  (indefinite)--two letters beginning with "N" (except NR)

* Task organization call signs--letter-number-letter-letter pattern

This feedback does restate the category definitions. The definition for voice calls, however, is incomplete

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Adequacy Summary:

None of the STATEMENTS are separated or identified carefully enough.

The presentation is confusing, and too wordy. There is not enough performance orientation. In particular, the student is told nothing about how to study, or what is important to learn for the final test.

The EXAMPLES, when they are given at all, do not illustrate use of the category characteristics. None of the examples have help that explains the reasons for classification. Further, since none of the examples are similar to the final test items, we can't decide if there are enough.

The PRACTICE USING is all inconsistent, and therefore inadequate.

The FEEDBACK is separated and identified, and includes help or additional explanation.

REVISED VERSION OF EXAMPLE 1.

PUMPS

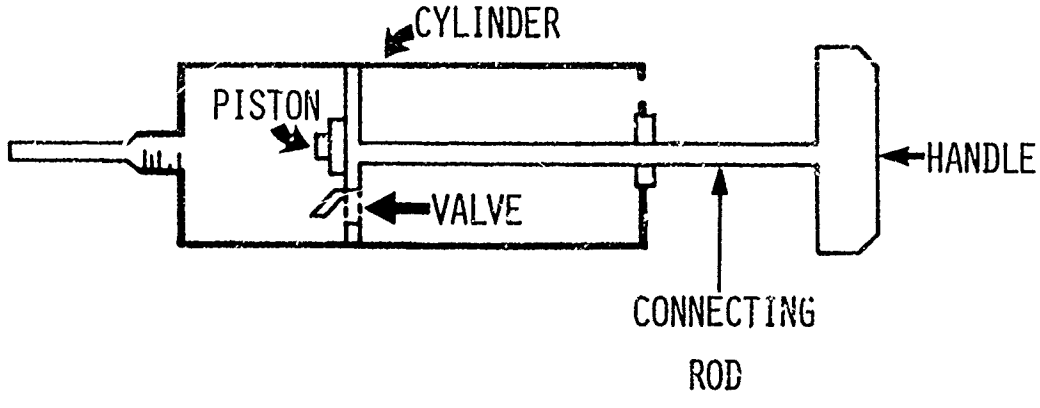
In your job aboard ship, you will need to know how to operate, maintain, and repair many different types of pumps. Pumps are important parts of the propulsion and fire control systems on a ship. The following lessons will teach you the part names of the pumps you will work with on the job. You must know the part names of a pump in order to operate, maintain, or fix it.

The Basic Reciprocating Pump

The first pump you will learn about is the basic reciprocating pump. Reciprocating pumps are used aboard ship to move water through pipe systems. You have probably used a basic reciprocating pump to fill a basketball or bicycle tire with air.

The parts of a basic reciprocating pump are labeled in the diagram below. Study the name of each part. When you think you have memorized the part names, turn the page to the PRACTICE section and try to label the diagram. On the test at the end of this lesson, you will be asked to label a diagram like this one.

