This training manual presents basic teaching principles and their application in Air Force teacher-learning situations. It implements both AFPD 36-22, Military Training, and AFPD 36-23, Military Education. The text addresses how people learn and how they communicate. It discusses various teaching methods and techniques, and ways to evaluate learning and the reasons for such evaluation. The manual is for instructors engaged in OJT and informal instruction as well as those assigned to Air Force formal schools. Send comments and suggested improvements on AF Form 847, Recommendation for Change of Publication, through channels, to CPD/EDE, 60 Shumacher Street, Maxwell AFB, AL 36112-5337. The use of a name or trademark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF REVISIONS

The reference to the Extension Course Version of the Academic Instructor School (AIS) in Chapter 1 has been deleted since the Extension Course Version of AIS no longer exists. A section on Strategy Statements has been added to Chapter 6, Developing the Lesson Plan. All example lesson plans have been upgraded in terms of format, presentation of content, and test items and have been moved to Attachments 2 through 9. Affective objectives have been added to these lesson plans and the strategy statements have been more clearly defined Chapter 18, Selection of Teaching Methods, has been rewritten to better define the processes for selecting teaching methods. In Chapter 24, Criterion-Referenced Evaluation, CRT Item Analysis has been expanded and the section on the Phi Coefficient has been deleted in its entirety. Attachment 1, Glossary of References, Abbreviations, Acronyms, and Terms, has been updated and expanded. Sample critique sheets can be found in Attachment 10.
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Chapter 1
THE AIR FORCE INSTRUCTOR

1.1 Introduction. This manual will give you the practical information you need to teach adult students. While it applies to most adult education situations, the emphasis is on a military setting. The manual was written and tested at the Air Force’s Academic Instructor School at Maxwell Air Force Base, Alabama.

1.1.1 As a new instructor, you will find the manual useful because it summarizes the best of what experts in education have written. If you have been to a library for material on teaching recently, you were probably bewildered by the array of topics and the number of specialized texts.

1.1.2 This manual concentrates on the “academic” classroom. While it is hard to distinguish clearly between technical and academic instruction, you might find the following comparison useful. Technical instruction normally includes a much higher proportion of the full range of theory and skills the graduate will need. When technical students are tested, the instructor can be sure of what they can do; the instructor has “proof” they have mastered the course material. In academic instruction, the scope of the course usually has a more general range of possible skills, objectives, and content. Unlike technical instruction, the course often has no “cap,” and students are encouraged to go beyond the minimum stated objectives. Instead of having technical instruction’s “proof” of learning, the academic classroom often has only samples of learning as evidence. Instructors often must be satisfied with a sampling process when designing individual class periods and when evaluating student achievement. The process of sampling is further discussed in this manual in Chapters 3 and 4 (planning lessons) and Chapters 20 through 24 (evaluation). You should not expect to learn everything you need to know about teaching solely from a manual. Extensive as this manual may appear, it cannot provide you with the final stages of the process—teaching and being judged on your teaching skills. Even experienced instructors can profit from constructive feedback—from other teachers and students—on their lesson preparation and presentation.

1.2 Curriculum Planning. The official Air Force process for curriculum planning, called Instructional System Development (ISD)—a deliberate and orderly, but flexible process for planning, developing, and managing high quality instructional programs—is a sound approach which has been successful in a variety of civilian and military contexts. (See Figure 1.1) The five phases in the ISD process are: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation.

1.2.1 These phases are described in detail in AFMAN 36-2234, Instructional Systems Development, and AF Handbook 36-2235, Information for Designers of Instructional Systems. This manual does not duplicate these publications but complements them by spelling out the instructor’s tasks and responsibilities which are related to classroom work. When planning curriculum, AFMAN 36-2234 and AF Handbook 36-2235 should be used.

1.2.2 The phases in the ISD process are used as an organizing theme in this manual. Once you understand the five phases in the ISD process, you should view your work as part of the total curriculum or “instructional system” for your school or course. When planning individual lessons, you should be aware of how the school determined the objectives and join in the process of validating them. When evaluation results are in, you should study them for possible use in modifying the course. Not all instructors have the same degree of involvement in curriculum planning, and this manual does not attempt to qualify you as an ISD specialist.

1.3 Instructor Skills Useful In Other Duties. Military personnel often comment on the value of instructor training for more general duties as an NCO or an officer. Air Force supervisors, like instructors, must give briefings, communicate in groups, counsel subordinates, and evaluate performance. Students or graduates of the resident course often comment on the value of instructor counseling and human relations in assignments other than instructing. You may find material in this manual which will help develop such skills, but the material is included primarily because it is necessary for the successful instructor.

1.4 The Air Force Approach To Academic Instruction. A major theme of this manual is the focus on the student, rather than the instructor or the subject matter. The focus on the students requires student-centered objectives and conscious attention to how the students react to the instruction received. For efficient instruction, students need feedback which reinforces learning while identifying and correcting errors. Students need the opportunity to try to work with what has been taught. Too often instruction is limited to the delivery of information, either through reading assignments, lectures, films, or slide tape modules in a learning center. To tell is not necessary to teach; teaching is not sufficient without effective learning.

1.4.1 In the approach presented in this manual, the only acceptable evidence that successful teaching has taken place comes from indications of change in student behavior. As important as good texts, good lectures, and good audiovisual materials are, they are only part of the
process. At least as important is feedback to the student in the form of encouragement, comments on written papers, correction of mistakes, and similar teaching activities. Instructors must plan opportunities for observing student work so they can provide timely comments. In many technical courses, feedback is routine, but this step is often overlooked in academic classrooms. In addition to feedback from the instructor, a well designed course can include features such as self-tests and evaluation checklists which allow “self-correction” by the students.

1.4.2 Creativity in the Classroom. Creativity can be defined as the imaginative combining of known elements into something new and useful. One of the charges often made against military instruction is that it is too traditional and lacks creativity; dry-as-dust presentations are more like briefings than real teaching lectures, instructors are stiff and expressionless and fail to communicate fully, and students are forced to memorize and recite low level information. Surely military classes like these are largely things of the past. But with all our modern insights and sophisticated aids to instruction, we still must not become complacent. There is a place in the military for creative teaching, but there are barriers to creativity which must be overcome.

1.4.3 Barriers to Creativity. A barrier is something that inhibits our ability to be free, natural, and spontaneous, thereby decreasing the opportunity for creative ideas. Recognizing and understanding various barriers is the first step in overcoming them.

1.4.3.1 Experts have identified four broad categories of barriers to creativity—inertia, fear, prejudice, and habit. Inertia causes many of us to continue to do what we are now doing unless we are challenged. Instructors who are afraid to be different may avoid attracting attention by leaving things as they are. Instructors who are prejudiced reject new approaches and methods, because they automatically prejudge anything new without trying it. Habit is a very real problem to Air Force instructors. Courses may be taught the same way time after time, not because the course is a good one, but because no one ever complained.

1.4.3.2 Air Force instructors, then, should be creative instructors, who know when to be guided by time-tested methods and when to strike out boldly in new directions.

1.5 Overview of Manual. This manual is designed to be generally read from chapter to chapter in order. Many of the chapters in this manual build on information presented earlier. You may find it difficult to understand a particular chapter if read out of sequence; but if you know what you are looking for, go directly to the
appropriate chapter. A careful reading of the chapters in order should allow the new instructor to benefit most from what this manual has to offer.

1.5.1 This manual may be divided into five major subject matters areas.

1.5.2 Lesson Planning chapters (Table 1.1) introduce the theory and practice of writing student-centered objectives for academic instruction. The system of lesson planning combines both behavioral and cognitive learning theories. Because student behavior in the academic setting represents more than what simply meets the eye, it is important to plan for changes in the level of student understanding. The techniques presented here will prepare you to plan for lessons designed to develop skills, understandings, or attitudes.

Table 1.1. Lesson Planning

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Planning</td>
<td>2. Learning Theory</td>
</tr>
<tr>
<td></td>
<td>3. Writing Student-Centered Objectives and Tests</td>
</tr>
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<td></td>
<td>4. The Level of Learning</td>
</tr>
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<td></td>
<td>Lesson Planning Process</td>
</tr>
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<td></td>
<td>5. Writing Criterion Objectives</td>
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<td></td>
<td>6. Developing the Teaching Plan</td>
</tr>
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</table>

1.5.3 Lesson Development chapters (Table 1.2) develop, organize, and support academic lessons. We must plan carefully to achieve different levels of knowledge, understanding, and attitudes. Several approaches and patterns of lesson development promote student learning. Regardless of how well we write learning objectives, poor lesson development can hinder or even prevent desired learning outcomes.

Table 1.2. Lesson Development

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Development</td>
<td>7. Developing Knowledge-Level Lessons</td>
</tr>
<tr>
<td></td>
<td>8. Developing Comprehension-Level Lessons</td>
</tr>
<tr>
<td></td>
<td>9. Developing High-Level Cognitive Lessons</td>
</tr>
<tr>
<td></td>
<td>10. Writing and Measuring Affective Objectives</td>
</tr>
</tbody>
</table>

1.5.4 While the academic instructor has a wide variety of methods available, Instructional Media and Methods chapters (Table 1.3) focus on several of the most valuable—Teaching Lecture, Guided Discussion, Case Study, Teaching Interview, and Demonstration-Performance.

1.5.5 The chapter on Selection of Teaching Methods presents other methods in less detail. In addition, the questioning chapter focuses on the skills of classroom questioning which are fundamental to nearly all methods of instruction.

Table 1.3. Instructional Media and Methods

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Methods and Media</td>
<td>11. Using Questions for Learning</td>
</tr>
<tr>
<td></td>
<td>12. Survey of Teaching Methods</td>
</tr>
<tr>
<td></td>
<td>13. The Teaching Lecture Method</td>
</tr>
<tr>
<td></td>
<td>14. The Guided Discussion Method</td>
</tr>
<tr>
<td></td>
<td>15. The Case Study Method</td>
</tr>
<tr>
<td></td>
<td>16. The Teaching Interview Method</td>
</tr>
<tr>
<td></td>
<td>17. The Demonstration-Performance Method</td>
</tr>
<tr>
<td></td>
<td>18. Selection of Teaching Methods</td>
</tr>
<tr>
<td></td>
<td>19. Visual Aids and Instructional Media</td>
</tr>
</tbody>
</table>

1.5.6 The Evaluation chapters (Table 1.4) introduce the two major approaches to evaluation—Norm Referenced (comparing individual student performance to that of the group) and Criterion Referenced (comparing individual student performance to a predetermined objective or standard). The section also introduces several ways to measure student performance and discusses the human element involved in providing meaningful feedback to students.

Table 1.4. Evaluation

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>20. Introduction to Evaluation</td>
</tr>
<tr>
<td></td>
<td>21. Constructing and Administering Classroom Tests</td>
</tr>
<tr>
<td></td>
<td>22. Measuring Learning Outcomes</td>
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<td></td>
<td>23. Evaluation by Rating</td>
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<tr>
<td></td>
<td>24. Criterion-Referenced Evaluation</td>
</tr>
<tr>
<td></td>
<td>25. Norm-Referenced Analysis</td>
</tr>
<tr>
<td></td>
<td>26. Using Feedback in the Classroom</td>
</tr>
</tbody>
</table>
1.5.7 The Student As An Individual chapters (Table 1.5) deal with the learner rather than the learning process. No instructional system can succeed unless student needs are taken into account. We must address these needs whether we are planning for group or individualized learning. Instructors have a responsibility to establish a helping relationship with students.

Table 1.5. The Student As An Individual

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Student As An Individual</td>
<td>27. Student Differences</td>
</tr>
<tr>
<td></td>
<td>28. The Dynamics of Small Learning Groups</td>
</tr>
<tr>
<td></td>
<td>29. The Instructor as a Counselor</td>
</tr>
<tr>
<td></td>
<td>30. Self-Concept</td>
</tr>
</tbody>
</table>

1.6 Conclusion. This manual is a fresh rethinking of a complex and not completely understood subject—how to teach in the academic classroom so Air Force people will be more effective on the job. No book on this subject can have all the answers. But those who study this manual carefully will know the standard terminology and be able to ask and answer many of the right questions. With the help of this manual, instead of improvising in the classroom, we can approach our teaching job more systematically.
Chapter 2
LEARNING THEORY

2.1 Introduction. Learning means many things to many people: to some, learning is simply a change in behavior as a result of experience; to others, it is something more difficult to see and measure which involves changing thinking processes. We learn to name objects as children and solve complex problems as adults. We learn attitudes and values. We can even learn to learn by improving study skills. But, how do we explain learning? Can any one theory of learning explain how we have learned all of what we can do, what we know, and why our attitudes and values are what they are? More importantly, what do we need to know about learning theory to be effective Air Force instructors?

2.2 A Historical View. Many theories try to explain how we learn, but psychologists and educators do not totally agree on any one of them. Most agree, however, that learning is best explained by one or a combination of two theories, behaviorism or cognitive theory.

2.2.1 Behaviorism. We know that all animals can learn. Many psychologists and educators believe that all animals, including humans, learn in about the same way. Behaviorists believe that we learn by having our behavior reinforced, and that our behavior can be shaped or controlled by someone else. In the classroom, the “someone else” is the instructor. If what we do as students is positively reinforced, we will learn to do it better and more often. If we get no reinforcement or are punished for something we do, we tend to stop doing it. And in general, it is better to get people to learn what we want them to learn by providing positive rewards than by punishing them.

2.2.1.1 The technical features of behaviorism are far more complex than this simple explanation. Those of us who need high-level understanding of behaviorism and its principles, especially authors of programmed instruction and other self-paced learning materials, should read the works of B. F. Skinner and Holland. As classroom instructors, though, we need to realize the importance of controlling learning experiences by manipulating the classroom environment (stimuli) which gives our students a chance to behave or perform (respond) in the way that we desire and can reward (reinforce). Behaviorism certainly explains the way our students learn much of what we teach. We need to be aware of the importance of stimulus, response, and reinforcement as they affect our classrooms. Whether or not we view ourselves as behaviorists, these are important concepts to consider as we plan, deliver, and evaluate instruction.

2.2.2 Cognitive Theory. Much of psychological thinking and experimentation today falls into the general category of cognitive psychology. Unlike the behaviorists, the cognitive psychologists are very concerned about what is going on inside the learner. Learning is not just a change in behavior; it is a change in the way a student thinks, understands, or feels. Learning can be measured in terms of behavior, but the behavior only represents learning; it is not equal to the learning in this theory.

2.2.2.1 Motivation, generalizing, insight, and discovery are significant concepts to cognitive theorists. Instructors have the responsibility to set up an environment which motivates students. Furthermore, we must plan learning experiences which allow students to go beyond simple recall and which cause students to gain an understanding of what they study.

2.2.2.2 Like the behaviorists, the cognitive psychologists acknowledge the importance of reinforcing behavior and measuring changes. Positive reinforcement is important when we are concerned with cognitive concepts such as knowledge and understanding. We still need to measure behavior, however, because it is the only way we can get a clue about what the student understands. While students may be able to do much more with what we teach than we are able to test, we have to measure what we can. And what we can measure is usually limited to the kinds of behavior we can capture on a paper-and-pencil test or a performance exam. There will be errors in measurement as we try to measure understanding, but since understanding cannot be measured directly we have little choice. Since we want to quantify learning, we have to measure and interpret student behavior.

2.3 Combining The Approaches. Both the behavioristic and cognitive approaches are useful learning theories. We can see from the two brief descriptions above that each theory has contributed to the way we plan, deliver, and evaluate Air Force instruction. Perhaps the best approach to planning and managing instruction is an approach which includes features of each major theory. The approach which retains the notion of cognitive learning while measuring behavioral outcomes seems to be the most workable. We can plan for low or high order cognitive outcomes and determine if these outcomes have been achieved by measuring and interpreting behavior. We often say that students really understand something because they can do this or that. We can plan for cognitive learning, but we must use behavioral evidence of learning.

2.3.1 Several approaches for planning instruction exist which combine cognitive concepts and behavioral evidence of learning. This manual presents an approach for writing and measuring cognitive levels of learning which stresses the need to specify and measure behavior. We will use the cognitive taxonomy of Dr Benjamin Bloom as a frame of reference to plan instruction and to give us a better understanding of the range of possible
cognitive learning outcomes. By using this taxonomy or hierarchy of learning, we will carefully specify behaviors which will give us reasonable evidence of learning at the various levels of knowledge and understanding. Figure 2.1 contains the basic description of the cognitive domain according to Bloom. The approach to using this taxonomy will be explained in considerable detail in several chapters throughout this manual.

2.3.2 A similar scheme for specifying attitudinal objectives has been developed by Krathwohl (see Figure 2.2). Like the Bloom taxonomy, Krathwohl’s hierarchy attempts to arrange attitudinal objectives in an order of difficulty. We can then attach behavioral evidence to the various levels of this taxonomy for purposes of measurement. Chapter 10 will provide ways in which this taxonomy may be useful for planning instructional objectives which deal with attitudes.

2.3.3 There are several taxonomies which deal with physical or psychomotor skills, but none of these systems has been as popularly accepted as those of Bloom and Krathwohl. The taxonomy developed by Simpson is generally acceptable to those who plan instruction leading to physical skills. This manual will not deal with psychomotor skills to any significant degree. (See Figure 2.3)

2.4 Summary. We must measure student behavior, but we can plan for different levels of understanding and attitude development. The behaviorists have taught us the value of several basic learning concepts including stimulus, response, and reinforcement. We need to plan instruction which capitalizes on these sound concepts.

2.4.1 In addition, we must remember that behavior represents a sample of learning in many cases. It is possible to change viewpoints, increase understanding, or affect the way a student feels about something. These changes in the student cannot be observed and must be inferred from observed behavior, but most of us must determine learning outcomes to provide evidence that we are doing our jobs as instructors. We have no choice, then, but to measure behavioral indicators which we will accept as evidence of learning. The system presented here combines several essential elements of behavioral and cognitive learning theory. It is not simple, but neither is learning; however, it is workable. Years of experience with this and other similar systems indicate that Air Force instructors can use it to plan prepare, deliver, and evaluate effective and efficient instruction.

<table>
<thead>
<tr>
<th>Cognitive Domain</th>
<th>Mental Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels-of-Learning</td>
<td>Exercise of learned judgment</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Create new relationships</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Determine relationships</td>
</tr>
<tr>
<td>Analysis</td>
<td>Use of generalizations in specific instances</td>
</tr>
<tr>
<td>Application</td>
<td>Translate, interpret, and extrapolate</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Recall and recognition</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
</tr>
</tbody>
</table>


Figure 2.1. Levels of Knowledge and Understanding
### Affective Domain

<table>
<thead>
<tr>
<th>Levels-of-Learning</th>
<th>State of Mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characterization</td>
<td>Incorporates value into life style</td>
</tr>
<tr>
<td>Organization</td>
<td>Rearrangement of value system</td>
</tr>
<tr>
<td>Valuing</td>
<td>Acceptance</td>
</tr>
<tr>
<td>Responding</td>
<td>Reacts voluntarily or complies</td>
</tr>
<tr>
<td>Receiving</td>
<td>Willingness to pay attention</td>
</tr>
</tbody>
</table>


Figure 2.2. Levels of Attitudes and Values

### Psychomotor Domain

<table>
<thead>
<tr>
<th>Levels-of-Learning</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origination</td>
<td>New Movement Patterns/Creativity</td>
</tr>
<tr>
<td>Adaptation</td>
<td>Modifies for Special Problems</td>
</tr>
<tr>
<td>Complex Overt Response</td>
<td>Skillful Performance of Complex Acts</td>
</tr>
<tr>
<td>Mechanism</td>
<td>Performs Simple Acts Well</td>
</tr>
<tr>
<td>Guided Response</td>
<td>Performs as Demonstrated</td>
</tr>
<tr>
<td>Set</td>
<td>Relates Cues/Knows</td>
</tr>
</tbody>
</table>

Adapted from Simpson, E.J., The Classification of Educational Objectives in the Domain, The Psychomotor Domain, Vol 3; Washington: Gryphon House,

Figure 2.3. Levels of Skill
Chapter 3
WRITING STUDENT-CENTERED OBJECTIVES AND TESTS

3.1 Introduction. When we’re deciding what to teach and how we’re going to measure our success in the teaching environment, it isn’t enough to simply determine who our students are, what they will need to know, or how we will present the material to them. When our planning stops here, we’ve failed to consider the most important element of the lesson planning process: what our students will be able to do once they have received and processed the information we present.

3.1.1 It doesn’t necessarily follow that what we present in class is what the student will learn. This mistaken belief has driven our public educational system for years, in violation of our most basic intuitions. For when we break the teaching process down into its basic elements we realize that, just as in any form of human communication, in the teaching-learning relationship there is always the possibility of transmitting false messages or receiving misunderstood symbols. Without effective and meaningful feedback to both the teacher and the student, the resultant problem will go undetected and uncorrected. For this reason, we advocate a change from the traditional model that places all the responsibility for learning on the student. According to this older model, if the student doesn’t get the message, it is the student’s fault. To underscore this responsibility, we have even listed the teacher’s activities, responsibilities and objectives in the lesson plan implying that if the teacher does what is required, then the student will be “educated.” Notice that when we design instruction completely in terms of teacher behaviors, there is little room for checking feedback the students can give us by way of behavioral change or improved abilities after the instruction has taken place.

3.1.2 Our current model attacks the assumption that, in order to plan effective lessons, it is enough to determine what the teacher must do in the classroom. Education is a shared process. Both the student and the teacher, we believe, have certain responsibilities and expectations. But we also stress the primacy of the teacher’s responsibility to plan lessons that bridge the gap between teacher and student responsibilities. And we propose that this gap can be bridged by writing objectives that focus on the abilities we want the STUDENT to display after receiving instruction our students should perform exactly what we predicted it would be. And we will be able to demonstrate our students’ success in learning by having them complete a test that demonstrates the very same physical or mental skill described in the objective. Determining what our objectives should be and how to write them is what concerns us at this point. The design phases of the ISD process comes after determining the general mission of our school, the goal of our course, etc., in the analysis phase. This is the step where we begin to plan for instruction. Figure 3.1 represents the thought process we should use at this point for determining specific testable behaviors that will represent the objectives we identify. These behaviors will be called for in test items that are derived from the student-centered lesson objectives. Our purpose here is to construct a plan for measuring our students’ success in achieving these objectives by starting with the objectives and, through a series of specific tasks, working toward writing specific test questions. Although this process may take a variety of steps, we have included all the necessary elements in the four steps represented in Figure 3.1. It is an expanded representation of the design phase of the ISD process and is commonly called the “Four-Step Process for Writing Student-Centered Objectives.
Figure 3.1. Four-Step Process for Writing Student-Centered Objectives and Tests

3.2.3 Determine level-of-learning objective or Proficiency Code. It is usually helpful to plan learning systems with a general-to-specific strategy; that is, by starting with general objectives and ending with very precise test items. By writing general, but carefully developed, nonbehavioral objectives as the first step in planning (see Table 3-1), we are better able to describe the general type of behavior we’re looking for from our students. An example of a nonbehavioral objective at the comprehension level would be, “The objective of this lesson is for each student to comprehend the Air Force vision statement.” Notice that the verb “comprehend” has two important characteristics. It is nonbehavioral because any student can comprehend something without doing anything that displays the comprehension and it identifies a particular level-of-learning, comprehension.  

3.2.3.1 At this point in the process we don’t want to use behavioral verbs because behavioral verbs alone cannot tell us the level-of-learning they describe. It is easy to misinterpret behavioral verbs in isolation from their specified levels of learning because actions are often performed for unstated reasons, or in response to unrecognizable stimuli. The level-of-learning identifies the character of the behavior for the teacher and student and prevents misinterpretation. What nonbehavioral objectives do, then, is describe the nature of the behavior; that is, they identify the desired level-of-learning or proficiency code we want our students to display. It is very important to decide the level-of-learning before we attempt to describe its evidence by precise behavior.

3.2.3.2 For example, requiring a student to give a definition would be an ambiguous task without specifying whether we would accept a verbatim recall of a definition or require a definition in his or her own words. In each case, the behavior is “to define,” but recall is a simpler task than understanding, which requires, at the very least, an ability to translate something into your own words. Alternatively, we might even expect students to derive a definition as a result of problem solving at the end of a course—an even higher level-of-learning. When we state the general level-of-learning at the first step in the writing process in the design phase, it makes each of the following activities that lead to the test question more exact.

3.2.4 List indicators (samples) of behavior. After we have carefully communicated the level-of-learning we want to test, we must decide which student behaviors we will accept as evidence of learning. In physical tasks or simple cognitive learning the decision is quite simple; there may be a one-to-one correlation between the behavior required by the test item and the real-world activity that corresponds to the test item. For example, in order to test whether a student knows the spelling of the word “malfeasance,” we would ask the student to spell the word. Or to test one’s driving skill, the teacher would have the student drive a car.
### Table 3.1. Cognitive Taxonomy

<table>
<thead>
<tr>
<th>LEVEL-OF-LEARNING</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Recall previously learned material (facts, theories, etc.) in essentially the same form as taught.</td>
</tr>
<tr>
<td>Comprehension</td>
<td>See relationships, concepts, and abstractions beyond the simple remembering of material. Typically involves translating, interpreting, and estimating future trends.</td>
</tr>
<tr>
<td>Application</td>
<td>Use learned intellectual material in new and realistic situations, including the application of rules, methods, concepts, principles, laws, and theories.</td>
</tr>
<tr>
<td>Analysis</td>
<td>Break down material into its component parts so that the organizational structure may be understood, including the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved.</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Put parts together to form new patterns or structures, such as a unique communication (a theme or speech), a plan of operations (a research proposal), or a set of abstract relations (schemes for classifying information).</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Judge the value of material for a given purpose. Learning in this area is the highest in the cognitive hierarchy because it involves elements of all the other categories, plus conscious value judgments based on clearly defined criteria.</td>
</tr>
</tbody>
</table>


### Table 3.2. Types of Learning

<table>
<thead>
<tr>
<th>Learning Categories</th>
<th>Proof of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forming Associations</td>
<td>Associate, name, or respond to a specific input (stimulus). The person associates the response with a specific input only. The response may be vocal, subvocal (say it to yourself), written or motor.</td>
</tr>
<tr>
<td>Forming Chains</td>
<td>Recall sequences of actions or procedures which must be recalled in a specific order. In a chain, the response to one input becomes the input to the next response. This may involve chains of verbal responses or chains of motor responses.</td>
</tr>
<tr>
<td>Making Discriminations</td>
<td>Make different responses to the various members of a particular class; it means being able to distinguish among input information sources and/or types and then respond appropriately to each.</td>
</tr>
<tr>
<td>Making Classification</td>
<td>Respond in a single way to all members of a particular class of observable or abstract events. This involves recognizing the essential similarity among a class of objects, people, events or abstractions, and recognizing the differences that separate those objects, people, events, or abstractions which are not members of the class.</td>
</tr>
<tr>
<td>Using Rules</td>
<td>Apply rules to a given situation or condition by responding to a class of inputs with a class of actions. A rule states the particular relationship between two or more simpler concepts. It is helpful to think of rules as “if-then” statements.</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>Compare previously learned rules to create a higher order rule.</td>
</tr>
</tbody>
</table>
## Table 3.3. Air Force Proficiency Code

<table>
<thead>
<tr>
<th>TASK PERFORMANCE LEVELS</th>
<th>SCALE VALUE</th>
<th>DEFINITION: The Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Can do most parts of the task. Needs help only on hardest part. (PARTIALLY PROFICIENT)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Can do all parts of the task. Needs only a spot check of completed work. (COMPETENT)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Can do the complete task quickly and accurately. Can tell or show how to do the task. (HIGHLY PROFICIENT)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TASK KNOWLEDGE LEVELS</th>
<th>SCALE VALUE</th>
<th>DEFINITION: The Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Can name parts, tools, and simple facts about the task. (NOMENCLATURE)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>Can determine step by step procedures for doing the task. (PROCEDURES)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Can identify why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Can predict, isolate, and resolve problems about the task. (COMPLETE THEORY)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECT KNOWLEDGE LEVELS</th>
<th>SCALE VALUE</th>
<th>DEFINITION: The Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Can identify basic facts and terms about the subject. (FACTS)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Can evaluate conditions and make proper decisions about the subject. (EVALUATION)</td>
<td></td>
</tr>
</tbody>
</table>

### EXPLANATIONS

* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Examples: b and 1b)

** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.

^ This mark is used alone instead of a scale value to show that no proficiency training is provided in the course.

X This mark is used alone in course columns to show that training is required but not given due to limitations in resources.

(Proficiency Code Key—Qualitative Requirements, ATC Regulation 52-1/ATC Form 60)
3.2.4.1 In higher level cognitive or affective learning, however, the relationship between student behavior and the level-of-learning is not always that clear. We must decide what behaviors are associated with that thinking skill or attitude we want to measure. We know we cannot directly measure understanding or attitudes, so we must decide which behaviors give us the best evidence of learning. Although there is always the danger that we may err in translating learning into behavior, it is a task we must accomplish because the value of measuring learning by its outcomes far outweighs the risk of error.

3.2.4.2 We may accept many or just a few student behaviors as evidence of learning. The important thing for us to ensure is that any evaluation must be comprehensive enough to give reasonable assurance that what we accept as evidence gives a true representation of that knowledge (see Chapter 20). We can never completely measure some cognitive skills or attitudes. However, carefully planned samples of behavior should provide us with adequate proof of learning. Chapters 4 and 10 discuss, in more detail, the concept of sampling cognitive and affective objectives. On the other hand, for simple objectives—"The objective of this lesson is for each student to know the spelling of 'Malfeasance'" or "The objective of this lesson is for each student to apply the driving skills and rules of the road presented in the course."—we may be satisfied with just one or two samples of learned behavior.

3.2.5 Develop criterion objectives. Samples of behavior that indicate achievement of a learning outcome are usually simple performance statements; for example, "Define ‘leadership,’” “Write a staff summary sheet,” “Explain the authoritarian style of management.” Further detail concerning conditions under which a student must perform and standards of performance that we require would be added at the next stage whether we go through the exercise of writing them down for each question or not. When we specify the testing conditions and standards of performance, we’re developing criterion objectives. An example of a criterion objective would be, “Given three alternative definitions of ‘leadership,’ and without the use of references, select the correct definition of ‘leadership’ found in the AFROTC handbook.”

3.2.5.1 Criterion objectives are valuable lesson planning tools, and should be shared with students in the test instructions. Whether written or not in the test item development stage, criterion objectives play an important role in designing student-centered instruction because they provide the specifications against which test items must be written.

3.2.6 Develop criterion referenced tests. The lesson planning process described in Figure 3.1 concludes with
the construction of test items and tests to measure learning. Other chapters discuss this concept in detail. At this stage, we will construct test items from criterion objectives. These test items give us the evidence that students have learned what we intended them to learn. Test items are written prior to instruction because we will use these requirements to determine what needs to be taught. For example, if our test item is “Identify the phases of the Air Force’s ISD Model,” determining this test item ahead of time gives us a pretty good idea of what needs to be covered in the lesson(s) we will plan later.

3.2.7 The Four-Step Process: An Overview. As Figure 3.1 illustrates, there is feedback throughout the four stages in this process, and each step is controlled by and accountable to all others. The practice of measuring the achievement of stated objectives—known as criterion referenced testing—is, often, more rigorous than traditional practice. Because of this rigor, criterion-referenced testing has been accepted only reluctantly and slowly in some sectors of the Air Force even though student-centered objectives are widely used.

3.2.7.1 Let us take an example of a simple concept, “leadership,” and demonstrate the results of each of the stages we described above.

3.2.7.1.1 Step 1. LEVEL-OF-LEARNING OBJECTIVE: “The Objective of this lesson is for each student to know the meaning of ‘leadership.’”

3.2.7.1.2 Step 2. SAMPLE OF BEHAVIOR: “Each student will define ‘leadership.’”

3.2.7.1.3 Step 3. CRITERION OBJECTIVE: “Given three alternative definitions of ‘leadership,’ and without the use of references, select the correct definition of leadership according to the AFROTC handbook within one minute.”

3.2.7.1.4 Step 4. TEST ITEM: “The AFROTC handbook describes leadership as

- the willingness to exercise management control over subordinates.
- the process of inspiring effective individual effort in a group environment toward achieving an objective.
- planning, organizing, staffing, directing, and controlling the capital, material, and human resources of an organization.

3.2.7.1.5 The construction of many instructional objectives is much more difficult than the example we’ve provided here. In some instances, there may be several samples of learned behavior rather than just one. Criterion objectives, whether written or assumed, can be much more elaborate and may require several paragraphs to describe the requirement. Additionally, there are many more alternative and complex ways to test learning outcomes than using simple test items. But regardless of how complex the subject matter or how high the level-of-learning might be, this four-step process for developing student-centered objectives and test items works. The results of this systematic thought process will be consistent with sound educational practice and will satisfy the critical elements of the design phase.

3.3 Summary. You probably are in the midst of a difficult transition from teacher-centered to student-centered instruction since most of your educational experience has reflected the former during your early schooling. In spite of our teacher-centered tradition, the Air Force has come a long way in specifying and measuring student-centered learning outcomes. For the past 20 years, Air Force instructors and other progressive educators have worked to develop appropriate techniques to fully implement the concept of student-centered instruction. While many techniques need further development, a helpful program for student-centered instructional planning consists of the following steps: (1) Determine level-of-learning objective, (2) List indicators (samples) of behavior, (3) Develop criterion objectives, and (4) Develop criterion-referenced tests.

3.3.1 The lesson planning, methodology, and evaluation chapters of this manual incorporate these procedures. While there are many approaches to student-centered instructional planning, this four-step strategy has worked in extensive field testing. The process of going from general level-of-learning objectives to precise criterion-referenced test items will be explained more fully in the remaining chapters. This chapter has provided an overview of the system for writing student-centered objectives and tests. With this information, you’re in the right frame of mind for efficiently improving your teaching skills.
Chapter 4
THE LEVEL-OF-LEARNING LESSON PLANNING PROCESS

4.1 Introduction. In Chapter 3 we were introduced to a four-step process for developing objectives and tests. In our examination of this process, we were briefly introduced to the concepts of educational taxonomies, level-of-learning objectives, samples of behavior, criterion objectives, and criterion-referenced test items. This chapter will examine, in more detail, the first two steps of the four-step process, level-of-learning objectives and samples of behavior (Figure 4.1). Steps 3 and 4 will be developed in subsequent chapters. We will use the Bloom cognitive taxonomy as our base. Chapter 10 will cover this process for the affective taxonomy.

4.2 Bloom’s Cognitive Taxonomy. Before we can begin writing level-of-learning objectives, we need an understanding of the types of learning outcomes represented by each level of the taxonomy.

Table 4.1. The Bloom’s Taxonomy

<table>
<thead>
<tr>
<th>graduated levels of understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>evaluation</td>
</tr>
<tr>
<td>synthesis</td>
</tr>
<tr>
<td>analysis</td>
</tr>
<tr>
<td>application</td>
</tr>
<tr>
<td>comprehension</td>
</tr>
<tr>
<td>knowledge</td>
</tr>
</tbody>
</table>

4.2.1 This taxonomy is simply a means of rank ordering learning within the cognitive domain. We must pass through each of the rank orders or levels as we move to the more complex behaviors; we must have some “knowledge” in a subject area before we can “comprehend” concepts or principles in the same subject area. We must have “comprehension” of principles before we can “apply” these principles to new situations, and so on up the ladder of the taxonomy. Each of the levels in this rank order forms the basis for writing level-of-learning objectives, as well as sequencing of lessons within a block of instruction.

4.2.2 Next, we will look at the types of behavior (or learning outcomes) that each of the six levels represents.

4.2.2.1 Knowledge. The recall or recognition of previously learned material (facts, theories, etc.) essentially in the same form as taught.

4.2.2.2 Comprehension. Seeing relationships, concepts, and abstractions beyond the simple remembering of material. Typically involves translating, interpreting, and estimating future trends.

4.2.2.3 Application. The ability to use learned material in new and concrete situations, including the application of rules, methods, concepts, principles, laws, and theories.

4.2.2.4 Analysis. The ability to break down material into its component parts so that the organizational structure may be understood, including the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved.

4.2.2.5 Synthesis. The ability to put parts together to form new patterns or structures, such as a unique communication (a theme or speech), a plan of operations (a research proposal), or a set of abstract relations (schemes for classifying information).

4.2.2.6 Evaluation. The ability to judge the value of material for a given purpose. Learning in this area is the highest in the cognitive hierarchy because it involves elements of all the other categories, plus conscious value judgments based on clearly defined criteria.

4.2.3 A review of courses from many Air Force schools indicates that more than 90 percent of the material taught in these schools is at the lower three levels of the taxonomy. This fact is not surprising, and with a few exceptions, such as our senior PME schools, the situation is as it should be. In most cases, the higher levels are more effectively reached through on-the-job experience; therefore, we will concentrate our attention on the lower three levels. For those instructors teaching at the three higher levels, we recommend the discussion in the Taxonomy of Educational Objectives Handbook I: Cognitive Domain, ed. B. S. Bloom, et al, New York: David McKay, 1956. We saw in Chapter 3 that we cannot directly observe such general behaviors as knowledge, comprehension, or application. In order to help us write our level-of-learning objectives, let us look at some key words or phrases which would reflect knowledge, comprehension, and application.

4.2.4 At the knowledge level of taxonomy (Table 4.2) we are asking that students recall or remember information in essentially the same form in which it was given to them. Students may have received this information from lectures, readings, programmed texts, video or audio tapes, or other means, but the source of the information has no bearing on what we expect the student to be able to do to meet our knowledge-level objective. The students simply memorize and store information, which they then give back to us, essentially verbatim, when evaluated.
* The Design Phase includes 8 events.
The 4-Step Process focuses on events 1 & 2 of the Design Phase only.

Figure 4.1. Four-Step Process for Writing Student-Centered Objectives and Tests

Table 4.2. Knowledge Level

<table>
<thead>
<tr>
<th>KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall</td>
</tr>
<tr>
<td>Remember</td>
</tr>
<tr>
<td>Recognize</td>
</tr>
<tr>
<td>Memorize</td>
</tr>
<tr>
<td>Store</td>
</tr>
</tbody>
</table>

4.2.5 At the comprehension level of taxonomy (Table 4.3) we go beyond simple recall and attempt to attach a meaning to what is communicated. In doing so, we try to establish relationships between pieces of information in order to form concepts, principles, and generalizations. Within the comprehension level, we can establish what we might call a minitaxonomy: Thus, after reaching the knowledge level, students pass through all three levels of comprehension before they reach the “application” level.

Table 4.3. Comprehension Level

<table>
<thead>
<tr>
<th>COMPREHENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Translate</td>
</tr>
<tr>
<td>Interpret</td>
</tr>
<tr>
<td>Extrapolate</td>
</tr>
<tr>
<td>- Implications</td>
</tr>
<tr>
<td>- Consequences</td>
</tr>
<tr>
<td>- Effects</td>
</tr>
</tbody>
</table>

4.2.5.1 Translation. First, we would expect a student to “translate” material from one form to another. As an example, we might ask students to tell us in “their own words” what something means, ask them to “paraphrase” a lengthy reading, or ask them to look at a graph or chart and tell us verbally, or in writing, what the various parts mean. Or, in a context that we are all familiar with, we might ask to have a passage written in a foreign language translated into English. We can see that we have gone a step beyond simply recalling information; we are now asking the students to give a meaning to what they have learned.

4.2.5.2 Interpretation. At the second level of comprehension, we are primarily interested in students’ ability to see relationships between various aspects of a communication. In order to interpret, they must first “translate” what the individual parts mean, and then see the relationship between these parts. We can see the evidence for interpretation when students perform such activities as making inferences, generalizations, and summations.

4.2.5.3 Extrapolation. At the third level of comprehension, we want our students to be able to answer the question, “What would happen if?” That is, we want them to go beyond the literal message contained in the communication and make predictions of consequences or trends. We would also expect the students to be able to tell us, with some reasonable degree of accuracy, the probability of their prediction, not statistical probability necessarily, but general probability such as “it would very likely happen” or “it’s only slightly probable.” The following example illustrates the three levels.

4.2.5.4 Example. Let us assume that we want our students to “comprehend” the relationship between factory production and unemployment as illustrated in these two graphs (Figure 4.2). First, we would want to be sure the students could “translate” the information contained in the graphs. For instance, we might ask students to tell us what Point A on the “factory
production” graph and what Point B on the “unemployment” graph represent. If they can successfully “read” the graph, they have demonstrated

![Graphs of Factory Production and Unemployment](image)

Figure 4.2. Relationship Between Factory Production and Unemployment

the ability to “translate” from graphic to verbal or written form.

4.2.6 Our next step, “interpretation,” would be to ask students to identify the relationship, at least as illustrated by the two graphs, between “factory production” and “unemployment.” Now, simply knowing the meaning of Point A and Point B is no longer enough; the students must now see each graph as a whole (i.e., factory production has increased, unemployment has decreased), and then make a generalization concerning their relationship (i.e., “as unemployment decreases, factory production goes up” or “there is an inverse relationship between unemployment and factory production”).

4.2.7 Finally, we could evaluate our students’ ability to function at the “extrapolation” level. Suppose we asked the students the following question: “Based on the trends illustrated in the two graphs, predict the level of factory production at the end of the first quarter of 1993.” We have asked the students to go beyond the literal communication (the two graphs) and answer the question, “What would happen if?” If they can extrapolate, students are able to function at the highest level of comprehension.

4.2.8 Before we leave comprehension, we should keep in mind two general concepts when writing objectives at this level.

4.2.8.1 First, we can think of all levels of the taxonomy above knowledge as increasingly complex levels of “understanding.” Students can be asked to “predict” at any of these levels. Again, referring to our graphs, at some higher level of the taxonomy students could bring in many other factors in addition to unemployment, such as interest rates, sales predictions, energy sources, to make a prediction about factory production. However, at the extrapolation level of comprehension, the prediction must be based only on the information the students are given in the literal communication (i.e., the two graphs).

4.2.8.2 Second, if our course is designed to bring students to the application level-of-learning (Table 4.4), we must ensure in our comprehension level objectives that we bring students through the extrapolation level of comprehension.

Table 4.4. Application

<table>
<thead>
<tr>
<th>Solve</th>
<th>Compute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td>Construct</td>
</tr>
<tr>
<td>Modify</td>
<td></td>
</tr>
</tbody>
</table>

4.2.8.3 At the application level of the taxonomy, we are asking our students to take the concepts and principles they have formed at the comprehension level and put them to use in situations new to them. For example, suppose we have just completed a block of instruction in which our students learned to comprehend several concepts of management, and one of the concepts they learned was “delegation of authority.” Now, we want to evaluate their “application” of the concept. We might give them a scenario of an Air Force organization in which the concept of “delegation of authority” was violated, causing problems in the organization. We would then ask them to read the scenario and give us their solutions to the problem, but we would not tell them which concept was being violated. Our criteria for evaluation would then be for the students to solve the problem by applying the “delegation of authority” concept to the organization described in the scenario.

4.2.8.4 Many instructors have difficulty in differentiating between application and the higher levels
of comprehension, and indeed the difference can sometimes be confusing. However, if we keep the following ideas in mind, distinguishing between the two should not be difficult.

4.2.8.5 At the comprehension level, students are able to demonstrate the use of a principle or concept when the principle or concept is identified. At the application level, when given a problem situation, students must identify the concepts and principles involved by themselves, and then demonstrate use of the principle or concept in solving the problem. Thus, at the comprehension level, students demonstrate use of an identified concept or principle. At the application level, students use the concept or principle when confronted with a problem situation new to them.

4.2.8.6 For example, in the “delegation of authority” situation, if we tell students that the scenario involves the misuse of “delegation of authority” and then tell them to solve the problem, they are working at the comprehension level, but by not telling them which concept is being violated and by making them come to this determination by themselves, we ensure they are working at the application level.

4.2.8.7 As we have suggested, the application level of the taxonomy is the point where students first encounter the “problem-solving” process. Application is, or should be, the level-of-learning that most Air Force schools attempt to reach. Just because students “comprehend” concepts and principles, we have no guarantee that they can “apply” these concepts and principles in new situations. The opportunity for practice of “application” level-of-learning activities must be provided for our students before we can expect them to function at this level.

4.2.8.8 Before we leave the application level, let us be sure we are clear on an area which often presents problems to both students and instructors. The word application, used at the cognitive level-of-learning, is not synonymous with the meaning of the word as we use it in our everyday speech. If we put this in terms of educational objectives, the term “apply” is not necessarily synonymous with the term “be able to.” We find the confusion most prevalent in dealing with skill development. Suppose we use the objective: “Be able to solve an algebraic equation for one unknown.” If we think back to our high school or college algebra courses, most of us can remember how we learned to meet this type of objective. We simply memorized the rules which applied and used these rules to solve the equation. Seldom was there any effort on our part, or the teacher’s, to have us comprehend the meaning behind the rule. Thus, we could solve the problem, but we were not really at the application level-of-learning. We often saw the results of this type of learning when we were asked to solve “word problems” in algebra or other types of mathematics, where we needed a comprehension of the concepts and principles involved to solve the problem.

4.2.8.9 There is a clear implication here for instructors and curriculum developers. If our students are expected to problem-solve or troubleshoot on the job, then they must be at the “application” level-of-learning, and, to get there, they must have satisfactorily passed through the lower levels of the taxonomy.

4.3 Level-Of-Learning (LOL) Objectives. A level-of-learning objective, as introduced in Chapter 3, contains three elements: Student-centeredness, Level-of-learning, and Specific subject. Let us now take a closer look at the function that each of the three elements serve.

4.3.1 Student Centeredness. Since the purpose of any educational objective is to express the outcome of the lesson in terms of learner behavior, this part of the LOL objective ensures that our focus is on the word “student.” We might want to write this portion of the objective as: “The objective of this lesson is for each student to....” However, since this part of the objective is a given, we can infer that all our objectives have this as an opening statement, whether it is actually written or not.

4.3.2 Level-of-learning. Every objective should state the level of the taxonomy we expect our students to reach by the end of a period or block of instruction. By using an ISD or systems approach to curriculum development, this decision may have already been made in the analysis phase.

4.3.3 Specific Subject. Level-of-learning objectives may be written to varying degrees of specificity. For example, if we are writing a level-of-learning objective for an entire block of instruction, which could include many hours, then our subject might be quite general. Normally, as we write objectives toward smaller and smaller units of instruction, the objectives become more specific.

4.3.3.1 Let us examine the three elements of the level-of-learning objective as we relate them to an example from a block of instruction in educational evaluation. We will assume for this example that we plan to devote 30 hours to achieve our block objective.

4.3.3.1.1 Student-centeredness. As can be seen, we chose not to include the statement: “The objective of this lesson is for each student to know (comprehend, apply...),” but we see that this statement is implied in each of the objectives above.

4.3.3.1.2 Level-of-learning. Each objective contains a specific level-of-learning (know, comprehend or apply), but only one level is contained in each objective. For this reason, we should always state the highest level that we want our students to reach in the period or block of instruction.

4.3.3.1.3 Specific subject. How specific to make the subject of the lesson normally depends on two variables: The scope of the content covered by the objective, and the level-of-learning.
4.3.3.2 In Table 4.2 the block objective (at the application level) is quite general because of its broad scope, and we would not expect our students to meet this objective until after many hours of instruction. At the other end of scale (the know level), both Period 1 and Period 2 objectives are very specific. Our basic guideline in this area is to make objectives as specific as possible, the more specific the objective, the easier it will be to plan lessons and assess achievement of the objective. Note that the block objective includes 3 major elements of content: (1) principles of test construction, (2) performance rating, and (3) test analysis. Up to this point we have dealt with only the first element of our block objective (i.e., principles of test construction). We would then proceed to write period objectives for performance rating and test analysis. We will not continue this procedure in this example, but the same logical progression would be used—starting our students at the knowledge level and progressing through application.

Table 4.5. Example Level-of-Learning Objectives

<table>
<thead>
<tr>
<th>Block Objective</th>
<th>Apply the principles of test construction, performance rating, and test analysis to assess student achievement of objectives.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period 1 (2 hours)</td>
<td>Know the mechanics for writing selection (multiple-choice, true-false, and matching) and supply (essay, short answer, and completion) test questions.</td>
</tr>
<tr>
<td>Period 2 (2 hours)</td>
<td>Know the procedures for planning, constructing, and grading selection and supply tests.</td>
</tr>
<tr>
<td>Period 3 (2 hours)</td>
<td>Comprehend that testing is a useful tool in assessing achievement of student learning.</td>
</tr>
<tr>
<td>Period 4 (4 hours)</td>
<td>Apply principles and techniques of classroom test construction to measure student achievement.</td>
</tr>
</tbody>
</table>

4.4 Samples Of Behavior. We have previously discussed our inability to directly observe students “knowing,” “comprehending,” or “applying.” But both instructors and students need to know how well the level-of-learning objectives have been achieved. Thus, we need a vehicle which will give us a base on which to plan our evaluation of the achievement of level-of-learning objectives. The vehicle we use is called a sample of behavior.

4.4.1 We can define a sample of behavior as a statement which specifies one of several observable behaviors which students should be able to demonstrate at the end of a period or block of instruction and which gives us evidence that they have achieved our objectives. These samples eventually become the basis for our evaluation, most often in the form of test questions. The actual process of converting these samples to test questions will be covered in Chapter 22.

4.4.2 The word evidence is the key here. There may be a great many behaviors we would expect students to demonstrate to us as evidence that, for example, they comprehend a concept or principle. In fact, there would be far more ways than we could ever have time to observe and evaluate. For this reason, we list a reasonable number (a sampling) of behaviors which are as equivalent in nature as we can possibly make them. We conclude that if students can demonstrate these behaviors, they will be able to demonstrate others. This sampling procedure is the same as any other sampling procedure—the larger the sample, the greater confidence we can put in the evidence obtained.

4.4.3 Certain behavioral verbs lend themselves for use at each level of the taxonomy. A partial list is in Table 4.6.

Table 4.6. Behavioral Verbs

<table>
<thead>
<tr>
<th>Level-of-learning</th>
<th>Sample behavioral verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>list, name, match, describe, define, state, outline, identify, select, explain, give an example, state</td>
</tr>
<tr>
<td>Comprehension</td>
<td>explain, compare, contrast, differentiate, predict, summarize, generalize, paraphrase, distinguish, solve, compute, identify, give an example</td>
</tr>
<tr>
<td>Application</td>
<td>solve, compute, prepare, use, develop, construct, modify, conduct, identify, teach</td>
</tr>
</tbody>
</table>

4.4.4 When we use any of these verbs in a sample of behavior, we cannot guarantee that the sample is written at any particular level-of-learning. The activity following the behavioral verb determines the level at which the student will respond to the sample. The whole
sample of behavior must be looked at “in context.” But, as a general rule, we use verbs of these types at each of the levels.

4.4.5 As a corollary, the same verb may be used at several different levels of the taxonomy. For example, consider the word “identify.” In the list above, this word is shown at the knowledge level because it is primarily associated with this level. Now, let’s look at how this word could be used at three different levels of the taxonomy.

4.4.5.1 In Table 4.7 our sample is calling only for recall of specific information.

<table>
<thead>
<tr>
<th>Sample of Behavior</th>
<th>Given a scenario in which a problem has arisen due to the misuse of delegation of authority, identify the best solution to the problem.</th>
</tr>
</thead>
</table>

4.4.6 In Table 4.8 we are giving the students three examples of student learning outcomes which they have not seen before. Their job then becomes seeing the relationship between what they have learned about criterion objectives and the three statements.

Table 4.8. Sample 2

<table>
<thead>
<tr>
<th>Comprehension</th>
<th>Comprehend that criterion lesson planning focuses instruction on student achievement of limited precise learning outcomes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td></td>
</tr>
<tr>
<td>Sample of Behavior</td>
<td>Given three logical examples of student learning outcomes, identify the one best suited for a criterion objective.</td>
</tr>
</tbody>
</table>

4.4.6.1 In Table 4.9 we have asked the student to solve a problem (identify the solution) by applying a previously learned concept to a new situation.

Table 4.9. Sample 3

<table>
<thead>
<tr>
<th>Application</th>
<th>Apply the management concept of “delegation of authority” to a problem situation.</th>
</tr>
</thead>
</table>
objective. If we will accept only one behavior, then we should go directly to Step 3 of the 4-step process and write a criterion objective rather than a sample of behavior.

4.4.7.6 Time available for evaluation. Ideally we would want to test our students on every sample of behavior that we write. Realistically, because of time, testing all samples is not always possible. There are two basic alternatives to this problem: We can write only the number of samples we will have time to test, and we can write the number of samples we think will adequately evaluate the objective, but actually test only a portion of the samples.

4.4.7.7 Based on the assumption that students will be given the samples as a part of the course overview, alternative 2 is preferred. The primary drawback with alternative 1 is that many students will key in on the small number of samples and disregard the rest of the material. By using alternative 2, students can identify all of the key ideas we want them to get from the lesson, but will have no way of knowing which of the samples we will test. Thus, they are forced to study all of the key material we have indicated in the samples. The primary deficiency in this system is that we get no feedback on student learning from those samples we do not test. However, if we teach a course given several times a year, we can use alternate tests and, perhaps over a period of several classes, test all of the samples.

4.4.7.8 What do we sample? The answer to this question might appear obvious—our objectives. That is true, but the next question that must logically follow would be, “Which objectives?” The answer to this question must be based on two variables: (1) the structure of our evaluation program, and (2) the use to be made of the evaluation results derived from the samples.

4.4.7.9 Let us now examine each of the two variables to see how we can determine which objectives should be sampled.

4.4.8 The Structure of Our Evaluation Program. Typically, the curriculum for an Air Force school might be designed in the following hierarchy.

<table>
<thead>
<tr>
<th>Mission statement</th>
<th>Course objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-- Area or phase objectives</td>
</tr>
<tr>
<td></td>
<td>--- Block objectives</td>
</tr>
<tr>
<td></td>
<td>---- Period objectives</td>
</tr>
</tbody>
</table>

4.4.8.1 Although we would probably never write samples from our mission statement, since it would simply be too broad to work with, any of the other levels of a course could be sampled. The key to which should be sampled is based on our evaluation program. If we have a program where tests are given after very large blocks of instruction—most often seen in longer PME courses—and in the form of a very comprehensive essay example, writing samples for the course or area objectives might be all that is necessary.

4.4.8.2 On the other hand, in shorter courses, or where testing is conducted relatively often on shorter blocks of instruction, it would be more feasible to write samples on block or period objectives.

4.4.9 The Use to be Made of Evaluation Results. If the primary purpose of all of our testing is summative in nature (i.e., used to determine students’ grades or whether they pass or fail), then the guidelines in the preceding discussion (structure of evaluation program) are all we need. However, many schools use formative, often referred to as diagnostic or enroute evaluation; that is, some tests are given only to give students and instructors feedback on student progress, not for grades or pass-fail. In this situation, we might want to write samples for every period or block of instruction even though summative evaluation might be based only on samples from area or course objectives. If your school or course falls in this latter category, there is a key point to keep in mind. Never use samples designated only for formative evaluation in an evaluation mode which is summative in nature.

4.4.9.1 When this mistake is made, we usually end up testing peripheral or trivial information instead of our primary objectives. See part 5 for further discussion of evaluation concepts including formative and summative evaluation.

4.5 Summary. The level-of-learning objective is our first step in describing student learning outcomes.

4.5.1 Knowledge-level objectives state outcomes where recall of specific information is our primary concern. Comprehension-level objectives state outcomes which require students to give meaning to what they have learned, establish relationships, and extrapolate beyond the literal message of a communication. Application-level objectives and above require the student to put previously learned concepts and principles into use in progressively complex situations.

4.5.2 Samples of behavior allow us to evaluate student achievement of level-of-learning objectives. Samples are statements which specify an observable behavior which students should be able to demonstrate at the end of a period or block of instruction, and give evidence that the students have achieved our objectives. Samples are always written at the same level as the objective.
Chapter 5
WRITING CRITERION OBJECTIVES

5.1 Introduction. A criterion objective is a word picture of what we expect students to do if they have learned what we taught. As introduced in Chapter 3, Writing Student-Centered Objectives and Tests, the criterion objective is one of the four important steps in going from a general non-behavioral objective to a very precise test item (Figure 5.1). This chapter will deal with criterion objectives as separate planning tools by illustrating their content and formats, describing many of the errors made in writing them, and providing some insight into ways they can be used to sequence instruction.

5.1.1 The criterion objective, a description of a test item or a measurement situation, ranges in length from a sentence or two to many paragraphs. A simple criterion objective might read, “Without the use of references, name all three parts of a criterion objective.” More complex criterion objectives are illustrated later in this chapter and in Chapter 22, Measuring Learning Outcomes. The criterion objective may be written and given to students, or it may exist only in the minds of instructors as they prepare tests to measure learning. In either event, the most efficient way to describe what students should learn is to describe carefully what they will be able to do if instruction is successful. The assumption made in this chapter is that the objectives will be written and given to students and others.

5.1.2 When we stop to think about it, the idea of expressing objectives or expectations in measurable terms is already familiar to us. We are used to reading the raised lettering on an automobile tire which tells us what the inflated pressure should be when the tire is cool. Through Saturday afternoon television, we know that a world class sprinter, timed electronically, can run the 60-yard dash in 6.1 seconds indoors. In both cases, we describe the performance of the subject in measurable terms. We can tell what the subject does on a test, and we also know about the environment and the quality or quantity of the performance.

5.1.3 In our Air Force experience, as well, we can understand the requirement for an Air Force manual to be written at a specific grade level (as measured in a standardized way). We ask airmen in basic training to name each major air command or list, in order, all enlisted and officer ranks without error. In a management course, we might expect the successful student to propose a solution to a particular type of personnel problem. In each of these instances, we have the beginnings of a fairly precise and quite easily understood instructional objective.

5.1.4 With very little additional information, two of us, each competent in a particular field, could agree whether a student had achieved our objective. Once we agree on the information needed to express an objective, it is easy for us to communicate the objective and measure it. Concern about clear communication and consistent evaluation is the primary reason for the use of criterion objectives in instructional planning.

5.2 Relationship Between Samples Of Behavior And Criterion Objectives. Figure 5.1, first explained in Chapter 3, illustrates the relationship between samples of behavior (performance or task statements) and criterion objectives (statements of performance, conditions, and standards). Each of the planning steps in Figure 5.1 becomes more specific and more measurable as we go from the general objective statement to the very precise test item. Although often our objective is to change what a student thinks or feels, we are forced to measure learning by behavioral change because we cannot look into the student’s head to see whether learning has taken place.

5.2.1 The difference between a sample of behavior and a criterion objective is that the objective is more specific and detailed as to standards and conditions. However, comprehensively written sample of behavior may contain all the elements of a criterion objective. A brief simple criterion objective may read like a sample of behavior if either or both the conditions or standards are assumed. Rather than split hairs about where the sample of behavior leaves off and the criterion objective begins, remember that the sample generally contains just a statement of performance. The criterion objective generally goes into more detail by adding standards and conditions to the performance statements. See the samples in Table 5.1 as well as those later in this chapter for a comparison of samples of behavior and criterion objectives.

5.3 Elements And Formats. The content of a criterion objective is far more important than the format that is used to communicate it, but the format can and does affect what we read and understand, so agreeing on a basic format and elements is an important step. We can be sure that we will not leave out any significant information in our instructional objectives by agreeing on and sticking to formats which include all of the essential elements of information needed to describe learning outcomes.
5.3.1 **Essential Elements.** Both Air Force and civilian educators agree that there are certain items of information which must be included in a well-stated criterion objective. While many authors have different labels for these items of information, there is general agreement that criterion objectives should include the following.

| CONDITIONS | A description of the testing environment including those problems, materials, and supplies which will be given (included) or specifically excluded from a measurement situation. |
| PERFORMANCE | The observable student behavior (or the product of that behavior) which is acceptable to the instructor as proof that learning has occurred. |
| STANDARDS | The qualitative and quantitative criteria against which student performance or the product of that performance will be measured to determine successful learning. |

5.3.2 **Formats.** The precision and exact language of a criterion objective will vary from instructor to instructor. The final product from any instructor; however, should be a clear statement which communicates the intended outcomes of learning. A common format for writing objectives makes communicating easier. Both the reader of the objective and the writer know in advance the type of information which will be contained in the objective. Writing a criterion objective, though, is more than an exercise to satisfy an official requirement. An objective that meets the format requirement but does not communicate fully is worse than no objective at all. An instructor can send students on a wild goose chase by giving them a criterion objective which does not honestly reveal what will be taught and tested. This practice results in two curriculums, one which exists on paper and the real one used in the classroom.

5.3.3 The order in which the elements of a criterion objective are written does not matter, although the common sequence is (1) conditions, (2) performance or behavior, (3) standards. While generally written as a sentence or short paragraph (Format 1, Figure 5.2), criterion objectives may also be written in columns (Format 2, Figure 5.2). The sentence or paragraph format lends itself to easy reading and efficient use of space in catalogs or lesson plans. The column format, which may be layered vertically or side by side (Format 2, Figure 5.2), avoids questions of grammar and punctuation and lends itself to worksheets used to construct objectives.

5.3.4 For some sophisticated instructional systems, the column format may be preferable. It is easier to analyze with the objective broken out by elements into columns. We can tabulate the supplies and materials needed for instruction by analyzing the conditions column. If we examine the performance column on several plans, we may find that different instructors are having students do the same things. Then it would be more efficient to have a common unit of instruction to save duplicated effort. Analysis of the standards column could reveal
questionable or ambiguous standards. Both formats for writing criterion objectives require the same elements of information, but the column format may make data gathering and analysis easier.

**Table 5.2. A Comparison of Samples of Behavior and Criterion Objectives**

<table>
<thead>
<tr>
<th>Illustrative Samples of Behavior</th>
<th>Interpreted as a Criterion Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. define...(insert term)</td>
<td>without the use of references, define...according to AFM xx-xxx. (knowledge)</td>
</tr>
<tr>
<td>2. give an example of...(insert concept)</td>
<td>given the concept of...as developed in class, give new examples of (insert concept) consistent with its attributes. (comprehension)</td>
</tr>
<tr>
<td>3. write a position paper on (insert subject)</td>
<td>using the library, local experts, and a topic assigned from the area of..., write a position paper which meets the content and format standards provided in class and in the assigned text. (application)</td>
</tr>
</tbody>
</table>

### 5.3.5 Mastery Learning

Students who achieve the criterion objective are often said to have “mastered” the objective. The term “mastery learning” has become strongly associated with criterion objectives and with tests which measure the achievement of criterion objectives. From the point of view of criterion objectives, however, mastery does not mean that a student must perform a task or apply a principle with 100 percent accuracy. Mastery means that the student can demonstrate achievement of the criterion objective at the level of proficiency stated. The proficiency level may well be 100 percent accuracy, but it may also be any other percentage or standard appropriate for the objective. The decision about whether a student has achieved an objective is essentially a “yes or no” decision. Regardless of the error rate permitted by the objective, if students can perform under a given set of conditions to the standards stated in the objective, we say that they have mastered the objective. See Chapters 20, 22, 23, and 24 for further discussion of criterion-referenced measurement which explains these concepts further.

### 5.3.6 Content Communicated by the Criterion Objective

Criterion objectives should be as simple and straightforward as possible. They are designed and written to communicate, and because good communication is the ultimate goal, no absolute set of rules for constructing a criterion objective can be provided. The suggestions in this chapter may be of assistance in writing better objectives; however, they cannot be used to defend objectives which satisfy the format but do not communicate well.

#### 5.3.6.1 No criterion objective can express all the possible conditions, performances, or standards for measuring student achievement. However, the criterion objective is one of the best devices for communicating between two or more reasonable people. The content of a criterion objective should be constantly reviewed to make sure that format and jargon do not get in the way of full and accurate communication. Even though our criterion objective may seem clear to us, the objective is unsatisfactory if our students find it unclear or incomplete.

#### 5.3.6.2 With the experience gained in writing criterion objectives for both academic and technical instruction, we can make some generalizations and establish some ground rules. We should keep the following points in mind as we write statements of conditions, performance, and standards.

#### 5.3.6.2.1 Conditions

A well-written condition statement will tell students what to expect when they are evaluated. What will they encounter, for instance, when they sit down to solve a problem or answer a test item? Will they have a simulated management problem to solve or just a word list from the text? If students are to write or speak on a topic, who will select the topic and what outside help may they seek? This kind of information gives students a context for their evaluation. If we describe the conditions well, our students can spend less time second guessing about how they will be tested and more time learning the material.

#### 5.3.6.2.1.1 If we remember that we are trying to draw a word picture, condition statements for physical tasks or performance items are relatively simple. Examples 1 through 4 contain illustrations of criterion objectives which require overt physical performance on the part of the learner. The condition statements should be easy to identify even without the highlighting. The description contained in the criterion objective provides an adequate word picture of the conditions under which the learner will be tested. Generally speaking, criterion objectives which call for overt student behavior give a more complete accounting of equipment, materials, and other physical factors in the environment than do objectives requiring responses to paper and pencil items.
(Conditions) Given a comprehension-level multiple-choice test item with one or more errors in construction (PERFORMANCE) EDIT THE ITEM (Standards) so that all construction errors identified in rating scale AI-XXX have been eliminated. Legend: Conditions, PERFORMANCE, Standards

---

### Format 2

**Columnar:**

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREPARE A WRITTEN CRITIQUE OF THE PROPOSED COURSE</td>
<td>1. All deviations from the manuals and pamphlets noted.</td>
</tr>
<tr>
<td>Given:</td>
<td>2. At least one plausible suggestion for improvement offered for each deviation noted.</td>
</tr>
<tr>
<td>1. A proposal for a new course with the following supporting documents:</td>
<td>3. Written critique free from errors in spelling, grammar, and punctuation.</td>
</tr>
<tr>
<td>a. System requirements</td>
<td></td>
</tr>
<tr>
<td>b. Lesson plans.</td>
<td></td>
</tr>
<tr>
<td>c. Criterion objectives.</td>
<td></td>
</tr>
<tr>
<td>d. Assigned readings.</td>
<td></td>
</tr>
<tr>
<td>e. Examination</td>
<td></td>
</tr>
<tr>
<td>2. AFMAN 36-2236</td>
<td></td>
</tr>
<tr>
<td>3. AFMAN 36-2234</td>
<td></td>
</tr>
<tr>
<td>4. AF Handbook 36-2235, Vol 10</td>
<td></td>
</tr>
</tbody>
</table>

Legend: Conditions, PERFORMANCE, Standards

---

**Figure 5.2. Formats for Criterion Objectives**

### 5.3.6.2.1.2 Condition statements for paper and pencil test items, examples 5 through 9, are written with the same techniques as those for performance testing. However, many instructors find them more difficult to write. In paper and pencil testing, it is usually more difficult to actually observe each of the elements (conditions, performance, and standards). Often we see only the product of the performance, such as a research paper, rather than actually observing the writing of the paper. But the elements are still present, and the word picture for the paper and pencil test requires no less precision than with performances.

### 5.3.6.2.1.3 The condition statements in the paper and pencil testing, particularly examples 6 through 9, focus more on the problem presented to the student than they do to the physical environment. In addition, by carefully manipulating the conditions of testing, we can produce criterion objectives which measure a wide range of proficiency.

### 5.3.6.2.2 Common Errors. As we write condition statements for criterion objectives, we may find ourselves making errors which are common to many writers. Some of these errors are predictable and can be anticipated.
Table 5.3. Example 1

<table>
<thead>
<tr>
<th>Criterion Objective:</th>
<th>Given a simulated patient requiring an ankle wrap and without assistance or references, WRAP THE ANKLE WITH AN ELASTIC BANDAGE correctly according to checklist EB-3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis:</td>
<td>We are asking students to copy a simple task (wrapping the ankle). Following a memorized procedure, they will reproduce a method for such wrappings on a simulated patient. This task is much like folding a flag, replacing a spark plug, or arranging ribbons and devices worn by members of the armed forces. These tasks can be performed from memory with little “understanding” required of the performer. Students need no special skills to perform the task.</td>
</tr>
</tbody>
</table>

Legend | Conditions, PERFORMANCE, Standards |

Table 5.4. Example 2

<table>
<thead>
<tr>
<th>Criterion Objective:</th>
<th>THE STUDENT WILL LOCATE AND REPAIR MALFUNCTIONS IN A PGN ELECTRICAL CIRCUIT BOARD. These malfunctions will be limited to shorts and incomplete circuits planted by the instructor at those points most often affected by these malfunctions. Repair manual PGN-1, schmatic drawings, screwdriver, pliers, standard electrical meters, and supplies as necessary may be used. Seventy-five percent of all planted malfunctions must be identified and repaired, with a 10-minute time limit for each.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis:</td>
<td>Although two verbs are used in the performance statement, the requirement to “locate and repair” can be dealt with as a single objective. It may be inconvenient to separate closely associated tasks into separate objectives. If the need exists; however, each action verb could be used as the basis for a separate objective. Each of the three essential elements, performance, conditions, and standards, is stated as a separate sentence. These sentences could be arranged in any order. The general condition statement describing the malfunctions is satisfactory, although more detail could be added if it served a useful function.</td>
</tr>
</tbody>
</table>

Legend | PERFORMANCE, Conditions, Standards |

Table 5.5. Example 3

<table>
<thead>
<tr>
<th>Criterion Objective:</th>
<th>Given the following purchasing information; name and description of item, stock number (if available), quantity and unit cost, whether the request is recurring or nonrecurring, a reason to purchase, and a date by which the item is needed, PREPARE A TYPEWRITTEN AIR FORCE FORM 9, REQUEST FOR PURCHASE, according to AFR 70-18, with no errors in typing, spelling, or format, free from math errors, and with correct organization number and fund classification code.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis:</td>
<td>This condition statement is quite specific because it lists each of the bits of purchasing information. An acceptable substitute would also be “given the necessary information.” Although the standards indicate that both the typing and math are to be error free, we could assume this requirement if it was omitted. There is no time standard given, so we can assume that any problem used in this exercise will be field tested and a “reasonable time” allowed based on actual experience.</td>
</tr>
</tbody>
</table>

Legend | Conditions, PERFORMANCE, Standards |
Table 5.6. Example 4

| Criterion Objective: | 1. Given a physician’s order to start intravenous fluids.  
|                      | 2. A cooperative conscious adult patient.  
|                      | 3. A routine situation in which extraordinary measures are not required.  
|                      | 4. Equipment and supplies, including  
|                      | a. IV fluid (as directed) in bag or bottle.  
|                      | b. Tubing  
|                      | c. Alcohol swabs  
|                      | d. Needle  
|                      | e. Tape  
|                      | f. Arm Board  
|                      | g. Tourniquet  
|                      | h. IV pole  
| PERFORMANCE: | START INTRAVENOUS FLUIDS IN ARM OR HAND.  
|            | 2. Acceptable nursing practice for procedure (cleansing of puncture area, site and application of tourniquet, and blood return).  
|            | 3. No swelling above puncture.  
|            | 4. Flow regulated to rate directed by physician’s orders.  
|            | 5. Patient discomfort not to be excessive for procedure considering condition of skin and visibility and condition of veins.  
|            | 6. Task to be performed without assistance.  
| Analysis: | This is a very significant task and a lengthy objective. However, there are several bits of information which limit the scope of the task. Notice that the intravenous fluids are to be started in the arm or hand. Other locations for administering these fluids such as the foot or jugular vein, are not included. In addition, the conditions rule out children, comatose patients, and hostile adults. The listing of equipment and supplies is quite complete, but they could have been assumed with a statement such as “given all necessary equipment and supplies.” Several of the standards require judgment, but no useful purpose would be served by making them more precise (e.g., how much discomfort is excessive?) Notice that the first standard deals with a large amount of information by referring to two external sources for information.  

Legend | Conditions, PERFORMANCE, Standards

Table 5.7. Example 5

| Criterion Objective: | Without the use of references, LIST THE PHASES OF THE USAF ISD MODEL, according to AFMAN 36-2234 in order and without error.  
| Analysis: | This criterion objective sets up a short answer test item. If the test item were to be multiple choice, a different criterion objective could be required. The conditions and standards in this criterion objective could have been assumed, but spelling them out in this way leaves less room for misunderstanding.  

Legend | Conditions, PERFORMANCE, Standards
Table 5.8. Example 6

| Criterion Objective: | After viewing a videotape which recreates a discussion between persons of different racial or ethnic backgrounds and which contains a number of instances of spoken and nonverbal communication which have been labeled by the base human relations council as racially or ethnically degrading, IDENTIFY at least two-thirds of THOSE INSTANCES. |
| Analysis: | This criterion objective again calls for students to exercise their understanding of a situation to see how well they agree with a panel of experts. Notice that the objective assumes that students will be doing the task on their own and within a reasonable, but unstated, period of time. This approach is correct as long as there is no apparent need to spell out supervision constraints and time standards. |

Legend | Conditions, PERFORMANCE, Standards |

Table 5.9. Example 7

| Criterion Objective: | Given problems calling for the computation of the differentiation index, the number of persons who have correctly and incorrectly responded to a particular test item, and without assistance, COMPUTE THE CORRECT DIFFERENTIATION INDEX in 80% of problems given. |
| Analysis: | As with most problems in computation of this type, the students must understand enough of the process to translate the problems given and interpret the formula well enough to substitute the correct values. Students can’t depend on simple recall, such as reciting the multiplication tables or recalling memorized formulas, e.g., $\pi r^2$. |

Legend | Conditions, PERFORMANCE, Standards |

Table 5.10. Example 8

| Criterion Objective: | Students will be given five scenarios with descriptions of misconduct punishable under the UCMJ and three articles from the UCMJ which may have been violated (multiple-choice test item). Without assistance, notes, or references SELECT THE ARTICLE WHICH HAS BEEN VIOLATED IN EACH CASE. Satisfactory performance will be no less than 4 of 5 UCMJ articles selected correctly within 20 minutes per scenario. |
| Analysis: | This criterion objective describes a fairly high-level task. Much is assumed about the difficulty and complexity of the scenarios, but it is probably not reasonable to attempt much more descriptive information here. Whatever the degree of difficulty, both the instruction and the testing should be essentially the same. “Correctly” in the standard makes two assumptions: that one or more experts in the field have determined what is correct, and that the student must come up with an answer which is consistent with that of the experts. Although very simple examples could be identified at the comprehension level, violations of the UCMJ are generally so complicated that it is more likely that they would require understanding at the application level. |

Legend | Conditions, PERFORMANCE, Standards |
Table 5.11. Example 9

| Criterion Objective: | Using a personally selected topic and without restrictions on reference materials or lesson planning formats, PREPARE A DEMONSTRATION-PERFORMANCE LESSON PLAN which contains:  
1. A criterion objective with all required elements,  
2. A criterion-referenced test which validly determines mastery of the criterion objective, and  
3. A teaching plan generally consistent with accepted principles of learning and instructional design. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis:</td>
<td>This criterion objective is broad in scope and complex. Obviously, many pages of information are dealt with in the standards. It is probably unreasonable, however, to put much more information into the objective. The objective calls for several qualified value judgments (“generally consistent with” and “validly determines mastery”), but such judgments can be expected in an objective at this level. In this case, both judgments require the instructor to be an expert, and neither can be quantified easily.</td>
</tr>
<tr>
<td>Legend</td>
<td>Conditions, PERFORMANCE, Standards</td>
</tr>
</tbody>
</table>

5.3.6.2.2.1 Mixing the outcomes of learning with the process of learning. Statements such as “by the end of this course” or “after a lecture by the base commander” are generally not appropriate in a criterion objective. Remember, we are describing the test, not giving a course outline. If we include information like this, we are saying that part of the testing situation includes attending the course or listening to a lecture by the base commander—which is probably not the case.

5.3.6.2.2.2 Omitting significant items of information. Significance obviously involves a value judgment. Something that is significant to one instructor about a testing situation may not be significant to another. Here again, the real measure is what will affect the performance of our students. We may assume that our students understand that they may refer to their notes, look up words in a dictionary, or ask questions. But do they know this information far enough ahead of time to prepare for their exams adequately? They will, only if we have included all the significant items of information in our condition statement.

5.3.6.2.2.3 Including information of little or no significance. Some condition statements look like an inventory from a weekend shopping trip to a variety store. Everything imaginable is listed but the kitchen sink. Unfortunately, this long meaningless inventory is often included and important information left out. One example of this error involved a course designed to teach mid-level supervisors how to manage effectively. The primary methods were case study and guided discussion. The criterion objectives were so poorly written that they destroyed the credibility of the instructor. While completely overlooking the significant conditions for evaluation, such as simulated management problems in case form, the writer was very careful to mention in the criterion objective that the students would be given paper and ballpoint pen. We can hardly argue against paper and ballpoint pen, but that bit of information could certainly be assumed without much effect on the objective. The information that was left out was significant and did have an effect on the students. Other routine environmental factors, such as light, air, tables, and chairs, need not be listed unless there is some concern that they might not normally be available.

5.3.6.2.2.4 Talking around the genuine conditions. Some writers of objectives seem to have trouble telling their students what to expect in terms of the conditions for testing. Often it is not a lack of writing skill or subject expertise; these instructors still have difficulty accepting the idea that they should be as open with their students as suggested here. For years many instructors have succeeded in keeping their students in constant suspense about what they were required to learn, and instructors who have really developed the skill of deception have been able to transfer them to writing criterion objectives. Often such expressions as “given necessary supplies and materials” or “given any management situation” are used to hide a more understandable statement. Does “given the materials” mean that they will all be preselected and laid out for the students, or do they have to make some decisions about which materials or supplies are appropriate? Does “any management situation” really mean “any,” or is there actually a very limited set of situations which could be described more precisely?

5.3.6.2.2.5 Describing the mechanics rather than conditions. Particularly in an academic setting, it is often easier to describe the mechanics of test
administration than conditions affecting student performance. A condition statement like “given a test with 30 items about...” misses the whole idea of the criterion objective. Such a statement is probably inappropriate unless the test is measuring a single criterion objective which requires 30 common items. Those who fall victim to this attractive short cut tend to write worthless condition statements. The temptation is to view paper-and-pencil tests containing several items as a single learner performance. It is possible that a written test of many items may measure a single criterion objective, but this is not usually the case.

5.3.6.3 Most paper-and-pencil tests measure more than one criterion objective: Test items 1-5 on a particular exam may measure criterion objective #1; items 6, 8, 10, 12, and 14 may measure objective #2; and so on. A paper-and-pencil test which measures several objectives generally does not need another overall criterion objective. Chapter 24 discusses one exception where the instructor has grouped individual criterion objectives together in a package and established an overall passing criterion. When asked what objectives a test is measuring, we should be able to point to the criterion objectives being measured by the various items within the test. In our operating instructions, we may wish to specify the minimum number of objectives required to pass the course rather than some overall test score or percentage for the exam.

5.3.6.4 The word picture created by describing the conditions should be clear and complete. Our students, another instructor, or any other reasonable person should be able to understand and recreate, if necessary, the testing environment in which we intend to measure student learning.

5.3.7 Performance. The performance portion of the criterion objective tells us what the student will be doing, or will have done, to prove learning. The description of behavior is most easily communicated by using an action verb and a clear description of the object of that action.

5.3.8 The Action Verb. There is no mysterious list of “magic” or forbidden words to learn. Generally speaking, active verbs which describe observable measurable student behavior are best. The criterion objectives illustrated in this chapter contain several acceptable verbs for describing student behavior. As can be seen from these examples from performance testing and paper-and-pencil testing, the verb gives a good indication of what the student will do. But verbs that describe an internal state of mind (know, comprehend, etc.), while acceptable to indicate the level-of-learning, will not give us the information we need to write a criterion objective. Table 5-2 shows a sampling of verbs which are generally felt to be acceptable and unacceptable for writing criterion objectives.

5.3.8.1 Some descriptions of student behavior do not fall clearly into either performance testing or pencil-and-paper testing. We may have to refine the performance description further to communicate our real intent. This ambiguity is rarely an issue for overt physical tasks, but it often enters the picture when the behavior is incidental, rather than critical, to the objective, which is the case in

Table 5.12. Verb Descriptors of Student Performance (Criterion Objectives)

<table>
<thead>
<tr>
<th>Acceptable Verbs (observable and measurable)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>shoot</td>
<td>fasten</td>
<td>drive</td>
</tr>
<tr>
<td>define</td>
<td>turn</td>
<td>remove</td>
</tr>
<tr>
<td>describe</td>
<td>edit</td>
<td>load</td>
</tr>
<tr>
<td>splice</td>
<td>assemble</td>
<td>speak</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unacceptable Verbs (going on inside the learner)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>know</td>
<td>analyze</td>
<td>understand</td>
</tr>
<tr>
<td>comprehend</td>
<td>synthesize</td>
<td>appreciate</td>
</tr>
<tr>
<td>apply</td>
<td>evaluate</td>
<td>be familiar</td>
</tr>
</tbody>
</table>

May be acceptable depending on context
(affected by writer preferences, rules of the school, need for extreme precision, etc.)

<table>
<thead>
<tr>
<th>Acceptable Verbs</th>
<th>Better if specific behavior is critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>list</td>
<td>list in writing</td>
</tr>
<tr>
<td>solve</td>
<td>write solution</td>
</tr>
<tr>
<td>critique</td>
<td>verbally critique</td>
</tr>
<tr>
<td>summarize</td>
<td>write a summary</td>
</tr>
<tr>
<td>identify</td>
<td>identify by circling</td>
</tr>
<tr>
<td>name</td>
<td>name orally and in writing</td>
</tr>
</tbody>
</table>

Most paper-and-pencil tests measure more than a single criterion objective. The task, or will we collect some product produced by the student—written paper, multiple-choice exam, or a properly folded flag?

5.3.9 Object of the Action. An observable measurable action verb gives half of the required information in the performance description; the object of the action verb is the other half of the required information. The object of the performance statement is not usually emphasized as much as the action verb, but it is very important. Note
that in the sample criterion objectives, examples 1 through 9, the object of the performance is clearly stated and included as a part of the performance statement.

5.3.9.1 Objectives frequently indicate that a student will be able to write a "thing" or repair a "thing" or critique a "thing." Often the "thing" in the performance statement is taken for granted and given little attention. The object of the action of the verb should be precisely stated. Here again, reasonableness can be a problem. Is the military letter, the object of the verb "write," the real target of performance, or is the target really "any written communication" with the military letter just a convenient device for testing? In addition, does the object named have a generally accepted definition, or is a definition or description necessary? Is the jargon or technical language used in the objective shared by our readers?

5.3.10 Common Errors. Of the three criterion objective elements, the performance description should be the least difficult to write. There are, however, a few common errors which we can anticipate and avoid.

5.3.10.1 Substituting Levels of learning for action verbs. Writing objectives for specific levels of learning was introduced in Chapters 2 and 3. Chapter 4 explains the approach to planning in-depth level-of-learning objectives. These levels or categories of learning serve a valuable function by grouping equivalent student behaviors for sampling. They are not meant to be substituted, nor can they be substituted, for the action verb in a criterion objective. Any attempt to replace the criterion objective action verbs with verbs from the levels of learning (know, comprehend, etc.) will produce a criterion objective which is unsatisfactory.

5.3.10.2 Using vague or general action verbs when specific verbs communicate better. It may seem that choosing between good (specific) and poor (vague and general) verbs is quite simple. Some verbs may seem to be better than they are at first glance. Verbs such as demonstrate, operate, or prepare may leave important unanswered questions; to demonstrate—by doing what, to operate—which operations, to prepare—which tasks of preparation? It is possible to use such verbs in well written objectives; however, they have to be seen in context and evaluated on their ability to communicate clearly.

5.3.10.3 Overly generalized or poorly defined object of performance. A verb may clearly describe the desired learner behavior, but the object of that behavior may be poorly stated. Often such terms as any and all in a performance statement do not mean "any" or "all." Generally, we find some limit on the type of problem or kind of object being acted on. It is unlikely that a student in a leadership school can solve all management problems. It is just as unlikely that a technical student could make all repairs on any object. The scope of the performance may be limited in the performance statement or in the condition statement. It does not matter which item does the limiting as long as the limits are communicated.

5.3.11 The performance section of the criterion objective must contain an action verb (do what?) and an object (to what?). Along with the condition statement, the performance description describes everything of significance that will occur during the test or measurement situation. All that remains is for us to tell our students the criteria or standards to be used to evaluate their performance.

5.4 Standards. The standards for criterion objectives are often difficult to write. Many difficulties show up quickly as we try to express standards to students so they can be understood. Some of our problems can be traced to the limits of written language, others to a lack of conscious awareness of our own standards, and still others to philosophical problems many of us have with revealing our standards to students.

5.4.1 Many standards are difficult to express in words. Standards should describe how well students must do a task to be acceptable, but often language lets us down. How smooth should a “smooth” finish be? When is a description of an object or event “complete”? How clear is a “clear” explanation? This problem with language cannot be completely overcome. A careful honest attempt to describe standards, along with trial and error, is the best we can hope to do. The creative use of models and other media to supplement our word pictures may be helpful. We must realize, however, that the perfect (satisfying to all readers) set of standards for a complex criterion objective is probably yet to be written, particularly for qualitative standards. This problem may be best summarized by the instructor who says, “I know a passing effort when I see one, but I just can’t express it in the right words.”

5.4.2 Some standards, particularly quantitative, should be easy to express because they lend themselves to precise terms; however, often even these standards are poorly written and incomplete because of an instructor’s inability to verbalize all of the standards which will be used to evaluate student performance. When there are many standards for an objective, there is a temptation to list those which are most obvious and easiest to express and measure. The student is put at a great disadvantage, however, when additional unstated standards are used to determine satisfactory performance. Instructors often apply unstated time standards and assumed quality standards to student work. No standard should be used to evaluate student performance which is not written into the criterion objective or reasonably assumed. If a student can meet all of the criteria in the criterion objective but the performance is still unsatisfactory, we should reevaluate the objective for additional standards.

5.4.3 A third and more fundamental reason for poor statements of standards is negative instructor attitude about revealing standards. In spite of the Air Force
commitment to Instructional System Development (ISD) and instructional objectives, many instructors feel there is something wrong with telling students exactly what is expected of them. Most of us are products of traditional schools which were not “systems” oriented. Few of us have had more than a course or two, in or out of the Air Force, where objectives were carefully spelled out. As successful students in those traditional schools, some instructors question ISD in general and criterion objectives in particular.

5.4.4 If instructors cannot see the benefits of this approach in terms of more relevant course content, as well as more effective, efficient instructional techniques, they may have trouble expressing their own objectives. Some would say, “I never had anyone spell the course out for me like that. Why should I spoon-feed my students?” This weak argument against writing criterion objectives is best summarized by an instructor who was overheard saying, “I’m not going to write criterion objectives. Why, if I tell my students exactly what they have to do and how well they have to do it, they may all get it right!”

5.4.5 Types of Standards. Many different types of standards may be used to evaluate student performance.

5.4.5.1 Referring to an external authority. Time and space may be saved by making reference to an external authority in criterion objectives. Authors of source material often state qualitative and quantitative standards very well, and rephrasing may be a waste of time with no improvement. Reference to specific regulations, manuals, authors, checklists, or rating scales is appropriate and should be encouraged. Figures 5-1 and examples 1 through 6 illustrate ways in which external authority may be referenced.

5.4.5.2 Expressing or implying a percentage or ratio. We frequently see a percentage or ratio in criterion objectives, as when a student must solve 80 percent of a set of problems or locate a malfunction in 2 of 3 cases. Where this type of standard is appropriate, it is easy to state and easy to measure. Examples 2, 6, 7, and 8 illustrate percentage or ratio standards.

5.4.5.2.1 We often find it natural to write a standard which says “with 100 percent accuracy” or “without error.” If there is any doubt that the reader will not assume this standard, we should include it, although we may find that the phrases become very repetitious. Often, we can assume the standard of “no error” in our objectives without spelling it out as long as our students understand what we mean. Figures 5-1 and examples 3 and 5 spell out the standard of “no error.” Other objectives, such as examples 4 and 9 assume the “no error” standard, and a percentage or ratio is not stated.

5.4.5.3 Specifying repetition or redundancy of testing. Standards which express a percentage or “no error” usually indicate a one-time test; that is, if the student does something without error once or locates 2 or 3 malfunctions one time, the objective has been met. If this is what we intended, we have said all we need to say, but we may want the student to show mastery of the objective more than once to prove that learning has occurred. In that case, to a standard such as 75 percent in example 2 or without error as in example 5, we would add another statement to the standard, such as “in two consecutive tests” or “in 2 of 3 examinations separated by at least two weeks.” We may even wish to extend our test or retest period beyond graduation and use the retest as part of the graduate follow-up program.

5.4.5.4 Specifying physical measurements and tolerances. Many types of physical measurements will appear in criterion objectives, such as tolerances, weight, number of words, pounds of pressure, distance, degrees, and rate. We should use these standards, which are generally easy to express, when appropriate. We find an example of this type of physical measurement in example 4, in the rate of flow of the intravenous solution.

5.4.5.5 Specifying the time requirements. We should express time as a standard when it may affect student performance. If time is not included as a standard, we assume that a reasonable period of time will be allowed for performance testing. A “reasonable” period allows any learner who has mastered the skill to complete the task without running out of time. If we plan to time the test or measurement in any way, we normally include time as a standard in the criterion objective. In paper-and-pencil testing, we may or may not include time for each objective being tested. In any case, the total time for the test should be the sum of times estimated for each of the objectives being tested. Examples 2 and 8 illustrate the use of testing time as a specific standard. “Reasonable time” is an assumed standard in the other examples.