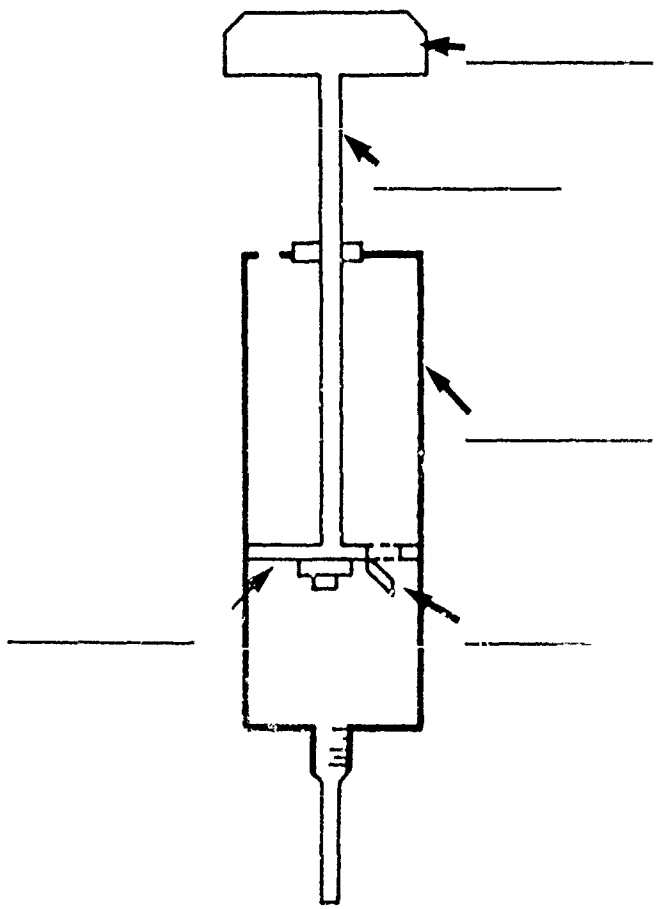
PARTS OF A BASIC RECIPROCATING PUMP:



PRACTICE SECTION

Label the diagram below. You will be asked to label a diagram exactly like this one on the test at the end of this lesson.

Check your answers by turning back to the previous page. If you missed any, study the part names again. When you are ready, you may take the lesson test.



REVISED VERSION OF EXAMPLE 2.

Sharpening a pocket knife of a sharpening stone

If your knife is not sharp, it may slip and damage your work or cut your hand. The procedure given below is the best way to sharpen your pocket knife.

You will be tested on two things: First, you will have to remember the steps for sharpening. On the test, you will have to write the steps from memory. Second, you will sharpen your knife while your instructor checks you. He will determine whether or not you follow the steps correctly.

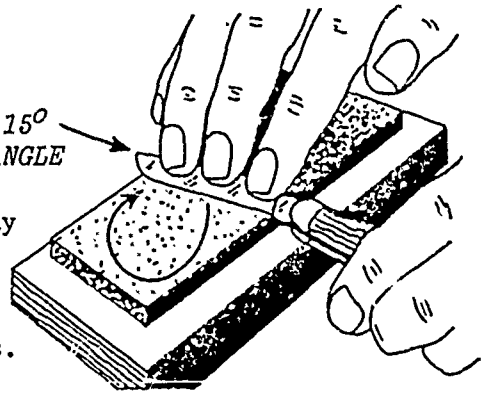
PROCEDURE FOR SHARPENING

Step 1. Get a medium or fine grade sharpening stone.

Step 2. Spread a few drops of oil on the surface of the stone.

Step 3. Hold the handle of the knife in one hand.

Step 4. Place the blade across the stone at a 15° angle.



Step 5. Press the blade down lightly but evenly with the fingers of the other hand.

Step 6. Stroke the blade across the stone in a circular motion five to ten times.

Step 7. Turn the blade over, so that the other side of the blade is at a 15° angle with the stone.

Step 8. Stroke the blade across the stone in a circular motion five to ten times.

Step 9. Rub each side of the blade on a soft block of canvas or leather.

Test Yourself:

On the test, you will have to write the steps above from memory. Turn this page over, and see if you can write each step from memory now. Turn back to this page to check your answers.

Example:

Your instructor will demonstrate the procedure for sharpening. He will show you each of the steps listed above. You should pay particular attention to the 15° angle, and how the knife is stroked on the stone.

Practice:

Practice sharpening your knife. Ask your instructor to check that you are doing each step correctly.

REVISED VERSION OF EXAMPLE 3. *(This example continues over the next 6 pages.)*

CALL SIGNS

Introduction:

Call signs are used by all radio stations to identify themselves. This includes commerical stations, like KFMB; Ham radio stations, like WB6SQM; police stations, like "ONE ADAM TWELVE," and many others.