5.4.5.6 Specifying the rate of production. Many performance skills are measured in rate of production. This measure should be included in appropriate objectives. Skill development situations which might use this standard include keyboarding, typing, shorthand, and production work. The typing problem described in example 3 could be modified to include production rate as a standard by adding “at a rate of 12 forms per hour.”

5.4.5.7 Specifying qualitative requirements. Many of the most significant standards applied to student performance are qualitative and may require judgments involving sight, sound, taste, and other inexact measures. To the greatest extent possible, we should legitimately quantify standards. If there is a color or smoothness scale, we should use it. If there is a format for a written course requirement, we should refer to it. If a “properly supported” argument means, among other things, including at least three acceptable statistics or examples, we should state that in the objective.

5.4.5.7.1 But often no such external standard exists, and qualitative standards are often genuinely difficult to
express. If there is no reasonable way to define the qualitative standard objectively (e.g., run smoothly; fold neatly; develop fully), we use the qualitative term. We must keep in mind, however, that the qualitative term may not be interpreted the way we mean it. All of the criterion objectives in this chapter contain one form or another of a qualitative standard, but particularly standard 2 in Figure 5-1, and standards 2 and 5 in example 4.

5.4.5.8 Specifying degrees of supervision or assistance. The degree of supervision or assistance provided during a test may affect the quality of the results. Students require a much higher degree of skill and need a greater depth of understanding to perform a task without supervision or assistance. If we do not specify a level of supervision or assistance, it is assumed that the student must perform without supervision and without assistance. Example 4 illustrates a specific assistance standard. The other examples may be interpreted to read “without supervision and without assistance.”

5.4.5.9 Common Errors. A wide range of difficulties may be encountered in writing standards for criterion objectives. There is no way, short of extensive experience, to identify all the possible problems we may encounter. The information which follows deals with many of the more common errors and should help in writing better objectives.

5.4.5.10 Overestimating the value of an external authority (regulation, pamphlet, rating scale). Information actually contained in the cited authority may not be precise enough or complete enough to use for student evaluation. The authority cited may include information which is unacceptable or inappropriate for the learning situation. In many cases, since these documents were not written to be used as part of a criterion objective, they are written in generalities which are not easily understood or measured.

5.4.5.11 Inappropriate or inexact percentage or ratio. Few standards are as easy to express and measure as percentages. Unfortunately, we can be tempted to use exact percentages when other more difficult criteria are appropriate. Instructors often mistakenly use percentages because of past practice rather than a careful analysis of real criteria. Often we express or imply a standard of 100 percent accuracy when it is unwarranted and unrealistic. We can easily fail to take into account such factors as fatigue or simple errors in math in cases where performance at less than 100 percent is acceptable for mastery.

5.4.5.12 Assuming retention based upon a single evaluation. If retention is important, we need to program reasonable retesting into our learning situations. Students should be told that they are going to be tested on the same objective more than once (e.g., query, block exam, or phase exam).

5.4.5.13 Understating or oversimplifying measurements. Some instructors write standards for criterion objectives to the lowest acceptable level of performance. Such a standard may be invalid if performance on the task is generally expected to be higher than the bare minimum. We may have many reasons for setting classroom standards higher than the lowest acceptable level of performance on the job. Additionally, we may make the mistake of using convenient easily measured standards when other more-difficult-to-express standards are more appropriate.

5.4.5.14 Overlooking time as a factor in testing. Many criterion objectives are written without reference to time, but time constraints are imposed upon students during testing. When time standards are set, they are often guesses and not verified to determine their reasonableness.

5.4.5.15 Incomplete or inaccurate production rates. The per minute or per hour production rate is often an important standard. Additionally, it is often important to specify the period over which the per minute or per hour standard is to be maintained. There is a big difference in typing 60 words per minute for one minute rather than for 10 minutes. We may also make an error in the actual unit of production being measured. It may be more appropriate to measure the number of business letters typed rather than the number of words typed or the number of words typed per minute.

5.4.5.16 Poorly stated quality standards. Quality standards are generally difficult to write as compared to measures of quantity. However, we often excuse poorly written standards simply because they contain quality standards. We should avoid such expressions as “to the satisfaction of the instructor” or “until the work is acceptable.” With these statements, the instructor has succeeded in keeping the real standards from the students. Students often have no idea what “satisfaction of the instructor” or “acceptable” may mean.

5.4.5.17 Failing to account for supervision or assistance. We may assume that students will perform a task without supervision or assistance, but omit that information from the criterion objective. When students don’t realize they must perform without supervision, we may be forced to provide additional instruction during the exam, answer questions, or inadvertently correct obvious errors as they are being made.

5.5 Task Steps As Planning Tools. Criterion objectives give a great deal of information about what a student should be able to perform after instruction. But criterion objectives do not tell us how we are going to get our students from where they are to where we want them to be. An effective technique for planning our instructional strategy is to break down the criterion objective into its component task steps and arrange sequential learning experiences. For planning purposes, task steps are expressed behaviorally, but are usually written without
conditions or standards, as with criterion objectives. If we are individualizing or self-pacing instruction, we may wish to write out task steps as criterion objectives, but generally, statements such as those listed below are typical of most published task steps.

Table 5.13. Task Steps

<table>
<thead>
<tr>
<th>Task Step</th>
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</thead>
<tbody>
<tr>
<td>Write criterion objective.</td>
</tr>
<tr>
<td>List management styles.</td>
</tr>
<tr>
<td>Insert module into circuit board.</td>
</tr>
<tr>
<td>Explain concept of detente.</td>
</tr>
<tr>
<td>Develop lesson plan.</td>
</tr>
</tbody>
</table>

5.5.1 Task steps are the subskills or understandings that must be accomplished in order to achieve the criterion objective. There are several texts that deal more fully with the subject matter of tasks, task analysis, and sequencing of instruction. However, the following brief explanation may be sufficient.

5.5.2 Analysis of a criterion objective into a relatively simple sequence of task steps might look like Figure 5.3. In this illustration, a student who starts with no skill must learn to perform four subskills or gain four items of supporting knowledge in order to show mastery of the objective. An analysis of this type is useful to make sure that all significant task steps and the necessary background are accounted for in planning the course or lesson. Listing these steps in order will provide a checklist if we wish to evaluate our students as they progress independently.

5.5.3 Although the task steps must be performed in a 1-2-3-4 sequence, our students may not need to learn them in that order. For instance, we may not have a work station for each student, or some students may already possess one or more of the subskills. Figure 5.4 illustrates two of the possible instructional designs that might result from such an analysis of a criterion objective.

5.5.4 This criterion objective represents the same learning outcome illustrated in Figure 5.3. In that figure, however, we were illustrating a sequence in which all of the task steps had to be performed in sequence to demonstrate mastery in the skill described in the criterion objective. Figure 5.4 shows two of several possible sequences in which the students might learn the skill. The skill and the component steps are imaginary, but the diagrams can be used to make the desired point. In Figure 5.4, the analysis of the skill has revealed that task step 1 must be learned before task step 2 can be learned.

and that task step 3 must be learned before task step 4. But, we have also discovered that task steps 3 and 4 are not dependent upon learning to perform task steps 1 and 2. Such a situation might exist when task step 1 is “measuring,” task step 2 is “computing,” and task steps 3 and 4 are “sawing” and “fastening.” Example 2 represents another analysis in which the performance of task steps 3 and 4 are dependent upon learning the first two task steps, but the order in which students learn the first two task steps is not significant.

5.5.5 These illustrations are quite simple, but the analysis of more complex skills may look like the electrical wiring diagram of a color television set. Refer to other instructional design texts for more comprehensive and detailed explanations of this procedure. The value of this type of analysis is twofold: (1) We can account for all component tasks and spell them out in detail, and (2) As we discover which skills are dependent upon other skills in the learning process, we become aware of appropriate strategies for instruction.

5.6 Summary. The criterion objective is an effective way to communicate precise outcomes of learning. Each criterion objective describes the proof that an instructor will accept that a learning outcome has been mastered.

5.6.1 While many formats for writing criterion objectives may be used, they all require three basic items of information: performance, conditions, and standards. The checklist in Figure 5.5, which is included as a part of this summary, will help us write criterion objectives with all the required elements. Criterion objectives provide the basis for tests which measure student performance for comparison with an objective standard.

5.6.2 In spite of a tendency for beginning writers to make fairly predictable errors and to oversimplify the learning process, criterion objectives have changed the face of instructional programs. Criterion objectives are invaluable to the technical instructor for specifying exact optimal levels of training. They are also valuable to the academic instructor in establishing the base line of instruction or minimum objectives upon which more open-ended courses, such as professional military education, are developed. Criterion objectives also help us to consider the environment for testing as well as the standards for evaluation so we can deal fairly with our students. In addition, criterion objectives help us to better visualize our test items so we can make valid reliable measurements of student achievement.
Figure 5.3. Task Analysis of Criterion Objective
Figure 5.4. Analysis of Instructional Sequence

Conditions:

1. Are there any physical factors, such as, materials, equipment, supplies or references, in the performance situation which should be noted as being present or specifically excluded?
   No ( ) Yes ( ) If yes, specify:

2. Is there any problem or situation which will confront students to which they must respond?
   No ( ) Yes ( ) If yes, specify:

Performance:

1. What will students be required to do? Specify with an action verb:
2. To what? Specify:

Standards:

Which of the following standards will be used to evaluate student performance?
( ) 1. External authority. Specify:
( ) 2. Percentage or ratio.
   ( ) Without error/100 percent correct.
   ( ) Other. Specify:
( ) 3. Requirement to be tested more than once. Specify:
( ) 4. Physical measurements and tolerances. Specify:
( ) 5. Time limitation. Specify:
( ) 6. Production rate. Specify:
( ) 7. Qualitative standards. Specify:
( ) 8. Degree of supervision. Specify:

Figure 5.5. Criterion Objectives Writer’s Checklist
Chapter 6
DEVELOPING THE LESSON PLAN

6.1 Introduction. A lesson plan is a plan for learning. As is true in most activities, the quality of planning affects the quality of results. Successful executives and professional people know that the price of excellence is careful preparation. A lawyer spends hours planning a case before appearing in court. A minister does not ad-lib a sermon but plans days or weeks in advance. In anticipation of the big game, the coach spends hours planning the plays and watching the team execute them. Should we attempt such a complicated process as learning with less attention than is given to other important activities? The answer is obvious: of course not. The effective instructor devotes much time and energy in carefully planning and preparing each lesson, whether the lesson encompasses one or several periods of instruction.

6.1.1 To ensure the greatest probability of learning, we must carefully select and arrange activities that will produce the desired learning outcomes in our students. Only through careful planning can we be certain that we include all necessary information and have our lesson plan properly organized to achieve the lesson objective. The complete cycle of lesson planning includes eight steps: (1) Determine the objective, (2) Research the topic as defined by the objective, (3) Select the appropriate instructional method, (4) Identify a usable lesson planning format, (5) Decide how to organize the lesson, (6) Choose appropriate support material, (7) Prepare the beginning and ending of the lesson, and (8) Prepare a final outline.

6.2 Determining The Objective. Often we will begin our lesson planning with an objective or objectives clearly in mind. At other times the objective may be shaped by the research and additional planning we do. In other words, although the first step of the lesson planning process is to determine the objective, our objective may not fully evolve until after we have completed other steps of the process.

6.2.1 Objectives need to be student-centered. We should not state them in terms of what we want to teach, but rather they should be stated in terms of what we want our students to learn. For instance, the objective of a lesson on developing a lesson plan might be for each student to know the eight steps of effective lesson planning as listed in this chapter. Of course the lesson might be taught at a lower than the knowledge level. We might want each student to comprehend the eight steps appropriate to effective lesson planning or even to be able to apply the eight steps of lesson planning. But whatever the level, the student-centered objective should guide our subsequent planning. Without a clear objective, we won’t know if we ever get there. Think about that statement.

6.3 Researching The Topic. After we have written or been provided with an instructional objective, we are ready to decide on the main points of the lesson and gather materials about the lesson topic. Normally we do not collect a mass of research materials and then develop an objective to match the findings. Not only is this latter approach inefficient, but it is also likely to be ineffective. It may well ignore the specific needs of the students and the Air Force. The objective should determine the research that needs to be done. On the other hand, research may justify a decision to modify an objective or rearrange main points for greater accuracy or clarity.

6.3.1 Usefulness and appropriateness are two important criteria for selecting relevant material. To be appropriate, information should relate to the lesson objective and have a high possibility for student retention. To be useful, it should aid both the instructor and the students in the teaching-learning process. If the instructor selects material solely on the basis of its interest value, a lesson may be filled with interesting information of little learning value to the student. On the other hand, dry, uninteresting facts—even though they are very important—may also defeat the instructor’s purpose. Students are more likely to grasp and retain facts and concepts that are enriched with interesting support material and arranged in a way that enhances learning.

6.3.2 With the objective clearly in mind, we are now ready to gather actual material or do research on the subject. The sources for this material are our own experiences, the experience of others which we gain through conversation and interviews, and written or observed material. Instructors concerned with teaching a good lesson will often draw from all of these sources.

6.3.3 Self. The first step in researching a lesson topic is to see what we ourselves know about the subject. Our personal knowledge may suggest a tentative organization, but more important, it will point up gaps in our knowledge where we need further research.

6.3.4 Others. The second step in the research process is to draw on the experience of others. People who are interested in the topic may provide ideas during the course of conversation. The most fruitful source is the expert who may help us clarify our thinking, provide facts and testimony, and suggest sources for further research.

6.3.4.1 While personal experience, conversation, and interviews provide valuable content for lessons, we must usually do further research elsewhere. If we have properly narrowed our subject and kept the purpose in mind, our research task will be easier.

6.3.5 Library. Modern libraries provide us with an abundance of sources: books, newspapers, popular
magazines, scholarly journals, abstracts, subject files, and microfilms. Quantity is no problem; quality is more difficult. We must always concern ourselves with the accuracy and relevance of the material we select. Using an article from 1950 to discuss atomic physics today might well lead to inaccurate, irrelevant conclusions.

6.3.5.1 The next step in the research process is to evaluate the material gathered. We will probably find that we have enough material for several lessons. We must now combine some ideas, eliminate others, and perhaps expand on what we found in the research materials. We will also want to give special attention to the types of support material we have selected (definitions, examples, comparisons, statistics, and testimony). Later in this chapter we will discuss types of support material in detail.

6.3.5.2 Sometimes we have an organizational pattern in mind before we start. If not, as we gather our material, we will probably see that the ideas are beginning to form into some type of pattern. Later in this chapter, we will discuss ways of organizing the lesson.

6.3.5.3 During the research phase, the instructor is likely to find material that students should read to prepare for a given class session. If we keep this possibility in mind when we begin our research, we can prepare a suggested student reading list and save time in selecting student references. When deciding on supplementary reading for the students, we should choose interesting and informative materials that reinforce or support the lesson objectives.

6.4 Selecting Instructional Methods. After deciding exactly what to teach, the instructor determines how best to teach it and what instructional method to use. When related to instruction, “method” refers to a combination of techniques or skills used by the instructor to engage students in meaningful learning experiences. A method is a broad approach to instruction—for example, the lecture method or the guided discussion method. A technique, on the other hand is a specific concrete skill or procedure used in implementing a method—for example, the technique of using the chalkboard or of using an analogy as support material.

6.4.1 Chapter 12 provides an overview of several instructional methods available to Air Force instructors. Chapters 13-17 present a number of these methods in detail.

6.4.2 Philosophy Underlying Selection. We should choose a teaching method suited to the student’s needs as a learner. In making the selection, we consider the ways that people learn: by doing, by discussing, by listening, by observing, by participating. We should select the instructional method that will most effectively guide students toward desired learning outcomes. Our role is to select the method and the techniques that will result in a meaningful learning experience.

6.4.3 The Selection Process. No one method is suitable for all teaching situations, because no single method is sufficiently flexible to meet the needs of students in every learning situation. Chapter 18 presents an expanded discussion of the factors to consider in the selection of teaching methods. In general, as we have seen, the nature of a learning outcome suggests the type of activity that will be most helpful to the students in achieving that outcome. If, for example, we want students to gain skill in performing a certain task, one of the activities should be practice in performing the task. If the desired outcome is knowledge, students should observe, listen, or read so they can relate what they are learning to their own experience. If students must learn to apply a principle, the instructor should ask them to solve problems or perform tasks requiring an application of that principle.

6.4.3.1 The instructional approach we choose for one learning outcome may be different from the approaches that we select for other outcomes in the same lesson. Our primary concern is to plan and select the most appropriate approach for students to achieve each outcome.

6.5 Lesson Planning Format. Good lesson planning is essential for any systematic approach to instruction. Although many instructors become discouraged by the time required for good lesson planning, a well written and properly used lesson plan can be a very worthwhile teaching aid. Experienced instructors use written lesson plans for a variety of purposes. They can be checkpoints to ensure well-planned learning experiences. They can serve as teaching guides during lessons and as references for other instructors who may teach for us in emergencies. They also serve as convenient records of an instructor’s planning techniques and methods of teaching. One of the most practical functions of lesson plans is that they serve as step-by-step guides for instructors in developing teaching and learning activities.

6.5.1 Authorities differ about the content and form of lesson plans, and many commands and schools have developed their own formats to satisfy particular needs. On the whole, however, most authorities generally agree on the essential characteristics of a good lesson plan. Figure 6.1 lists these characteristics, as well as those items of information which they routinely include.

6.6 Organizing The Lesson. After we have researched the topic, selected the appropriate instructional method, and identified the lesson planning format to use, we must decide how to organize the lesson. Every lesson needs an introduction, body, and conclusion. In most instances the body of the lesson should be prepared before the introduction or conclusion. After we prepare the body or main part of the lesson, we will be in a better position to begin or conclude the lesson. The first consideration in planning the body is how to organize the main points, but organization of subpoints is also important.
Arrangement of the main points and subpoints of a lesson will help both the instructor and the students—the instructor in teaching it and the students in learning. Most lessons, regardless of their length, divide nicely into from two to five main points.

6.6.1 The typical ways of organizing main or subpoints of a lesson are by the patterns of time, space, cause-effect, problem-solution, pro-con, or topic. Furthermore, certain strategies can be used with each pattern from known to unknown, for instance, or from simple to complex. How does an instructor decide which patterns and strategies to use? The lesson material will often organize itself more easily with one pattern and strategy than with another. Let us consider how various patterns and strategies can be used to organize the main points of a lesson.

6.6.2 Time. Our vocabularies are filled with words which refer to time: now, tomorrow, yesterday, today, sooner, later, earlier, last week, a month from now, four years ago, next time. We work, play, sleep, and eat at certain times. Major events in our lives are organized by time: births, engagements, marriages, deaths. Time or the chronological pattern of lesson organization is a natural way of arranging events in the sequence of order in which they happened, or in giving directions in the order to be followed in carrying them out. This kind of organization is sometimes called sequential organization. Certain processes, procedures, or historical movements and developments can often be explained best with a time sequence pattern.

6.6.2.1 The medical technician presenting a lesson on mouth-to-mouth resuscitation would probably use the time order for the main points: (1) preliminary steps—proper body position, mouth open, tongue and jaw forward, (2) the mouth-to-mouth process, (3) caring for the patient once breathing resumes. Time order is also a logical approach to lessons dealing with such subjects as “How to Pack a Parachute,” “Development of the F-15 Fighter,” or “How to Prepare a Speech.”

6.6.2.2 Furthermore, any lesson on a subject with several phases lends itself well to the time pattern. For example, given an objective for students to know the three planned phases of the Common Market (where phase one was to precede phase two, and phase two precede phase three), a lesson might have these main points: (1) Phase one—a customs union where nations agreed to reduce duties, (2) Phase two—an economic union allowing laborers and
goods to move freely across national borders, (3) Phase three—a political union with national representatives as members of a common parliament and using a common currency.

6.6.2.3 Of course, rather than looking forward in time from a given moment, the strategy might be to look backward from a point in time. In other words, the strategy might be to move from recent to earlier time rather than from early to late. Regardless of which strategy is used, the flow of the lesson and the transitions should make the chronological relationships between main points clear to the students.

6.6.3 Space. A spatial or geographical pattern is effective in describing relationships. When using this pattern, the lesson material is developed according to some directional strategy such as east to west or north to south. For instance, if an instructor were describing the domino theory of guerrilla infiltration, a good strategy would make the main points of the lesson correspond to the geographical locations of various nations.

6.6.3.1 With lessons about certain objects, the strategy might be to arrange the main points from top to bottom or bottom to top. A fire extinguisher might be described from top to bottom, an organizational chart from the highest ranks to the lowest in the organization, a library according to the services found on the first floor, then the second, and finally those on the third.

6.6.3.2 Sometimes, the strategy is to organize the lesson from the center to the outside. For example, the control panel in an airplane might be discussed by describing first those instruments in the center most often used, then by moving out toward the surrounding instruments which are used least often.

6.6.3.3 In all lessons arranged spatially, we need to introduce each aspect or main point according to some strategy. Just as with a lesson organized by time, the subject matter and the transitions should include elaboration and clarification of how the main points relate to one another. A simple listing of the various objects or places without elaboration as to how they are related may confuse the students and make the points harder to remember.

6.6.4 Cause/Effect. A cause/effect pattern of organization is used in a lesson where one set of conditions is given as a cause for another set. In such lessons we may use one of two basic strategies to arrange our main points. With a cause/effect strategy, we begin with a given set of conditions and show that these will produce or have already produced certain results or effects. With an effect-cause strategy, we take a certain set of conditions as the effects and allege that they resulted from certain causes.

6.6.4.1 The cause-effect strategy might be used in a lesson concerning the increasing number of women in the Air Force. The lesson might first discuss the fact that women are now assuming more responsible leadership roles in the Air Force. One effect of women assuming such roles might be that women are joining the Air Force with increasing frequency.

6.6.4.2 The effect-cause strategy might be used in a lesson on child abuse. The first point might explain the effects of child abuse upon the children themselves, the parents, and even on society. The second point might suggest that the causes are that parents themselves were abused as children or that they lack proper education on parenting.

6.6.4.3 Whichever strategy is used, two cautions must be observed: (1) Beware of false causes. Just because one event or circumstance precedes another does not mean that the former causes the latter. Many persons assume that “First A happened, and then B took place, so A must have caused B.” (2) Beware of single causes. Few things result from a single cause. There may be several causes and they may not act independently. Their effect may be greater or less than the sum of their parts. Lack of safety features on automobiles does not by itself cause most highway accidents, but this cause plus careless driving and unsafe highways may, in combination, account for many highway accidents.

6.6.5 Problem-Solution. This pattern, sometimes called the disease-remedy pattern or the need-satisfaction pattern, presents students with a problem and then proposes a way to solve it. With this pattern we must show that a problem exists and then offer a corrective action that is (1) practical, (2) desirable, (3) capable of being put into action, and (4) able to relieve the problem. It must also be one that does not introduce new and worse evils of its own. For example, the issue of controlling nuclear weapons has long been debated. Those against control argue that erosion of national sovereignty from arms control is more dangerous than no control.

6.6.5.1 There are different strategies we might employ when using the problem-solution method. If the students are aware of the problem and the possible solutions, we might discuss the problem briefly, mention the possible solutions, and then spend more time in showing why one solution is better than others. For instance, our objective is for students to comprehend that solar energy is the best solution to the energy crisis. Our main points might be (1) the world is caught in the grip of an energy crisis, (2) several solutions are possible, and (3) solar energy is the best long-term solution.

6.6.5.2 If the students are not aware of the problem or need, we may describe in detail the exact nature of the problem. Sometimes when students become aware of the problem, the solution becomes evident, and little time is needed to develop the solution in the lesson. At other times we need to spend time developing both the problem and the solution.

6.6.5.3 Still another strategy is to alternate or stagger portions of the problem with portions of the solution. For
example, the cost of a project may be seen as one problem, work ability another, time to do the project as a third. Taking each in turn and providing solutions to cost, work ability, and time as we present these aspects of the problem may be more satisfying to students than if we had discussed all of the problem and then its total solution.

6.6.5.4 Whatever strategy is used, with the problem-solution pattern students must become aware that a problem exists before a solution will be agreed upon.

6.6.6 Pro-Con. The pro-con pattern, sometimes called the for-against pattern or advantages-disadvantages pattern, is similar to a problem-solution pattern in that the lesson is usually planned so as to lead to a conclusion. A major difference, however, is that fairly even attention is usually directed toward both sides of an issue with a pro-con pattern.

6.6.6.1 There are various strategies to consider when using the pro-con pattern. One consideration is whether to present pro or con first. Another is whether to present both sides and let students draw their own conclusions or to present the material in such a way that students are led to accept the “school solution.” For instance, with a lesson on the effects of jogging we have to decide whether to present the advantages or disadvantages first. Then we must decide whether to let students decide for themselves whether the advantages outweigh the disadvantages. Pro-con plus one is the label given to the organization used when we draw a final conclusion based on the two sides.

6.6.6.2 When deciding the specific strategy to use with the pro-con pattern and determining how much time to spend on each, the following guidelines may be helpful: (1) giving both sides fairly even emphasis is most effective when the weight of evidence is clearly on the favored side; (2) presenting both sides is more effective when students may be initially opposed to the school solution; (3) presenting only the favored side is most effective when students already favor the school solution or conclusion; (4) presenting the favored side last is generally more favorable to its acceptance, especially if the side not favored is not shown in too strong a light.

6.6.7 Topical. A topical division of the main points of a lesson involves determining categories of the subject or lesson objective. This type of categorizing or classifying often springs directly from the subject itself. For instance, a lesson about a typical college population might be divided into topical divisions of freshmen, sophomores, juniors, and seniors, with each class division serving as a main point. Housing might be discussed in terms of on-base and off-base housing. A lesson on the Minuteman intercontinental ballistic missile might be arranged with the main points of warhead, guidance, and propulsion systems.

6.6.7.1 At times the material itself suggests certain strategies for ordering the main points. For instance, a lesson on levels-of-learning lesson planning would most likely begin with knowledge-level planning as the first main point, since knowledge-level lessons are generally simpler to understand. Then the lesson would move on through the hierarchy to comprehension, application, analysis, synthesis, and finally evaluation levels. In other words, our lesson would follow a simple-to-complex strategy in organizing the “topics” or levels-of-learning.

6.6.7.2 Other topically organized lessons might follow strategies of known to unknown, general to specific, or specific to general. The number of strategies for arranging topical main points is practically infinite. The important consideration, as with any pattern, is that we give thought to the strategy of arrangement in order to improve student understanding and learning.

6.6.8 Combining Patterns. If we use a single pattern to organize the main points, our lessons will make more sense. We will be able to remember more readily what the main points are when we teach the lesson. Even more important, students will be able to follow the lesson more easily and retain the material if we use a single, logical pattern of organization.

6.6.8.1 While we may choose a certain organizational pattern for the main points, we may decide to use different patterns for subpoints. Consider the following tentative outline of a lesson with an objective for students to know the importance of nonverbal factors of communication.

Table 6.1. Non-Verbal Communication

<table>
<thead>
<tr>
<th>I. Performance factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Upper body (head and face)</td>
<td></td>
</tr>
<tr>
<td>1. Positive effects</td>
<td></td>
</tr>
<tr>
<td>2. Negative effects</td>
<td></td>
</tr>
<tr>
<td>B. Middle body (arms, hands, torso)</td>
<td></td>
</tr>
<tr>
<td>1. Positive effects</td>
<td></td>
</tr>
<tr>
<td>2. Negative effects</td>
<td></td>
</tr>
<tr>
<td>C. Lower body (hips, legs, feet)</td>
<td></td>
</tr>
<tr>
<td>1. Positive effects</td>
<td></td>
</tr>
<tr>
<td>2. Negative effects</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Nonperformance factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Objects</td>
<td></td>
</tr>
<tr>
<td>B. Space</td>
<td></td>
</tr>
<tr>
<td>1. Personal or body</td>
<td></td>
</tr>
<tr>
<td>2. Furniture arrangement</td>
<td></td>
</tr>
<tr>
<td>C. Time</td>
<td></td>
</tr>
</tbody>
</table>

6.6.8.2 Notice that the main points (I. Performance factors and II. Nonperformance factors) are arranged topically. The subpoints for main point I (upper, middle, and lower body) are organized spatially. A pro-con pattern is followed in discussing positive and negative effects from each body performance factor. The
subpoints of main point II (objects, space, and time) are organized topically as are the two subpoints under space. The important thing to remember is that each set of main points or subpoints should follow a given pattern of organization. Our tentative outline reflects this fact.

6.6.8.3 Of course, it may be that none of the formal patterns of organization discussed in this chapter adequately fits our content. If this is the case, we must simply strive to organize our lesson in the way that will help present the information to our students in the most meaningful fashion. As we construct our tentative outline, we must do so with our students’ needs in mind. But whatever pattern or strategy we choose, it should be a conscious and rational choice and we should be able to defend or explain it. Quite often, the experienced teacher revises the outline three or four times before being satisfied and finally putting it into final form on the lesson plan.

6.7 The Strategy Statement

6.7.1 Character and Purpose. The strategy statement is simply a detailed plan which explains one’s overall lesson objective and the steps one intends to take in achieving that objective most efficiently and effectively. A well-written strategy statement benefits the writer of the lesson plan by helping to determine the best options to adopt when deciding on methodology, teaching techniques, interim objectives, and type and amount of proof and clarification support. It also helps anyone else who is tasked to teach or modify the lesson later on by spelling out the detailed rationale for choosing these options. When the teachers understand why the different elements of a plan are included and when these reasons are sound, the teachers can more easily adopt the process as their own or adapt the plan more coherently—both internally and as it relates to other lessons in the curriculum. And, just as importantly, the strategy can also benefit the students immensely because it provides a well-formulated overview for the lesson introduction itself by telling the students exactly what will be covered in the lesson without exposing the lesson itself.

6.7.1.1 The strategy statement should be designed in such a way as to walk the instructor through the entire lesson, focussing on every element of the lesson. In this way, a comprehensive strategy statement helps the writer of the plan by forcing the writer to consider questions that are often taken for granted: (1) whether the overall lesson outline and order of main points and subpoints are the most logical and intuitively acceptable; (2) whether the teaching techniques one decides to use are the most appropriate for the lesson; and, (3) how much leeway one can take in the presentation before one changes the actual objective. Moreover, it provides a quick mental outline of the entire lesson that helps prevent the instructor’s having to script, or slavishly rely on the lesson plan (thereby destroying the spontaneity of the presentation).

6.7.2 Method of Presentation. The strategy statement should move the reader through the lesson simultaneously from the general to the specific elements as well as sequentially, from attention step through the closure. No part of the lesson plan and no decision about teaching techniques (use of demonstrations, use of questions, where to insert mini-lectures) should be overlooked or assumed in the strategy. Spelling out each element about which we sometimes make subconscious decisions in lesson formulation often reveals conventions that we sometimes misuse or overuse in the practice of education—again, a benefit to the writer and any other teacher of the lesson.

6.7.2.1 We suggest that you start by looking at your lesson objective and organizational pattern to decide on an overall strategic ordering of the main points. State this ordering up front; e.g., general to specific, specific to general, most to least important, known to unknown, simple to complex. This decision will give you a general focus to lead you toward the objective efficiently.

6.7.2.2 Follow this with a sequential statement of each main point and its associated subpoints to include method of presentation and rationales for the method and order of presentation. Each of these steps is important to help the lesson planner fit the elements together and consider all the factors necessary for justifying each decision. In effect, this method can be simplified by meticulously asking and answering the three questions that are indispensable for comprehensive lesson development: “WHAT, HOW, and WHY.”

6.7.3 Interrelating the Questions. Whenever there is a significant lesson element, it constitutes an answer to the “What?” question that must be answered in the strategy. A significant lesson element is every main point or subpoint that the instructor includes in the lesson and each must be denoted in the strategy statement. Often, segments of the lesson, e.g., the introduction, attention step, interim summary, or conclusion, represent significant elements that should or must also be mentioned in the strategy. Significant lesson elements tell the teacher (and sometimes, the student) what will be covered or where there is an important or required tactical decision. But this is just the beginning of the process because, if we were to stop with these determinations of what we intend to do and where we intend to do it, we would be left with simply a laundry list of elements to be touched on during the lesson. Of more significance to the lesson planner are the answers to the “How?” and “Why?” questions.

6.7.3.1 Asking and answering “How?” to each of these “whats” force us to determine and delineate the method, manner, or sequence of presenting the significant elements that will be included. It is important to make these determinations because we have a palette full of teaching techniques, patterns, and methodologies from which to choose. And it is often helpful to specify these
decisions to encourage precision in our lesson formulation. For example, very often we state that we will "discuss" a particular topic when we have absolutely no intention of discussing it at all (as evidenced by our failure to plan discussion questions in that part of the plan). Answering the "How?" question will help us to focus our intentions and prevent us from making the mistake of saying we will discuss something without providing discussion questions within the lesson plan. Alternatively, we might want to demonstrate, or even have a student demonstrate, something within the lesson or we might want to show a movie or slides to illustrate a lesson element most effectively. But if we state, in the strategy, that we will "explain" a given concept in this part of the lesson, this disconnect with what we actually plan in the lesson will be more evident.

6.7.3.2 But one cannot determine the final answer to "How?" without giving full consideration to why the decision is made. Therefore, the answer to "Why?" must be fully integrated into the strategy statement. This answer provides the intellectual glue that binds the parts of the strategy statement into a cohesive whole. It justifies each decision the planner makes and fits the elements of this puzzle together. It helps to prevent our adding the dazzle and flash that add no educational value to the lesson. Everything must have a sound reason for its inclusion or it should be left out of the lesson. The "Why" should ask why the main points and subpoints are in the order we choose as well as force us to provide a reason for our choice of techniques, patterns, methods, and the inclusion of every other "what" in the lesson.

6.7.3.3 This explanation of the role of "WHAT, HOW, and WHY" in writing a comprehensive strategy should stimulate at least a preliminary understanding of how the strategy statement can help us plan much better lessons. A full appreciation can only be aroused, however, by our use of this technique and by comparing lesson plans based on this process to those written without comprehensive strategies. But beyond the immediate benefits to lesson planning, there are other benefits that are just as valid and sometimes more helpful. For example, lesson plans are continuously modified or updated—often by other than the original lesson developer. What a benefit it is to be able to make minor adjustments with a clear understanding of the reasoning that dictated the original form of the lesson!

6.7.4 Significance of the Questions. Why is it so important to be this specific in writing the strategy? The answer is self-evident since all techniques and methods (or combinations of these) are potentially appropriate in a lesson until the lesson planner decides which is most effective. If the writer does not make this decision or doesn’t realize what is best to do in a given scenario, the lesson will never be as effective as it could be. In almost any human endeavor the effectiveness of interpersonal communication is inversely proportional to how much one allows to be left unstated or "understood."

6.7.4.1 In order to emphasize the importance of including each of these questions in the strategy statement, an appropriate comparison can be made between the strategy statement and a cooking recipe. In each case, the intended result is a palatable concoction of ingredients. But none of us can combine a list of ingredients (what) of a dish (what) to produce the desired result unless we knew the correct measurements of each (how) as well as the method (how) and the time (how) of cooking. Even the order of combining the ingredients (how) at each stage of the cooking process is often important to get the desired result. Needless to say, adding salt too early in a meat recipe could reduce the succulence of the dish. But without a working understanding of what each of the ingredients does in a recipe (why) we would be unable to easily and successfully modify the recipe for the microwave in lieu of the oven or to substitute elements such as mayonnaise for oil and eggs in a cake recipe.

6.7.4.2 Therefore, it is imperative to ask and answer these three questions in a well-developed strategy statement. And it is equally important to interweave the answers throughout the strategy. This careful choice and justification of all lesson plan elements will result in better preparation.

6.7.4.3 The following are examples of strategies that demonstrate the principles outlined above. Two things should be noticed about these examples. First, the "WHAT, HOW and WHY" statements are interwoven throughout the statements. This intertwining of elements helps to ensure that everything in the plan has a justifiable purpose. Second, some of these statements serve double duty, e.g., some "what" statements are also "how" or "why" statements. This is perfectly legitimate and any type statement can serve more than one purpose. This phenomenon may even help to strengthen the cohesion of the overall strategy.
Table 6.2. Example 1

<table>
<thead>
<tr>
<th>WHAT?</th>
<th>HOW?</th>
<th>WHY?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESSON TYPE: Informal Lecture.</td>
<td>PART IB</td>
<td></td>
</tr>
<tr>
<td>ORGANIZATIONAL PATTERN: Topical.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRATEGY: This lesson will begin with a definition of personal effectiveness to ensure that students start from a common reference point. Once the definition is covered I will discuss the three elements of the time management model: setting priorities, daily planning, and delegation, along with their relationship to personal effectiveness. Beginning with priority systems, I will establish the principle that “Using a Priority System Improves Personal Effectiveness” through lecture, questions, and answers. Since establishing priorities is the first step one takes in a time management system, it is logical that I begin here. Once priorities are established, planning can begin. With the relationship between priorities and personal effectiveness established, I will next examine how planning daily activities improves personal effectiveness. Finally, I will discuss how “Delegation Improves Personal Effectiveness.” Delegation is the last step in my time management model and therefore, will be reviewed last during today’s presentation. I will summarize the three main points in a comprehension-level summary combining my teaching points with the student inputs from the classroom questions to aid in reaching the generalization that “Time Management Techniques Improve Personal Effectiveness.”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.3. Example 2

<table>
<thead>
<tr>
<th>WHAT?</th>
<th>HOW?</th>
<th>WHY?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESSON TYPE: Demonstration-Performance.</td>
<td>PART IB</td>
<td></td>
</tr>
<tr>
<td>ORGANIZATIONAL PATTERN: Sequential.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRATEGY: The lesson on determining cash value will be taught in sequential order to show how each step of the calculation builds on the next. The lesson will start with a brief explanation of present value and cash flows. This explanation will help students understand the benefit of using this method in determining the time value of their money. Next, a demonstration and explanation of each task step of the process of calculating the present value of an unequal stream of payments to show each student how to extract necessary data from a scenario and obtain the present value of the each amount. This demonstration and explanation step will also teach students how to use the present value table. The instructor will then have the students perform the calculations themselves while he reads the task steps to give the students practice under controlled conditions. Once the students have completed the task steps, they will practice once more on their own with the last practice occurring under conditions duplicating the final evaluation so that the instructor can be sure each student is ready. The demonstration and explanation of problem, the controlled practice problem and the independently done practice problem should provide enough repetition of the required sequence of steps while providing adequate time for questions to ensure students are learning the procedure. The instructor will then have the students perform the computations without assistance, and then he will grade the results to ensure the students have performed to the required standards.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.8.1 Most students find it difficult to understand unsupported ideas or assertions. Suppose, for instance, we tell our students that it is important to organize a speech or a lesson according to one of several patterns of presentation. We then tell them that the most common patterns are time, space, cause, problem-solution, pro-con, and topic. Most likely, we will not have provided enough information so that our students can actually use these patterns of organization. We must go on to explain each of these patterns, as has been done in the preceding section of this chapter.

6.8.2 The subject, the method, the ability of students, the size of the class, and similar factors will help determine the amount and kinds of support material we need. We may also want to use visual support. Chapter 19 discusses types of visual support materials. Some rules governing their use are also presented.

6.8.3 Verbal support is needed either (1) to clarify or explain our points or (2) to prove our assertions. Definitions, examples, and comparisons are used primarily for clarification support. Their use as proof is limited. Statistics and testimony of experts can be used either for clarification or proof. With lectures and other presentational methods, the instructor actually furnishes the support. With methods involving student interaction, such as the guided discussion, instructors use questions to encourage support materials from the students. Chapter 11 discusses how to use questions effectively.

6.8.4 Definitions. Definitions are often needed to clarify or explain the meaning of a term, concept, or principle. But like so many words, the term definition can mean different things and function in different ways.

6.8.4.1 In some lessons we need to use words that are technical, complex, or strange to our students. With the increasing specialization of Air Force schools in both theoretical and applied subjects, the output of words races ahead of dictionaries. Words such as “emphysema” (medicine), “taxonomy” (education), “detente” (military strategy), or “groupthink” (group dynamics) might require literal definitions or restatement in simpler language.

6.8.4.2 At other times we need to define words that we frequently and loosely employ. Some words simply have different meanings for different people. Words such as “democracy,” “equal rights,” “security needs,” and “loyalty” can often be defined easily. For instance, “disseminate” can be defined very simply as “spread widely.” At other times we might seek novel and memorable ways to define our terms. “Pragmatism” might be defined as “a fancy word to mean that the proof of the pudding is in the eating.” Sometimes it takes a little longer to define fully what we mean by a certain term. A former POW might define the sacrifice of one prisoner for another:

Table 6.4. Example 3

<table>
<thead>
<tr>
<th>WHAT?</th>
<th>HOW?</th>
<th>WHY?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESSON TYPE: Teaching Interview.</td>
<td>PART IB</td>
<td></td>
</tr>
<tr>
<td>ORGANIZATIONAL PATTERN: Topical.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRATEGY: The interview will start with lead-off and follow-up questions about the general role and purpose of the Security Assistance Training Program (SATP) to show the main point that the SATP promotes national security. Then a series of lead-off and follow-up questions addressing the particular role the International Officers School (IOS) plays in the training process will demonstrate the other main point; viz., that IOS (also, as a player in the SATP) promotes national security. Students will learn what the SATP is from the point of view of its initial purpose as well as how it operates today. This will be done by use of a practicing expert within the SATP. The interviewing of the expert is chosen for two reasons: 1) to effectively present the concept of the SATP in an understandable and interesting format with the use of personal experience and real-life examples; and, 2) to foster an affective response on the part of the students by testimony of one who believes in the goals of the SATP. A topical pattern will be used to explain the goals and importance of the SATP as well as the goals and importance of IOS as it contributes to reaching that goal through the use of Air Force training resources. The interview will proceed from a general explanation and understanding of the role of IOS. This strategy should be more effective in fostering a deeper comprehension of the importance of the program as well as pointing out the personal relevance of the program to the ordinary Air Force civilian or military member, all of whom are likely to encounter an international military student during their careers. After the formal interview of the guest by the instructor, a question and answer period will be directed by the instructor to further illuminate the topic.</td>
<td></td>
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</tbody>
</table>
6.8.4.3 “When you see an American prisoner giving up his meager ration of fish just so another American who is sick can have a little more to eat, that is sacrifice. Because when you don’t have anything, and you give it up, or you have very little and you give it up, then you’re hurting yourself, and that is true sacrifice. That’s what I saw in the prison camp.”

6.8.4.4 Definitions should be used to explain the meaning of acronyms, that is, words formed from initials. In the preceding paragraph, with some audiences it might have been necessary to explain that POW stands for prisoner of war. When discussing PME at AU, we might have to explain that PME at AU means professional military education that is taught at Air University. Furthermore, we might go on to mention that PME includes AWC, ACSC, SOS, and SNCOA—that is, the Air War College, the Air Command and Staff College, the Squadron Officer School, and the Senior Noncommissioned Officer Academy.

6.8.5.1 Often short examples can be clustered together in order to help students gain a more complete understanding of the point. In a lesson on a barrier to effective communication, we might cluster examples of spoonerisms: “Is the bean dizzy?” (Is the dean busy?); “I’ll have a coff of cuppee” (I’ll have a cup of coffee); “A half-warmed fish within us” (A half-formed wish within us).

6.8.6 Comparisons. Description often becomes more graphic when we place an unknown or little understood item beside a similar but better known item. We might want to compare things that are unlike or things that are very much alike.

6.8.6.1 Metaphors such as Winston Churchill’s “iron curtain” or similes (using the words like or as, such as Robert Burns’ “My love is like a red, red rose,” or the saying “strong as an ox”) are comparisons of things that are unlike in most ways. We often use comparisons of unlike things in lessons. For instance, we might say, “The flow of knowledge is like the relentless and uncompromising flow of a river after the spring thaw as it imposes on us the requirement that we not only adjust but anticipate the future.” Or we might show that being a member of a branch in an Air Force organization is like living in a family where we have intimate contact with each other. We might carry the analogy or comparison further by pointing out that in a unit as in a family, members can protect, help, or irritate one another.

Table 6.5. Example 4

Several questions can be asked about examples used in lessons:

- Do they accurately represent the point?
- Will students clearly understand their meaning?
- Do they fit the content? (Avoid those that may confuse.)
- Do humorous ones add rather than distract from the lesson? (Chapter 13 presents some guidelines for using humor.)
- Do they come from personal experience or can other examples be personalized in such a way as to seem real?
- Can anything be gained from clustering more than 3 or 4 examples? (Usually not.)
- Do long ones take too much time? (At times affective or attention-getting value of long examples may justify their use.)
- Are they interesting?

The appropriate answers to these questions should be obvious.
6.8.6.4 Obviously, any kind of comparison may be very brief like those given here or they may be quite long. We need to decide what will work best in a given situation. But whether long or short, comparisons are a valuable and generally underused method of verbal support.

6.8.7 Testimony. Words and thoughts of others become particularly useful when we wish to add strong proof support for assertions or points that we make. None of us is expected to be an expert on all subjects; often we must rely on what others have said. At times we use the testimony of others simply to clarify or explain an idea; often it is intended to provide proof for a claim.

6.8.7.1 A lesson dealing with managerial effectiveness in an organization may have as one of its main points the importance of effective downward communication. In other words, we want to stress how important it is for supervisors to keep their subordinates informed. We might quote from a recent “Air Force Policy Letter For Commanders,” which says, “Commanders and supervisors have an increased responsibility to keep Air Force military and civilian members informed.” We might also report the findings from a recent study by the International Association of Business Communicators which show that “face-to-face communication, including group meetings and one-on-one dialogue, proved the most effective means of communicating with employees.”

6.8.7.2 Sometimes, we will use direct quotations as we have done here. At other times we will paraphrase what another has said. Whatever the case, there are two questions we will want to ask about the sources of testimony we plan to use: (1) Are the sources competent—do they know what they are talking about? And (2) Can they be trusted—are they free from bias? We might also consider whether the testimony is relevant, clear, and interesting and whether quotations are longer than necessary.

6.8.8 Statistics. Statistics are probably the most misused and misunderstood type of verbal support. When properly collected and wisely used, statistics can help instructors clarify their ideas. Statistics are also the most powerful proof support we can use. Not all figures, however, are statistics; some are simply numbers. Statistics show relationships (largeness or smallness, increases or decreases) or summarize large collections of facts or data. When we choose statistics to use in our lessons, there are some questions we should ask.

6.8.8.1 Are the statistics recent? Figures concerning the cost of living in 1960 would have limited usefulness for today’s family planning its budget. When selecting statistics to use in our lessons, we should be on guard if no date is given or if the statistics are outdated.

6.8.8.2 Do the statistics indicate what they purport to? A single test score may not be a true measure of a student’s ability. Comparing the simple number of planes may not indicate the comparative strength of two countries’ air forces.

6.8.8.3 Do the statistics cover a long enough time to be reliable? The results of how one class responded to a new curriculum change would be less meaningful than how three or four classes responded to the change.

6.8.8.4 If the statistics are drawn from a sample, does the sample accurately represent the group to which we are generalizing? Public opinion surveys and experimental researchers are generally sensitive to the importance of obtaining a representative sample. Instructors also need to be sensitive to this need.

6.8.8.5 When statistics report differences, are the differences significant? Minor variations can often be attributed to chance. In other words, if we were to collect our statistics again, the results might differ.

6.8.8.6 When comparing things, are the same units of measure used to make the comparison? Failure in one course might have a different meaning from failure in another. If more students fail one course than another, we cannot necessarily conclude that the content of one course is more difficult. Perhaps the grading scale rather than the content was more difficult.

6.8.8.7 Do the statistics come from a reliable source? And is the source clearly indicated? It is more effective to state the source of the information than to say, “recent surveys show.”

6.8.8.8 Are the statistics presented to their best advantage to aid student understanding? Could visual aids be used to present the statistics in graphic or tabular form for easier understanding? Have figures been rounded off where possible? Students are more likely to remember nearly $45,000 than $44,871.24. Is the number of statistics limited so that students are not overwhelmed by them? Could the significance of statistics be made more clear with meaningful comparisons? To say that World War II cost the United States 200 billion dollars would be more clearly perceived if the figures were converted to today’s dollars or if they were compared to the cost of other wars using a standard measure.

6.9 Beginning And Ending The Lesson. So far we have selected the verbal and visual material that best supports our lesson and made necessary changes in the original tentative outline. We are now ready to cast our lesson into a final content outline. Usually before we outline, however, we will want to consider how to begin and end the lesson. If the lesson is not the first in a block of instruction, we may have little to do in the way of beginning or introducing the lesson. If other lessons in the same block of instruction are to follow this lesson, we may not need an extensive conclusion. But especially if the lesson is to stand alone, we need to give some attention toward preparing an introduction and conclusion.

6.9.1 Introduction. The introduction to a lesson should serve several purposes: to establish a common ground between the instructor and students, to capture and hold
attention, to outline the lesson and relate it to the overall course, to point out benefits to the student, and to lead the student into the lesson content. While humor may be appropriate, the introduction should be free of irrelevant stories, jokes, or incidents that distract from the lesson objective. It should not contain long or apologetic remarks that are likely to dampen student interest in the lesson. Educators often speak of three necessary elements in the introduction of a lesson: gain attention, motivate, and provide an overview of lesson material.

6.9.1.1 Attention. To gain attention, the instructor may relate some incident that focuses on the subject and provides a background for the lesson. Another approach may be to make an unexpected or surprising statement or ask a question that relates the lesson to group needs. A rhetorical question (Have you ever...? or Can you imagine...?) may be effective. At other times, nothing more than a clear indication that the lesson has begun is sufficient. In all instances, the primary concern is to focus student attention on the subject.

6.9.1.2 Motivation. The instructor should use the introduction to discuss specific reasons why the students need to learn whatever they are about to learn. In this motivational discussion, the instructor should make a personal appeal to students and reinforce their desire to learn. The appeal may relate the learning to career advancement or to some other need. But in every instance, the instructor should cite a specific application for student learning experiences. In many cases, the need for this lesson as a foundation for future lessons is strong motivation. This motivational appeal should continue throughout the lesson. If a brief mention of needs is made only in the introduction, the instructor is square-filling, not motivating.

6.9.1.3 Overview. For most instructional methods, the introduction should provide an overview of what is to be covered during the class period. An overview with a clear, concise presentation of the objective and key objective and key ideas serves as a road map for learning. Effective visual aids can be helpful at this point. A clear overview can contribute greatly to a lesson by removing doubts in the minds of the learners about where the lesson is going and how they are going to get there. Students can be told what will be covered or left out and why. They can be informed about how the ideas have been organized. Research shows that students understand better and retain more when they know what to expect. The purpose of the overview is to prepare students to listen to the body of the lesson.

6.9.2 Conclusion. The conclusion of a lesson may stick with the students longer than anything else said. For this reason, we should give much care to its preparation. But the conclusion is also important in its own right. The conclusion of most lessons should accomplish three things: summarize, remotivate, and provide closure.

6.9.2.1 Final Summary. Short or interim knowledge-level summaries may be appropriate at various places in a knowledge-level lesson, for example, after each main point has been made. But final knowledge-level summaries come after all main points of the lesson have been made. An effective knowledge-level summary retraces the important elements of the lesson. As the term suggests, a final knowledge-level summary reviews the main points in a concise manner. By reviewing the main points, it can aid students’ retention of information and give them a chance to fill in missing information in their notes.

6.9.2.1.1 In lessons designed to reach a conclusion (principle), a comprehension-level summary is desired as the final summary. Short or interim comprehension-level summaries may come at the conclusion of main points. But the final comprehension-level summary comes after all main points of the lesson have been made and serves as the first part of the lesson conclusion. The purpose of a comprehension-level summary is to provide logical and consistent reasons which support or lead to the desired conclusion (lesson objective).

6.9.2.1.2 The comprehension-level final summary may require several minutes. While containing a brief restatement of significant information, it requires an expansion of key items to establish relationships which lead to a generalization. The generalization is the instructional objective. New support material can be introduced when needed to establish the generalization.

6.9.2.2 Remotivation. The purpose of the remotivation is to instill in students a desire to retain and use what they have learned. Effective instructors provide motivation throughout the lesson. But the remotivation step is the instructor’s last chance to let students know why the information presented in the lesson is so important to the student as an individual. Perhaps it is important because it provides the groundwork for future lessons or because it will help do their jobs more effectively. But whatever the reasons given, they should be ones that appeal directly to the students and show the importance to them of what was learned.

6.9.2.3 Closure. For many instructors the closure presents the most difficult challenge in planning a lesson. Students need to be released from active participation. In lectures they need to be released from listening. In interactive methods they need to know that it is time for their verbal participation to cease. Sometimes instructors, at a loss as to how to close, say, “Well that’s about all I have to say,” or “I guess I don’t have anything else.” This type of closure is not very satisfying. There are much more effective ways of closing. Sometimes vocal inflection can signal that the lesson is ending. Quotations, stories, or humorous incidents can also provide effective closure. Sometimes when the lesson is to followed by others in the same block of instruction, we might say something such as, “Next time, then, we will...”
continue with our discussion of.... Between now and then if you have any questions, come to my office and I’ll see if I can answer them for you.”

6.10 Preparing The Final Outline. After we have researched the topic, selected an instructional method, identified the lesson planning format we will use, organized the lesson, chosen our support materials, and decided how to begin and end the lesson, we are ready to prepare our final content outline. We may, in fact, prepare two versions of the outline. One version will be very complete—almost in manuscript form—so we can return to it several weeks or months later when we have to teach the lesson again or when someone else must teach the lesson. Another version will be much briefer—perhaps only one page long, or written on cards so we can carry it with us to the classroom and teach from it. This brief outline may be thought of as a keyword outline with key words and phrases to remind us of main points, subpoints, support material we plan to use, questions we might ask, and the things we want to mention in the introduction and conclusion of the lesson.

6.10.1 Since this keyword outline is a basic minimum for most of us to take into the classroom with us, the following discussion focuses on its construction. The longer version of the outline will follow the same principles, but much more information will be included in the outline.

6.10.2 Preparing a Keyword Outline

6.10.2.1 Division. The outline should be divided into three main parts: introduction, body, and conclusion. As discussed previously, the introduction will generally have three subparts: attention, motivation, and overview. The body will have the main points of the lesson as major subdivisions. The conclusion will have three subdivisions: final summary, remotivation, and closure.

6.10.2.2 Symbol system. To show the relative importance of lesson materials in the body of the lesson, we use a number or letter symbol before each entry. A Roman numeral may be used to designate main points, capital letters for subpoints, Arabic numerals for sub-subpoints, lower case letters for sub-sub-sub-points, and so forth. Some rules of outlining to remember are: (1) Only one symbol should be used per point or idea, (2) Subordinate points should be indented, and (3) The principle of subpoints or subordination means that a point follows logically or supports the point above it.

6.10.2.3 Sample Keyword Outline. Earlier we considered how we might make a tentative outline for a lesson on nonverbal communication. Now let us consider how we might revise that outline to teach from in class.

This outline has been prepared to use with the lecture method. The same outline could be revised slightly to use with a guided discussion or teaching interview method by simply replacing references to support material the instructor supplies with questions that would prompt students or an expert to supply appropriate support material.

6.11 Summary. A lesson plan is a plan for learning. The complete cycle of lesson planning may include eight steps: (1) Determine the objective and state in terms of what the students are expected to learn, (2) Research the topic as defined by the objective. To obtain useful and appropriate subject matter material we would draw first from our own personal knowledge of the subject, then draw on the expertise of others around us, and finally make effective use of a library, (3) Select the appropriate instructional method with regard to designated student outcomes and acceptable student activities, (4) Identify a usable lesson planning format. We need to select a format that serves as a checkpoint for well-planned learning experiences and provides a worthwhile teaching aid, (5) Decide how to organize the lesson. Organization of main points and subpoints is important because it helps instructors and students remember the material. Commonly used patterns of organization are time, space, cause-effect, problem-solution, pro-con, and topical. Strategies for how we organize material with these patterns are also important. Although we may choose one pattern for organizing our main points, we may choose a different pattern for organizing subpoints, (6) Choosing support material. Students understand supported ideas or assertions better than if support is not given. Definitions, examples, and comparisons are used mainly as clarification support. Statistics and testimony from experts can be used for either clarification or proof, (7) Beginning and ending the lesson. The beginning or introduction generally has three necessary elements: attention, motivation, and overview of what is to follow. The conclusion has three parts: final summary (or summation in lessons teaching principles), remotivation, and closure, and (8) Preparing the final outline. We may prepare two versions of the outline. One version will be very complete so the information remains intact if we want to return to it at a later time. A second version will be much briefer so we can teach from it in the classroom.
### Table 6.6. Non-Verbal Communication

#### INTRODUCTION
Attention: “Actions speak louder than words.” “Dinner jacket” example
Motivation: Dr. Ray Birdwhistle—65% of message communicate nonverbally
Importance—jobs, family, church, clubs
Overview: Chart listing main points and first level subpoints
Define “performance factors” and “nonperformance factors”

#### BODY
I. Know performance factors of nonverbal communication
   A. Upper body—importance capitalized on by F.D.R.
      1. Head
         a. Theory of origin of head gesture.
         b. Cultural differences
      2. Eyes—very important
         a. Show interest in others—example of blind student
         b. Nonverbal feedback—cultural differences
         c. Increase credibility—describe U of Mo. studies
      3. Facial Expression
         a. Affect displays—read Charles Darwin quote on expression
         b. Affect recognition—use everyday examples
   B. Middle Body
      1. Arms—demonstrate how we use them
      2. Hands—primary means of gesturing
         a. Compare meanings from different cultures—OK and Victory signs
         b. Demonstrate use of hands
      3. Torso—demonstrate shoulder, chest, stomach—belly dancer example
   C. Lower body
      1. Hips—Elvis example
      2. Legs—compare with foundation of building
      3. Feet—show different angles
II. Nonperformance Factors
   A. Objects
      1. Present—clothes, home, office
      2. Past—things we have constructed—example of my former home
   B. Space
      1. Personal
         a. Stress cultural differences—give example of visit to Greece
         b. Space bubble—example of waiting for bus or in line
         c. Acceptable distance—cite statistics by Hall
      2. Constructed—office arrangement, fences, etc.
   C. Time—humorous definition from Esquire, Wetumpka example

#### CONCLUSION
Summary: Reteach main points
Remotivation: Stress importance of nonverbal to each student
Closure: Tell humorous story of how deaf man solved problem; challenge students to do likewise
Chapter 7
DEVELOPING KNOWLEDGE-LEVEL LESSONS

7.1 Introduction. Most of us could not do our jobs without knowing a great many facts. As described in previous chapters, the ability to recall or recognize facts is classified as learning at the knowledge level. According to most systems for classifying learning objectives, the task of memorizing factual information is a low level mental process (see Chapter 3). According to Bloom’s taxonomy, the basis of this chapter, knowledge-level learning is the most elementary and least complex level of learning in the cognitive domain. Although it is the lowest level of learning, it is absolutely necessary as the foundation for all higher levels of learning.

7.1.1 Learning facts is not necessarily easy. Some information is fairly simple to remember—the USAF rank structure, the major commands, or the range and payloads of various aircraft. Other information, such as complex operating procedures and the wide range of complex regulations, is extremely difficult to learn and remember.

7.2 Appropriateness Of Classroom Instruction At The Knowledge Level. As difficult as knowledge-level lessons can be for the student, they are generally the easiest for instructors to plan and teach. Instructors may be tempted to teach at the knowledge level to avoid the more difficult task of developing understanding. While it is important to learn facts, we must avoid using too much classroom time teaching at the knowledge level if it is at the expense of higher levels of learning. To teach facts, we should normally use reading assignments, slide-tape presentations, and other noninstructor controlled methods whenever feasible, and save available classroom time for other uses.

7.2.1 There are many classroom situations, however, when we need to teach knowledge-level information. Use class time for knowledge level lessons if any of the following conditions exist.

7.2.1.1 Rapidly changing subject matter. Many areas of instruction change too rapidly to keep printed materials and other media up to date. To keep instruction current, we may have to teach knowledge-level lessons in class, even though other methods of presentation could better do the job.

7.2.1.2 Cost effectiveness. In many cases, it may simply cost less to teach knowledge-level information in a classroom setting. We may discover that the cost of preparing another medium is more than the cost of the classroom presentation. Considerations that might affect this decision include the costs for media production, course administration, study carrels, and costs of changes or updating.

7.2.1.3 Need for interpretation of facts. No matter how clear and straightforward, many facts are difficult to learn without instructor assistance. We rarely get a class of adult students with backgrounds and reading levels that match perfectly with what they need to learn. An instructor may be of assistance in interpreting technical terms, important data, and charts or graphs. It is difficult for students to memorize knowledge-level information if they do not understand the basic terminology used.

7.2.1.4 Increasing the significance of subject matter. We can make knowledge-level material more significant in the eyes of our students by bringing it out of the text and into our classroom. The importance of the material for our students may be increased by the special attention that we give it. Out of so many facts that could be learned from any course, we may signal to our students that some material is more important than others by devoting some class time to it. A review of a reading assignment, going over a handout in class, or bringing in an outside speaker to impart information are all cues to our students that the subject matter has special significance.

7.2.1.5 Need for human interaction. Because much of the knowledge-level information that must be learned is dry and difficult, students become discouraged or disinterested. Even highly motivated students quickly tire of this type learning. It may be to their best interest, and ours, to have some instruction in a group to raise interest or sustain motivation. Often individualized study assignments, especially over a long period of time, fail to satisfy basic needs for interaction with others. An awareness of group dynamics is important even at this level of instruction.

7.3 Planning Knowledge Level Lessons. Teaching information at the knowledge level is relatively simple compared to the higher levels of learning. Good planning, however, is as vital at this level as it is at any other. Planning for students to learn and remember important factual information can be a challenge. Much of that challenge comes from the need to keep instruction on target and free from unnecessary complications.

7.3.1 Patterns and strategies. Factual information should be well organized for learning. Although the reasons for learning many facts are obvious, the pattern and strategy of the plan can affect learning. Although the material on organizational patterns and strategies is introduced in Chapter 6, a brief discussion of how they apply to teaching at the knowledge level is appropriate.

7.3.2 The pattern of lesson development can help a student organize and retain information. In knowledge-level lessons, the organizational pattern should be obvious and logical. Information about the structure of a unit may be learned more easily and retained if it is presented spatially (top to bottom as in an organization chart, or by geographic regions going from one direction to another in a logical fashion). Safety information, first
aid, and many other similar topics can be organized into a cause-and-effect pattern. Sequencing or ordering is a very successful way to organize for teaching procedures. Topical planning is a very useful pattern for knowledge-level instruction. Topical planning is especially effective since so much of the factual material we teach naturally groups itself this way when the topic outline is made clear to the students. Strategies for dealing with factual information may be looked at as applied common sense. Most of us prefer to learn new information by relating it to what we already know. There are many strategies for presenting facts to our students which capitalize on this need to relate the new to the old. The obvious strategy of known to unknown works well at the knowledge level. Building from simple information to more complex information, still at the knowledge level, is generally another good strategy. Unfortunately, many experts fail to plan for linking new information to old because the relationship seems so obvious to them, but not to the student. The plan for teaching and learning should be focused on the needs of students and must take their beginning level of knowledge into account.

7.4 Developing The Teaching Outline. By the time we sit down to develop an actual outline for teaching and learning, several important steps in the planning process are already done. Lesson objectives have been written by or for us. We have researched the subject, and we begin to see a logical organization of the material and a basic strategy for teaching. We may even be given a skeleton lesson outline which we are to expand on and "personalize." In most cases, we have already selected an appropriate teaching method.

7.4.1 The teaching outline of our lesson plan will be the product of our decisions in all of these matters. Whether we are writing our own teaching outline from scratch or personalizing one given to us, the teaching outline must make sense both to us and to our students. The lesson organization and planning strategy should be obvious. In addition to keeping us on track with our lesson, we should also share our outline with the students, in an overview, so they will know how the lesson will proceed.

7.4.2 The teaching outline for this level of learning may range from a few note cards to several pages, but the outline should always be simple and straightforward. The following examples illustrate three simple knowledge-level teaching outlines. Each example contains objectives written at the knowledge level and main points in outline form. Considerably more detail would be required to satisfy the need for a teachable plan, but the examples do illustrate the relatively simple teaching outline of most knowledge-level lessons.

7.4.2.1 Example 1 illustrates a plan organized topically; the teaching strategy is probably known to unknown. (Table 7.1) The instructor has calculated that these three objectives represent a logical way to organize this material for both teaching and learning. In addition, the instructor has started the lesson plan with information on the mission because it is assumed that students have some previous knowledge in this area. After receiving the information on mission and history, students are now prepared to tackle the most complex and lengthy area—organization.

7.4.2.2 Example 2, the nature of the ISD model and the three items concerning each, provides us with at least two logical patterns for instructional system lesson development. (Table 7.2) The first outline follows a topical development for the objectives with a sequential development for the main points. An equally good alternative is illustrated in the second outline. In this case, the objectives in the lesson outline are the sequential process steps in the ISD process, and the three areas of information about each are set up as topical main points. The strategy is also driven by the ISD model. The philosophy behind this approach to teaching and learning is already built into the model and forms the strategy of the lesson.

7.4.2.3 Example 3 shows the fairly common cause-effect pattern of organization. (Table 7.3) Depending on the actual topic being developed, the main points might have been arranged in a simple to complex or known to unknown strategy.

7.4.3 Each of these examples illustrates simple but logical development for a knowledge-level lesson. Basic outlining skills and a little planning will add greatly to effective teaching at the knowledge level.

7.5 Support Material. All lessons, no matter which level, require adequate and appropriate support material, but unlike support material for lessons at higher levels of learning, support for knowledge-level lessons is provided for its own sake, to contribute directly to the student’s ability to remember what is being taught. Examples are not given to enable the student to generate new examples. Steps in a procedure are taught in a way that will make the student remember, not so the student can interpret the reason for the procedure. Statistics and testimony are taught to be remembered in themselves, not to raise the students’ understanding to a higher level of abstraction.

7.5.1 Testimony, supplemental data, and statistics—important for the higher levels—should be kept to a minimum if they interfere with the learning of important information. For this reason, very little information which is not important enough to be remembered should be contained in a knowledge-level plan. Instructors who use support material to develop understanding, rather than to promote retention, should reexamine the lesson objective. Continued need for new examples, need for discussion to clarify points, or a dissatisfaction with the low level of test items may be a clue that we should be teaching to a higher level of learning.

7.6 Teaching The Lesson. Instructors teaching at the knowledge level must make a real contribution to learning. If not, they come close to being little more than
audiovisual aids. Instructors can best add those benefits that come from interaction among students. Keeping in mind that the flow of knowledge-level information lessens the importance of a live instructor, we should at least make certain that we are no less effective than a well prepared visual aid.

Table 7.1. Example 1

<table>
<thead>
<tr>
<th>Objectives and Main Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Know the mission of the ____________________</td>
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<tr>
<td>a. .....</td>
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<tr>
<td>b. .....</td>
</tr>
<tr>
<td>2. Know the history of the ______________________________</td>
</tr>
<tr>
<td>a. .....</td>
</tr>
<tr>
<td>b. .....</td>
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<tr>
<td>3. Know the organization of the ______________________________</td>
</tr>
<tr>
<td>a. .....</td>
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<tr>
<td>b. .....</td>
</tr>
</tbody>
</table>

Table 7.2. Example 2

<table>
<thead>
<tr>
<th>Objectives and Main Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Know the phases of the USAF Instructional System Development (ISD) Model.</td>
</tr>
<tr>
<td>a. Analyze</td>
</tr>
<tr>
<td>b. Design</td>
</tr>
<tr>
<td>c. Development</td>
</tr>
<tr>
<td>d. Implementation</td>
</tr>
<tr>
<td>e. Evaluation</td>
</tr>
<tr>
<td>2. Know techniques required to use the ISD Model.</td>
</tr>
<tr>
<td>a. Analyze</td>
</tr>
<tr>
<td>b. Design</td>
</tr>
<tr>
<td>c. Development</td>
</tr>
<tr>
<td>d. Implementation</td>
</tr>
<tr>
<td>e. Evaluation</td>
</tr>
<tr>
<td>3. Know major problems expected in implementing the ISD Model.</td>
</tr>
<tr>
<td>a. Analyze</td>
</tr>
<tr>
<td>b. Design</td>
</tr>
<tr>
<td>c. Development</td>
</tr>
<tr>
<td>d. Implementation</td>
</tr>
<tr>
<td>e. Evaluation</td>
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</tbody>
</table>

OR

<table>
<thead>
<tr>
<th>Objectives and Main Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Know the analysis phase of the USAF Instructional System Development (ISD) Model.</td>
</tr>
<tr>
<td>a. Description</td>
</tr>
<tr>
<td>b. Techniques</td>
</tr>
<tr>
<td>c. Problem areas</td>
</tr>
</tbody>
</table>
2. Know the design phase of the USAF Instructional System Development (ISD) Model.
   a. Description
   b. Techniques
   c. Problem areas

<table>
<thead>
<tr>
<th>Table 7.3. Example 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives and Main Points</strong></td>
</tr>
<tr>
<td>1. Know the primary causes of child abuse.</td>
</tr>
<tr>
<td>a. Cause 1</td>
</tr>
<tr>
<td>b. Cause 2</td>
</tr>
<tr>
<td>c. Cause 3</td>
</tr>
<tr>
<td>2. Know the primary effects of child abuse.</td>
</tr>
<tr>
<td>a. Effect 1</td>
</tr>
<tr>
<td>b. Effect 2</td>
</tr>
<tr>
<td>c. Effect 3</td>
</tr>
</tbody>
</table>

7.6.1 Clarity of Presentation. Our lesson plan should be developed well enough that we will have little need to restate ourselves for the sake of clarity. The presentation in a knowledge-level lesson should add to the student’s ability to learn the factual information. The more complex the facts or the processes being taught, the greater the need for a clear presentation.

7.6.2 Redundancy of Information. Some redundancy is probably desirable in a knowledge-level lesson. We should not be afraid to say something more than once or through a different medium if it can help our students to remember. We can build desirable redundancy into knowledge-level lessons in several ways.

7.6.2.1 Summarize when needed. Interim and final summaries will ensure that all information has been noted.

7.6.2.2 Supplement presentations. Readings and handouts are invaluable study aids for knowledge-level lessons, particularly if we show students how they support the lesson.

7.6.2.3 Use more than one teaching medium during the lesson. We should seek opportunities to support verbal information with visuals. Overhead transparencies, slides, and other projected media allow us to go after learning by sight as well as sound. Perhaps our best teaching aid for the average size class or seminar is still the chalkboard. We owe our students the chance to have what they hear reinforced by what they see.

7.6.2.4 Helping students remember. Knowledge-level information can be presented in group situations, but students normally need to study on their own to memorize. If we have to learn a long string of facts, we would probably not try to do it while someone is lecturing. We should organize and present knowledge-level lessons so that we have done all we can to help students remember what has been taught. We should take advantage of what we know about memory to help our students get the most from the lesson.

7.6.2.4.1 Avoid needless distractors during the presentation. Humor, for instance, can add greatly to a lesson, but it may also interfere with the orderly transfer of information. See Chapter 13 for a further discussion of humor while lecturing.

7.6.2.4.2 Stick to a well thought out plan. When we teach in a system using objectives, we have to resist the temptation to take off in some unplanned direction because it seems more attractive at the moment.

7.6.2.4.3 Build in memory aids where possible. We should suggest acronyms, word pictures, and other memory aids when possible. These devices can help the memory retain facts.

7.6.2.4.4 Encourage and plan for study to aid retention. Students should develop study systems which are effective for learning facts. As instructors we can suggest flash cards, drill and repetition, studying with another, or other methods that seem appropriate.

7.6.2.4.5 Quiz and review frequently. Students should have an opportunity to test their memories before doing formal evaluation. By the time they are tested for real, students should already know whether they have been able to store and retrieve the information we have given them. Periodic checkups on the subject matter are also a good way to lessen the rate of forgetting. Material taught once and tested once may be forgotten at once.

7.7 Summary. Teaching at the knowledge level requires logical planning and effective presentation. Classroom lessons at the knowledge level should be looked at carefully to see if they can be replaced by readings or other media. Knowledge-level material which must be presented in class should be done so in the clearest way possible and benefit from the presence of an instructor.
7.7.1 The pattern of organization for this level of instruction should be clear and help the student learn and retain the material. The strategy for teaching should take into account the need for students to relate new material to what is already known.

7.7.2 Lessons should be planned and taught with a focus on memory. Aids to memorization such as redundant teaching and use of multimedia are important points at this level of learning. While knowledge-level lessons are at the lower end of the cognitive taxonomy, learning and remembering facts are the foundation stones upon which the understanding of concepts and principles is built.
8.1 Introduction. Most instruction in American schools and colleges involves comprehension and not just simple recall. Similarly, we conduct much Air Force academic instruction at the comprehension level of learning or higher. Unless students progress through the comprehension level to determine how and why something is done, they will experience difficulty applying information or skills in new situations on the job. (See Chapter 4 for the position of comprehension in the taxonomy of educational objectives.)

8.1.1 Comprehension is defined as the ability to generalize or to grasp the meaning of material. Students are expected to understand what is being communicated and to be able to make some use of the material or ideas contained in it. A student can demonstrate this ability by translating material from one form to another, interpreting material, or estimating future trends. Comprehension is one step beyond the simple remembering of material and represents the lowest of the understanding levels.

8.1.2 When conducting lessons at the comprehension level, instructors often teach either concepts or principles. Using this classification system, concept teaching needs to be addressed first, since principles are statements of relationship between two or more concepts.

8.2 The Teaching Of Concepts. A concept is a class of people, objects, events, ideas, or actions which are grouped together on the basis of shared attributes or characteristics, and are called the same name. When we teach a concept we are referring to one of these classes or categories. The members in the class are put into the same category on the basis of shared attributes. These shared attributes are critical to the identity of the concept. All members of the class sharing the critical attributes are called by the same name.

8.2.1 The term “instructor” is a concept. It refers to a class of people which is distinguished from others by distinctive duties and responsibilities. Only those performing these duties can be called instructors. The concept “bomber” refers to a class of objects with critical attributes which distinguish it from fighter, transport, and reconnaissance aircraft. Terms such as counterinsurgency, unconventional warfare, doctrine, strategy, tactics and total quality benchmarking are concepts. In fact, most of the terms we use in the classroom are concepts.

8.2.2 A specific individual, object, event, idea, or action is not a concept. No class is represented. Sergeant Ed Jacobs is an individual and not a category of people. While “war” is a concept, World War II is a specific event and not a class of wars. “Book” is a concept, but Tolstoy’s War and Peace is not, since no class or category is presented.

8.2.3 For planning purposes, instructors need to understand the reasoning process students go through in comprehending concepts. This understanding assists in organizing the concept teaching plan.

8.2.4 Generalizing. Humans have the mental ability to make the same response (give the same name) to a new example of something which differs in some way from previously met examples. When children reach the comprehension level on the concept “dog,” they can point to a schnauzer, poodle, or collie and say “dog.” Although each new example of a dog differs from their own beagle or German shepherd, they can correctly call each new example a dog. Similarly, a student who comprehends the concept “strategy” can correctly label a new grouping of actions by a military commander as strategy. In each instance the person is generalizing.

8.2.5 Discriminating. Humans also have the mental ability to make a different response for a non-example of something which shares some properties or characteristics with previous examples. This process is called discrimination. Children who comprehend the concept “dog” can correctly differentiate a dog from a cat or fox even though all share certain attributes such as four legs and sharp teeth. Similarly, a student who comprehends the concept “strategy” can differentiate the term from “tactics” even though the actions share certain attributes or characteristics.

8.2.5.1 When we evaluate student performance at the comprehension level, we often ask them to give or recognize a new example of something we have taught. Students who respond correctly are able to generalize. When we ask students to differentiate between examples and non-examples of something we teach and they respond correctly, they are able to discriminate. Students who comprehend a lesson on the concept “prejudice” should be able to identify which written summaries of human interactions are examples illustrating prejudice and which are not.

8.2.5.2 Concept teaching is fundamental to instruction at the comprehension level. As instructors, we want our students to be able to solve problems on the job (application). Problem solving requires that certain rules or principles have been learned. These principles cannot be learned until certain concepts have been learned. In short, some educational objectives are prerequisite to others.

8.2.5.3 The ability to spout a memorized definition of an important concept is of little or no value on the job if a student cannot recognize new examples and non-examples of that concept and use the concept in the work setting. Reciting the definition and characteristics of leadership (a concept) is of little value on the job unless the person can apply leadership in real-life situations.
Thus, knowledge-level instruction for teaching concepts is insufficient.

8.2.5.4 Comprehension-level instruction provides the missing link between recalling information about a concept and the direct application of the concept in real-life settings.

8.3 Organizing A Concept Teaching Plan. Since concept teaching is fundamental to instruction at the comprehension level, attention needs to be focused on the organization of the lesson plan. Whether 5-minutes or several hours are required to teach a concept, the following format can be used: Define the concept, teach its critical attributes, give examples and non-examples.

8.3.1 The Definition. Defining the concept is the first step in concept teaching. Concept definitions can be found in dictionaries, glossaries, and in the content of textbooks. Those who are subject experts can form their own definitions. Concept definitions are statements identifying critical attributes and indicating how these attributes are combined. Often, we can start with the critical attributes and use them to write a definition.

8.3.2 The Attributes. A difficult step in teaching a concept is differentiating among its attributes. An attribute is a special name used to refer to characteristics that determine whether a person, object, event, idea, or action is a member of a particular class (a concept). Critical attributes must be present in all members of the class. Variable attributes are characteristics shared by some but not all members of the class. They are not necessary for determining class membership.

8.3.2.1 If we wanted to teach the simple concept “stool” to students, we might start with a dictionary definition. A stool is a single seat on legs or a pedestal and without arms or a back. In this definition, the critical attributes are (1) a single seat with (2) the seat resting on legs or a pedestal, and it cannot have (3) arms or (4) a back. Variable attributes would include characteristics such as a round seat, a rotating seat, four legs, and a covering of leather material. The variable attributes are shared by some members of the class but do not determine class membership. A stool may have a square seat, a fixed seat, a varying number of legs, or have a cloth covering or no covering at all.

8.3.2.2 If we do not have the expertise to label characteristics properly as critical attributes and variable attributes, then we should turn to experts for assistance.

8.3.3 Examples. To make conceptual learning meaningful, we need good sets of examples and non-examples. We build an understanding of concepts on examples. We vary the examples in such a way that students are able to make the discriminations and generalizations on which real understanding depends. In selecting teaching examples, we should use those that are as different as possible in variable attributes. Otherwise students may believe a particular variable attribute is critical to comprehending the concept. If each example of a stool shows a round seat, the student may believe that all stools have round seats. However, all examples must illustrate the critical attributes possessed by members of the class.

8.3.4 Non-examples. We should select non-examples that vary in the critical attribute omitted. For the stool example, a good non-example would be a seat for two people, such as a love seat. Since a stool must have legs or a pedestal, a single seat suspended from the ceiling would serve as another non-example. Non-examples containing arms and a back should also be included.

8.3.4.1 Technically everything that is not an example is a non-example. However, most non-examples are not useful for concept instruction. Only non-examples that resemble examples and hence represent a source of confusion for students are useful non-examples. Generally, when we use the word non-example, we are referring only to those instances that a student might incorrectly call an example. For each example, we should try to collect or devise a matched non-example.

8.3.4.2 When a comprehension-level lesson calls for a definition, a concept lesson or concept teaching point is probably needed. The recommended organization in this chapter can be used for simple concepts like stool or for complicated concepts like ISD.

8.3.5 Testing Concept Learning. Students who learn new concepts should be able to generalize their learning to the point that they can recognize new examples of the concept when they see them. In addition, they must be able to discriminate between an example and a non-example of a given concept.

8.3.5.1 Test items which require generalizing and discriminating are essential for testing concept learning. Test items which test concept learning may be either selection or supply items (see Chapter 21). These items generally require the use of a scenario or other description of an alleged example of a concept.

8.3.5.2 In supply questions, students may be asked to identify a concept from a scenario or may be required to describe a scenario which would meet all the critical attributes of a given concept. Selection items, particularly multiple choice, often contain a description or scenario in the stem. Students are then asked which concept the scenario illustrates or whether there is enough information given to qualify as an example or non-example of the concept. See the test items in the lesson on the concept of democracy at the end of Chapter 13, in Figure 22.3 (psychological concept of reinforcement), and in Figure 22.6 (educational philosophies) for sample test items which measure concept learning.

8.4 Sample Concept Teaching Plans (Part I). The lesson plan Part I illustrated in Example 1 can be used for teaching a single concept. (Table 8.1)

8.4.1 In this model Part I, the term “concept” is included in the lesson objective. The objective might also be
written simply as “comprehend prejudice.” Samples of behavior are based on the lesson objective. Notice that the first main point is taught at the knowledge level, but the first sample of behavior requires an explanation in the student's own words. In teaching the concept, at the end of the first main point the student should simply be able to recall the definition the instructor gave. However, by the time the lesson is complete and the concept is developed, the instructor would want students to define the concept in their own words to show comprehension. The main points outlined in this model plan illustrate a recommended approach for teaching concepts at the comprehension level.

8.4.2 The lesson plan cover sheet illustrated in Example 2 can be used for teaching multiple concepts in a single period or several periods of instruction. (Table 8.2)

8.4.3 In this model Part I, three concepts are being taught. Although the term “concepts” is omitted from the objective, each term represents a class or category of leadership. Samples of behavior are derived from each concept. The instructor should ensure an adequate sampling of each objective. Each concept is developed using definitions, attributes, examples, and non-examples.

8.4.4 As we have seen thus far, the terms we use for communicating in the classroom usually represent concepts. When an understanding of key concepts is essential to comprehension of a lesson objective, we need to take the time to ensure that students reach the comprehension level on each concept in the objective. Once students understand the concepts we are teaching, we can build on these concepts to more complex learning.

8.5 The Teaching Of Principles. A principle is a statement of the relationship between two or more concepts. The principle is stated in terms of a conclusion (generalization) about a class of people, objects, events, ideas, or actions.

8.5.1 The statement, “Barriers to creativity inhibit innovation in classroom instruction,” is a principle. A relationship is established between concepts. To comprehend this relationship in a lesson, students need to comprehend the following concepts: barriers, creativity, inhibition, innovation, classroom, and instruction. In addition, students need to comprehend the new concept formed by combinations of these concepts. When barriers and creativity are combined, we have a new concept “barriers to creativity.” Similarly, when the concepts in the statement's predicate are combined, a new concept is formed representing actions (a class) which “inhibit innovation in classroom instruction.” The relationship between the combined concept in the subject and the combined concept in the predicate becomes very important when we plan lessons using deductive reasoning as we will see below.

Table 8.1. Example 1

<table>
<thead>
<tr>
<th>Lesson Objective: Comprehend the concept of prejudice.</th>
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</thead>
<tbody>
<tr>
<td><strong>Samples of Behavior:</strong></td>
</tr>
<tr>
<td>1. Define prejudice in student's own words.</td>
</tr>
<tr>
<td>2. Distinguish critical attributes of prejudice from variable attributes and nonattributes.</td>
</tr>
<tr>
<td>3. Give new examples and non-examples of prejudice.</td>
</tr>
<tr>
<td>4. Given scenarios containing transactions between persons, differentiate between prejudicial and nonprejudicial interactions.</td>
</tr>
<tr>
<td>5. Explain the concept of prejudice.</td>
</tr>
<tr>
<td><strong>Main Points:</strong></td>
</tr>
<tr>
<td>1. *(K) The definition of prejudice.</td>
</tr>
<tr>
<td>2. **(C) The critical attributes of prejudice.</td>
</tr>
<tr>
<td>3. **(C) Selected examples and non-examples of prejudice.</td>
</tr>
<tr>
<td>* Knowledge level of learning. See page 15, adapted from Bloom’s Cognitive Taxonomy.</td>
</tr>
<tr>
<td>** Comprehension level of learning. See page 15, adapted from Bloom’s Cognitive Taxonomy.</td>
</tr>
</tbody>
</table>
Table 8.2. Example 2

Lesson Objective: Comprehend the concepts of (1) authoritarian (2) laissez-faire, and (3) democratic leadership.

Samples of Behavior:

1. Define authoritarian, laissez-faire, and democratic leadership in student’s own words.
2. Distinguish critical attributes of authoritarian, laissez-faire, and democratic leadership from variable or nonattributes.
3. Distinguish examples from non-examples of authoritarian, laissez-faire, and democratic leadership.
4. Explain the concepts of authoritarian, laissez-faire, and democratic leadership.

Lesson Objective: 1. (C) Authoritarian leadership.

Main Points:

a. (K) The definition of authoritarian leadership.
b. (C) The critical attributes of authoritarian leadership.
c. (C) Selected examples and non-examples of authoritarian leadership.

Lesson Objective: 2. (C) Laissez-faire leadership.

Main Points:

a. (K) The definition of laissez-faire leadership.
b. (C) The critical attributes of laissez-faire leadership.
c. (C) Selected examples and non-examples of laissez-faire leadership.

Lesson Objective: 3. (C) Democratic leadership.

Main Points:

a. (K) The definition of democratic leadership.
b. (C) The critical attributes of democratic leadership.
c. (C) Selected examples and non-examples of democratic leadership.

8.5.2 Other examples of principles are: visual aids enhance an instructor’s presentations, values influence a person’s motivation, and the tactics employed by urban guerrillas pose a direct threat to the international order. Each statement has a subject and a predicate with a relationship established between concepts. Each statement could serve as a lesson objective or as a main supporting point for another principle or concept being developed as an objective.

8.5.3 The statement, “Sergeant Jones teaches military science,” is not a principle. The subject, Sergeant Jones, is not a concept. The predicate is a concept representing a class of people who teach military science. Since the subject of the statement is not a concept, we do not have the statement of a relationship between concepts. Neither is “Military strategy in unconventional warfare” a principle: while the phrase involves more than one concept, a critical attribute of a principle is missing—the statement of a relationship between concepts. Closer examination of the phrase “military strategy in unconventional warfare” will reveal that it is a concept which could be effectively taught using definitions, attributes, examples, and non-examples.

8.5.4 The teaching of principles is very important in Air Force instruction. If students are going to comprehend the principles taught, they must be able to reason logically. Logically organized lesson plans will assist
students in reasoning through to the principles we are teaching.

8.5.5 Logical Lesson Planning. As we organize our lessons to teach principles, some understanding of approaches which may be used will assist in planning topically organized lessons.

8.5.5.1 General-to-Specific. The general-to-specific presentation (often referred to as “deductive reasoning”) is a mental process in which we start with a principle to be taught and then apply this principle in specific instances to form supporting main points. The reasoning is from general to specific. For example, suppose our lesson objective reads: “The objective of this reasoning is from general to specific. For example, specific instances to form supporting main points. The principle to be taught and then apply this principle in reasoning”) is a mental process in which we start with a principle, then apply this principle in specific instances to form supporting main points. The reasoning is from general to specific. For example, suppose our lesson objective reads: “The objective of this lesson is for each student to comprehend that barriers to creativity inhibit innovation in classroom instruction.” The italicized portion of the objective is a principle representing the content to be taught. If a topical pattern is chosen for lesson development, the focus should be on the subject of the objective statement, barriers to creativity. By moving from the general to the specific, we know, from our review of lesson content, that four common barriers to creativity are: fear, prejudice, habit, and inertia. If the lesson content provides logical support for the principle in the objective, then we can reason that fear, prejudice, habit, and inertia (the specific instances) each inhibit innovation in classroom instruction. The reasoning might be depicted as follows: Barriers to creativity inhibit innovation in classroom instruction. Fear (prejudice, habit, inertia) is a barrier to creativity. Therefore, fear inhibits innovation in classroom instruction.

8.5.5.1.1 By starting with the principle, we topically divide the subject (first concept of the principle) into more specific instances and then draw a new conclusion about these specific instances.

8.5.5.1.2 The next step is to write main points as principles which support the lesson objective. The simplest way is to use the principles developed through the general-to-specific approach. The first main point might read, “Habit inhibits innovation in classroom instruction.” Using a second approach, we might write the principle, “Habit causes instructors to resist change.” The second principle is more specific than the first in showing how habit inhibits innovation in classroom instruction. Notice that the predicate in the second principle supports the predicate of the principle stated in the lesson objective. When the main points are made more specific, this requirement must be met. We could continue the process and write principles for fear, prejudice, and inertia using either approach indicated above. If the more specific statement is used in the first main point, then the same approach should be used in writing the other main points.

8.5.5.1.3 Since instructors seldom have time to develop all aspects of a topic, sampling is usually required. In the lesson above, the instructor must provide sufficient evidence to support the lesson objective. If two barriers to creativity are discussed in depth, this support should provide sufficient evidence for students to accept the conclusion stated as the principle in the objective. In this illustration, sampling of two of the four barriers should provide sufficient evidence to get students to accept the broader generalization. On another occasion we could be faced with fourteen defense mechanisms for use in supporting the principle “defense mechanisms allow the individual to cope with stress.” Three might be chosen as main points to show how each allows the individual to cope with stress. Then we would ask the students to accept a conclusion about all defense mechanisms based upon a sampling of three. Samples should be representative of all members of the class. Enough samples should be chosen to provide sufficient evidence for drawing the correct conclusion.