The Navy also uses call signs to identify its ship and shore radio stations. There are five types of Navy call signs:

1. International U.S. Navy Ship Call Signs.
2. International U.S. Navy Shore Call Signs.
3. Indefinite Call Signs.
4. Task Organization Call Signs.
5. Voice Call Signs.

On the job, you will have to determine the type of any call sign you might be given.

There are two things you will be tested on after this lesson:

1. You will have to write from memory the NAMES and DEFINITIONS of each of the five types of call signs. You should memorize these names and definitions.

2. We will give you a list of call signs that you have not seen before. For each call sign on the list, you will have to decide which type it is, and write the name of the type next to it. Some signs on the list will not be valid Navy call signs. For those, you will just write "invalid."

How to study this lesson:

On page 2, you will find the NAMES and DEFINITIONS of each of the five types of Navy call signs. You should memorize these.

On page 3, you can practice remembering the names and definitions just like you will get on the test. The answers are on page 2.

On page 4, we will give a list of example call signs, and show you how to decide which of the five types they are.

On page 5, we will give you a list of call signs just like you will get on the test. For each of these, you can practice deciding which type of call sign it is. The answers are on page 6.

When you think you can answer all the test questions, give this booklet back. Then you will be given the test. Your test will be scored right after you finish so you will know how you did.

Remember, don't take the test until you are sure you'll get it right.

Five types of CALL SIGNS, NAMES and DEFINITIONS

To Study: MEMORIZE the NAMES *and* DEFINITIONS *given below. You don't have to memorize the explanations in italics.*

NAME	DEFINITION	*Explanation*
1. INTERNATIONAL U.S. NAVY SHIP	STARTS with "N," has THREE more LETTERS.	*Every ship has its own international call sign so it can identify itself both in port and at sea.*
Remember:	"N" + 3 more letters.	
2. INTERNATIONAL U.S. NAVY SHORE	STARTS with "N," has TWO more LETTERS.	*Shore radio stations also have international call signs to identify themselves.*
Remember:	"N" + 2 more letters.	
3. INDEFINITE	STARTS with "N," has ONE more LETTER (NOT "R").	*Indefinite call signs are used when the identity of a station must be kept secret. These are used on coded ("codress") messages.*
Remember:	"N" + any LETTER except "R."	
Remember:	"NR" is Not Really a call sign.	
4. TASK ORGANIZATION	ANY LETTER ANY NUMBER ANY LETTER ANY LETTER	*Task organization call signs are used to refer to groups of ships during tactical exercises. When the operation is over, ships may change groups, but the task organization call sign stays with the group.*

Task Organization call signs are listed in ACP 112(b) and ACP 112 U.S. SUPP(A)-1. Both of these are CONFIDENTIAL.

5. VOICE		WORD (or WORDS)	*Voice call signs are used on voice radio circuits. they are words that can be pronounced easily. Numbers or letters are also pronounced, like "ALPHA" for "A," or "EIGHT" for "8."*
	or	WORD (or WORDS) plus a LETTER	
	or	WORD (or WORDS) plus a NUMBER	
	or	NUMBER plus WORD (or WORDS)	
	Notice:	ABBREVIATIONS do NOT count as words.	

Voice call signs are listed in JANAP 119(f) which is CONFIDENTIAL.

There are other types of call signs, but you need books to look them up. You can't tell them apart any other way. You will learn about them in a later lesson.

PRACTICE:

On the test, you will have to write the names and definitions of the five types of call signs. In the space below, see if you can write them now. You have to be able to do this without looking at page 2.

NAME	DEFINITION

Turn back to page 2 to check your answers.

EXAMPLES

On the test, we will give you a list of call signs. You will have to decide which type each one is, and write down the type. We have done some samples below. Study these so you understand how to decide on the type.