8.5.5.1.4 When a topical organization is chosen as the best means for developing the lesson, the process just described can be used effectively to develop main points from an objective stated as a principle. Similarly, a main point stated as a principle can be divided topically into subpoints by using the same method. Other common organizational patterns for use on comprehension-level plans will be developed in the sample plans which follow in this chapter.

8.5.5.2 Specific-to-General. While the general-to-specific approach assists us in breaking down a principle into its component elements, the specific-to-general approach (often referred to as “inductive reasoning”) can assist us in developing principles from specific examples. In teaching principles, we ask students to take pieces of evidence we present to form a related pattern and then draw a conclusion from the evidence. The pieces of evidence are definitions, examples, statistics, comparisons, and quotations or testimony used as support material. When skillfully put together by the instructor, these pieces of evidence and their relationship form a pattern which leads to a generalization. Movement in the lesson is from specific instances (support) to a general conclusion (the principle).

8.5.5.2.1 For instance, a security police instructor presents the following evidence: (1) a security police vehicle overturned on perimeter road last week during an emergency run in the rain, (2) on Monday a dependent’s car slid on a wet road into a base exchange oil truck, and (3) an airman’s motorcycle went out of control on a base street following a rain shower. Based on this evidence, we would conclude that base roads are slippery when wet. The conclusion would be even stronger if a statistic was then added: “Last year, according to security police records, 45 accidents occurred on base roads following rainstorms.” The statistic serves as a summary of specific instances and as proof support for the conclusion drawn.
8.5.5.2.2 In teaching principles at the comprehension level, instructors should keep in mind both the inductive and the deductive nature of lesson development. In lecturing, we should include only those items of support material needed to clarify and prove the principle being taught. In discussions, we should keep students on track so material that is irrelevant to support of the principle does not develop. No matter what method is used, we should ensure that we develop sufficient support for comprehension of the principle. Often strong support is lacking, and we can only say that, based upon available evidence, the conclusion stated as a principle is probably correct. In all cases, we must ensure that logical organization is used.

8.6 Testing Principle Learning. Students who learn new principles should be able to understand the relationship between two or more concepts. They ought to be able to translate these relationships into their own words, interpret instances where the principle is applied or ought to be applied, and make simple predictions based on their understanding of the principle involved. It is essential that test items which measure principle learning determine the extent to which students understand the relationship expressed in the principle rather than just an understanding of the individual concepts contained in the principle.

8.6.1 Test items which test concept learning may be either selection or supply items (see Chapter 21). Like concept test items, items which measure principle learning often require scenarios to set up the proper conditions for testing. In supply questions, students may be asked to identify a principle which is working or ought to be working in a given scenario. Selection items, particularly multiple choice, often contain a description or scenario in the stem. Students are then asked to identify the principle at work, to explain the principle involved, or to make a limited prediction about the situation based on their understanding of the principle. See the examples in the lesson on democracy at the end of Chapter 13, in the lesson on situational leadership at the end of Chapter 14, and in Figure 22-4 (management style) for sample test items which measure principle learning.

8.7 Sample Plans For Teaching Principles (Part I—Cover Sheet). Various organizational patterns can be used successfully in teaching principles at the comprehension level. Some of the most common patterns are illustrated in Examples 3 and 4.

8.7.1 Topical Pattern. Example 3, lesson plan cover sheet (Part I), illustrates the use of topical organization to teach a principle. (Table 8.3) 8.7.1.1 As indicated earlier in this chapter, the lesson objective is a principle and topical organization is used. Main points one and two are supporting principles which serve as specific instances developed from the lesson objective. Because only two of four common barriers are covered, the main points are samples which serve as evidence in support of the objective. If the students comprehend the two conclusions stated as main points, then the instructor has sufficient evidence to support the lesson objective. On the sample plan, notice that the lesson objective is repeated as the third main point. This approach is recommended to ensure that the instructor gives attention to development of the lesson objective. Additional barriers to creativity can be introduced in the third main point showing how they inhibit innovation in classroom instruction. The instructor has the final responsibility for tying the lesson together to show how all the lesson parts lead to the conclusion stated as the principle in the lesson objective.

8.7.1.2 The Part I just examined illustrates a single objective plan. The key principle in the objective was supported by the principles stated as main points. However, it would be possible for each main point to stand by itself as an objective for a lesson.

8.7.1.3 Example 4 illustrates a multi-objective plan. (Table 8.4) Two objectives are being taught in the same period of instruction. Each objective is then supported by main teaching points. The main points under each objective are developed topically. Each is a specific instance (principle) which supports the broader principle stated in the objective. Notice that the predicates of the objectives are repeated as predicates for the main points in this sample. While repeating the predicates in the main points appears redundant, such action ensures that principles are taught instead of concepts. For instance, teaching “fixed attitudes” as a concept requires different organization and support than teaching that “fixed attitudes cause instructors to resist creative change.” While the experienced instructor may not repeat the predicate each time on the lesson plan, the mental connection is still made between the concepts to form the principle (between fixed attitudes and things that cause instructors to resist creative change).

8.7.1.4 The topical organizational patterns illustrated below are two of the most commonly used in teaching principles. Another common pattern is problem-solution. 8.7.2 Problem/Solution. Example 5 illustrates a plan organized with a problem/solution organizational pattern. (Table 8.5)
### Table 8.3. Example 3

**Lesson Objective:** Comprehend barriers to creativity inhibit innovation in classroom instruction.

<table>
<thead>
<tr>
<th>Main Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (C) Habit causes instructors to resist change.</td>
<td></td>
</tr>
<tr>
<td>2. (C) Prejudice restricts an instructor’s thinking.</td>
<td></td>
</tr>
<tr>
<td>3. (C) Barriers to creativity inhibit innovation in classroom instruction.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8.4. Example 4

**Lesson Objective One:** Comprehend that habit causes instructors to resist creative change.

<table>
<thead>
<tr>
<th>Main Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reliance on old solutions for solving new problems causes instructors to resist creative change.</td>
<td></td>
</tr>
<tr>
<td>2. Fixed attitudes cause instructors to resist creative change.</td>
<td></td>
</tr>
<tr>
<td>3. Fixed behavioral patterns cause instructors to resist creative change.</td>
<td></td>
</tr>
<tr>
<td>4. Habit causes instructors to resist creative change.</td>
<td></td>
</tr>
</tbody>
</table>

**Lesson Objective Two:** Comprehend that prejudice restricts an instructor’s creative thinking.

<table>
<thead>
<tr>
<th>Main Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotional bias restricts an instructor’s creative thinking.</td>
<td></td>
</tr>
<tr>
<td>2. Sticking to favorite teaching methods restricts an instructor’s creative thinking.</td>
<td></td>
</tr>
<tr>
<td>3. Any irrational attitude of hostility directed against an individual student or group of students restricts an instructor’s creative thinking.</td>
<td></td>
</tr>
<tr>
<td>4. Prejudice restricts an instructor’s creative thinking.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8.5. Example 5

**Lesson Objective:** Comprehend that widespread public concern is the most effective weapon available for combating child abuse.

<table>
<thead>
<tr>
<th>Main Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (C) Child abuse damages the health of children</td>
<td></td>
</tr>
<tr>
<td>2. (C) Widespread public concern is the most effective weapon available for combating child abuse.</td>
<td></td>
</tr>
</tbody>
</table>
8.7.2.1 On this Part I, the lesson objective is a statement of a relationship between concepts so a principle is involved, main point one states the problem and main point two the solution. Main point two is a repeat of the objective indicating the instructor is putting emphasis on the solution for evaluation purposes.

8.7.2.2 If the instructor wanted to put equal emphasis on both the problem and solution in this lesson, it would be a multi-objective plan whose objectives might read: “Comprehend that (1) child abuse damages the health of children and (2) widespread public concern is the most effective weapon available for combating child abuse.”

8.7.2.3 With a problem/solution pattern, the problem is normally covered before the solution although the reverse strategy might be used. Another common strategy is to develop the problem as a main point, examine several possible solutions as a main point, and then pick the best solution for development as the final main point.

8.7.2.4 Although the main points are organized using a problem/solution pattern, the subpoints could be developed topically. Using the principle in the first main point, child abuse could be divided into physical and mental abuse. Supporting subpoints might read: (1) Physical abuse damages the child both physically and psychologically and (2) mental abuse damages the child psychologically, or more simply, (1) Physical abuse damages the health of children and (2) mental abuse damages the health of children. Similarly, the subpoints for the solution could be developed topically.

8.7.2.5 Thus far we have examined topical and problem-solution patterns which are commonly used in developing comprehension-level lessons for teaching principles. A cause-effect pattern can also be used effectively.

8.7.3 Cause-Effect. Example 6 illustrates a cause-effect organizational pattern. (Table 8.6)

Table 8.6. Example 6

| Lesson Objective: Comprehend that sexism inhibits the effectiveness of skilled female employees. |
| Main Points: | 1. (C) A negative self-concept fosters sexism in the workplace. |
| | 2. (C) Sexism inhibits the effectiveness of skilled female employees. |

8.7.3.1 The lesson objective is a statement of the relationship among three concepts. Usually only two of the concepts are stated in the objective but, as the lesson will point out, a third concept (the distant problem or condition) will be used to cancel or explain the concept stated as the proximate problem or condition. The statement will consist of two major concepts representing sexism (the proximate problem or condition) and actions inhibiting effectiveness of skilled female employees (the result). The last main point is a statement of the lesson objective because instructor emphasis in a cause-effect pattern of organization is usually on the effect (linking of the proximate problem and the result). However, if the principles stated as cause and effect are of equal importance, then the plan would reflect a compound objective. The objective might read, “Comprehend that (1) a negative self-concept fosters sexism in the workplace and (2) sexism inhibits the effectiveness of skilled female employees.”

8.7.4 Pro-Con Plus One. A fourth pattern for teaching principles might be labeled pro-con, plus one. Often students are asked to examine both sides of an issue. If a discussion is being conducted, the lesson might end with students comprehending the pro and con positions, but no final conclusion is drawn. This development is acceptable for certain subjects, especially those involving a great deal of controversy. At other times, the instructor can lead students to a final conclusion if the lesson is planned properly. Example 7 illustrates such a Part I. (Table 8.7)

8.7.4.1 While each main point is an important principle, the key principle in the objective goes beyond the main points in the reasoning process. Therefore, this sample illustrates the Part I of a single objective plan. The objective is that a final conclusion to be drawn. Main point three, the lesson objective, requires development which will encompass comparing and contrasting the pro-con arguments.
8.7.4.2 For strategy, the instructor wants to develop a logical arrangement which would support the lesson objective. By starting with the con argument, students comprehend how planned obsolescence exploits our natural resources, then attention turns to the value of such a program. Instead of leaving students wondering what conclusion should be drawn, the instructor leads them to a final conclusion (the lesson objective).

8.8 Sampling Achievement Of The Objective. In the Part I’s illustrated above, emphasis was placed on the organization of main points in support of a lesson objective. In this section, the focus is on samples of behavior written on the same objectives.

8.8.1 Sample One. This lesson was organized topically. Two principles were used as main points in support of the lesson objective. Appropriate samples for the objective are in Table 8.8.

8.8.1.1 Notice that the samples of behavior are written on the lesson objective, not on main points. The principle in the objective is a broader generalization than the principles stated as main points. Although samples of behavior written on the main points might provide some evidence of achievement of the objective, significant evidence must develop from samples of behavior written directly on the objective. If samples are written on the principles stated as main points, they should be used for test questions written for purposes of formative evaluation (sometimes referred to as diagnostic testing where results are used to assist students in overcoming deficiencies before a final evaluation or posttest is given). Samples written on the objective would be used for summative evaluation (the final evaluation or posttest).

8.8.2 Sample Two. In this lesson, two parallel principles were stated as individual objectives. (Table 8.9)

8.8.2.1 The objectives are of equal importance so a similar number of samples of behavior are written on each.

8.8.3 Sample Three. This Part I was organized using a problem-solution pattern. The solution represented the last main point and the lesson objective. (Table 8.10)

8.8.3.1 In this lesson, the instructor is putting emphasis on the solution for evaluation purposes. Therefore, the samples of behavior are written on the solution alone. In most problem-solution lessons, testing of the solution is all that is needed since an understanding of the solution can only be based upon an understanding of the problem. However, if the problem and solution are of equal importance, then a multi-objective format can be used and samples of behavior would be written for the problem and the solution.

8.8.4 Sample Four. This Part I illustrated a cause-effect pattern. The objective and main point two stated the effect. (Table 8.11)

Table 8.7. Example 7

<table>
<thead>
<tr>
<th>Lesson Objective: Comprehend that a program of planned obsolescence must represent a balance between the exploitation of our natural resources and the generation of a higher standard of living.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Points:</strong></td>
</tr>
<tr>
<td>1. (C) Planned obsolescence exploits our natural resources.</td>
</tr>
<tr>
<td>2. (C) Planned obsolescence generates a higher standard of living.</td>
</tr>
<tr>
<td>3. (C) A program of planned obsolescence must represent a balance between the exploitation of our natural resources and the generation of a higher standard of living.</td>
</tr>
</tbody>
</table>

Table 8.8. Sample 1

<table>
<thead>
<tr>
<th>Lesson Objective: Comprehend that barriers to creativity inhibit innovation in classroom instruction.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Samples of Behavior:</strong></td>
</tr>
<tr>
<td>1. Describe the barriers to creativity and their relationship to classroom instruction.</td>
</tr>
<tr>
<td>2. Estimate the consequences on classroom instruction when barriers to creativity are in operation in a classroom.</td>
</tr>
<tr>
<td>3. Explain why barriers to creativity inhibit innovation in classroom instruction.</td>
</tr>
</tbody>
</table>
4. Interpret the relationship of the barriers to creativity to each other as they interact to inhibit innovation in classroom instruction.

### Table 8.9. Sample 2

**Lesson Objective:** Comprehend that (1) habit causes instructors to resist creative change and (2) prejudice restricts an instructor's creative thinking.

**Samples of Behavior:**

1a. Predict the effect on a group of instructors when a new supervisor takes over and makes an effort to innovate.

1b. Explain the relationship between an instructor’s habits and the desire to be creative in the classroom.

1c. Give original examples of habits which cause instructors to resist creative change.

2a. Interpret the relationship between prejudice and an instructor's creative thinking.

2b. Explain how prejudice acts as a barrier to an instructor’s creativity in the classroom.

2c. Give original examples of prejudice operating to restrict an instructor’s creative thinking.

### Table 8.10. Sample 3

**Lesson Objective:** Comprehend that widespread public concern is the most effective weapon available for combating child abuse.

**Samples of Behavior:**

1. Estimate the consequences of an aroused public on the problem of child abuse.

2. Interpret the relationship between public arousal over child abuse and the number of cases of child abuse.

3. Explain how a concerned public can reduce the number of child abuse cases.

4. Generalize as to actions a concerned public can take which will reduce the number of child abuse cases.
Table 8.11. Sample 4

<table>
<thead>
<tr>
<th>Lesson Objective: Comprehend that sexism inhibits effective utilization of skilled female employees.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples of Behavior:</td>
</tr>
<tr>
<td>1. Give original examples which illustrate ways sexism inhibits effective utilization of female employees.</td>
</tr>
<tr>
<td>2. Generalize as to the relationship between sexism and the effective utilization of female employees.</td>
</tr>
<tr>
<td>3. Estimate the consequences when sexism prevents effective utilization of skilled female employees.</td>
</tr>
<tr>
<td>4. Explain how sexism inhibits effective utilization of skilled female employees.</td>
</tr>
</tbody>
</table>

8.8.4.1 In this lesson, emphasis is being placed on the effect and not the cause. Therefore, samples of behavior are needed for the effect alone. In most cause-effect lessons, testing of the effect is all that is needed since an understanding of the effect is based upon an understanding of the cause. However, if the cause and effect are of equal importance, the plan would be multi-objective with samples of behavior written on both the cause and the effect.

8.8.5 Sample Five. This Part I illustrates a pro-con plus one pattern. (Table 8.12)

8.8.5.1 Since there is a final conclusion in this lesson (the objective and main point three), samples of behavior should be based upon this conclusion. Samples based upon main points one and two would not provide the best source of evidence for evaluating achievement of the objective. If samples are written for main points one and two, they should be used as a basis for interim evaluation of students and not a final evaluation.

8.9 The Comprehension-Level Summary. In developing a comprehension-level lesson plan, we must plan summaries carefully. This rule holds true even in guided discussions where most of the support material comes from students.

8.9.1 A comprehension-level summary (or summation) (1) reviews and expands on key material and (2) develops relationships which lead to a generalization which is (or supports) the instructional objective. Only the most significant information is restated and expanded and the focus is on how the items are related. This relationship allows a general conclusion to be drawn. The generalization will be either a concept or a principle. The concept or principle developed is the stated lesson objective or is used in support of the objective.

8.9.2 A comprehension-level summary permits the introduction of new support material (from instructor or students) needed to establish the generalization. The summary may require from a few minutes to several minutes depending on the amount and complexity of the material. A summary for very complex material or for a block of instruction may require a much longer period of time.

8.9.3 A comprehension-level summary is used to summarize support material needed for achieving a comprehension-level main point. A summary of this type is not used for a knowledge-level objective or a knowledge-level main point.

8.9.4 Table 8.13 is an example of a comprehension-level summary for a lesson illustrated (the Part I) earlier in this chapter. While comprehension-level summaries would normally be given after each of these main points, only the summary in the lesson conclusion is illustrated.

8.10 Summary. Comprehension is a step beyond the simple remembering of material and represents the lowest level of understanding. Students who comprehend are able to grasp the meaning of material.

8.10.1 Concept teaching is fundamental to instruction at the comprehension level. A concept is a class of people, objects, events, ideas, or actions which are grouped together on the basis of shared attributes (characteristics) and are called the same name.

8.10.2 A student who comprehends a concept is able to generalize and recognize new examples of the concept which differ in some way from previously met examples. The student is also able to discriminate by identifying non-examples which share properties or characteristics with previous examples. 8.10.3 In teaching a concept, instructors define the concept, teach its critical attributes, give examples, and then non-examples. A very difficult step in planning for concept teaching is to identify the critical attributes.

8.10.4 A principle is a statement of the relationship between two or more concepts. Principles represent conclusions drawn in comprehension-level lessons and are based upon support material used in the lesson. Deductive reasoning is often used to develop main points which provide logical support to the lesson objective. Deductive or inductive reasoning is used in the classroom
when an instructor puts supporting points together to draw conclusions.

8.10.5 Common organizational patterns used in comprehension level lessons for teaching principles include topical, problem-solution, cause-effect, and pro-con plus one.

Table 8.12. Sample 5

| Lesson Objective: Comprehend that a program of planned obsolescence must represent a balance between the exploitation of our natural resources and the generation of a higher standard of living. |
| Samples of Behavior:                                                                 |
| 1. Explain the economic cycle that is initiated by the practice of planned obsolescence. |
| 2. Differentiate between positive and negative effects on our national economy of a program of planned obsolescence by the US auto industry. |
| 3. Estimate the effect on our economy of a program of planned obsolescence. |
| 4. Predict ways in which industry and the government can work together to achieve a balance in conservation of resources and a higher standard of living through planned obsolescence. |
**Table 8.13. Comprehension-Level Summary**

**Objective:** Barriers to creativity inhibit innovation in classroom instruction.

**Main Points:**
1. Habit causes instructors to resist change
2. Prejudice restricts an instructor’s thinking.
3. Barriers to creativity inhibit innovation in classroom instruction.

**Summary:** “In this lesson we have examined two barriers to creativity which inhibit innovation in classroom instruction. As a barrier to creativity, habit causes instructors to resist change. We find instructors using old solutions in trying to solve new problems because such an approach is comfortable. Instructors also develop fixed attitudes which prevent them from accepting something that is new or different. Many instructors develop fixed behavioral patterns which establish a very comfortable instructional routine. Old solutions, fixed attitudes, and fixed behavioral patterns are habits which cause instructors to resist change. Such habits become a barrier to the instructor’s creativity.

“Prejudice, a second barrier to creativity, restricts an instructor’s creative thinking. When instructors are prejudiced, emotional bias can cause them to reject new ideas. Prejudice can also cause instructors to stick to favorite teaching methods instead of trying innovative instructional methods, or instructors can reserve the assignment of key curriculum hours for personal friends, often preventing new and talented instructors from improving a course. Emotional bias, sticking to favorite teaching methods, and assignment of key curriculum hours to friends are forms of prejudice which restrict an instructor’s creative thinking. Such forms of prejudice become a barrier to the instructor’s creativity.

“In viewing barriers to creativity, four are often mentioned. In addition to habit and prejudice, fear and inertia can serve as barriers to an instructor’s creative efforts. The fear of ridicule, failure, being laughed at, or being branded as an oddball limits the frequency of new, original, or unconventional ideas among instructors. Inertia causes groups to accept things as they are and discourages members from looking for new and better ways of doing things.

“The Air Force has a continuing need for instructors with the imagination to develop new and useful educational tools. However, corrective action will not occur until instructors understand that barriers to creativity inhibit innovation in classroom instruction.”
Chapter 9
DEVELOPING HIGHER-LEVEL COGNITIVE LESSONS

9.1 Introduction. Teaching and learning at the higher levels of understanding are difficult and challenging. These higher levels of understanding include the ability to apply, analyze, synthesize, and evaluate. This is not to say that the two lower levels of the cognitive taxonomy, knowledge and comprehension, necessarily come easily to students. They may not. But when students learn at the higher levels, they are called upon to put theory into practice. Both the instructor and the student are challenged to determine whether they can put into use what is being learned.

9.1.1 Little of what we learn in the classroom has real value in and of itself. Few concepts or principles have value unless students can apply them in real work situations. We should seriously question the learning of concepts and principles for which there is no apparent need for application.

9.1.2 Not all lessons should be taught and tested at the higher levels of learning. Efficient, effective teaching should be directed at levels which are neither higher nor lower than those appropriate for the desired learning outcomes.

9.2 Higher Levels Of Cognitive Learning

9.2.1 Application. Students who can apply concepts and principles in new and different situations are operating at the application level of understanding. When students apply or recognize the application of principles and other generalizations, they have clearly gone beyond simple understanding. Students who can answer theory questions about principles of management, human relations, and other significant topics, but are not able to put their understanding into practice, are not yet at the application level of learning.

9.2.1.1 Students who solve problems by applying principles and other generalizations, and are able to explain why, are working at least at the application level. It is likely that any educational experience beyond an introductory course or basic principles course will and should involve the application level of learning.

Instructors and course developers should plan lessons to this level with the realization that they require more advanced planning and more effective classroom skills than the lower levels of learning.

9.2.1.2 Student-centered instructional objectives at the application level are typically written in Table 9.1.

9.2.2 Analysis. The ability to analyze a problem or situation into its component parts and to determine relationships which exist between them characterizes the student at the analysis level. Students retain and use analytic skills long after they have forgotten the specific subject matter used as a vehicle to develop the skills. “Scientific problem solving” and other examples of management tools for decision making characterize this level of learning.

9.2.2.1 Learning and testing at the analysis level and higher can be very complicated. There are few opportunities for “school solutions,” and solutions to problems may not be clearly right or wrong. One student’s analysis may be better than another, but both may be correct. Often students will discover relationships between elements of a situation not anticipated by the instructor. Being unable to anticipate and plan for all student interpretations can make teaching at the analysis level very challenging for even the most experienced instructor.

9.2.2.2 Student-centered instructional objectives at the analysis level are typically written in Table 9.2.

9.2.3 Synthesis. Students who can rearrange elements of a problem or situation in new and creative ways to form relationships not previously apparent are functioning at the very high level of cognition known as synthesis. Since creativity is so important to this level of understanding, instructors may have to evaluate learning at this level without a model to compare to the student’s answer or solution. Previously learned skills of deductive and inductive reasoning play a critical role in the student’s ability to synthesize.

Table 9.1. Instructional Objectives At the Application Level

<table>
<thead>
<tr>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply the concepts of ISD to actual curriculum development situations.</td>
</tr>
<tr>
<td>Apply basic human relations skills to situations involving superior-subordinate interpersonal relations.</td>
</tr>
<tr>
<td>Apply their understanding of the Russian definition of democracy to the interpretation of real or hypothetical situations.</td>
</tr>
<tr>
<td>Apply the principles of war to scenarios in simulated, fictitious theaters of operation.</td>
</tr>
</tbody>
</table>
Table 9.2. Instructional Objectives At the Analysis Level

| Analyze the communication network of an organization to determine discrepancies between the formal and informal organization chart. |
| Conduct an analysis of work flow within an organization to determine potential areas of improved productivity. |
| Analyze several sources of input into an accident investigation to determine fact and uncorroborated assumptions or allegations. |
| Analyze apparently unrelated government documents to identify principles of strategy or tactics. |

9.2.3.1 Learning and planning for learning at the synthesis level are certain to be complex and time consuming. Only experienced instructors should attempt to bring students to such a high level of understanding. Fortunately, or unfortunately, depending on your point of view, few right or wrong answers to problems exist at this level. Rather than judge student work against a set of absolute standards, instructors must engage in a shared experience to explore new alternatives with students while providing scholarly guidance and seeking expert opinion.

9.2.3.2 Student-centered instructional objectives at the synthesis level are typically written in Table 9.3.

9.2.4 Evaluation. Carefully considered judgments made by students based upon objective standards are characteristic of students at the highest level of learning, evaluation. Informed judgement on the part of students requires them to separate personal feelings from objective analysis and apply a set of quantitative and qualitative criteria to given situations. This level of learning requires understanding so complex that few USAF schools will include it in their curriculums. Where it is applicable, however, it represents the highest level of cognitive behavior and creative problem solving.

9.2.4.1 Teaching and testing at this level is the most difficult task facing an experienced instructor. Those instructors not at this level themselves should not attempt to teach lessons at this level. The constant search for new and different problems to be evaluated for creative solutions is time consuming and difficult. Lack of time prevents many instructors from attempting higher learning outcomes. Teaching at this level represents the best of what we mean when we refer to the instructor as a real expert or a genuine scholar.

9.2.4.2 Student-centered instructional objectives at the evaluation level are typically written in Table 9.4.

9.3 Principles Of Teaching And Learning At The Higher Levels. There are several important principles to keep in mind as we plan and teach at all the higher levels. Several of these principles are outlined below. The significance of one of these principles over another will vary from situation to situation. However, they all apply generally to instruction at the higher levels. It is unlikely that instruction can be successful at these levels if any of these principles have been violated.

9.3.1 Carefully planned learning experiences at the desired level of learning facilitate the transfer of learning.

9.3.1.1 Students who are attempting to reach the higher level of learning need sufficient opportunity to practice their newly acquired skills. If we take our students through the understanding of theory and then ask them to apply the theory without appropriate guidance, we are violating this critical principle. Students need to be guided through experiences at each level of the taxonomy so they can benefit from the constructive feedback of their instructor and other experts. Giving good feedback in carefully structured learning situations isn’t spoon feeding; it’s good teaching and critical for learning.

9.3.2 Experience with new, unfamiliar or substantially different learning and testing situations promotes insight at the higher levels-of-learning.

9.3.2.1 One of the most demanding elements of learning at the higher levels is the need to come up with many new and different situations for applying, analyzing, synthesizing, or evaluating principles and other generalizations. Essential principles may be the same in apparently diverse situations, but there must be enough new about the problems that students cannot solve them from rote, memory, or recollection. This critical need for instructors to develop apparently different teaching and learning situations with common principles places great demands on their subject matter expertise.

9.3.3 Effective feedback for learning demands flexibility in evaluating the products of student outputs at the higher levels.

9.3.3.1 Teaching, learning, and testing at the higher taxonomy levels places considerable extra demands on the flexibility of both the instructor and the student. Creativity is characteristic of all the higher levels and should be encouraged! Because instructors and students bring their unique backgrounds with them into the classroom, it is often impossible to anticipate the exact solution that any student may offer to a given problem.
Table 9.3. Instructional Objectives At the Synthesis Level

<table>
<thead>
<tr>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthesize data from recent armed conflicts to propose new principles of warfare which may affect future conflicts.</td>
</tr>
<tr>
<td>Synthesize a variety of inputs from management decision-making techniques to determine a course of action which is highly supportive of the mission.</td>
</tr>
<tr>
<td>Prepare an accident prevention plan for a new facility which synthesizes appropriate regulations as well as the most applicable principles of safety engineering.</td>
</tr>
<tr>
<td>Synthesize relevant research and expert opinion into the revision of existing USAF instructor manuals and other related literature.</td>
</tr>
</tbody>
</table>

Table 9.4. Instructional Objectives At the Evaluation Level

<table>
<thead>
<tr>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate alternative operational plans to determine a justifiable course of action.</td>
</tr>
<tr>
<td>Evaluate an original research project including data gathering techniques, research methodology, validity of findings, and logic of recommendations.</td>
</tr>
<tr>
<td>Evaluate a system for the comparative assessment of the performance of subordinates to determine its applicability to a given situation.</td>
</tr>
</tbody>
</table>

9.3.3.2 While it is possible to retain the notion of a “school solution” for some application level learning, most learning at the application level and beyond probably does not lend itself to predetermined model answers. Feedback to the students becomes much more difficult and subjective. Evaluation of the student becomes more complex because a solution or strategy proposed by a student may be 180 degrees in the opposite direction of one proposed by the instructor, and yet may be of equal or greater value. However, as complex as this situation may be, the instructor should remember that feedback and evaluation must remain objective to be worthwhile. Students are to solve problems and propose alternatives based on solid facts and a thorough grasp of higher principles. Learning at the higher levels is disciplined and scholarly and must not be reduced to expressions of personal preference and unsubstantiated opinion. Unfortunately, the latter is often the case.

9.3.4 The need for supplemental expert evaluation of student outputs increases as the level of learning increases.

9.3.4.1 The increased use of expert judgement in evaluation is closely related to the need for flexibility in evaluating the products of student learning described above. By definition, students must produce creative insights or solutions when working at the higher taxonomy levels. Often, this creativity is best judged by an objective evaluation of proposed student evidence of learning by one or more experts in a given subject matter area. The instructor may or may not be one of the expert judges.

9.3.4.2 Since learning activities at the higher levels are often highly individualized, students may be doing much, if not most, of their work outside of class. Often, instructors and students engage in mutual goal setting through negotiation. Research proposals and individual learning contracts are often characteristic of learning at these levels. In these cases, a mutually agreed upon plan is developed so that both the instructor and the student agree to the scope and procedures of the learning activity as well as the goals. Often, such research and individual contracts contain a provision to have them evaluated by third parties. The instructor may also evaluate the student product, but a more qualified expert may be consulted if the project is highly specialized or technical.

9.3.5 The focus of evaluation at the higher levels gradually shifts from a primary concern about the process used to arrive at a decision to the quality of the decision itself.

9.3.5.1 As students function at the higher levels of taxonomy, it becomes less important to predict their exact behavior in the process of insight or problem solving. The product of their efforts eventually becomes more important than the process they go through.
Sooner or later the student’s work needs to be evaluated on whether or not a proposed solution will work. Eventually the books must balance and the solution must have the potential to relieve a problem. A solution which comes about as a result of applying a scientific problem solving method but doesn’t work is unacceptable at the highest levels of learning. Checklists or models which are often helpful at the application level may be of little or no value at the evaluation level. In fact, solutions generated by students functioning at this level of learning are characteristically different from one student to another in their approach and process.

**9.3.5.2** When giving students feedback on their products, however, it may be necessary to help them with difficulties they had in their process of problem solving. This feedback should aid them in their next attempt to produce a product.

**9.3.5.3** The concept of sampling described in Chapter 4 still has validity but must be approached with more caution at the higher levels. Predictable samples of behavior characterize the knowledge and comprehension levels but become increasingly difficult from that point upward in the taxonomy. Many samples of behavior are broad general indicators of student activity which serve as a baseline for evaluation. The samples can still be of value if they sufficiently describe the essential elements of the product at these levels. However, efforts to write criterion objectives at these levels may produce objectives which are so general that they are meaningless.

**9.4 Lesson Planning.** The basic skills for planning lessons at the higher cognitive levels are generally as described elsewhere throughout this manual. The questioning skills, discussed in Chapter 11, are critical to promoting learning at these levels. Chapter 26 describes feedback considerations which become more important as we go up the ladder of taxonomy. Discussion skills (Chapter 14), student differences (Chapter 27), and counseling skills (Chapter 29) take on new and more important dimensions as we attempt to cause learning at the highest levels. Differences in planning techniques between lower and higher levels are most often in terms of degree rather than totally different skills.

**9.4.1 Style and Format.** Actual lesson plans are often quite simple for conducting class sessions for learning at these levels. The detailed step-by-step outline which characterizes lower level lesson plans may not be appropriate. The sample lesson plans in Chapters 13 through 17 illustrate the amount of detail recommended for teaching at the knowledge and comprehension levels. Chapter 15, The Case Study Method, contains an application-level lesson plan with considerable detail.

**9.4.1.1** Typical application-level lesson plans, as well as those for higher levels, might be rather brief outlines of activity or as complex as the plan in Chapter 15. This lesson plan is in great detail because all of the information needed to teach this lesson has been included. This much detail in a lesson plan is unusual. Often, an outline is developed around a set of locally produced or commercially prepared materials. The exercises involved might include case studies, gaming exercises, in-basket exercises, role playing scenarios, or other elaborate simulations; see Chapter 12 for a description of these and other teaching methods. No attempt to illustrate these complex exercises will be attempted in this manual beyond the case study in Chapter 15. Good simulation exercises are often many pages long and go beyond the scope of this chapter.

**9.4.1.2** The brief lesson plan outline found in this chapter illustrates the kind of plan which might go along with an elaborate simulation package. The in-basket exercise referred to is fictitious and is not attached to the plan. More detail in the plan might be appropriate, but the plan as illustrated here could accompany such an in-basket package. The elaborate detail which usually accompanies such exercises is assumed to be included with the package. Only the objective, the samples of behavior, and the general teaching outline for four periods of instruction are illustrated.

**9.4.2 Classroom Instruction as a Part of a Total Learning Package.** The higher the level of learning, the less relative significance traditional classroom instruction and time in class are likely to play. Much of what is to be learned will be learned outside of class. Readings, research, personal interviews, and other individualized learning experiences play more of a role than at the lower levels. The classroom experiences may become the group anchor for individualized experiences. At these session, students may share what they have gleaned from their personal research and share their creative ideas for peer and instructor reaction. Depending on the overall methodology chosen, actual classroom time may account for just a *fraction of the time spent in the total learning experience*.

**9.4.3 Quality of the Simulation in the Learning Experience.** Perhaps the single biggest factor which discourages teaching at the higher cognitive levels is the need for quality simulation exercises. In order to develop a deep understanding in a subject area, it may be necessary for students to have several different opportunities to practice their new insights and skills in problem solving. Each of their practice exercises must include the elements which are critical to develop the higher levels of understanding, and must be sufficiently different so that it cannot be resolved through simple recall. Case studies, in-basket exercises, games, and role playing scenarios are a few of the complicated, time consuming, and often expensive approaches used to bring these simulations to the students.

**9.4.4 Time Devoted to Instruction.** Although classroom activity may constitute a smaller percentage of the time spent on learning at the higher levels, more total classroom time may be required than with lower levels.
That is, actual classroom time may be just 3 or 4 hours of a learning experience (reading, research, writing), but this time may be double that typically devoted to any single topic in the curriculum. Instructors often raise the level of learning and increase the amount and complexity of outside work, only to find they are unsuccessful because no additional classroom time was built into the schedule. Classroom time required for a higher level lesson may be two, three, or more times that of a lower level lesson. A common mistake is to take a sequence of instructional periods and allocate them evenly without regard to the level of learning. One-third of the periods may be allocated to knowledge-level lesson, one-third to comprehension, and the remaining third to application level and beyond, or an even distribution of time may be made among departments competing for scarce time. A good course analysis might reveal that the time allocation should be more like 10 percent to knowledge lessons, 30 percent to comprehension, and a full 60 percent or more of the available time allotted to the higher levels.

9.4.5 Maturity and Sophistication of Students. Students must take a more active role in their own learning process at the higher levels. Those who are used to being passive learners may suffer some initial trouble coping with learning at these higher levels. They may mistake the lack of lectures by the instructor as weakness or disinterest. They may need close attention and assistance during this period. In the opposite vein, relatively sophisticated students may resent interference from the instructor as they pursue objectives with a higher degree of motivation. The instructor may become a barrier to learning in their eyes. As instructors, we will have to use our teaching and counseling skills to the fullest to try to map our individual strategy with each student. See Chapter 26, Using Feedback in the Classroom, and Chapter 27, Student Differences, for further discussion about dealing with the individual student.

9.4.6 Subject Matter Expertise of Instructors. The level of learning to which we teach is limited by the level of our own understanding. To be effective at the higher levels, we must be genuine experts in our subjects. We can stay with a canned lesson plan at the lower levels and be quite successful. We are doomed to failure if we try that at the higher levels. We cannot apply, analyze, synthesize, and evaluate student learning outcomes unless our own level of understanding permits us to do so. Instructors cannot teach above their own level of learning.

9.4.7 Special Emphasis Upon Feedback. The highly individualistic nature of higher level learning makes quality feedback to students especially critical. Feedback here has the same meaning as that described in Chapter 26 of this manual. Evaluation, or the passing of judgment on a student effort, is far less important than constructive feedback at these levels. Of course, at some time the instructor has to decide whether learning has occurred, but the primary emphasis should be placed on feedback to foster learning rather than labeling or grading. Good lecturers and even good discussion leaders may be uncomfortable with this feedback role. But the increased use and importance of feedback must be anticipated and planned into the curriculum. It is obvious that the quality of this feedback is related directly to both the subject matter expertise and the teaching and counseling skills of the instructor. The degree to which these skills are available must have a significant impact on the planning of individual lessons and the entire course.

9.5 Summary. The five important principles described earlier in this chapter for teaching and learning at the higher taxonomy levels place heavy demands on both instructors and students. Instructors become more like helpers or counselors and become partners in the learning process to a much greater extent than most of us are used to experiencing. While this change in roles may be very uncomfortable to some, most expert instructors find teaching at this level to be most rewarding. At these levels of learning, it is not unusual to hear instructors say, “I’ve learned as much as my students!”

9.5.1 As could be expected, there is a great deal of extra energy and effort expended by both instructors and students in working at the higher levels. Expenditures of energy and effort are very difficult to measure; however, there is no doubt that there are increased demands upon both students and instructors. But this increased energy and effort does affect a very tangible asset, time. The time necessary to plan for and conduct higher level learning experiences is substantially greater for both instructors and students. In addition to the time spent in class by both, there is the need to do considerably more planning and preparation. One-on-one conferences, individualized evaluations, and increased emphasis on feedback all place additional demands on time. Time, as a critical factor, must be accounted for by the instructor and the curriculum planner as instruction is developed at the higher levels of the cognitive taxonomy.

9.5.2 Instruction at these higher levels becomes increasingly student-centered. This student centeredness shifts much more of the burden for learning from instructors to students. Often, more learning occurs outside of class periods than within. Trial and error, discovery, and creative insight characterize student activity. Students may incorrectly sense a lack of direction or shortcomings in instructor expertise as they discover fewer and fewer answers that are clearly right or wrong. With the patient and skillful help of instructors with great subject matter expertise, these students can be guided to the highest and most satisfying levels of learning.
PU -- THROW THIS PAGE OUT
10.1 Introduction. All instructors should care about the attitudes of their students. We want our students to have positive feelings about our courses, our schools, and us as instructors. Some courses are designed specifically to affect attitudes but do so only informally, or with no real plan. Whether we plan to or not, much of what we do as instructors affects the attitudes of our students. But, potential to affect student attitudes about instructors and the way they feel about what is taught is too important to leave to chance.

10.1.1 As we have seen in previous chapters, we can and should plan for measurable learning outcomes. Although we have focused on cognitive or subject matter outcomes to this point, we should not ignore the need to plan for attitude development. Attitude development is complicated and must be approached with caution, but the affective domain should still be of great interest to us as instructors. We should realize our potential effect upon student attitudes. Further, we should be aware that many of the techniques for writing and measuring cognitive objectives apply to the affective domain. We may find that affective objectives are more difficult to write and that the measuring tools are less precise, but paying more systematic attention to the affective domain will improve our course.

10.1.2 There are at least four elements of writing and measuring objectives for student attitude development that should be of concern to the instructor: Clarifying what is meant by the term attitude (or affect), writing attitude development objectives, measuring student attitudes, and designing a curriculum to develop attitudes in a desired direction. This chapter will be limited to a discussion of the first three of these topics, which are of practical concern to the classroom instructor.

10.1.3 The fourth topic, designing a curriculum to develop attitudes in a desired direction, is beyond the scope of this manual. Classroom instructors are usually not involved with curriculum development at this level. Among the many schools and courses which successfully develop attitudes are Basic Military Training, Officer Training School, pilot training, survival training, and virtually all safety courses, but we could not describe their approaches to attitude development here without writing a separate manual on the subject. A person who wants to develop an effective curriculum plan for developing student attitudes on a systematic basis would be wise to study the programs of successful schools.

10.1.4 Although most of our objectives are cognitive, we would often like an indication of the effect our handling of the subject has on student attitudes. In those cases, it is not necessary to plan for affective outcomes separate from the cognitive outcomes. Much of the affective impact of cognitive lessons is in the way teachers deal with the subject matter. If we teach it effectively, student attitudes will probably be positive. If we do the job badly, their attitudes might well be negative.

10.1.5 There are still the other areas of interest to the instructor in developing student attitudes without getting into the broad implications of curriculum development. The definition and structure of student attitude development are important to us. The way we write and measure attitude objectives for our own courses is something we should understand. We should also care about the ways our daily classroom behavior affects student attitudes.

10.2 A Structure For Attitude Development—The Affective Taxonomy. A basic structure for attitude development was first presented by Krathwohl and associates in 1956. Their work provides a taxonomy that we can use to plan and classify instructional objectives. As introduced in Chapter 2, the affective taxonomy is developmental. Attitudes seem to develop through several identifiable stages, and a person cannot reach a level of attitude development without going through the level below it. Levels of the affective taxonomy are identified and described below.

10.2.1 Receiving. The first step in any teaching effort is to get the students to receive, that is, to pay attention or listen to what is being presented. Awareness of what is being communicated is the issue at this level. Willing attention is a logical follow-on to awareness, with selective attention following that. Selective attention is important because students choose the stimulus they will attend to.

10.2.2 Responding. If learning is to occur, getting students simply to listen to a message is not enough. Once we are sure of being received, we want our students to do something. Responding involves some sort of action or response on the part of the student. At first, the student may respond by merely complying. Later, the student may willingly perform an action and obtain satisfaction from it. Responding behavior at a high level is reflected in what we commonly refer to as “interests,” that is, those activities that bring personal satisfaction.

10.2.3 Valuing. As a person responds, some worth or value may be seen in what is being done. Students may come to accept, prefer, or commit themselves to an object or activity because of its perceived worth or value. When students value something, we can also say that they “appreciate it.” Commonly used terms associated with valuing are “attitudes” and “appreciation.”

10.2.4 Organization. At this level students compare, relate, and synthesize values into their own value system. Conflicts between the new material and the existing value system must be resolved because we cannot hold two strongly opposing values or attitudes at the same
time. Hence, this synthesizing step must occur as part of the development of a philosophy of life, which takes place in the next level.

**10.2.5 Characterization.** At the highest affective level, the student incorporates values into a system and that system now becomes characteristic of the student. These values now are the student; they represent a student’s way of life or life style. Behaviors that result from such values are considered typical for a given individual.

**10.2.5.1** Figure 10.1 summarizes the affective taxonomy, its levels of learning, and those activities characteristic of each level.

**10.3 Lesson Planning For Affective Development.** As an example of attitude development, let us take the topic of “lesson planning” and trace the building of a value through the various levels of development within the affective taxonomy. When potential instructors take an instructor training course, a goal is to teach them how to plan a lesson. Lesson planning may be a pretty dry subject to some, and so we have to capture our students’ attention and focus it on lesson planning as best we can. Upon attaining that focus, we have made students aware, at the receiving level, that the topic of lesson planning exists.

**10.3.1** To further illustrate the point, consider the basic design for lesson planning introduced in Chapter 6, Developing the Lesson Plan. For cognitive reasons we can see that a good attention step can help students focus on the subject and get them ready to learn. Affectively, we stimulated the students to tune in and begin receiving. Recall that “receiving” is the lowest level in the affective taxonomy. Remember, the student must begin receiving before the worth of the topic can even be considered. The other lesson parts have important cognitive and affective consequences as well. These consequences are summarized in Table 10.1.

**10.3.2** Awareness is not enough, so our next step is to get the students to act on the information. At first, students plan lessons because they are told to do so—simple compliance at the responding level. Willingness to respond emerges and later develops into satisfaction with responding. As students go through lesson planning procedures, some of them will begin to see some worth or value in planning a lesson. A lesson plan helps them clearly state what is to be accomplished. It is a handy outline they can use in giving a presentation. It helps them remember visual aids, stories, and examples. Most students will begin to feel more confident with a lesson plan available. Hence, we have obviously arrived at the valuing level of the affective taxonomy.

**10.3.3** As experience increases, the value of lesson planning may be assimilated into the students’ value system through the process of organization. This is a phase that a person goes through to fit the new value into his or her existing structure of values.

**10.3.4** At some point in the future someone may say, “Let’s do a lesson on a new topic,” and the immediate reply will be, “First, we’ll have to develop a lesson plan.” This positive attitude toward lesson planning now seems to be typical or characteristic of the student. Student behavior can then be generally predicted in terms of the value of lesson planning. The characterization level has been achieved.

**10.4 Relationship Of Affective Domain To Other Domains.** Although it is very convenient to think of the cognitive, psychomotor, and affective domains of learning as being separate, in fact they are not. Educators have treated the domains of learning as separate entities to make it easier to conceptualize them. In reality, learning takes place and behavior is affected in more than one domain at the same time.

**10.4.1** Consider, for instance, the Air Force specialty of pararescue. This job involves highly dangerous situations where a person may parachute or be lowered by cable from a moving helicopter into a combat situation or to the scene of a natural disaster for the purpose of aiding the stranded or wounded. In what domains of learning do the pararescue specialists operate? Certainly the psychomotor domain is involved: Lines must be operated, knots tied, and first aid rendered. Obviously cognitive learning also comes into operation: Procedures must be remembered, situations evaluated, and the best courses of action taken. It is not difficult to see that the affective domain is also involved. The mere fact that people would volunteer for

| Highest Level | Characterization — To integrate values or value systems into one’s style or philosophy of life. Behavior that typifies or characterizes a person. |
| Lowest Level | Receiving — To become aware. To attend, willingly or selectively. |
|               | Organization — To compare, relate, and synthesize values into one’s own value system. |
|               | Valuing — To accept, prefer, or commit one’s self to an object or behavior because of its perceived worth or value. To appreciate. |
|               | Responding — To act or comply. To perform an act willingly and to obtain satisfaction from it. |
such a job tells us something about their feelings about the job and other human beings. They probably operate at the valuing level or even higher. It is clear, then, that learning often takes place in all three domains at the same time. While we separate the domains to plan better for learning and evaluation, it is often impossible to distinguish between them in real life situations.

10.5 Affective Objectives Can Be Specified And Measured. Few military or civilian schools have undertaken the task of specifying affective outcomes, planning and developing lessons to account for affective outcomes, or measuring such outcomes. Although little has been done to account formally for changes in student feelings and attitudes, in many cases there is at least an implied concern for these affective changes. Many schools have demonstrated their concern by putting affective goal statements into their curriculum catalogs. These statements, which quite often sound and look good, might be useful as mission statements, but they represent a level of abstraction too high for measurable objective statements. Broad affective statements need to be specific to be measurable.

10.5.1 Consider the following two unmeasurable objectives: Students should be stimulated toward reaching their maximum potential as teachers, and to strengthen those professional values necessary for a full career of dedication and service to their country.

10.5.2 These statements are worthwhile goals, but they are of little value as objectives because they are not measurable. How do we know when students have been stimulated toward their maximum potential as a teacher? How do we know when airmen have strengthened their professional values? The answer, of course, is that we have no effective way of measuring such broadly stated objectives. That does not mean that we should not be concerned about affective outcomes. The problem is that the objectives were not stated so that they could be measured. These value objectives do indicate a concern and an acknowledgment of the importance of affect in education, but the writers of these statements simply do


does not exist.

Figure 10-1. The Affective Taxonomy

Table 10.1. Cognitive And Affective Consequences

<table>
<thead>
<tr>
<th>Lesson Part</th>
<th>Cognitive Consequence</th>
<th>Affective Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention Step</td>
<td>Students focus on subject matter and get ready to learn.</td>
<td>Students are stimulated to be attentive, to begin receiving, and to consider the worth of the topic.</td>
</tr>
<tr>
<td>Motivation</td>
<td>Students know why they should listen.</td>
<td>Students are urged to see the worth of the subject and to respond. They are encouraged to develop an interest in the subject.</td>
</tr>
<tr>
<td>Overview</td>
<td>Students follow more effectively when they see the logical sequence of ideas and methods the lesson will include.</td>
<td>Students are oriented when they have the security of knowing where they are going and how they are to get there.</td>
</tr>
<tr>
<td>Body (Lesson Development)</td>
<td>Students acquire knowledge or gain understanding of the subject.</td>
<td>When support is credible, students see and develop positive attitudes and appreciation.</td>
</tr>
<tr>
<td>Summaries</td>
<td>Students see relationships between main ideas and the essential ideas are summarized.</td>
<td>Students feel confident about lesson content and have a feeling of security and completeness.</td>
</tr>
<tr>
<td>Remotivation</td>
<td>Students realize how the lesson can be put to use.</td>
<td>Students see worth in the lesson and leave with a positive feeling.</td>
</tr>
<tr>
<td>Closure</td>
<td>Students recognize that the lesson is over.</td>
<td>Students sense a psychological completeness.</td>
</tr>
</tbody>
</table>
not go far enough to specify a measurable affective objective.

**10.6 Similarity Of Cognitive And Affective Learning Outcomes.** If we think for a moment about the schools where we have taught or attended as students, we realize that most schools have specifically stated cognitive objectives. Perhaps some have specified psychomotor objectives as well. Few, however, specify affective objectives. But if we closely examine the purpose for most schools, we will discover that they are also very interested in whether or not their students are: Conscientious, Empathetic, Receptive, Interested, Willing, Participate, Dependable, and Ethical

**10.6.1** What are some of the lessons learned from working with the cognitive domain that will help us to get started on writing and measuring affective objectives? We will use and build upon the lesson planning concepts that were illustrated earlier in this manual. We will not have to learn new approaches to lesson planning. Devices used to measure changes in learning are imperfect. Anyone who has attempted to test understanding or rate skilled performance knows the difficulties involved. The same is true for the affective domain. In the affective domain we will often observe behavior and make judgments or inferences about what the behavior means. Many of the assumptions made when working in the cognitive domain will also apply in the affective domain. For instance, we will sample behavior and assume that it is typical of the way students behave. We cannot possibly measure all behavior, so we will use the concept of sampling. Behavior is the primary indicator of what people feel, just as it is the primary indicator of what people know. We cannot look inside the brain to determine how a student feels about something any more than we can determine what is understood.

**10.6.2** Consider a brief example of the use of behavior in the affective domain. Joe is a student in one of our classes. While talking to another instructor we might say, “Joe has a bad attitude about this school.” Our colleague may respond by asking, “What makes you think so?” The evidence we give for Joe’s having a bad attitude will probably sound like this: “Why do I believe that Joe has a bad attitude? Well, it’s pretty obvious because he, comes to class late (or not at all), doesn’t bring his textbook, doesn’t take notes, sleeps in class, stares out of the window, cleans his fingernails in class, talks during lectures, doesn’t participate in class discussions, or reads magazines during class.

**10.6.3** What has happened is that we have sampled Joe’s behavior and inferred from it that he has a bad attitude about our school. We frequently reach conclusions about people’s attitudes and feelings in this way. How can we possibly know how people feel except through their actions or behavior? We infer how people feel from what they do. We need behavioral indicators of attitude just as we need them in the other domains.

**10.6.4** A wide range of techniques for specifying and measuring affective objectives is available. What follows will introduce a few of these techniques.

**10.6.5 Stating Affective Objectives.** Stating affective learning outcomes is not especially difficult given the complexity of the area with which we are dealing. Many of the objectives we have seen or perhaps have already written reflect concern for affect. Consider the following example of a lesson objective and purpose statement.

**Table 10.2. Lesson Objective and Purpose Statement**

| The objective of this lesson is for each student to comprehend that overpopulation is detrimental to world development so that the student may better appreciate the need for population control. |

**10.6.5.1** In Table 10.2 concern for affect is seen in both the objective and the italicized purpose statement. Not every school requires that purpose statements be written. It is almost certain, however, that every instructor has some purpose in mind when planning a lesson. Purpose statements answer the question, “Why does the student need to learn this material?” The lesson objective itself deals with what the lesson is about. Purpose statements, whether written or not, very often reflect the instructor’s concern for student feelings and attitudes which should result from the lesson. This instructor wants the students to comprehend that overpopulation is detrimental and also wants them to feel that it is detrimental. The use of the word detrimental implies a value judgment about overpopulation. In this case the purpose statement also reflects a concern for affect. A look back at the taxonomy will reveal that appreciation is synonymous with valuing. We have an objective and a purpose statement that reflect affective concern at a specific level within the affective taxonomy. The writer of this objective may not have realized that attitude as well as understanding were under development.

**10.6.6 Sampling Changes in Student Feelings.** Using another example closer to the classroom, consider the following lesson objective and outline of main teaching points. Notice that the third point is clearly affective.

**10.6.6.1** The objective of this lesson is for each student to comprehend that classroom examinations play a valuable role in the learning process. Comprehend that examinations aid teachers by…. Comprehend that examinations aid students by…. Value classroom examinations as learning experiences.

**10.6.6.2** We must now attempt to determine whether students do in fact “value classroom examinations as
learning experiences” as stated in this objective. Using the same concepts as were used to measure cognitive learning, we proceed to sample student behavior. Using behavioral terms, we construct samples of behavior that will provide evidence that the students do value classroom examinations. The samples might be listed as follows. Value classroom examinations as learning experiences. Propose using examination feedback to improve performance. Select use of examinations to improve performance when given the opportunity. Justify the continued use of classroom examinations to improve performance.

10.7.4 If students meet this objective “without supervision,” no one will watch them, pressure them, or remind them to replenish supplies— they must now do it on their own. If students meet such an objective, they are functioning at the responding level of attitude, or perhaps even higher.

10.7.5 Consider another criterion objective: Upon completion of assigned laboratory tasks, return all tools and equipment to designated storage places.

10.7.6 We might add a different phrase to this objective to account for attitude and end up with: Without being told to do so and upon completion of assigned laboratory tasks, return all tools and equipment to designated storage places.

10.7.7 Now the student must do the task without being told. Here again, we are at least at the responding level of attitude development.

10.7.8 There are any number of changes to criterion objectives that can help us to express affective objectives better. Consider the list of suggested changes in Table 10.3.

Table 10.3. Suggested Changes

<table>
<thead>
<tr>
<th>Suggested Changes</th>
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</thead>
<tbody>
<tr>
<td>Voluntarily takes action to….</td>
</tr>
<tr>
<td>Without being told to do….</td>
</tr>
<tr>
<td>Without promise of reward….</td>
</tr>
<tr>
<td>Without threat of punishment….</td>
</tr>
<tr>
<td>Without being reminded….</td>
</tr>
<tr>
<td>On student’s own time….</td>
</tr>
<tr>
<td>In spite of social pressure to do otherwise….</td>
</tr>
<tr>
<td>Initiates on his or her own….</td>
</tr>
</tbody>
</table>

10.7.9 Notice the last three of these phrases in particular. If students do something on their own time, initiate something on their own, or do something in spite of social pressure to do otherwise, they are displaying behavior at the valuing level of the taxonomy or perhaps higher.

10.8 Stating Purely Affective Objectives. The changes described so far are used when we want to “add on” some affective outcomes, but what if the primary purpose of a lesson is affective, or what if the affective outcome is just as important as a cognitive or psychomotor outcome? If the main purpose of a lesson is affective, we should plan and conduct the lesson accordingly. Sometimes, it might be best to have both a cognitive and an affective objective for the same lesson. In either case, we need to know how to write an objective which describes affective outcomes.
10.8.1 If we teach management, we have probably spent time ensuring that our students know that it is important for good interpersonal relations to exist between supervisors and subordinates. However, knowing what to do is one thing and being willing to do it is something else. We want to determine whether our students will, in fact, establish good relations between supervisors and subordinates when given the chance. What sort of affective lesson objective could we plan to help express our desired goal?

10.8.2 First, we select the desired level of learning from the affective taxonomy and state the lesson objective using that level. We might choose the responding level and begin with the following lesson objective: The objective of this lesson is for each student to respond to the desirability of having good interpersonal relations between supervisors and their subordinates.

10.8.3 As with a cognitive lesson plan, we must outline the main points we want to teach in support of our lesson objective. In this instance, we will select a main point at the responding level of learning as indicated by the lesson objective. The first main point (MP) might look like the sample in Table 10.4.

Table 10.4. Sample 1

| MP 1 | Respond, during guided discussion, to the importance of effective supervisor-subordinate communications. |

10.8.4 This main point also points toward a teaching method, guided discussion. Here we will use the discussion for something other than a cognitive purpose.

10.8.5 As in previous examples, the next step is to write several samples of behavior using behavioral terms. The samples in Table 10.5 might be appropriate in this situation.

Table 10.5. Sample 2

1. Present arguments to support the desirability of open communication between supervisors and subordinates.
2. Voluntarily tell personal experiences which illustrate problems which arise from a lack of good supervisor-subordinate communication.
3. Select organizational designs which emphasize interaction between supervisors and subordinates over those which do not.

10.8.6 Putting the objective, the first main point, and the samples of behavior together, we end up with the plan in Table 10.6. The objective of this lesson is for each student to respond to the desirability of having good interpersonal relations between supervisors and their subordinates.

10.8.7 Of course we would continue this process for subsequent main points and samples. Notice that in this lesson plan, we deal primarily with the affective domain and that the major purpose of the lesson is to get students to respond positively to our topic. At the same time, we provide built-in evaluation criteria which tells whether or not we have met the objective.

Table 10.6. Sample 3

<table>
<thead>
<tr>
<th>MP 1</th>
</tr>
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<tbody>
<tr>
<td>• Respond during class discussion to the importance of effective supervisor-subordinate communications.</td>
</tr>
<tr>
<td>a. Present arguments to support the desirability of open communication between supervisors and subordinates.</td>
</tr>
<tr>
<td>b. Voluntarily tell personal experiences which illustrate problems which arise from a lack of good supervisor-subordinate communication.</td>
</tr>
<tr>
<td>c. Select organizational designs which emphasize interaction between supervisors and subordinates over those which do not.</td>
</tr>
</tbody>
</table>

10.9 Measuring Changes In Student Attitudes. Let us look again at the samples of behavior in the previous examples. These samples actually form a small attitude assessment instrument—an attitude scale. The behaviors students exhibit in the samples will tell us something very specific about their attitude toward the task. Such evidence gives us some indication that the affective objective was met. In measuring attitudes we cannot be concerned with hair-splitting measurements. We are primarily concerned with general tendencies and whether these tendencies are positive or negative. Keep in mind too that we should not be satisfied with a measure of just one sample of behavior by itself, because of the broad range of possible behaviors. We run a big risk of misinterpreting if we use only one or two samples of behavior since attitudes are so very complex. We must always be sure to use several samples in an important attitude measurement so that we can have confidence in the resulting decision.

10.10 Using Published Attitude Scales. When we first discussed measuring attitudes, we were probably reminded of some sort of attitude scale or test written by a psychologist. Most of us have taken such tests or filled
out such scales at one time or another. Most libraries have copies of the publication, Buro’s Mental Measurements Yearbook, which reviews a wide variety of commercially available scales and inventories. Scales can measure attitudes toward such items as teachers, education, politics, student ratings, self, study habits, and many more. If we find a scale in Buro which measures what we are interested in, such a scale may be useful and save time in developing one of our own.

10.10.1 If we are faced with measuring the attitudes of a large group of people, a commercially published attitude scale may be just what we need. If we go back to the level-of-learning example just used and its accompanying samples of behavior, we can see that to determine whether or not students can perform each of those samples without a written test would require close observation during the learning process. If we had a large group of students, we might find it difficult to observe and record the necessary responses accurately and objectively. When we are tasked with measuring the attitudes of a large group of people, some sort of written instrument will probably be most accurate, efficient, and reasonable to use.

10.10.2 We might find the following affective criterion objective for these commercially available scales to be of value. Given the (name of the scale) attitude scale, show a statistically significant gain in (whatever the scale measures) on the posttest as compared to a pretest.

10.11 Making Our Own Attitude Assessment Scale.
As useful as the published attitude assessment instruments may be, the one we need may not be available in print. In such cases we might write our own. But constructing a scale to measure attitudes and feelings is not an easy task. The complexity of human behavior makes us appreciate the difficulty of accurately measuring changes in attitudes. Whether instructor-made evaluation instruments can accurately and consistently record changes in student attitudes is questionable. But these instruments can be of value and are better than nothing. To the instructor using self-made attitude assessment devices, some words of caution: Use the results carefully and do not generalize results to a large population, and use data primarily for your own information. With those reservations in mind, we can approach the process of developing attitude assessment scales.

10.12 Pretest-Posttest Design. Probably the most widely used strategy in affective measurement is the pretest-posttest design. In this design, students' attitudes are measured at one point in time to determine their attitudes prior to instruction. Students are then exposed to some sort of intervening learning experience. After the intervening activity, attitudes are again measured and the results compared to those obtained in the pretest. What we want to measure is a change of attitude and its direction (positive or negative). The diagram below illustrates the pretest-posttest design.

10.12.1 We will now address the issue of the specific item types to use in the pretest-posttest design. There are many formats that can be used for this purpose. Some examples follow:

10.12.2 Word List Format. Suppose we were interested in the attitudes of Air Force middle management personnel toward a new management technique. One way to begin would be to survey these managers and ask them, at random, to list words that describe other management techniques they know. These words would come from techniques with which they have been both successful and unsuccessful. With the words obtained we could develop a master list of both positive and negative adjectives such as effective, efficient, and logical.

10.12.2.1 Assume that we then have a group of managers in our course who have never used a particular management technique. Further, assume that we are interested in finding out what happens to the attitudes of these managers as a result of attending our school and learning this new technique. Our attitude test could be conducted as in Table 10.7.

10.12.2.2 The idea is that once the managers actually learn and use the new technique in the school setting, their attitudes should change toward the positive. If we are successful, they will likely conclude that the new technique is of real value to them as managers. Therefore, when the word list is re-administered the number of positive words selected should increase. We can construct a criterion objective for this pretest-posttest situation which would look like this: Given a list of mixed (positive and negative) adjectives used to describe a technique of management, select 10 which include more positive connotations on a posttest as compared to a pretest.

10.12.3 Multiple-Choice Format. A multiple-choice question for measuring the affective domain will have no right or wrong answer. Rather, it will permit students to express, in a structured way, their feelings about a topic. (Table 10.8)

10.13 Bipolar Scale Format. The bipolar format is simply a variation of the word list technique. In this format the person taking the test is not required to select single words, but instead is asked to rate something along a line between two extremes. This format could also be used to measure attitudes about the new management technique used in the earlier example. The major difference from the word list format is that the managers would now be given the opportunity to indicate their feelings at some point along a line between two extremes. For example, instead of making the adjective “irrational” an option, we might put the word “irrational” at one end of a continuum and the word “rational” at the other end.

10.13.1 In this example the respondents would place an “X” or check mark at some point on each line. The
various points could be given values that would enable us to calculate total or average scale scores permitting pretest-posttest comparisons. Note that the values of the qualities are purposely mixed, with positive and negative terms on both sides, forcing the student to think about the responses. The bipolar scale is an excellent device to use when your lesson involves a concept or concepts as described in Chapter 8.

10.14 Measuring Attitude Changes Following The Experience. Sometimes it is impossible to give an attitude test during both a pre- and posttest. In certain situations there is only one chance to measure student attitudes. The bipolar scale just discussed can be used as a one-time measure. Another example would be an end-of-course critique. On such critiques, students indicate how they feel about various aspects of the experience. For example, we might give the students a set of instructions and a scale and ask them to rate a series of curriculum topics such as methodology, communication skills, or evaluation. (Table 10.9)

10.14.1 We could further break down the major areas into topics to get more specific feedback. For example, under the major curriculum area of communication skills we might ask students to rate statements in the following two examples using the same five-point scale (A, B, C, D, E). (Table 10.10)

10.14.2 Most end-of-course critiques obtain responses to questions like those listed above, but do not use results to determine whether an attitude objective has been reached. We could also write a school criterion objective that would set a goal for how well we are meeting student needs. (Table 10.11)

Table 10.7. Attitude Test

<table>
<thead>
<tr>
<th>Rational</th>
<th>Efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helpful</td>
<td>Bothomsie</td>
</tr>
<tr>
<td>Inefficient</td>
<td>Irrational</td>
</tr>
<tr>
<td>Stable</td>
<td>Effective</td>
</tr>
<tr>
<td>Traditional</td>
<td>Volatile</td>
</tr>
<tr>
<td>Ineffective</td>
<td>Modern</td>
</tr>
<tr>
<td>Rewarding</td>
<td>Hindrance</td>
</tr>
<tr>
<td>Workable</td>
<td>Unworkable</td>
</tr>
</tbody>
</table>

2. Teach the managers the concept and principles behind the new technique and give them the opportunity to apply it successfully to relevant situations.

3. Re-administer the word list following the course.

Table 10.8. Multiple-Choice Format

<table>
<thead>
<tr>
<th>I find the subject of ____ (fill in) ____</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. very interesting</td>
</tr>
<tr>
<td>b. somewhat interesting</td>
</tr>
<tr>
<td>c. somewhat uninteresting</td>
</tr>
<tr>
<td>d. very uninteresting</td>
</tr>
</tbody>
</table>

I believe that the performance of this school in the tasks described below has been:

A. Outstanding
B. Excellent
C. Good
D. Fair
E. Unsatisfactory

Table 10.9. Example 1
Table 10.10. Example 2

The degree to which the curriculum:

- prepared me to organize and prepare lessons which will ensure clarity and effectiveness in communication, or
- prepared me to listen more effectively to others.

Table 10.11. Example 3

Given a series of curriculum topics and a related rating scale, rate at least 80 percent of the topic areas as average or higher.

10.14.3 In this instance we have decided that if the students at our school rate 80 percent of the areas we ask about as average or higher, we will be satisfied that our students have positive feelings about our school to a degree we find acceptable.

10.14.4 Likert-Type Scale. Another approach to posttest only or pre-post evaluation is the Likert-type scale. Students respond to clearly favorable or unfavorable statements by selecting one of the following responses: strongly agree, agree, no opinion, disagree, or strongly disagree. This approach is useful for measuring attitudes toward concepts or principles as described in Chapter 8. The Likert-type scale is relatively easy to quantify by assigning numeric values to each point on the scale. For example, we might assign a 5, 4, 3, 2, or 1 respectively from the strongly agree to strongly disagree end of the scale.

10.14.5 Either-Or Format. This simple format gives the student a choice of expressing an attitude by selecting one alternative over another. (Table 10.12)

Table 10.12. Example 4

| If I had it to do all over again, I (would) (would not) have taken this course. |

10.14.6 Open-Ended Question Format. Sometimes we have to permit our respondents to express themselves in a somewhat less structured way than those already mentioned. The open-ended question can help us in this regard. This format structures what is asked, but allows freedom of response. (Table 10.13)

Table 10.13. Example 5

| If I were teaching this class, I would…. |
| If I caught a student cheating, I would…. |

10.14.6.1 The major drawback to this format is that the responses must be read and interpreted, making it very difficult to code and quantify data.

10.15 Dealing With The Higher Affective Levels. Written scales and tests like these are useful when measuring the lower affective levels, especially in changes in attitudes over short periods of time. Short courses and brief exposure to material can be expected to change attitudes very little and only at the lower affective levels (receiving, responding, and, possibly, valuing). Changes at the higher affective levels (valuing, organization, and characterization) require much longer exposures, a block of instruction or an entire course rather than a lesson, and are more difficult to measure. We cannot be sure a particular attitude characterizes a person when our only measure or index is a paper-and-pencil test or scale. It is very difficult to measure the higher affective levels at all, much less with paper-and-pencil tests.

10.15.1 The methods for measuring higher affective levels are not objective or precise, but it is possible to measure the higher levels. The best way to get evidence of this level of attitude is to place students in specific situations for a long period of time and then observe their behavior for indicators of attitude. For example, if we are interested in determining if some value or attitude “characterizes” our students, we might have them role-play in a realistic situation. Observing their role-playing can tell something about student attitudes. Similar situations might include case studies, games, simulations, and class projects. Each of these situations provides an opportunity to observe a student under realistic conditions. Short experiences which do not get students to act out or somehow show their real attitude are of no particular value at the higher attitude levels.

10.16 Which Affective Measure Should Be Used?. We may wonder which techniques for measuring attitude change should be used in our own teaching. Unfortunately, there is no easy answer to the question, just as there is no easy answer to which measurement techniques we should use to measure knowledge or skills. Many methods and techniques adequately measure attitude, just as many methods and techniques measure other learning. Who decides whether to use true-false, matching, multiple-choice, or essay items at a particular school, the faculty members, curriculum advisor, or commandant? The same person might also make similar decisions with regard to attitude measures. Someone
must decide which techniques would be most appropriate and practical for the particular situation.

10.17 Summary. Writing and measuring affective objectives is an important but difficult task. In many ways, we have more difficulty specifying and measuring attitudes than we do for any other type of learning. We are forced to accept indicators of behavior which are second-hand evidence of student attitudes. Our measurement devices are often inconsistent and occasionally marred by error. But we do have attitudinal objectives, and our difficulties in writing and measuring them should not keep us from making attitude development a critical part of our courses.

10.17.1 The guided discussion plan at the end of this chapter includes many of the ideas presented here. Both a cognitive and affective objective are stated, and the test items measure both the comprehension level (cognitive) and valuing (affective). •
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Chapter 11
USING QUESTIONS FOR LEARNING

11.1 Introduction. Questions are so much a part of teaching that they are often taken for granted. Many professionals, such as lawyers and doctors, are taught how to ask questions, but few instructors receive formal training in questioning skills. This lack of training, coupled with the average instructor’s lack of planning for questions, often results in ineffective or inefficient use of questions. But it doesn't have to be that way.

11.1.1 Why should we care about questions? Because the effective use of questions may result in more student learning than any other single technique used by instructors. A considerable amount of classroom communication is in the form of questions; they play a key role in most teaching methods. Thus, it is important for us to learn to use questions correctly.

11.1.2 In this chapter we will begin by comparing questions at the knowledge and comprehension levels to show that the level of learning is always the starting point in formulating questions. Having determined the level of learning and organizational pattern, we will see that questions are categorized by purpose depending on our objective. We also see that questions are categorized by direction to ensure that all students are involved in the process and reach the appropriate level of learning. Finally, we will discuss some common problems associated with the use of questions and some techniques that can be effectively used to overcome these problems.

11.2 The Starting Point. In order to understand that the level of learning expressed in the lesson objective is the starting point in designing questions, let us compare the first two levels of learning in Bloom’s taxonomy. We know that at the knowledge level, the goal for our students is to recall specific information. The process of critical thinking begins with data or facts; therefore, recall questions are a necessary beginning. Recall questions help guide the students to the higher intellectual processes of thinking. During the lesson we want our students to remember factual information and to repeat what they have learned. What kinds of questions should we ask during the class session to produce this behavior? Knowledge-level questions are usually characterized by such words as who, what, when, where, and which. For example, “Which presidents of the US had military service before their election?” Students either know the answer to this question or they don’t.

11.2.1 There are many legitimate reasons for asking knowledge-level questions. In a demonstration-performance lesson you may want to determine if the students have been able to keep up with your explanation. In an informal lecture you may want to determine if the students have the background information necessary for the class to proceed. Perhaps you want to determine if the students can recall basic principles and generalizations before you begin more in-depth discussion of them.

11.2.2 There is a danger in asking only these kinds of low-level questions. Simply because your students can parrot back what you said in class or what they have read does not necessarily mean that they understand the material. If we ask solely knowledge-level questions, we run the risk of slighting other intellectual processes of our students. If we want our students to engage in more than just memory work, then more work in formulating questions is required from us.

11.2.3 At the comprehension level-of-learning the emphasis is on understanding, rather than mere recall. We want our students to grasp concepts, to explain similarities and differences and to infer cause-and-effect relationships. To achieve these results we should ask open-ended questions that are thought provoking and require more mental activity than simply remembering facts. For instance, questions containing the word “how” allow the students to compare and contrast; “why” questions encourage the students to question the causes of events or actions; “What if…” questions prompt the students to predict. For example, “With all the emphasis put on safety in the Air Force, why do accidents continue to be such a problem?” Notice that students must expend greater effort to answer this question than they did to answer the simple recall question about which presidents had military service.

11.2.4 In many Air Force classes, instructors must bring their students beyond the comprehension level to a position where they can use what they have learned to solve Air Force problems. Most of what we say about questioning at the comprehension level holds true for the higher levels of learning. Even though the remainder of this chapter addresses the comprehension level, it also applies to the higher levels.

11.3 Determine Purpose. Questions serve a variety of purposes. A good question posed by the instructor can command the students’ immediate attention. Properly planned and asked questions will stimulate student thinking. Questions help instructors see how effective their teaching has been.

11.3.1 One of the most important purposes of questioning is to develop the subject of the lesson. In a guided discussion, case study, or informal lecture, the subject would be developed through questions which foster student participation. In a teaching interview, development would occur through questions directed toward the guest.

11.3.2 Regardless of the method, if your purpose is to start participants talking, plan a leadoff question that will generate discussion. Your leadoff question should stimulate thinking and be phrased so that participants are
aware of the main point. For instance, a guided discussion on the topic of time management might have as a main point “Effective management begins with proper time management.” The discussion might be initiated with a leadoff question such as “Why is there a need for all of us to manage our time properly?”

11.3.3 After you have initiated the lesson with a leadoff question, your purpose is to guide the direction of the discussion. Plan follow-up questions that are designed to guide the lesson progression by supplying subideas. Your follow-up questions should be such that they promote reasoning. In the same discussion on time management, an appropriate follow-up question might be: “How do we mismanage our time?” Notice how the instructor’s question has provided a subidea—mismanagement of time. The students will now consider this aspect of the issue and relate it to the main point.

11.3.4 Once your lesson is in progress, you may notice that one of the students is starting to get sidetracked. At this time you can ask a spontaneous question to lead the straying student back to the main point. A spontaneous question can control the content of the lesson by ensuring that responses are pertinent. A spontaneous question can be used to seek clarification. For instance, in a teaching interview, if the guest gives a response that is not clear, you could prompt the guest by asking for an explanation or an expansion through such questions as “Would you restate your answer in another way?” or “What else can you add?” or “Are there other reasons?”

11.3.5 Spontaneous questions are also used to seek support when a statement is made that appears to be shallow, lacks focus, or merely parrots information from a text or previous lecture. You need examples or statistics as support for the assertions just made in order to promote understanding. Hinting or further prompting, from the instructor, may be necessary before the lesson can continue. For example, in an informal lecture on the strategy of deterrence, you might ask: “How would a countervalue strategy affect the free world order of battle?” If the students were unable to reply, you could ask for a definition of countervalue at the knowledge level. With that answer in mind, you could then provide a hint such as: “Opposed to a countervalue strategy is a counterforce strategy. How would the targets differ?”

11.4 Questions Categorized By Direction. After you have determined the purpose of a particular question, you are ready to actually ask the question. Your first decision should be your target: Who do you want to respond?

11.4.1 Directed to Entire Group. A question projected overhead is directed to the entire group rather than to a specific individual and is one to which you expect an answer. Overhead questions work well in stimulating thinking and getting participation started. Leadoff questions are often projected overhead since they are usually addressed to the class rather than one person.

Questions of this kind alert all members of the class and keep them following the discussion.

11.4.1.1 Instructors frequently ask questions for which no answer is expected. These are rhetorical questions because they are either answered by the instructor or are left unanswered. Why would an instructor ask questions for which no answer is expected? Such questions can be found throughout a lesson, from the attention step to the conclusion. “Have you ever wondered why…” can be an arresting opening. “What could Captain Jones have done to prevent…?” could motivate students by putting them mentally into a specific situation. “What do you think the Inspector General’s recommendation might have been?” could lead into an overview of the lesson.

11.4.1.2 As the instructor nears the end of a lesson, there are also many ways rhetorical questions can be useful. The summary often begins with something like “Well, what have we learned about NCO responsibilities today?” In an interim summary it is very natural to say “What have we learned so far?” As we remotivate students we might say “If you faced the same situation as Captain Jones, do you see where this approach would have worked?” Even in the concluding statement we might find such questions as: “What will you do the next time a traffic fatality is reported in your squadron?” or “Based on what we have observed today, what would you recommend to the new wing commander?”

11.4.2 Directed to Individuals. Many times during a class session, the instructor will find it necessary to direct a question to a specific individual. A direct question is addressed to a particular person to elicit involvement, to seek an opinion, or to draw out support. For example, “Sergeant Lopez, you’ve taught for a while. How have you handled individual differences in your classroom?”

11.4.2.1 When a student asks you a question, you may prefer not to answer it because you want the other students to continue to think and discuss. Or, you might ask a reverse question, one that directs the question back to the student who asked it. Lieutenant Michaels might say to you, “I really can’t see your point. Why is it necessary to have authoritarian leaders?” You could reverse the question to him or her by saying, “Think about it for a minute, Lieutenant Michaels. Why do you think it would be necessary to have an authoritarian leader, say, in a combat situation?”

11.4.2.2 Similarly, if a student asks you a question and if, again, you prefer not to answer it, you may choose to redirect the question to another student. This relay question will help keep the discussion among the students. Ms. Cannon might ask, “But how does an authoritarian leader fit into the modern Air Force?” Your reply could be, “Your question is one we ought to consider. Airman Cook, how would an authoritarian leader fit into today’s Air Force?” A relay question, then, is one in which student A asks a question of the instructor and the instructor passes it on to student B.
11.5 Effective Questioning Techniques. Now that we have discussed the factors involved in planning and selecting comprehension-level questions, the real challenge is in asking the questions. Even the right type of question can be carelessly asked. Let’s assume that you have one overall problem at this time in your class—no one is saying anything, or they are saying the wrong thing! What are some of the things that you can do to avoid this situation?

11.5.1 Avoid Do-Nothing Questions. Your first course of action can be to avoid questions that do nothing to promote thought and discussion. If not carefully planned, questions can be too simple or too complex. We should avoid the kinds of questions that actually limit the discussion.

11.5.1.1 The first category to avoid is dead-end questions. For instance, a question that requires no more than a yes-or-no response is really a dead-end question. If you asked your students, “Is Colonel Doaks an example of a democratic leader?” as a leadoff question, what would they discuss? This kind of question does not promote discussion; it encourages guessing and can be a waste of time. If you find that you must ask a yes-or-no question, be sure to follow it up by asking “how” or “why” to get the students to explain their answers and have something to discuss.

11.5.1.2 A second category of do-nothing questions is foggy questions. As the name implies, foggy questions are unclear or nebulous, usually because the instructor has not thought about the desired answer. Foggy questions are often ambiguous, such as “What happened in Cleveland in 1873?” Students will not understand what is wanted or what the teacher is suggesting. Indefinite questions are also unclear because they are not limited. “How do a manager and a staff member differ?” is a foggy question because the students have not been provided any focus.

11.5.1.3 Multiple questions are another example of this category. Students become confused when you ask double- and triple-barrelled questions, such as “What are some of the Federal laws passed by Congress in support of education, and what have they accomplished, if anything?” This double-barrelled question is confusing because the students will not know which part the teacher wants answered first. As a result, they just sit there with puzzled looks on their faces.

11.5.1.4 The last category of do-nothing questions to avoid is the catch question—where you already know the answer and imply it in the question. Some kinds of leading questions fall in this category, such as “Now, this is the first step, isn’t it?” Because the question implies the expected answer, it prevents the students from reaching their own conclusions. Often, they elicit no more than a yes-or-no answer or a nod of the head, and therefore generate very little discussion.

11.5.1.5 Loaded questions are another example of catch questions. “Have you quit pressuring your subordinates?” is a loaded question because no matter what the student says, it could be wrong. Loaded questions should be avoided because they reflect the bias of the teacher.

11.5.2 Avoid Stifling the Discussion. If you find that despite the nature of your questions the students still are not talking, perhaps you are somehow hampering the flow of discussion. You can avoid stifling the discussion by allowing enough time for students to think and respond. Waiting for an answer is perhaps the most difficult task for an inexperienced instructor who is intimidated or threatened by moments of silence. Too many rapid fire questions will not allow for thought, and you may be encouraging short responses and therefore little discussion; patience is necessary. Allowing enough time is especially critical after the leadoff question. You might indicate to your students that you do not want an immediate answer by saying something like “I want you to think about this for a minute before answering.” and then ask the question. This tactic tends to discourage aggressive, hand-waving students and gives the quieter ones a chance to think and then respond.

11.5.2.1 To compensate for the fact that students may not be responding, impatient instructors sometimes feel tempted to provide the information themselves. Avoid this habit: Don’t answer your own questions. This habit can be very annoying because it increases the amount of teacher talk and minimizes student participation time. Students will learn quickly that it is not necessary for them to prepare for class, because “the teacher answers all the questions anyhow.” Also, try to allow more than one student response per question. Don’t rush the responses; give the students a chance to explain. Rushing responses inhibits students and tends to stifle the discussion.

11.5.3 Be Clear and Concise. Human energy can be extravagantly wasted when we persist in trying to answer questions that are vague and meaningless. How often have you sat in class and listened to the instructor ask a question for which your response was “Huh?” The wording of your questions is very important, especially to avoid smart-aleck remarks like: To the question, “When do you use Boyle’s law?” the answer might come, “Never. I don’t even know the man.” If you rephrase or ask questions several times, the students may become confused and unable to discuss your material.

11.5.4 Show Concern for Individual Differences. The last technique for asking effective questions pertains more to your presence in the classroom and your acceptance of the students. If there is little discussion, perhaps it is because you are not showing concern for your students. Rather than allowing one student to dominate the conversation, encourage all students to participate. If you make it a practice to call on nonvolunteers, everyone soon gets the idea that they are
responsible for participating. If you encounter reticent students, who are quiet and do not say much, be tactful in drawing them out. Probably the least effective approach is surprising the student with, “What do you think about this point, John?” Often simple eye contact will encourage a response, rather than using direct by-name confrontation. Reasons for the reticence may be varied; the student may not be prepared, may feel ill at ease in the group, or may simply be thoughtful. If a topic is new, challenging, or complex, some students may need more time than others to get into it.

11.5.4.1 When considering individual differences, be sure that you don’t embarrass your students. If someone has been inattentive, alert that person by calling their name and choose a question which you think that person can answer, or start with a recall question. Do not embarrass an inattentive student by asking a difficult question. Make all the students feel that they have a share in the class.

11.5.4.2 Finally, be accepting of your students and their responses. Student answers should be genuinely sought. Your body language, facial expressions, and tone of voice all play a part in encouraging or discouraging students to participate. Be aware that mannerisms as well as words can deter participation. Also, be careful not to cut someone off too quickly. Even though an answer may sound inappropriate, if the student is given a chance to explain, part of the answer may be correct, and even if the answers are not “correct,” they may provide valuable clues to student difficulties and provide a basis for reteaching. Criticism from you at this point might cause withdrawal from participation. When students ask you questions which are not pertinent, tactfully defer the answer until later in the lesson or arrange to discuss the issue later.

11.5.4.3 If you adopt such suggestions, your students are likely to realize that you are concerned about them and will be more willing and able to discuss the material.

11.6 Summary. Questioning is an important means of producing mental activity in students. It is possible to reach a specific level-of-learning by designing questions to elicit the responses necessary for support. Learning at the comprehension level and beyond will require more than responses to who, what, where, which, and when questions. Determining the purpose of a question will also help to reach a given level of learning. The leadoff question initiates the discussion; the follow-up question guides discussion; and the spontaneous question controls and supports the discussion. Questions can be directed to the entire group or to specific individuals, depending on whether you are trying to motivate the students, get them involved, or keep the discussion going. Planning questions to include everyone will help ensure that all students reach the objective. Promote a lively discussion by avoiding questions that do not stimulate thought. Word the questions so that students understand what is being asked, and be considerate of the individuals in the group.

11.6.1 Questions are used for many purposes, but they should always develop the lesson’s central theme or thought. If the objectives of the lesson are clearly determined in advance, instructors will find it much easier to handle questions and keep the discussion moving in the planned direction.
Chapter 12
SURVEY OF TEACHING METHODS

12.1 Introduction. Which is more important—what you teach or the way you teach, or the payload or the delivery vehicle? Obviously, both are critical. Good objectives are wasted on poor teaching methods. Good teaching methods aid learning but have little value if course objectives are poor. Most of the previous chapters have been concerned with design. This chapter and several which follow discuss the many ways to deliver instruction—the teaching methods.

12.1.1 After determining the lesson objective, the instructor should choose a method of instruction, not in terms of instructor activities, but in terms of the student’s activities as a learner. In making a decision, the instructor considers the ways that people learn: by doing, by discussing, by listening, by observing, and by participating. The instructor’s role is to select an organized set of activities that will result in meaningful learning experiences for the students.

12.1.2 This chapter is a survey of many popular teaching methods. Although the descriptions are short, there should be enough detail to identify those methods which deserve further study. Five methods of teaching are described in considerable detail in subsequent chapters. These are lecture, guided discussion, teaching interview, case study, and the demonstration-performance methods. These five have been selected for expanded treatment because of their applicability to Air Force classroom instruction.

12.1.3 For the sake of clarity, the individual methods described in this chapter have been grouped into broad major categories—presentational methods, student verbal interaction methods, and application methods. Examples of each category are included since no one particular method is suitable for all teaching situations. If, for example, students are to gain skill in performing a certain task, one of their activities should be practice in performing the task. If the desired outcome is knowledge, students probably should observe and listen so they can relate what is seen and heard to their own experiences. If students must learn to apply a principle, the instructor might ask them to solve a problem or perform some task requiring an application of that principle.

12.2 Presentational Methods. The presentational methods provide situations in which the skill or material to be learned is in some way presented to or demonstrated for the learner. In some presentational methods there is little if any activity or interaction required of students other than their attention and desire to learn. In other instances there is considerable student activity involved. What distinguishes these methods from the other categories is that students begin the learning experience with little or no previous exposure to the material or skills to be learned.

12.2.1 Lecture Method. The teaching lecture is a formal or informal presentation of information, concepts, or principles by a single individual.

12.2.1.1 The formal lecture is usually given to large groups (more than 100 people) with no active participation by the student. The learning experience is essentially passive.

12.2.1.2 In the informal lecture, the size of the group is usually smaller than the formal lecture, and student participation develops when the instructor questions the students or they question the instructor on points presented.

12.2.1.3 A briefing is a formal or informal presentation in which a variety of significant facts is presented as concisely as possible. The briefing is rarely concerned with material beyond the knowledge level and is almost always accompanied by visual representation of the material in the form of charts, graphs, slides, and other aids. Strictly speaking, the briefing is not a teaching method, but it is sometimes used in school situations.

12.2.1.4 A guest lecture is a presentation by a person other than the instructor who is usually an expert. It is used to give variety to the class period or to supply information in an area where the instructor is not an expert.

12.2.2 Indirect Methods of Discourse. Indirect discourse involves verbal interaction among two or more persons which is seen and heard by students. Some examples include:

12.2.2.1 A dialogue—interaction between two or more persons, one of whom may be the instructor, generally to present sharply opposing points of view for students. The dialogue is often highly structured towards preplanned goals and may take the form of questions and answers between the participants.

12.2.2.2 A teaching interview—the instructor questions a visiting expert and follows a highly structured plan which leads to educational objectives. The advantage of the teaching interview over the guest lecture is that the instructor controls the expert’s presentation. The expert normally requires little or no advance preparation, but responds extemporaneously from general experience. When a question-and-answer period follows the interview, students can interact with the expert.

12.2.2.3 A panel—a structured or unstructured discussion between two or more experts (generally excluding the regular instructor), presented in a variety of ways, such as constructive arguments followed by debate, response to questions from the instructor or the students, a preplanned agenda, a fixed or a random order of speakers, or free discussion.
12.2.2.4 Skits, playlets, and other dramatizations—an often effective means of introducing variety into instruction and or reaching objectives directly or indirectly. A subdivision of dramatization is role-playing by an instructor to point out good or bad examples. Role-playing by the instructor differs from role-playing by students—a simulation method.

12.2.3 Demonstration-Performance Method. The demonstration-performance is the presentation or portrayal of a sequence of events to show a procedure, a technique, or an operation, frequently combining oral explanation with the operation or handling of systems, equipment, or material. The demonstration-performance is the most commonly used small group learning experience in a classroom or laboratory (which requires significant instructor involvement) to develop learner skills in the operation of equipment or the acquisition of mental skills.

12.2.3.1 Coaching is an intensive learning experience for individual or for small groups, characterized by significant student involvement and immediate instructor feedback. A videotape of student performance is an excellent teaching aid when supplemented by an instructor’s analysis and critique. This technique is particularly effective in instructor training.

12.2.3.2 Tutoring is an informal, student-centered activity generally involving instructor and learner in a one-to-one relationship, often for remedial reasons, for test taking, for students to get ahead, or for learners with special needs.