Call Sign	TYPE	*EXPLANATION*
NDCP	INTERNATIONAL U.S. NAVY SHIP	*"N" + 3 more letters.*
NR	INVALID	*NR is NEVER USED as a Navy call sign. Remember, "Not Really"*
NPX	INTERNATIONAL U.S. NAVY SHORE	*"N" + 2 more letters.*
PORK CHOP THREE	VOICE	*WORDS plus a NUMBER*
USS CONSTELLATION	INVALID	*"USS" is an abbreviation.*
NUWEPCEN	INVALID	*This is an abbreviation. Even though it starts with "N," it has too many letters.*
NT4	INVALID	*This starts with "N", but it doesn't have 2 more letters. Also, it isn't letter-number-letter-letter.*
NTP	INTERNATIONAL U.S. NAVY SHORE	*"N" + two more letters.*
CRUDESRON FIVE	INVALID	*"CRUDESRON" is an abbreviation.*
N3RT	TASK ORGANIZATION	*letter-number-letter-letter.*
NB	INDEFINITE	*"N" + one more letter.*
SEVEN ICEBERG	VOICE	*NUMBER plus WORD.*
R9FH	TASK ORGANIZATION	*letter-number-letter-letter*

PRACTICE

On the test, you will be given a list of call signs, and you will have to write which type each one is. For practice, we have given a list of call signs below. Next to each one, write its type. If it is not a valid Navy call sign, write "invalid." Answers are on the next page.

Call Sign	TYPE
ROBINHOOD THREE	
NG	
NPQ	
DESRON FOUR	
S3BR	
NEAC	
N7GL	
NBRA	
NPQL	
NL	
WAY OUT PAPA	
COMNAVAIRPAC TWO	
NR	
NGA	
NAPD	
OVERLOAD	
NMR4	

ANSWERS

Call Sign	TYPE	Explanation
ROBINHOOD THREE	VOICE	*WORD plus NUMBER.*
NG	INDEFINITE	*"N" + any letter except "R"*
NPQ	INTERNATIONAL U.S. NAVY SHORE	*"N" + 2 more letters.*
DESRON FOUR	INVALID	*DESRON is an abbreviation.*
S3BR	TASK ORGANIZATION	*letter-number-letter-letter*
NEAC	INTERNATIONAL U.S. NAVY SHIP	*"N" + 3 more letters.*
N7GL	TASK ORGANIZATION	*letter-number-letter-letter.*
NBRA	INTERNATIONAL U.S. NAVY SHIP	*"N" + 3 more letters.*
NPQL	INTERNATIONAL U.S. NAVY SHIP	*"N" + 3 more letters.*
NL	INDEFINITE	*"N" + any letter except "R."*
WAY OUT PAPA	VOICE	*WORDS + LETTER ("P"=PAPA)*
COMNAVAIRPAC TWO	INVALID	*COMNAVAIRPAC is abbreviation*
NR	INVALID	*"NR" is NEVER used as call sign*
NGA	INTERNATIONAL U.S. NAVY SHORE	*"N" + 2 more letters.*
NAPD	INTERNATIONAL U.S. NAVY SHIP	*"N" + 3 more letters.*
OVERLOAD	VOICE	*WORD*
NMR4	Invalid	*Starts with "N," but doesn't have 3 letters. Also not letter-number-letter-letter*

If you didn't get all these right, you should review the previous pages. You may ask to take the test whenever you feel ready.

CONCLUSION

This concludes Volume II of the IQI, the User's Manual. This volume is intended to provide additional explanation and examples of the application of the procedures in Volume IV.

Two points made in this volume must be reemphasized: First, the IQI is not a set of rigid procedures that must be meticulously followed in all situations. Instead, the IQI should be viewed as a set of guidelines designed to help the user ask appropriate questions about what is to be taught and how it should be taught.

Second, the most important thing to keep in mind while using the IQI is "REMEMBER THE JOB." All too often, users of procedures like this become lost in the procedural details, and forget about what they are trying to accomplish.

For More Information:

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