12.2.4 Reading. Reading is the assignment to a student of printed verbal materials including books, periodicals, microforms, manuals and regulations, and handouts (instructor-produced).

12.2.5 Self-Paced Methods. Self-paced instruction is a learning program which is organized so that students are allowed to move through it at their own pace under the guidance of an instructor. Some typical applications are:

12.2.5.1 Programmed instruction—a method of instruction which usually includes a carefully planned sequence of small units of instruction which require the learner to respond to cues and receive immediate feedback. Various media (books, teaching machines, and computers) are used to deliver the programmed instruction to the learner.

12.2.5.2 Modular instruction—prepackaged units of instruction which typically contain a clear statement of objectives and all necessary learning resources to permit the learner to achieve these objectives. A module can be a complete unit or part of a course.

12.2.5.3 Computer-assisted instruction—a learning experience which uses a computer as the vehicle for interaction between the learner and the planned course of instruction.

12.2.5.4 Mediated instruction—includes such devices as slides, films, tapes, and cassettes used to present the planned course of instruction to the learner.

12.3 Student Verbal Interaction Methods. Verbal interaction methods, as the designation implies, present situations in which students interact verbally with an instructor, a group leader, or with each other. Learning is enhanced as students deal with the material as a group. These methods presuppose a certain amount of previous preparation by the students.

12.3.1 Questioning Method. Questioning as a method is used to emphasize a point, stimulate thinking, keep students alert, check understanding, review material, and seek clarification (see Chapter 11.) Examples of this method are:

12.3.1.1 Socratic Method. While rarely seen in its pure form, instruction by asking students questions is a method as old as ancient Greece and as modern as a great books course. The method may resemble a guided discussion, but the goal is often to obtain specific answers to specific questions (reiteration) and not to stimulate discussion. An instructor may use the method for “trapping” students into inconsistencies in logic which sharpen their thinking skills. Law professors often use the method for “interrogating” specific students using a series of questions as they might be used in a court of law.

12.3.1.2 Student Query. “Students asking questions” is often used in combination with other methods such as the lecture, the panel discussion, or the teaching interview, but it could be used by itself, either on a one-to-one basis in tutoring or coaching or as part of small or large groups. The method is student controlled, although the responder can also control the session to a certain extent if skillful enough. Students’ questions may often be a measure of the degree of their understanding of a particular matter, that is, they “know enough to ask the right questions.”

12.3.2 Nondirected Discussion Method. Nondirected discussion is a group interactive process in which task or objective-related information and experiences are evoked from the student. The instructor normally plays a very limited or passive role. Some examples are:

12.3.2.1 In its original form, the peer-controlled seminar is a group of highly qualified peers (such as a doctoral-level faculty) who meet periodically for the exchange of ideas, usually in the form of prepared papers with discussion or questions following. The research seminar resembles a peer-controlled seminar when the instructor allows qualified students to lead the discussion with the instructor providing proper supervision. In professional military education, a peer often acts as a “facilitator” to lead discussions or conduct workshops. When used, the instructor should provide a statement of the educational objectives, a suggested discussion guide, and should
require some tangible evidence of the results of the discussion.

12.3.2.2 Akin to the “bull session” or the “war story” hour, free discussion can be a valuable adjunct to participatory management or brainstorming but, by its very nature, it seldom supports measurable objectives.

12.3.3 Guided Discussion Method. The guided discussion is an instructor-controlled, interactive process of sharing information and experiences related to achieving an educational objective. The difference between nondirected discussion and guided discussion is the active involvement of the instructor in asking questions and summarizing the concepts and principles learned. The instructor interacts with the group as a whole through questions, but tries not to dominate the discussion. Students are encouraged to learn about a subject by actively sharing ideas, knowledge, and opinions. The flow of communication is a transaction among all the students rather than question and response between individual students and the instructor. The method employs the general-to-specific presentation to help students form generalizations.

12.4 Application Methods. Application methods provide learners with opportunities to apply previously learned material in situations calling for the practical use of the material. Some application methods require students to relate material already learned to new experiences and mentally recognize how the material applies, that is, to transfer concepts to new situations. Other application methods require students to apply previously learned materials to new situations for the purpose of making decisions or solving problems.

12.4.1 Individual Projects. In all practical exercises, students interact with things, data, or persons, as necessary, to attain training objectives. Student projects usually take place outside the classroom setting, but not necessarily. An important aspect is instructor feedback, which is given periodically as needed. Some examples of the uses of this method are research papers, staff instruments, theses, dissertations, construction or assembly of equipment or models, creative writing, and making of graphics, pictures, or displays.

12.4.2 Field Trips. A field trip is an out-of-classroom experience where students interact with persons, locations, and materials or equipment for the attainment of instructional objectives. An important aspect of the field trip is the student’s encounter with real settings.

12.4.3 Simulations. Simulations are low-risk, educational experiences which substitute for some real-life situation. Simulations may involve individuals, groups, or whole units. They may preempt normal classroom time, and they are especially effective as capstone methods following a block or several blocks of instruction. More elaborate versions may require special equipment, simulation areas of various sizes and configurations, and specially trained staff. Some kinds of simulations are:

12.4.3.1 Role playing—students to project themselves into a simulated interpersonal situations and act out the parts of the persons and situations assigned by the instructor. Role playing is generally limited to practice of the skills involved in interpersonal relations, such as counseling, interviewing, and conference leadership.

12.4.3.2 In-basket exercises—used in random order to simulate a series of matters or decisions which a leader might actually encounter. Students are confronted with a rush situation, limited information, and a list of action-demanding items which actually might be found in an in-basket. After sorting out priorities, students dispose of matters by delegating, replying by mail, setting up meetings, delaying action, and deciding who should do some of the urgent actions.

12.4.3.3 Organizational or management games—students manipulate an organization or some component part to produce certain outcomes. Various degrees of competition between teams of students may be built into these exercises. If they entail any degree of complexity, organizational games almost always employ a computer to carry out the simulation.

12.4.3.4 Hardware simulation—students use trainers that resemble, to some degree, the equipment that is to be used on the job. (A flight simulator, for instance, has some characteristics of an airplane.) Such devices are substituted when use of the actual equipment is too costly or otherwise impractical.

12.4.4 Case Study Method. The case study is a learning experience in which students encounter a real-life situation in order to achieve some educational objective. By studying realistic cases in the classroom, students develop new insights into the solution of specific on-the-job problems and also acquire knowledge of the latest concepts and principles used in problem solving.

12.5 Summary. This chapter has provided a brief overview of several teaching methods grouped under the broad categories of presentational, student verbal interaction, and application. Most familiar methods have been identified here with enough detail to determine whether further study might be worthwhile. Five individual methods will be dealt with in detail in the chapters which follow. A process for selecting teaching methods, appropriate to given situations, from among those described in this chapter is the subject of Chapter 18.
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13.1 Introduction. Traditionally, lecturing has been the most popular teaching method in the military. We sometimes lecture to large groups of students in auditoriums for extended periods. Other times we explain a subject or a process briefly and informally in small groups, before proceeding with some other activity or method—a kind of mini-lecture.

13.2 Types of Lectures. A teaching lecture is a formal or informal presentation of information, concepts, or principles by a single individual.

13.2.1 Formal Lecture. Normally communication in a formal lecture is one-sided, from the instructor, with no verbal participation by students. Because it is impersonal, a formal lecture is usually given to a large audience. Even though structured and often rehearsed, the formal lecture should have a natural and conversational delivery style, without overuse of notes.

13.2.2 Informal Lecture. The audience for an informal lecture is usually smaller than for a formal one. Considerable verbal interaction between instructor and student is often possible in the form of both questions and discussion. The delivery style is even more conversational, with students often addressed directly by name. Many Air Force schools with classes of less than 100 use the informal lecture extensively.

13.3 Other Types Of Oral Presentations. Two other speaking situations common in the Air Force differ from the teaching lecture.

13.3.1 Briefing. The main purpose of the military briefing is to inform rather than to teach. The briefing format or organization is often fixed, with different subjects arranged topically which may be in the same order day after day. The briefing often forms the basis for decision making or operations. The formal briefer minimizes self, while effective lecturers often project more personality or humor. The briefer is usually not concerned with such learning techniques as interim summaries, repetition, and extended conclusions. If there is interchange between the briefer and the audience, questions are usually restricted to the material being presented. As Air Force teachers we may occasionally present briefings, but we should avoid strict briefing style in the classroom.

13.3.2 Speech. A speech generally has one of three basic purposes: to inform, to persuade, or to entertain. The informative speech is a narration concerning a specific topic, but does not involve a sustained effort to teach. The Air Force Speakers Program, orientation talks, or presentations at commander’s call are examples of speeches to inform. The persuasive speech is designed to move an audience to belief or action on some topic, product, or other matter. Recruiting speeches to a high school graduating class, budget justifications, and courts-martial summations are all primarily speeches to persuade. The entertaining speech gives enjoyment to the audience. The speaker often relies on humor and vivid language as a primary means of entertaining the listeners. A speech at a dining-in is frequently a speech to entertain.

13.3.2.1 Instructors may, at times, want to accomplish all three basic purposes of speaking. We often attempt to inform students on a given subject. When we try to influence students to modify their behavior we become persuaders. Finally, it may be advantageous at times to gain attention by entertaining. Still, our primary purpose is to facilitate student learning.

13.4 Advantages And Disadvantages Of Lecture Method. In many Air Force teaching situations the method of instruction to be used is predetermined, and as instructors we may have a limited role in deciding how the material will be presented. In some cases, however, it may be our job to choose the method to use for a lesson or a series of lessons. We should select the appropriate method only after we write the lesson objective and complete our initial research on the subject. The selection process will be more effective if we are aware of the advantages and disadvantages of the lecture method. While these advantages and disadvantages pertain especially to the formal teaching lecture, most also apply to the informal teaching lecture.

13.4.1 Advantages. Because of its advantages, a majority of Air Force instructors use the lecture method at least part of the time.

13.4.1.1 The lecture is one of the most efficient teaching methods for presenting many facts or ideas in a relatively short time. Material that has been logically organized can be presented concisely in rapid sequence.

13.4.1.2 The lecture is particularly suitable for introducing a subject. To ensure that all students have the necessary background to learn a subject, we can present basic information in a lecture. By using the lecture in this manner, we can offer students with varied backgrounds a common understanding. A brief introductory lecture can give direction and purpose to a demonstration or prepare students for a discussion.

13.4.1.3 The lecture is a convenient method for instructing large groups. If necessary, we can use a public address system to ensure that all students can hear us. The lecture is sometimes the only efficient method to use if student-to-faculty ratio is high.

13.4.1.4 The lecture is often useful to supplement material from other sources or for information difficult to obtain in other ways. If students do not have time for research or if they do not have access to reference material, the lecture can fill the bill. In subject areas where information is available in widely scattered places
(textbooks, journals, tapes), the lecture allows the instructor to summarize and emphasize pertinent material. Reports, current research, and information which change frequently may not be easily available in written form, and the lecture can give students the most up-to-date information.

13.4.1.5 The lecture allows a large number of students to receive information from real experts in a subject. In general, a person who can speak from actual experience or a scholar who has carefully analyzed the results of research will have great credibility with students. The lecture is often the most effective way of communicating the energy and enthusiasm of a person who has actual experience in a field, thus motivating students.

13.4.2 Disadvantages. Although the lecture method can be an effective and efficient teaching method, it has a number of disadvantages.

13.4.2.1 The lecture does not lead to maximum achievement in certain types of learning. Speech skills, cooperative group thinking, and motor skills, for example, are difficult to teach with the lecture method. Students can develop such skills well only through practice. Moreover, the formal lecture alone is generally not appropriate for presenting material above the comprehension level of the cognitive domain. Because it allows for little or no student verbal participation, the formal lecture may also be inefficient for comprehension-level lessons in which concepts and principles are developed.

13.4.2.2 The lecture does not provide teachers with an opportunity to estimate student progress before an examination. Within a single lecture period, we may unwittingly present more information than our students can absorb, and we have little accurate means during the lecture of determining what they have learned.

13.4.2.3 Too often, the lecture makes no provision for participation by the students. As a result, many students willingly allow the instructor to do all the work. Learning is an active process, but the lecture method tends to foster passiveness and dependence on the instructor.

13.4.2.4 Instructors may have to spend much time preparing for the lectures. With the demonstration-performance method of instruction, students participate actively. With the case study and guided discussion methods, students participate verbally. The teaching interview relies heavily on the knowledge of an expert and provides for student involvement through a question-and-answer period. But, with lecture, a greater burden for the total lesson rests on the instructor.

13.4.2.5 Finally, many instructors find it difficult to hold the attention of their students when they lecture for an entire class period. To use the lecture method effectively, we obviously need considerable skill in speaking.

13.4.2.6 The first two disadvantages of the lecture, difficulty in achieving certain types of learning and effectiveness of assessment, are inherent to the method. The third, student passivity, while characteristic of the method can be alleviated with an effective informal lecture. The final two disadvantages, time of preparation and speech skills necessary for an effective lecture, provide the focus for the remainder of this chapter.

13.5 Preparing The Lecture. When faced with the responsibility for planning and preparing a lecture, a primary requirement is to analyze the students. This requirement is especially critical because students tend to be passive when hearing a lecture. Your analysis of the students will greatly influence how you plan your instruction.

13.5.1 Student Analysis. There are two reliable methods for gaining student information. Used together they can be extremely useful. The first is to organize information you already have about the students. Knowing such variables as age, sex, rank, and experience can help you relate to your students. If one or more of these variables separates you from your students, you may want to give special attention to ways of emphasizing your similarities and reducing differences. The second method, when you have not talked to the group before, is to check with someone who has. Perhaps a friend or colleague has already lectured to the same group and can tell you what to expect.

13.5.1.1 Especially important are the questions, “What do students already know about my topic?” and “What do they need to know?” If some students are already experts, you will want to reveal your credentials in a pleasing but informative manner. If they know much less about the topic than you do, there may still be a problem. One of the greatest difficulties a lecturer faces is not to talk up or talk down to students. Only by carefully analyzing the needs and characteristics of the students can you be certain your comments are at the appropriate level.

13.5.1.2 Assuming that you have carefully assessed the students and written an appropriate student-centered objective, as discussed in Chapter 4, you are now ready to collect and arrange your information. What you already know and what you learn from others or from books will probably yield more information than you have time to present. Possession of extra and extended information is especially important in the informal lecture where students may ask questions, but it is also important in the formal lecture. Students can rightfully expect the lecturer to know more about the topic than is presented in the lecture.

13.5.1.3 In preparing the formal teaching lecture, you will want to follow a lesson planning process similar to the one discussed in Chapter 6 and illustrated in the sample lesson plan at Attachment 4. Choice of an appropriate organizational pattern, the effective use of support material, a clear introduction, and a complete
13.5.2 Lecture Development. Research indicates that clear attention, motivation, and overview steps in the introduction of the lesson significantly improve learning by appealing to students, giving them a reason to listen, and providing a forecast of what will be taught. (See the introduction of the sample plan.) Strong organization and clear verbal and visual support in the body of the lesson help students understand and retain the material. In the sample plan for the formal lecture, see how organization is planned and verbal support—definition, example, comparison, statistics, and testimony—are all used. Also visual support is planned. A complete conclusion to the lesson—final summary, remotivation, and closure—reaches, challenges, and leaves the students with a satisfying sense of completeness. With the teaching lecture, each of these concerns becomes especially critical since the burden for presenting the lecture falls directly upon the instructor. In fact, every part of the lecture must be designed to elicit attention and challenge students to listen. If you do any less, you will not be totally effective. All verbal and visual support should be selected and used carefully.

13.5.3 Audiovisual Support. Chapter 19 discusses kinds of audio and visual aids available to the instructor. The sample lesson plan may indicate that the instructor plans to use an audio cassette recording, an overview chart, overhead transparencies, and a student note-taking handout. Careful planning can help you choose appropriate and timely aids. Although audiovisual aids are both appropriate and useful with all teaching methods, they are especially important with the lecture. The following guidelines should help you in planning the use of visual support, not only for the lecture but for all methods.

13.5.3.1 Use only materials that are relevant. Avoid using materials solely for aesthetic or interest value. Certainly visual materials should be interesting, but the primary purpose of any visual aid is to portray or support an idea graphically. Irrelevant materials distract from the idea you are presenting.

13.5.3.2 Use visual materials that are large enough to be seen by all the students. Nothing is so disturbing as to be seated in the back of the room unable to see the visuals. In preparing for your presentation, display the visuals, then move yourself to the location of your most distant listener. If you can’t readily see the material, consider replacing it with something more appropriate.

13.5.3.3 Use visual materials only at the proper time. Do not expose the visual material until the proper point in the lecture. As illustrated in Part II of the sample plan, cues for audiovisual aids are clearly marked. Materials that are visible too soon, or those that remain in view after the point has been made, distract from and interrupt the continuity of the lecture. You may want to use the “striptease” or buildup method for revealing a series of points. Don’t list 10 main points for the students and then discuss each one. Instead, uncover the points one at a time to keep student attention focused.

13.5.3.4 Keep visual materials as simple and clear as possible. Emphasize only the most important information. Omit unnecessary details. A series of simple charts is preferable to a single complicated one.

13.5.3.5 Talk to the student, not to the visual aid. If you are explaining a chart, look at your students as much as possible. By the time you make your presentation, you should be so familiar with your visual aids that it will not be necessary for you to look at them closely. When possible, paraphrase the visual instead of reading it.

13.5.3.6 Place visuals away from obstructions. Don’t allow other objects or persons—including yourself—to obstruct the view of your students. You decided to use visual materials to support and clarify your lecture; don’t hinder their effectiveness by obstructing the student’s view.

13.5.4 Humor. Appropriate humor (that which supports the subject and/or lesson) is useful in a lecture. Humor relaxes both teachers and students. Humor serves this role especially well at the beginning of a lecture because it places the teacher directly in communication with the students. There are two reasons to use humor in the body of the lecture. One is to bring back the attention of the students; humor regains attention. The second reason is to emphasize an important point. Although a humorous story or anecdote is seldom real proof, it may be the most powerful memory or clarification device a speaker can use. Notice how the sample lesson plan for the lecture incorporates humor into the planning.

13.5.4.1 Humor must be used properly if it is to be effective. There are five essentials to using humor.

13.5.4.1.1 Know the item thoroughly. If you know the story and have told it before, you will be able to tell it again and know the kind of response to expect. It is generally a good rule not to use a story or humorous item unless you have told it several times in informal situations so you can both practice and gauge the reactions of others.

13.5.4.1.2 Don’t use off-color stories to get a cheap laugh. Even people who laugh at such stories in private often lose respect for the teacher who uses them in public.

13.5.4.1.3 Vitalize humor. Stories should be personalized so they are believable and sound as if they really happened. Rather than talk about “this guy I heard about” or “this truck driver,” give the characters in the stories names. Successful comedians and speakers nearly always vitalize their humor.
13.5.4.1.4 Don’t laugh before the audience laughs. If you fail to get the story across, laughing alone on a platform is disaster. If the joke fails, leave it and go on.

13.5.4.1.5 Capitalize on the unexpected. One of the primary elements of humor is that people laugh when they are surprised. A few years ago streaking was a fad on college campuses. Most firsthand observers laughed when confronted by a streaker. Some of the laughter was no doubt due to embarrassment, but much of it was due to the element of surprise. The following are all types of humor which depend on the unexpected: Quips (of course men aren’t what they used to be—they used to be boys), puns (try our bread, we knead the dough), exaggeration (the heat was so terrific last week that I saw a hound dog chasing a rabbit; they were both walking), understatement (if at first you don’t succeed…well, so much for skydiving).

13.5.5 Transitions. Transitions are statements used by the instructor to move from the introduction to the body of the lecture, between main points, between subpoints within each main point, and from the body to the conclusion of the lecture. Transitions signal to the students that we are progressing to a new point, but they are also important in maintaining the continuity of the information being given. Consider this transition: “We have discussed the precedents for a mandatory physical fitness program in the military. Next we will consider the benefits of such a program.”

13.5.5.1 This transition indicates a change in direction, but it does not indicate the reason for or importance of the change.

13.5.5.2 For transitions to be effective, they should (1) mention the point just discussed, (2) relate that point to the objective, and (3) introduce the next point. Suppose the objective is for students to know the need for a mandatory physical fitness program. Notice how all three steps are incorporated in the following transition: “(1) We have discussed the precedents for a mandatory physical fitness program in the military, (2) but these precedents alone will not prove a need for such a program. To understand that need more fully, (3) we must next examine, in several practical situations, the benefits of mandatory physical fitness.”

13.5.5.3 When planned and used correctly, transitions contribute substantially to the continuity of the total lecture. The lesson plan shows how the lecturer plans to use transitions.

13.5.6 Summaries. Summaries are useful tools for maintaining continuity within a lecture and for highlighting areas of particular importance. Summaries prepared for use between main points are not always necessary in the lecture. In fact, if the point is very clear, a summary may be redundant and boring. You should use them, however, when main points are unusually long or contain complex or unfamiliar information. With summaries we repeat information concisely and reinforce student understanding before new information is presented. Summaries should not take the place of transitions. They should provide a means for us to progress logically from one main point through the transition and into the next point.

13.5.6.1 The summary given in the conclusion of the lecture should be designed so that it reviews for the students those facts or those aspects of a concept or principle which you consider particularly important. It may be helpful to think of this summary as a “capsulized” version of the lecture itself, in which key ideas are related both to each other and to the lesson objective.

13.5.7 Questions. In both the formal and the informal lecture, questions may be used to add continuity to the lesson. In the formal lecture the instructor may plan rhetorical questions to use within a main point or in the conclusion of the lecture. Questions encourage students to review in their own minds the information that has been presented. They also indicate areas of special importance and should be phrased to allow students to see the relationship of these areas to the lesson objective. Chapter 11 discusses the use of questions in more detail.

13.6 Presenting The Lecture. Although preparing a lecture can be laborious, for many instructors the hardest part is actually presenting the lecture. Questions instructors most often ask are: How many notes should I use? How can I overcome nervousness? What kind of physical behavior is appropriate for me to use when I speak? What if my voice isn’t suited to speaking before a group? How can I project sincerity and enthusiasm? Answers to these questions will provide the basis for the remainder of this chapter.

13.6.1 Methods of Presentation. Instructors, like all other speakers, use one of four common methods of presentation: (1) speaking from memory, (2) reading from manuscript, (3) speaking impromptu with no specific preparation, and (4) speaking extemporaneously with, ideally, a great deal of preparation and a limited number of notes. The fourth method usually allows us the most freedom in adjusting to an audience as we speak and is best suited for almost all instructing in the Air Force.

13.6.1.1 Memorizing. Speaking from memory is the poorest method of delivering lectures, and it should be used very sparingly or not at all. While this method may seem to be helpful for persons who cannot think on their feet, the memorized lecture is a straitjacket. Such a lecture cannot be adapted to the immediate situation or to student reactions. In other words, it does not allow the teacher to adjust to the particular situation. Moreover, the method is almost sure to destroy spontaneity and a sense of communication. The method also requires an inordinate amount of preparation, and the danger of forgetting is ever present.
13.6.1.2 Manuscript Reading. Reading a lecture from a manuscript allows for planning the exact words and phrases to use. But the disadvantages of this method of presentation far outweigh the advantages. Many instructors use the manuscript as a crutch instead of fully thinking through the ideas in the lecture. All too often the written lecture is regarded simply as an essay to be read aloud. Therefore, the lecture is too broad and has language which is too abstract to be understood when presented orally. Also, very few people can read from a manuscript with the same emphasis and spontaneity used with extemporaneous delivery.

13.6.1.2.1 If you must adhere closely to a manuscript, keep the following guidelines in mind.

13.6.1.2.1.1 Keep spoken words simpler, clearer, and more vivid than in writing.

13.6.1.2.1.2 Make sentences shorter and ideas less complex than in writing.

13.6.1.2.1.3 Clarify the transitions between thoughts and ideas. Provide punctuation with vocal inflection, variety, and pauses.

13.6.1.2.1.4 Use repetition to emphasize main ideas and key points.

13.6.1.2.1.5 Use direct address when speaking about people. Personal pronouns such as I, we, our, us, you are better than they, people, a person, the reader, the listener.

13.6.1.2.1.6 Use concrete language where possible. Follow abstract or complicated reasoning with specific examples, comparisons, and definitions.

13.6.1.2.1.7 Prepare your manuscript to facilitate reading. Double or triple spacing, marking the manuscript, using only one side of the paper, and using shorter paragraphs may be helpful.

13.6.1.2.1.8 Practice the lecture aloud several times to see how it sounds. Recording yourself on a cassette recorder and listening to the playback will help you to discover places where you may not be communicating effectively.

13.6.1.2.1.9 Try to make your lecture sound like conversation, as if you were thinking the words for the first time as you read them.

13.6.1.2.1.10 Practice looking at your audience most of the time as the manuscript becomes more familiar to you.

13.6.1.3 Impromptu. Impromptu speaking requires a tremendous amount of skill and knowledge. We may find it necessary at times to lecture on the spur of the moment without any preparation. But this method should be used only by experienced instructors who are saturated with their subjects and who have the ability to organize their thoughts for learning as they speak. Even these experienced instructors fall back upon thoughts and phrases they have used before. They have spent years, so to speak, in preparing to give an unprepared lesson.

13.6.1.4 Extemporaneous. The technique effective speakers use most widely, extemporaneous speaking, produces the most fruitful results when it is based upon full preparation and adequate practice. The lesson is carefully planned and outlined in detail. The instructor’s only guide is a well-constructed outline like that given in Part II of the model. It is a lesson planned idea-by-idea rather than word-by-word.

13.6.1.4.1 The advantages of teaching from a well-planned outline are many. The method compels instructors to organize ideas and puts pressure on them to weigh materials in advance. It gives freedom to adapt a lesson to the occasion and to adjust to student reactions. It enables instructors to change what they plan to say right up to the moment of utterance. In short, the extemporaneous method permits the instructor to adhere to the two vital needs of effective teaching, adequate preparation and a lively sense of communication.

13.6.2 Nervousness. If a teacher suffers from stage fright, nervousness, or fear of speaking, students may also become uneasy or anxious. Yet some nervousness is both natural and desirable. Even skilled instructors often experience the queasy feeling of “butterflies in the stomach” as they prepare to speak. The secret is to get the butterflies “flying in formation” through practice. Visiting athletic teams practice on a field before game time to accustom themselves to differences in terrain and environment. Similarly, the speaker may need to practice a new lecture several times, preferably in the room where the lecture will be given, before actually presenting it. Practice reminds us to concentrate on the pronunciation of a word that is new or check an additional piece of information on an important point. Consider the following suggestions for overcoming nervousness.

13.6.2.1 Be enthusiastic. At times we may lecture on subjects that we find dull, but as we get more involved, the subject becomes more interesting. There is no such thing as a dull subject, only dull teachers. It is important to be enthusiastic about a subject, because enthusiasm can replace fear. And the more enthusiastic you are about the subject, the more the students will be involved with both you and what you are saying.

13.6.2.2 Hold good thoughts toward your students. The students in the audience are the same ones that you enjoy speaking with in a less structured environment. Most classes are made up of warm human beings with an interest in what you have to say. Students rarely boo or throw vegetables. Most students have great empathy for teachers and want them to do a good job.

13.6.2.3 Do not rush as you begin to speak. Many teachers are so anxious to get started that they begin before they are really ready. The little extra time taken to arrange your notes will generally pay big dividends. When you are ready to begin, look at the various parts of the class, take a deep breath, and begin to speak.

13.6.3 Physical Behavior. Communication experts tell us that over half of our meanings may be communicated
nonverbally. Although some nonverbal meaning is communicated through vocal cues, much meaning is carried by eye contact, body movement, and gestures. As teachers we need to know how physical behavior can improve our lecturing skill and thus enhance learning.

13.6.3.1 Eye Contact—Eye contact is one of the most important factors of nonverbal communication. Nothing will enhance your delivery more than effective eye contact with your students. Eye contact is important for three reasons. First, it lets the students know that you are interested in them. Most people like others to look at them when talking. Second, effective eye contact allows you to receive nonverbal feedback from your students. With good eye contact, you can gauge the effect of your remarks. You can determine if you are being understood and which points are making an impact and which are not. You will be able to detect signs of poor understanding and signs that the students are learning. Then you can adjust your rate of delivery or emphasis; you can rephrase or summarize certain points or add more supporting data. Third, effective eye contact enhances your credibility. Teachers with greater eye contact are judged by students as being more competent.

13.6.3.1.1 To achieve genuine eye contact, you must do more than merely look in the direction of your listeners. You must have an earnest desire to communicate with them. The old advice of looking over the tops of your listeners’ heads or attempting to look at all parts of the class systematically simply does not describe effective eye contact. Furthermore, looking at only one part of the audience or directing attention only to those students who seem to give you positive feedback may cause you to ignore large parts of the audience. Make it evident to each person in a small class and each part of the audience in larger auditoriums that you are interested in them as individuals and eager to have them understand the ideas you are presenting. In this way you will establish mental as well as sensory contact with your listeners.

13.6.3.1.2 Effective eye contact can be described as direct and impartial. You look directly into the eyes of your listeners, and you look impartially at all parts of the audience, not just at a chosen few.

13.6.3.2 Body Movement—Body movement is one of the important factors of dynamic and meaningful physical behavior. Good body movement is important because it catches the eye of the listener. It helps hold the attention needed for learning to occur. Movement also represents a marked departure or change in your delivery pattern; it is a convenient way of punctuating and paragraphing your message. Listeners will know that you are done with one idea or line of thought and ready to transition to the next. Finally, aside from its effects on the listeners, it helps you as a lecturer. Movement helps you work off excess energy that can promote nervousness. Movement puts you at ease.

13.6.3.2.1 How much movement is desirable? Few teachers never move, yet are quite effective. Unless the formality of the situation or the need to use a fixed microphone keep you in one position, then you probably should move frequently when presenting a teaching lecture. Movement from behind the lectern can reduce the psychological distance between you and the students and place them more at ease. Some instructors feel that they need the lectern to hold their notes, but instruction is actually more effective if you carry your notes with you rather than have to look down at the lectern to see them. When you do look at your notes, remember to direct your eyes, not your head, to the paper.

13.6.3.2.2 Of course, some instructors move too much. Perhaps out of nervousness they pace back and forth in front of the class. Still others have awkward movement that does not aid communication. Some leave their notes on the lectern then move in and out from behind it like a hula dancer. Others plant their feet firmly in one place then rock from one side to the other in regular cadence.

13.6.3.2.3 Effective body movement can be described as free and purposeful. You should be free to move around the class. You should not feel restrained to stay behind the lectern, but should move with reason and purpose. Use your movement to punctuate, direct attention, and otherwise aid learning.

13.6.3.3 Gestures—Gestures may be used to clarify or emphasize ideas in the lecture. By gestures we mean the purposeful use of the hands, arms, shoulders, and head to reinforce what is being said. Fidgeting with a paper clip, rearranging and shuffling papers, and scratching your ear are not gestures. They are not purposeful and they distract from the verbal message. Placing both hands in your pockets, or behind your back, or in front of you in the fig leaf position severely limits their use for gesturing. Holding your shoulders and head in one position during the lecture will also rob you of an effective means of strengthening your communication.

13.6.3.3.1 Although gestures can be perfected through practice, they will be most effective if you make a conscious effort to relax your muscles before you speak, perhaps by taking a few short steps or unobtrusively arranging your notes. Effective gestures are complete and vigorous. Many speakers begin to gesture, but perhaps out of fear, they do not carry through and their gestures abort. Comedians get laughs from the audience by timing gestures improperly. A gesture that comes after the word or phrase is spoken appears ludicrous. Good gestures should come exactly at the time or slightly before the point is made verbally. Poor timing results from attempting to “can” or preplan gestures. Finally, good gestures are versatile. A stereotyped gesture will not fit all subjects and situations. Furthermore, the larger the audience, the more pronounced the gestures will need to be. As with all aspects of communication, gestures must fit the transaction.
13.6.4.1 Quality refers to the overall impression a voice makes on others. Certainly a pleasing quality or tone is a basic component of a good speaking voice. Some persons have a full rich quality, others are shrill and nasal, and still others may have a breathy and muffled tone or quality. While basic aspects of quality may be difficult to change, your voice may become more breathy when you are excited, tense when suspense is involved, and resonant when reading solemn language. Students can often tell from the voice if the teacher is happy, angry, sad, fearful, or confident. Similarly vocal quality can convey sincerity and enthusiasm. Some teachers are over-concerned about the basic quality of their voices, but at the same time they pay too little attention to the effect of attitude and emotion on the voice. Most people have reasonably pleasant voices suitable for lecturing.

13.6.4.2 Intelligibility of your speech depends on several factors. Attention to articulation, pronunciation, volume, as well as avoidance of vocalized pauses, overuse of stock expressions, and substandard grammar can make your voice more intelligible.

13.6.4.2.1 Articulation refers to the precision and clarity of speech. A synonym for articulation is enunciation. Good articulation is chiefly the job of the jaw, tongue, and lips. Most articulation problems result from laziness of the tongue and lips or failing to open the mouth wide enough. You should over articulate rather than under articulate your speech sounds. What sounds like overarticulation to you will come out as crisp, understandable words and phrases to your students.

13.6.4.2.2 Pronunciation refers to the traditional or customary way words sound. Standards of pronunciation differ, making it difficult at times to know what is acceptable. Dictionaries are useful, but as they become outdated, they should not be adhered to excessively. Generally, educated people in your community, as well as national radio and television announcers, provide a good standard for pronunciation. Common faults of pronunciation are to misplace the accent saying device instead of de-vice, to omit sounds by saying guh’mnt for government, to add sounds by saying ath-a-lete for athlete, to sound out silent letters by saying mort-gage instead of mor-gage or of-ten instead of of-en. Do not overcompensate to the point that you call attention to your speech, but remember that pronunciation acceptable in informal conversation may be substandard when presenting a formal lecture.

13.6.4.2.3 Vocalized pause is the name we give to syllables “a,” “uh,” “um,” and “ah,” often used at the beginning of a sentence. While a few vocalized pauses are natural and do not distract, too many impede the communication and learning processes.

13.6.4.2.4 Overuse of stock expressions, such as “OK,” “like,” and “you know,” should be avoided. These expressions serve no positive role in communication and only convey a lack of originality by the speaker.

13.6.4.2.5 Substandard grammar has no place in the teaching lecture. It only serves to reduce teacher credibility with some students. Research shows that even persons who have been using substandard grammar all of their lives can, with diligent practice, make significant gains in this area in a relatively short time.

13.6.4.3 Variety is the spice of speaking. Students tire rapidly listening to a teacher who doesn’t vary delivery style or a teacher with a monotonous voice. A teacher’s voice that is intelligible and of good quality still may not appeal to students. You may vary your voice and, at the same time, improve your communication by considering the vocal fundamentals of rate, volume, force, pitch, and emphasis.

13.6.4.3.1 Most teachers speak at a rate of from 120 to 180 words a minute when presenting a lecture. In normal speech, however, we vary the rate often so that, even within the 120 to 180 word per minute constraints, there is much change. The temperamentally excitable person may speak at a rapid rate all the time, and the stolid person generally talks in a slow drawl. The enthusiastic but confident individual, though, will vary the rate of delivery to emphasize ideas and feelings. A slower rate may be appropriate for presenting main points, while a more rapid rate may lend itself to support material. The experienced lecturer also knows that an occasional pause punctuates thought and emphasizes ideas. A dramatic pause at the proper time may express feelings and ideas even more effectively than words.

13.6.4.3.2 Volume is important to the lecturer. Always be certain that all the students can hear you. Nothing hinders the effect of a lecture more than to have some students unable to hear. On the other hand, the lecture should not be too loud for a small room. A bombastic or overly loud speaker tires listeners out very quickly.

13.6.4.3.3 Force or vocal energy is needed at times to emphasize and dramatize ideas. A drowsy audience will come to attention quickly if the teacher uses force effectively. At times a sudden reduction in force may be as effective as a rapid increase. By learning to control the force of your voice, you can help to add emphasis and improve communication.
13.6.4.3.4 Pitch is the highness or lowness of the voice. All things being equal, a higher pitched voice carries better than a low pitched one. On the other hand, students will tend to tire faster when listening to the higher pitched voice. If your voice is within normal limits—neither too high or too low—work for variety as you speak. Try not to become firmly entrenched in your habitual pitch level.

13.6.4.3.5 Emphasis obviously stems from all forms of vocal variety, and any change in rate, volume, force, or pitch will influence the emphasis. The greater or more sudden the change, the greater the emphasis will be. As a lecturer you will want to use emphasis wisely, however, two things should be avoided—overemphasis and continual emphasis. Be judicious. Emphasizing a point beyond its real value may cause you to lose credibility with your students.

13.6.5 Sincerity. A lecturer certainly needs to prepare well and possess strong delivery skills to do an effective job in the classroom, but something more is needed to be really effective; a teacher must be sincere. As long as you obviously try to generate light and not merely heat students will be amazingly tolerant of weakness in both preparation and delivery, but give them a chance to suspect your sincerity, and you lose effectiveness. And, once lost, effectiveness is nearly impossible to regain. What is sincerity? It may be defined as the state of honesty, truthfulness, and faithfulness—a state of honesty, truthfulness, and faithfulness.

13.6.5.1 Sincerity toward students is reflected in your eye contact, enthusiasm, and concern about students, both as individuals and as learners. Sincerity toward the subject is judged by whether or not you seem involved and interested in the subject or topic of the lecture. Sincerity toward self is displayed in the confidence and concern you have that you are doing the best job possible in the classroom. Lack of sincerity in any of these areas will almost certainly hinder learning.

13.6.6 Verbal Interaction. The verbal interaction in the informal lecture takes place in two ways; first, students should ask questions to clarify confusing points or to ensure their understanding of the information, and second, the instructor should also question the students during an informal lecture. By asking both planned and spontaneous questions, the instructor can stimulate participation, emphasize important points and, most importantly, judge whether or not students understand the material.

13.6.6.1 To be most effective, verbal interaction should occur consistently throughout an informal lecture. The instructor must allow ample time for discussion when planning and practicing the lesson and, during the introduction, he or she should encourage questions. By comparing the sample lesson plans at Attachment 4, we can see the substantial differences in planning for the informal and formal lecture. Students will be more likely to participate if the instructor indicates, through direct eye contact, frequent pauses, and a relaxed delivery, that he or she is sincerely interested in student participation. Instructor questions are especially effective when they require students to summarize important information or to provide additional support in the form of personal examples.

13.6.6.2 Although frequent verbal interaction is a goal of the informal lecture, it should not take priority over achievement of the lesson objectives. If a portion of the material is complex, unfamiliar to the students, or follows a necessary sequence the questions may be distracting or cause confusion. In this case the instructor should ask students to hold their comments until after that material has been presented. This additional structure may also be necessary when time constraints do not allow student participation towards the end of a lecture. Careful planning is needed to ensure a comfortable balance between the material to be presented and the questions to be shared.

13.7 Summary. Formal and informal lectures are popular teaching methods in the military. Advantages of the lecture are (1) presentation of many ideas in a short time, (2) suitability for introducing a subject, (3) convenience for instructing large groups, (4) value for supplementing material from other sources, and (5) allowance for a large number of students to hear an expert. Disadvantages are (1) not appropriate for certain types of learning, (2) no provision for the teacher to estimate student progress, (3) no active participation by students, (4) requirement for too much preparation, and (5) dependence on speaking skill.

13.7.1 To prepare for a lecture we must analyze our student audience, carefully plan the beginning and ending of the lecture, and organize and choose verbal supporting materials to help students listen and understand. In addition, we should consider using humor when appropriate, choose visual aids wisely, and plan transitions and interim summaries when needed. When presenting the lecture, we need to select the method for presentation; overcome nervousness; attend to the physical factors of eye contact, movement, and gestures; and strive for a pleasant, communicative, and expressive voice. Above all, we need to show sincerity toward our students, our subject, and ourselves.
14.1 Introduction. Discussion is one of the most used teaching methods in civilian and military educational institutions. One type, the “guided discussion,” is an instructor-controlled group process in which students share information and experiences to achieve a learning objective. A guided discussion is different from “free” discussion and a “peer-controlled seminar.” Like the “bull session,” free discussion can be valuable for brainstorming or as a management aid, but it seldom supports measurable objectives. The peer-controlled seminar relies on qualified students to lead discussion among peers which may significantly reduce the likelihood of reaching the learning outcomes.

14.1.1 In a guided discussion, the instructor carefully plans the lesson to reach desired learning outcomes. The group interacts in response to questions, and the instructor refrains from entering the discussion as an active participant. Students are encouraged to learn about the subject by actively sharing information, experiences, and opinions. The flow of communication is a transaction among all the students rather than recitation and response between individual students and the instructor. Questioning and summarizing skills become critical as the instructor guides the students to the lesson objective.

14.1.2 In the sections that follow, the guided discussion will be treated in terms of a teaching method with a set of teaching skills that differentiate it from other teaching methods.

14.2 Selection And Planning Factors. Proper consideration of selection and planning factors contributes to the success of guided discussions. Some of the most important factors follow.

14.2.1 Lesson Objectives. The discussion method is a superior method for teaching more complex cognitive and affective objectives. Thus, the method is appropriate for promoting the understanding of concepts and principles and the development of problem solving skills. It is inappropriate for transmitting knowledge-level material where lectures or readings are more efficient.

14.2.1.1 The degree of consensus in a subject area is also an important consideration. In some subjects there is a high degree of consensus among authorities in the field because of established concepts, principles, laws, and factual information. In such subjects the objective is to communicate these facts, concepts, and principles to students. Thus, Air Force instructors in civil engineering, nuclear physics, mathematics, and highly technical subjects might find forms of one-way verbal communication, such as the lecture method, more appropriate. They might also use individualized instruction or the demonstration-performance method in achieving lesson objectives.

14.2.1.2 If authorities in a field have a low degree of consensus, or if there are two or more widely held schools of thought, the guided discussion method is a very appropriate way to achieve lesson objectives. In such subjects the experts do not always agree. Concepts and principles differ considerably from one school of thought to another and controversy often exists. Air Force instructors who give instruction in Quality Air Force (QAF), history, management, leadership, financial management, logistics, and USAF organization, for instance, will find many objectives which lend themselves to guided discussion. Through discussion students begin to understand the controversy and differing points of view. They have the opportunity to develop and defend a logical position of their own.

14.2.1.3 Another consideration are the needs of particular students. If your students need to develop the ability to think critically in appraising the ideas of others the guided discussion method works well. Students also get the opportunity to reason together and to develop group decision-making skills. In the discussion, they learn to evaluate ideas while listening to others, to formulate their own ideas, and to present and defend these ideas in the process of achieving an instructor’s planned learning outcomes.

14.2.1.4 The guided discussion may also be effective in changing student attitudes and their behavior. Research in social psychology supports the position that discussion is more effective than the lecture for achieving such objectives. When students make a public commitment in a discussion, they are more apt to follow through with a change in behavior. Instructors in fields such as religious education, social actions, and safety will find the guided discussion method serves as an effective tool for modifying attitudes and behavior of Air Force personnel.

14.2.2 Group Size. If the instructional objective lends itself to the guided discussion, the next consideration is group size. With one student, individualized instruction is appropriate. With over 40, the lecture method is typically used. When the number is 20-40, instructors may find that a combination of methods works best. For instance, a combination lecture-discussion is often used. When the students number 2-20, the guided discussion method is frequently used. In smaller groups, there is more opportunity for each student to participate. Reticent students may not participate at all when the group becomes too large. Five to seven students would seem to be the ideal size, but few instructors will have such a low instructor-to-student ratio in their classes.

14.2.3 Time Available. Instructors should keep in mind the relationship between group size and time. As group size increases, so should the available discussion time.
Ideally, enough time should be scheduled for the contributions of all members to be heard and discussed, but this goal may not be achieved even with groups of five to seven students. When costs are a significant factor and a given amount of material must be covered in a short time, the teaching lecture may be more efficient than the discussion.

14.2.4 Instructor Personality. Some instructors have personalities which are better suited to the guided discussion than others. When this method is used, instructors must be willing to relinquish some of their authority over the lesson. A key to success for this method like any other method is that the instructor needs to be flexible enough to adjust his/her teaching style to achieve the lesson objective. The guided discussion method requires a little more give and take between the instructor and students. Instead of presenting material directly to students, they must be confident in their ability to use questions and other control devices skillfully and to develop the concepts and principles based upon student input. If your lessons must be highly organized, tightly controlled, and instructor centered, then you will have difficulty using the guided discussion. Similarly, if you have difficulty following the twists and turns of a discussion without losing track of the argument, losing patience with its complexity, or in pulling scattered points together in summaries to reach conclusions, the discussion method may be difficult for you to use successfully.

14.2.5 Establishing a Common Base for the Discussion. If you decide to use a guided discussion after considering these factors, your next planning consideration is to establish a common ground for the discussion. Students should be at least at the knowledge level on a discussion topic when they are asked to engage in a guided discussion. Lectures, programmed texts, reading assignments, films, and field trips can provide basic knowledge. Guided discussions conducted near the end of a block of instruction should be based on a consideration of the common ground established prior to the discussion.

14.2.6 Use of a Problem. One way to make sure that students in a discussion group are able to sustain a worthwhile discussion is to give them a problem or short case to read or view in advance. This problem, along with knowledge students already have, should keep the discussion on track and productive. The problem is usually a printed paragraph or two which illustrates the concept or principle under discussion. Unlike a higher level case study, we are not yet attempting to apply specific principles to solve complex problems. Guided discussions centered around a problem are designed to develop a comprehension of concepts and principles, with the problem providing the discussion vehicle. The techniques for leading this type of discussion are essentially the same as those described throughout this chapter.

14.2.7 Planning the Room Arrangement. Because of its effect on group dynamics, room arrangement is an important factor in a successful guided discussion. (An understanding of group dynamics is also a prerequisite for maximizing learning in a guided discussion; see Chapter 28.) Research shows that eye contact is one of the most important variables in conducting a successful guided discussion, since direct visual contact between members of a group increases communication. Therefore, a circular arrangement is recommended in which no one is placed in a position of dominance, and each member can establish direct eye contact with each of the other members. With tables, an arrangement involving a pentagon, hexagon, or octagon also works well. Avoid rectangles which tend to put those at each end in a position of authority. To foster group discussion, instructors should avoid placing themselves in a position of authority where student eye contact (and most student comment) is directed toward the instructor. Instead, the instructor should become a group member without relinquishing control.

14.3 Organizing The Guided Discussion. Once you have considered the planning factors and have decided to use a guided discussion, you are ready to develop the lesson plan. Note the sample lesson plans at Attachment 5. The first page, part I, lists such things as lesson title, references, statement of the lesson objective, main points, and samples of behavior. Assistance in developing this part of the lesson plan is provided in the lesson planning chapters. Therefore, attention in this section is directed toward preparation of the part II, the actual teaching plan.

14.3.1 Introduction. A guided discussion is introduced in a way similar to other teaching methods with attention, motivation, and overview steps; see Chapter 6. However, the overview is especially important to the success of a guided discussion and deserves further comment.

14.3.1.1 A good overview will pinpoint the topic for discussion and the key areas to be developed. If the topic is motivation, the two key areas for discussion might be extrinsic and intrinsic motivation. The student should be told what will be discussed, and the overview should be shown visually on a chart, chalkboard, or handout. The overview visual should be available throughout the lesson to aid students in following the lesson organization and to assist the instructor in summarizing and transitioning between main ideas. A lesson overview also provides the instructor with an opportunity to review, with students, pertinent information already known or understood about a subject. Terms or concepts should be defined or clarified to prevent confusion, and students should be made to feel that their ideas and active participation are wanted and needed.
14.3.2 Development. You may wish to refer to the lesson plan at the end of this chapter to follow key aspects of the development phase of the lesson plan.

14.3.2.1 Lead-off Question (LOQ). The first item listed on the plan under development is the concept or principle you are teaching. How can you best lead your students to an understanding of this concept or principle? The logical reasoning process starts with the leadoff question.

14.3.2.1.1 To develop a concept, you might start the discussion with a leadoff question which calls for a definition of the concept, such as “How would you define prejudice?” If you have already provided the students with a definition in your introduction, your leadoff question might focus on the attributes (characteristics) of the concept, such as “What behaviors might we expect from a person who is prejudiced?” Follow-up and spontaneous questions will be used to further the development of the concept.

14.3.2.1.2 To develop a principle, you might rephrase the principle as a how or why leadoff question. For instance, if your main point was “An authoritarian leadership style is appropriate in crisis situations,” your leadoff question might be “Why is the authoritarian leadership style appropriate in crisis situations?” This question will identify supporting points for development through spontaneous and follow-up questions.

14.3.2.1.3 Another acceptable approach for developing a principle is to ask a leadoff question based upon a key supporting point. If this approach were used with the principle just cited, you might ask “How would you describe the authoritarian leadership style?” Additional supporting points would be developed which contribute to development of the principle.

14.3.2.2 Follow-up Questions (FUQ) Once your leadoff question is identified, you must develop appropriate follow-up questions. If a concept is being developed, follow-up questions will ensure that characteristics, examples, and non-examples of the concept are developed. When principles are taught, follow-up questions will be planned for key supporting points which are important in the logical development of the principle. Since guided discussions are normally conducted at the comprehension level, little time should be devoted to follow-up questions written at the knowledge level unless they are necessary for establishing a base for the discussion. Instead, questions dealing with “how,” “why,” and “what effect” should be used. Knowledge-level facts can often be given in the introduction or in a handout.

14.3.2.3 Anticipated Responses (A.R) Notice the right column on the sample plans (Attachments 3 through 7). By listing anticipated responses, the instructor is forced to think about possible answers students might give. Leave space in the right column after the anticipated responses of each subpoint so you can write in additional responses of students for use in your summaries. As an alternate recording method, you may wish to list the student responses on an overhead transparency or a sheet of paper for use in summarizing. If the lesson plan is to be used again, the best student responses can later be added under anticipated responses.

14.3.2.4 Transitions. Since the instructor is working toward desired learning outcomes in the discussion, major transitions can be planned in advance of the discussion. A good transition reviews the key point just made, reminds the students of the central idea (lesson objective), and introduces the next point. (Note the transitions on the sample lesson plan at Attachment 5.) Transitions written on the lesson plan serve as a good memory jogger each time the lesson is taught.

14.3.2.5 Planned summaries. If the guided discussion has a single conclusion you are working toward (single objective), then comprehension-level summaries will occur after main points in the discussion. If the lesson has more than one objective (multi-objective), then comprehension-level summaries will occur after each main point and objective. These comprehension-level summaries are not tightly planned but develop primarily from student contributions. However, you can mention planned anticipated responses which were not discussed. Also, you may add additional support material in the summaries in the form of examples, statistics, and expert testimony to aid students in achieving lesson objectives.

14.3.2.6 The Conclusion. The conclusion to a guided discussion has three parts as discussed in Chapter 6. Remotivation and closure are planned as are certain aspects of the summary. When a single objective is taught, a comprehension-level summary is required in the conclusion. Additional support material can be introduced from the lesson plan to insure achievement of the lesson objective. Once the lesson is planned and organized, the instructor is ready to conduct the lesson.

14.4 Conducting A Guided Discussion. A number of skills are involved in conducting a guided discussion. The most important ones follow.

14.4.1 Controlling. How active should your role be in the discussion? You can do most of the talking (which results in over-control), you can remain almost silent (which usually results in under-control), or you can find an active intermediate role. You define your role since you are the instructor. However, the more you talk the less students can talk and the less will be the benefit of using the guided discussion method. Thus, it is wise to limit your role to that of questioning, clarifying, probing, and summarizing.

14.4.1.1 As discussions with new groups begin, students will look to you for a definition of your role. While you may tell them what your role will be, your actions will be closely observed. Eye contact of group members will give you good feedback on your control. If all eyes turn to you as the instructor when silence occurs, perhaps you are exercising too much authority in the discussion. An
analysis of lines of communication (sociogram) will also provide valuable feedback. Have a student plot the lines of communication on a piece of paper. If the lines of communication usually flow back and forth between you and the students rather than among the students, then you are probably over controlling the discussion.

14.4.1.2 If you under-control the guided discussion, you may never reach your desired learning outcomes. Minimal instructor participation may result in excessive disorganization or aimlessness. Aimless discussion can quickly lose the respect of students and have a negative effect on their motivation to learn. To prevent this deterioration in the discussion, the instructor must judge quickly and accurately when intervention is necessary.

14.4.1.3 As a guideline, remember that there are desired learning outcomes to be achieved in a designated period of time. Proper control will ensure maximum student participation in achieving each of these desired learning outcomes in the time allotted.

14.4.2 Questioning. An instructor who is going to be successful in conducting a guided discussion in which desired learning outcomes are achieved must have an understanding of questions and the role they play in this method. (See Chapter 11 for detailed coverage of questions and their uses.)

14.4.2.1 Leadoff Questions. The instructor opens the discussion by asking a prepared leadoff question and then waits for responses. The students must be given a chance to react. The instructor has the answers in mind before asking the question, but a student must think about the question before answering. Avoid asking two questions at once, questions requiring a yes or no response and complex questions which leave students confused.

14.4.2.1.1 The discussion begins with the first student response to the leadoff question. The instructor should listen attentively to the ideas, experiences, and examples contributed by the students. As the discussion proceeds, the instructor guides the direction of the discussion, stimulates the students to explore the subject in depth, and encourages them to discuss the topic in detail by using both planned and unplanned (spontaneous) follow-up questions.

14.4.2.2 Spontaneous Questions. As the name implies, these questions cannot be planned, but they serve a very useful purpose. When a leadoff question or follow-up question is asked, the instructor can never be sure of the response students will give. The discussion may start to wander in ways the instructor had not anticipated and the spontaneous question can get the discussion back on track. While the instructor hopes that in-depth comprehension-level support material will develop, the opposite may be true. Consequently, to develop the topic properly, the instructor uses spontaneous questions. Direct questions which bring reticent students into the discussion may be spontaneous and are based upon an observed need. Spontaneous questions also work well when the instructor wishes to probe for more information or to seek clarification of a point.

14.4.3 Summarizing. One of the key skills involved in conducting a discussion is summarizing. You should plan for summaries to occur after discussion of main points and objectives. Unplanned summaries occur because of need and may be used periodically to designate relationships, to get students back on track when the discussion wanders, or to transition between subpoints. No matter when you summarize, use ideas developed by the group which support achievement of your objectives. Try to use the words of the students and show how their ideas have developed the learning outcomes.

14.4.3.1 Not all student contributions will support a lesson objective nor will you have time to cover each student response. Therefore, avoid crediting students by name for their contributions or making quality judgments about the various responses. Such comments may cause certain students to wonder why their contributions were ignored or treated differently. Consequently, they may participate less and open discussion is stifled.

14.4.3.2 After summarizing student contributions, additional support for a main point or objective may be needed. At this point you should introduce new support material which will aid in achieving the learning outcome.

14.4.4 Knowing When to Intervene. As you develop your skill as a guided discussion leader, you will become more skillful in knowing when to intervene in your role as questioner, clarifier, prober, and summarizer. These guidelines might prove helpful.

14.4.4.1 If several contributions in a row indicate a drift away from the main point or subpoints, then a brief interim summary followed by a spontaneous or follow-up question may be appropriate for getting back on target.

14.4.4.2 If pauses between contributions become too long, there are three possible causes. The participants may be confused, your question was not clear in starting the discussion, or perhaps the students have no additional contributions in the area. At this point you may want to find out the reason for the pauses by asking a spontaneous question.

14.4.4.3 A student may state an error in fact which seems to be having a negative effect on the discussion. If other students do not correct this error, you should intervene. A probing question or asking a student to clarify what was said may suffice, but the error should not be allowed to stand.

14.4.4.4 Watch to see if serious fallacies in reasoning are going undetected. If so, the fallacies should be pointed out before they have a chance to damage the validity of the discussion. For instance, the students may be divided along two extremes on an issue (black and white fallacy) and be unable to see that a reasonable course of action exists between the extremes. Or students may omit
important facts or distort and arrange evidence in a special way to make a point (stacking the evidence). While analogies might be helpful in suggesting new ideas or in illustrating a point, students should not use them to prove a point (misuse of analogy). Generalizations may be reached based upon insufficient evidence, or instances supporting an opposing point of view may be ignored (hasty generalization).

### 14.4.5 Dealing with Non-participation.

What happens if you ask your leadoff question and nothing happens? Several possibilities exist. Perhaps you have not clearly established a context for the question in your introduction. The question may be double-barreled, too long, or confusing. Students may not understand their role in the discussion or they may be afraid to say anything because of an authoritarian role you played in a previous discussion. The question may simply be one that requires some thought before giving a reply. Try waiting out the silence for several seconds. At that point you may need to ask the group what the silence means, rephrase the question, or make a few content comments about the subject and follow them up with a new question. If the question does not work successfully, be sure to change it on the plan before conducting the discussion again with another class.

**14.4.5.1** Another problem is uneven distribution of responses. Certain students may refrain from discussing a particular topic or any topic presented for discussion. Other students may tend to monopolize the discussions. Through awareness, the instructor can take certain actions to gain more participation by non-participants. The direct question and relay questions to non-participants can be used to draw them into the discussion. By avoiding eye contact with the active participants when a question is asked and focusing on others, the quieter members can be encouraged to reply. Non-participants can often be encouraged to participate when you give them positive reinforcement for contributions (when such recognition is appropriate). Tying the quiet student’s ideas to other ideas and referring to these ideas often is a kind of positive reinforcement that has been repeatedly found to promote achievement and favorable attitudes. Head nods and positive remarks such as “Good point” and “That’s interesting!” reinforce a person’s contributions, while frowns and withholding reinforcement suppress the responses of group members.

### 14.4.6 Dealing with Hurt Feelings.

As you gain more experience with the guided discussion, you will become increasingly aware of student feelings in a discussion. Instructors should insure that student feelings are not hurt unnecessarily. Sarcasm and ridicule have no place in a guided discussion, whether from the instructor or other students. By example and guidelines if necessary, the instructor should rule personal attacks out of order. On the other hand, group members should be encouraged to accept criticism or correction without taking it personally. Mature students should be able to learn to accept valid criticisms of their ideas without being irrationally defensive about the ideas or themselves. Instructors can help by acting in a rational and non-emotional way to criticisms of their own ideas.

### 14.4.7 Avoid Biasing the Discussion.

Instructors must be constantly reminded of the power they have in the classroom. Casual mention of their own opinions, attitudes, and beliefs will influence some class members. Over a period of time students have honed their senses to be able to detect what the instructor wants. The instructor must be careful that opinions expressed do not close discussion or force student conformity.

### 14.4.8 Avoid Encouragement of Yielding.

Groups exert enormous pressure on members to conform. The instructor and one group of students may agree on something and, through group pressures, try to get the other students to conform. Guided discussion leaders should encourage the expression of minority points of view. If the instructor insists on unanimity of opinion, then minority views will be stifled and the discussion will suffer.

### 14.4.9 Avoid Withholding Crucial Information.

At times the discussion may suffer from the lack of a fact, definition, concept, or principle. It is not wrong to share your expertise with the group when the discussion would profit by it. However, you should not use the expertise if your only goal is to enhance your own image of competence in the eyes of students.

### 14.4.10 Avoid Sticking to a Dead Topic.

When students have exhausted a topic, the instructor should be prepared to move on with a short interim summary or a new question. A dead topic is one which no longer helps achieve your objective. Signs of a dead topic include periods of silence, repetition of points already made, boredom, or inattention. Normally, you should not let a discussion get to this point before you intervene.

### 14.5 Post Discussion Actions.

After the lesson is complete, you should go back to your lesson plan to make notes and then evaluate the discussion.

**14.5.1 Annotating the Lesson Plan.** While the material is still fresh in your mind, annotate your lesson plan. If unanticipated material entered the discussion, make note of it on the plan. If certain questions did not work well, rewrite them or eliminate them. Perhaps you became aware of points or definitions that would have aided the discussion if they had been covered or clarified in the introduction. Now is the time to make such annotations or corrections on your lesson plan. It is important to establish records on the plan which allow you to improve your instruction.

**14.5.2 Evaluating the Discussion.** After the discussion has been completed, you should take time to evaluate its effectiveness in achieving your lesson objective. Did students have the required knowledge to discuss the topic adequately? Should the reading assignment be changed?
or is there some better way to get students to the knowledge level prior to the discussion? If you or another student maintained a diagram of the discussion, what do the lines of communication say? Such evaluation may be subjective but still valuable in improving instruction.

14.5.2.1 More formal evaluation comes when tests are administered. When you develop test questions, you will have direct evidence of how well the guided discussion achieved your lesson objective. Such evidence will also allow you to make changes to the lesson plan which will help in reaching your objective.

14.6 Summary. The guided discussion is a teaching method in which students learn by sharing experiences and opinions with each other. The instructor carefully plans the lesson to reach desired learning outcomes and then guides the discussion through questioning and summarizing.

14.6.1 Student needs should be considered when planning the guided discussion. The discussion method is effective in teaching cognitive and affective objectives. It helps students develop skill in group reasoning and problem-solving and in facilitating changes in attitudes and behavior. Instructors should use the guided discussion when group size is from 2-20 students and when there is sufficient time for all students to participate. The classroom should be arranged to allow maximum eye contact among students, and each student should have a basic knowledge of the subject before the discussion begins.

14.6.1.1 The guided discussion is organized to encourage maximum student participation. In the overview the instructor tells students what will be discussed, gives any necessary definitions or concepts, and encourages participation. Carefully planned leadoff and follow-up questions then elicit this participation. The instructor should also anticipate possible student responses and include these in the lesson plan. Although remotivation and closure are planned, the final summary is developed using inputs from the students.

14.6.1.2 Certain specific skills are needed to conduct a successful guided discussion. The instructor should control the group so that discussion flows among the students. Leadoff and follow-up questions are asked as they were planned, but spontaneous questions should also be used frequently to clarify student responses and eliminate errors in fact and reasoning. The instructor should avoid biasing the discussion or withholding necessary information from the students. All students should be encouraged to participate, and positive reinforcement should be given to student inputs.
Chapter 15
THE CASE STUDY METHOD

15.1 Introduction. The case study method presents students with real life challenges. It helps bridge the gap in the classroom between theory and practice by applying previously learned concepts and principles.

15.1.1 Some Air Force schools teach manual tasks, the practice of a job—missile operations, for instance—or vehicle maintenance. Usually, the more specific the task to be learned, the more closely the school tends to fit job requirements. Theory and practice come together. Engine mechanics, for instance, are trained on actual engines or mock-ups in shops similar to those on the job.

15.1.2 Other schools teach abstract or mental skills, the theory of a job—like strategies for limited warfare—or an aspect of professional military education. In schools where the subjects are abstract, however, students tend to be less involved with the specific tasks they will encounter later, on the job. Theory and practice may be far apart. The curriculum of an NCO leadership school, for instance, does not relate directly to NCO specialty codes. Thus, bridging the gap between school concepts and reality is a challenge to many Air Force schools or curriculums.

15.2 Using Case Studies. Using case studies is one approach to teaching we can use in meeting this challenge. In the case study method (hereafter referred to as the case method) students meet a simulated, real-life situation in the classroom in order to achieve an educational objective. The case study, typically written, is an account provided to students, usually as a homework assignment, which serves as a basis for class discussion. Usually, a case will describe a problem already faced by others in a given field. The greatest value of the case study is that it challenges students to apply what they know and comprehend to a realistic situation. The case method takes students out of the role of passive listeners and makes them partners with the instructor in applying the concepts and principles under study. The method enables students to think, reason, and employ data in a logical fashion, just as they will in a real job.

15.2.1 The case method is a flexible teaching approach. It can be the basis of an entire curriculum, a course, or simply an individual lesson. While the case method is versatile, there are times when other teaching methods are suggested in lieu of the case approach. The case method may not work with students who are immature, or with large classes. The method is not applicable in situations where students are learning a procedure or a single solution which has been accepted as “correct.” Case studies do not lend themselves to development of objectives at the knowledge level, where the lecture and reading are usually more efficient. But once the knowledge level of learning has been achieved, the case study is an excellent way for students to progress to the higher levels.

15.2.2 Variations of the case method were first used in teaching medicine and law, but over the years, the case method has been widely used in the study of business, management, and education. The method can be used in almost any learning area that can draw cases from real situations for study and discussion.

15.3 Teaching Value and Limitations. A principle advantage of the case method is to provide students experience in solving problems. Many students can repeat isolated facts or principles, but they have difficulty in interrelating these facts and principles. The case method provides an opportunity for them to gain experience in making decisions and in working with other people. It exposes them to a number of different approaches to the solution of problems. As they learn various problem-solving techniques, they make their mistakes in the classroom and not on the job where an error is much more costly.

15.3.1 Students learn by encountering situations from real life instead of listening to lectures or reading theoretical descriptions of the solution to problems. By interacting with others, they learn to respect the opinions of others. Because the case may not list all pertinent facts, they also learn how to cope with ambiguity and uncertainty. As with real life, we sometimes ask questions and get answers, and at other times we can only ask questions.

15.4 Typical Case Applications. Because of its versatility, the case lends itself to a wide variety of teaching conditions.

15.4.1 Case Courses. Some schools use the case method exclusively, especially graduate schools of business. The assumption is that the best way to prepare for a business career is to have experience in analyzing data and making decisions. Students in these courses are given complex cases to analyze and to solve. The quality of the analysis and the reasoning behind the suggested decisions are often more important than arriving at a single solution. In the classroom, students participate in collective analysis and decision-making. As more and more cases are analyzed, students begin to form generalizations which they can apply to new situations. Thus, case studies thus substitute for a period of on-the-job training.

15.4.1.1 Normally in the case study course, concepts and principles are not taught directly. Instead, they emerge gradually as students are forced to formulate theories to support their case decisions. Because these theories arise from practical work with problems, students remember them better and are able to recall them for similar solutions.
15.4.1.2 The case study course is usually conducted using group problem solving techniques in open class session. But the case may serve as an out-of-class written assignment, with students asked to bring solutions to class along with a rationale for their decisions. These solutions may form the basis for class discussion, and may also be turned in for the instructor to grade. A variation like this may overcome the need for relatively small classes in the pure case method.

15.4.2 Capstone Method. A case or a series of cases is often-used at the end of a body of instruction to help show the application of the course content. Often a course will proceed by lectures, discussions, and other more used methods. Towards the end of the instruction, students will apply what they have learned to a series of cases specifically designed to support the course objectives. This capstone method is particularly appropriate when students start at lower levels of learning (such as the knowledge level) and are brought gradually to the higher levels (such as the application level). The capstone method is particularly appropriate in Air Force leadership schools where readings and lectures can supply the basic material and case studies can allow an opportunity to practice the theory as a capstone experience.

15.4.3 The Short Case or “Problem.” The case also has applications at lower levels of learning. This technique is also called “use of the problem in teaching.” A realistic problem situation, often a page or less in length, is used as a discussion vehicle. The instructor plans the lesson much like a guided discussion. For example, the objective of the lesson may be to have students comprehend the management principle of span of control. The instructor might introduce a situation in which a supervisor failed to take this principle into account. A serious accident or a dramatic event might then result.

15.4.3.1 The primary object is not to find a “correct” solution to the problem posed, but to understand the principles involved. The problem posed should be sufficiently interesting and difficult to involve all the class members for the time allotted. Because the written problem provides the discussion vehicle, the class can also be broken up into smaller discussion groups.

15.4.3.2 A variant of the short case can also be used in group dynamics exercises where the emphasis is not on solving the problem, but on the interaction of group process. Similarly the short case can be used to demonstrate a decision making process, where the process is more important than the solution arrived at. A series of short cases or scenarios often works for reinforcing affective objectives, in human relations or equal opportunity exercises, for instance.

15.5 Types Of Cases. Teaching cases are situations from real life. There is no single format for cases, and great variation in the types of cases can be found. They may vary in length from a paragraph or two through many pages. For convenience sake, types of cases will be discussed in two categories: Case format and mode of presentation.

15.5.1 Full Text. A full text case contains all the information the student will need to deal with the situation and requires access to no other source. Business school cases, for instance, often illustrate a real situation faced by managers in the past. They contain the problem to be addressed, how the problem arose, the organization’s structure, and the employees involved in the situation, as well as their perceptions at the time of the original incident. Cases of this type are usually of eight to fifteen pages, take considerable time to analyze, and are usually the basis of a case course. Students are required to read the case, perform an analysis, make a decision, and support that decision before their peers. With such a case the instructor is particularly interested in the student’s ability to perform an analysis and make a decision.

15.5.1.1 Another full text case is the abbreviated case, which is much shorter, from one paragraph to several pages in length. An obvious consequence of the length is the diminished content. Since it is shorter, the focus is usually built in and the solution or solutions may be more limited. The abbreviated case may deal with one “problem,” or it may define a scenario with a series of limited choices. The abbreviated case may lend itself to lower levels of learning.

15.5.1.2 A third variation of the full text case is the unsifted case. Although all the data required by students is presented at one time, it is given in an unorganized form (simulating an in-basket exercise), and extraneous information may be included. It is the student’s task to select and arrange the information into some meaningful pattern for action.

15.5.2 Partial Text. With partial text cases students are given only limited information about the situation under study, and part of their job is to find or ask for the additional information they need for solution. In the incident-process case the instructor presents a brief incident, and the students are required to take some action, make a decision, or suggest recommendations. The instructor usually provides additional information only when the students request it; if it is not requested, it is not provided. Partial text cases are designed to teach students analysis and problem solving and also the ability to ask the right kinds of questions. The situation parallels real events because we often make decisions based on partial information. The incident-process case is designed to prepare students for this contingency.

15.5.2.1 In an interactive case students also receive limited information. Then they interact with other sources for additional data, return to class and ask for additional information or receive another segment of the case from the instructor, return to interaction, and so on.
Other sources include additional readings, interviews, and library research. This process is similar to doing a research project. It is an artful blend of dealing with reality while, at the same time, acquiring additional knowledge and skill.

15.5.2.2 Like other partial text cases, the sequential case begins with limited information. The situation unfolds in succeeding installments of information to the students, much like a command post exercise. At the end of each installment, students decide if intervention in the situation at that point is called for or not. Some incidents resolve themselves and intervention will only aggravate the situation. Other incidents continue to deteriorate and might even become unresolvable if intervention comes at an inappropriate time, or even too late. The sequential case is particularly suited for training in personnel management.

15.6 Mode Of Presentation. Thus far, we have assumed that all cases are written. While the majority of cases do come in this format, other modes of presentation add variety, drama, and realism to the case class. Movies and sound-on-slide presentations can offer the participants the incident and the emotions of the case in a dramatic and lifelike way. Typically the film will unfold the situation to a decision point, then the students take over. After some individual or corporate decision has been made, the presentation can be continued by presenting more information, by using the outcome as an illustration and as a basis for further discussion, or for closure, whichever suits the student and instructor needs.

15.6.1 Videotape cases have the potential of increasing realism by presenting the original case participants who give their perceptions in their own words. How the original participants saw the case is often more critical and important to the student than the interpretations of these perceptions by a case writer. Another step toward case realism is to have a live presentation, where the participants come in person before the class to recreate the case experiences and respond to questions. A variation is to have students meet with the case participant, perhaps in the actual case environment.

15.7 Case Methodology. More is required in teaching with the case method than simply reading the case and asking a few questions in class. Proper use of the case method requires conscientious preparation, presentation, and follow-up.

15.7.1 Preparation. While there is no “best” way to approach case preparation, some generalizations can be made. The instructor should identify the specific learning objective toward which the class will proceed. Here, also, some appraisal of the relationship between the lesson and the rest of the curriculum is appropriate. Consider the instructor who has taught the principles of management to students during a two-week period. The objective now is to see if they can apply these principles to a given situation. Using the case in this way makes it a “capstone method,” since the case reinforces and extends the teaching that has gone before. Most Air Force case teaching uses this approach.

15.7.1.1 Sources of Cases. Once instructors decide to use the case method, where can they find cases? They can either use a prepared case or write an original one.

15.7.1.1.1 Prepared Cases. Because of its long involvement with the case method, the Harvard Business School, through the Intercollegiate Case Clearing House (ICCH), Soldiers Field Post Office, Boston, MA 02163, offers the most centralized source of prepared cases. Cases can be ordered from the published catalogue for a nominal fee. The Inter-University Case Program, Box 229, Syracuse, NY 13210, is a similar source of professionally written cases. The Air University Library has an extensive collection of cases which have been used in AFIT and in professional military schools, but some of these cases cannot be released for general use.

15.7.1.1.1.1 The base or community library is also a source of cases. Periodicals such as Academy of Management Review have a regular section devoted to cases. Textbooks in specialized areas often contain cases such as How to Use The Case Study in Training for Decision Making by David R. Willings, The Case Method of Teaching Human Relations and Administration by Kenneth R. Andrews. Other texts on this same order are also available to the course developer. For film cases available for rent or purchase, see Roundtable’s Catalog of Training Materials.

15.7.1.2 Case Writing. Quite often the instructor is unable to find the exact kind of case to achieve a specific objective. The solution may be to write a case to fit the specific school need. The idea for a case may come in some current event, an article or periodical, or personal experience. For guidance in case writing, see Case Research: The Case Process by Leenders and Erskine, or James W. Culliton’s Handbook on Case Writing available through ICCH.

15.7.1.2 Case Selection. In evaluating a case for use, regardless of source, we should ask ourselves five questions:

15.7.1.2.1 Is it realistic? A case is realistic if it describes an actual problem or situation, even if the organization or participants are disguised. Obviously fabricated or fantasy cases are unlikely to have credibility. If the case is not realistic, it is hard to make the students’ solution, decision, or action seem real. While it is theoretically possible to “invent” a case or use a composite of several situations, in practice such an approach is rarely as successful as dealing with an actual real-life case.

15.7.1.2.2 Is it meaningful? The case should be meaningful to students so that they are able to identify with it in some way. They must be generally familiar with the problem either through their past experience or in the experiences they expect to face in the future. A case on a moon walk, for instance, may not work for
students who are not involved with space travel or who do not have the necessary technical background.

15.7.1.2.3 Is it challenging? The case should contain actual or potential controversy. If the case is one in which the solution is obvious, it should be rejected.

15.7.1.2.4 Is it complete? Usually a case is complete within itself. It presents enough information so that students can deal with the problems without reference to outside sources or the instructor.

15.7.1.2.5 Does it provide for a logical difference of opinion? A case study that prompts a single line of analysis may not result in productive discussion. An acceptable case should provide an opportunity for reasonable people to differ rationally.

15.7.1.3 Writing the Teaching Note. A good case allows both the instructor and student to achieve educational objectives—the instructor to reinforce general principles with specific examples and the student to gain experience from the past in a close to real-life role. These objectives are both met by the instructor having analyzed the case beforehand in what is called a teaching note, which may include: Essential details in the case, major issues, analysis of these issues, evaluation of the case characters (their relationships, goals, values), prior knowledge students need to work the case, and questions to be included in the lesson plan which will guide the discussion.

15.7.1.3.1 The teaching note is not the solution to the case, but it should detail typical student activities which the case will stimulate and define the specific student outcomes the instructor expects. It should also define the level of student for which the case is written and relate the case to readings and to preceding or subsequent classes. The note should include at least an outline of the instructor’s analysis of the case to show that it is internally consistent and able to hold up under analysis. After writing the teaching note, instructors will often find that the case contains insufficient or misleading information, and they may want to revise or amend it before giving the case to students. For certain groups, the case may assume knowledge of a process or background material which may need to be summarized in an attachment. A case on discrimination in promotion, for instance, may depend on a detailed knowledge of the promotion system and its appeals which the average social actions specialist may not have.

15.7.1.3.2 The instructor’s preparation, then, should extend beyond the limits of the case to include political, economic, or social factors; policies and procedures in effect at the time of the case; and concepts and principles alluded to but not explained in the case. The more expert the instructors are about a case, the greater the chance of teaching it successfully, especially if the subject area is unfamiliar or the details skimpy.

15.7.1.4 Lesson Format. Before the actual lesson planning begins, the instructor must select some logical sequence for analyzing the case. Often an analytic format will be inherent in the concept, principle, or objective the case is to reach. If so, the concept, principle, or approach may serve as the lesson objective, and its format as main points in the lesson plan. These main points also become the procedures the students will use to develop the lesson during the class period. They also might well be used as broad categories to be outlined, on the chalkboard, during the class to help with lesson development. The following is an example of this process.
Table 15.1. Lesson Plan Process

Lesson Objective: “...for the students to apply Gelatt’s decision-making model to given situations.”
Main Points:
1. *(A) Analysis procedure to identify the problem.
2. *(A) Research resources to collect data.
3. *(A) Creativity in determining alternatives.
4. *(A) Assessment of possible outcomes of each alternative.
5. *(A) Assessment of probable outcomes of each alternative.
6. *(A) Individual choice of acceptable solutions.
* The letter (A) before the main point indicates “Apply.”

In teaching the case, the instructor would probably record student comments on the chalkboard using the following columns.

<table>
<thead>
<tr>
<th>Identify</th>
<th>Possible</th>
<th>Probable</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>Data</td>
<td>Alternatives</td>
<td>Outcomes</td>
</tr>
</tbody>
</table>

At times the case under consideration has no obvious format for main points or analysis, but an approach will emerge from the instructor’s own study of the case. The following is an example:

Lesson Objective: “...for the students to apply the principle of delegation of authority in management situations.”
Main Points:
1. (A) Past management training and experience to separate the facts and the assumptions.
2. (A) Group problem solving techniques to clearly define the problems.
3. (A) Individual creativity to reach the best possible group solution to the problems.

Chalkboard Arrangement:
- Facts
- Assumptions
- Problems
- Solutions

15.7.1.4.1 Other examples of lesson objectives, main points, and associated chalkboard arrangements are in Appendix 1. These examples are merely illustrations of possible approaches. Two different instructors teaching identical objectives and using the same case might use completely different main points and analysis procedures with equal efficiency and effectiveness.

15.7.1.4.2 The instructor is now prepared to develop the lesson objective and the lesson’s main points. The objective is often stated at the application level, although some cases may lend themselves better to the comprehension level. An example of an acceptable objective is illustrated in Part I of the lesson plan at the end of the chapter. Note that this instructor wants students to “apply the principle of delegation of authority.” The main points will be identical to the format selected for analysis, namely; (1) facts and assumptions, (2) Defining the problem, and (3) Presenting solutions.

15.7.1.4.3 With a specific well-defined objective and logical main points, we are ready to develop the lesson plan.

15.7.1.4.4 The introduction of the case lesson plan development differs only slightly from the other teaching methodologies. The attention and motivation steps are the same, with the major difference occurring in the overview. Here the students are given an opportunity to read the case, if it is short and if they have not read it before coming to class. Students are told how the lesson will proceed and the point of view they should adopt. They may or may not role play. In the sample lesson plan at Attachment 7, students assume the role of a colonel, Major Beeman’s boss.

15.7.1.4.5 The development phase elaborates on each main point in the lesson plan through the use of well-formed preplanned questions. “What are the facts in this case?” “Who is causing the biggest problem?” “Which of these violations has the most serious consequences?” Instructors who have prepared thoroughly will be able to transition from one main point to another, and from issue to issue within main points, to guide the class into critical areas for discussion, and ultimately to lead them to the overall lesson objective.

15.7.1.4.6 The conclusion summarizes the case and relates it to the concept or principle to be illustrated. It then proceeds to show how this same concept or principle can be used to deal with other similar situations. The remotivation and closure steps are similar to those in other methodologies.

15.7.2 Presentation

15.7.2.1 Guidelines. As with other aspects of the teaching case, there is no set procedure for conducting the class, but a number of general guidelines have worked well in past case sessions.

15.7.2.2 Refraining from Lecturing. The case method is inherently a student-centered approach. Keep instructor
comments to a minimum and let the students do the talking.

15.7.2.3 Starting the discussion. Some case leaders begin with the question, “What is the issue here?”; then go on to, “What are the pertinent facts?” Others begin with the more general question, “What action should be taken?” The approach depends on the intellectual maturity of the students and with the subject matter.

15.7.2.4 Controlling participation. The case discussion is controlled much like the guided discussion, except that in the case, the instructor may feel more free to enter the discussion. The case instructor often keeps track of the discussion at the chalkboard, so that the entire class has a visual record of where the discussion has been and where it is going. The questioning techniques used in case method are the same as for the guided discussion.

15.7.2.5 Being Nondirective. In case studies there is often no single right answer. It is more important to lead students toward sound application of principles than to persist in an endless search for one right answer. In the body of the lesson, the instructor should, of course, “guide” the discussion. But imposing the instructor’s views on the students, passing judgments on contributions, and arguing do little toward encouraging independent thinking or achieving the lesson objective. Attempts to force a conclusion on the group often fail. Save instructor comments for the conclusion.

15.7.2.6 Case Roles. In the process of presenting a case, the instructor and students have roles they are responsible for. Fulfilling these roles increases the probability of a successful lesson.

15.7.2.6.1 Instructor Roles. As case leaders, how should we behave? We can dominate, control, and structure the discussion of a case and emerge from the discussion with our own solution. On the other hand, we can demonstrate a high degree of leadership skill in guiding and involving students in the discussion and solution of the case. In either instance, we serve in the role of recorder, questioner, and occasionally as clarifier or expert.

15.7.2.6.1.1 In our role of recorder, we provide direction and organization to the discussion of a case by writing ideas on a chalkboard as they are submitted by the students. We also record problem areas and items for further analysis and solutions by the discussion group. To avoid confusion or distraction, we might list the major elements of the selected decision or analysis process on the chalkboard. Under each category, we might list specific student contributions. This task requires disciplined listening and undivided attention to every statement made during the discussion period.

15.7.2.6.1.2 One of the most important requirements of the case study method is the instructor’s ability to use good questions. Questions are the principal device for clarifying contributions to the discussion and for relating ideas to the problem under discussion. Another questioning technique in the transfer of ideas is to review past experiences as they relate to a new problem. Frequently, to avoid student superficiality, a simple “why” question is used to confront a student’s assertion and stimulate an orderly analysis of a problem. The instructor also has a responsibility to assure that the discussion is meaningful. We are the experts in teaching the subject and also in helping students express themselves. We should see that every student has an opportunity to participate. It is also our responsibility to establish rapport and maintain student interest in the case under discussion.

15.7.2.6.2 The Student’s Role. The case method of instruction may require more student preparation than any other teaching method. If students do not prepare for class participation, they do themselves an injustice and deprive other students of possible discussion. As minimum preparation, they must read and study the case thoroughly. If there is time they might also refer to as many related references as possible.

15.7.2.6.2.1 During class discussion of the case, students should think reflectively and strive for cooperation rather than competition. They should share responsibility to contribute briefly and directly to the discussion and to assist in developing group concepts based on specific items of information. Thus, self-motivation is a significant element of the case study method, and this motivation obviously enhances the learning process.

15.7.3 Follow-up. What we do after the class session is over is often as important as what preceded the period. If student participation is part of the course grade, we should establish the criteria for grading beforehand, make it known to the students, and take notes while the impressions are still fresh in our minds. Even more important for future use of the case, we should review the lesson plan and note corrections needed in the case, possible changes in questions, and new lines of thought or different methods of analysis brought out by the students. In this way, the case stays fresh and becomes a more refined tool for use with subsequent classes.

15.8 Summary. The case, properly used, initiates students into the ways of independent thought and responsible judgment. It faces them with situations which are not hypothetical, but real; it places them in the active role, open to criticism from all sides; it puts the burden of understanding and judgment upon them; and it gives them the stimulating opportunity to make contributions to learning.

15.8.1 In the problem solving environment of the classroom, the students develop skills in communicating their ideas to others. At times, they may add to the ideas contributed by other members of the group, and, at other times, they may take exception to their peers’ ideas. Both actions require effective communication techniques, and both involve a type of interaction that leads to consensus and understanding. The case study method
increases the student’s ability to appreciate other points of view, to explore and discuss differences of opinion, and, eventually, to reach an agreement. It forces students to think analytically, constructively, and creatively, and it gives them the satisfaction of participating in an orderly social relationship with others.
16.1 Introduction. As part of our daily lives, conversation occurs when two or more people exchange information or viewpoints. An interview is a special type of controlled conversation aimed at specific objectives. Interviews vary broadly in content according to their purpose or the situation in which they are conducted. For example, we use personal interviews when we evaluate performance and when we reassign, retain, or separate. Managers use interviews for giving orders and handling complaints or reprimands. Interviews are also used in sales, counseling, and information gathering, including polls and surveys, and for such specialized purposes as medical diagnosis, criminal investigation, and legal inquiry. The teaching interview is another type of interview, but its main use is to promote learning.

16.2 Background. Much like the guided discussion, the interview as an educational technique started when the first student asked the first question and the first teacher replied. Tradition credits the Greek philosopher Socrates with a pupil-teacher dialogue which replaced the one-sided lecturing of the Sophists, a class of professional teachers in ancient Greece. Still in use today, Socratic dialogue relies on the assumption that each person has a storehouse of knowledge and understanding which can be discovered through questioning techniques. Students who participate in this exchange of ideas and opinions learn by relating what they know to what they don't know. The dialogue is the basis of most discussion methods of learning.

16.2.1 The teaching interview is a dialogue in a classroom situation which pairs a skilled instructor with a recognized expert. The expert has specialized knowledge or a broad understanding of a subject, and the instructor draws out that knowledge and understanding by means of questions. The students learn by observing the interview and asking questions.

16.3 Uses Of The Teaching Interview. The teaching interview can be used as a primary method for achieving planned learning objectives. The instructor’s job is to elicit the responses from the guest expert which allow the students to reach these desired learning outcomes. Many schools already have a guest speaker program. Because guests may depart from the planned topic or lesson outline, they often do not help achieve planned lesson objectives. Reasonable control over the actions of a guest speaker is the primary advantage of the teaching interview.

16.3.1 The teaching interview may also be used to supplement the instructor’s knowledge of a specific subject area. In the Air Force, we are often asked to teach subjects in which we are not completely expert. When the subject matter is very broad, an outsider may help cover our “knowledge gap.” For example, management courses could easily profit from the interview of an expert who has had experience in conference leadership. In educational fields, experts who have worked with motivating adults could contribute significantly to an understanding of the learning process. PME schools frequently benefit by bringing management experts to the classroom and interviewing them for the students.

16.3.2 Another use of the teaching interview is curriculum enrichment. The appearance of an expert or authority enhances the credibility of a classroom that is difficult to duplicate by the average teacher. The teaching interview lesson may also be used to add variety to the curriculum. For example, if the instructor usually lectures, a teaching interview can be an exciting change of pace to the regular routine.

16.3.3 The teaching interview can also be a motivational device. It can be used to introduce a block of instruction and gain the students’ interest. For example, a physician might introduce a series of lessons on first aid, or a former POW could stimulate interest in the Code of Conduct.

16.3.4 The teaching interview can also be used as a problem-solving activity. The instructor can interview an expert in a particular area, presenting a problem to the expert for solution. During the course of the interview, the expert can present the solution to the problem.

16.4 Initial Planning Factors. The instructor must examine the curriculum closely to determine the need for interview lessons. The interview lesson is best suited for exploring attitudes, experiences, and opinions. Generally speaking, teaching interview lessons should be planned at the comprehension level within the cognitive domain and at the lower levels of the affective domain. The instructor should also make a value judgment about the expert’s ability to contribute to the overall learning experience.

16.4.1 An interview can examine an expert’s reasoning process and the rationale used for arriving at conclusions. The interview probes the “whys” and “hows” of a thinking mind. The interview lesson discusses “the importance of…,” and “the reasons for…,” and “the value of…,” particular events or actions, rather than the events or actions themselves. These valuable additions to the learning process influence the focus of the lesson objective. The teaching interview lends itself to teaching both concepts and principles.

16.4.2 After stating the objective of the lesson and selecting the teaching interview as the method, we must select the expert to be interviewed. Just as the first step in any sort of research is to explore our own resources, so the first step in selecting an expert is to examine our own faculty or colleagues. The best available resource may be
in the next office. Your base, the local community, or a nearby college often provide experts for interview lessons.

16.4.3 We should select a recognized expert if one is available. Students respond to persons they acknowledge as experts and generally accept their remarks readily. Since students frequently accept the acknowledged expert’s testimony at face value, you can save time by not having to develop support material to substantiate the expert’s ideas.

16.4.4 When selecting a prospective expert, find out all relevant information about the person. Make sure the expert can set forth views with candor and frankness and explain clearly the basis for opinions. If you discover that the person generally thought to be an expert really is not particularly expert, or that the expert’s personality or style of presentation might be a serious barrier to learning, find someone else.

16.4.5 Spend time researching the subject that the interview lesson will cover. If the expert has published works or made public statements, examine them to gain insight into the views expressed. If you have a thorough grasp of the expert’s opinions and viewpoints, you can pick and choose those ideas of the expert which will be of the greatest value to the students.

16.4.6 You are now ready to narrow your research to the subject of the interview itself: What specific topics will be covered? What sorts of questions will prompt the best answers? How should you react to the responses of the expert? Obviously, you do not need to know the subject matter of the interview as well as the expert. Perhaps a method other than the teaching interview should be used if you have as much expertise as your guest expert.

16.4.7 The last step in the preliminary planning of the teaching interview is the preparation of a logically organized outline of the lesson. Consider how the expert’s knowledge can best be used to satisfy the overall lesson objective. As you prepare this outline, you will probably discover that some limitation of the subject, as well as the lesson objective, is necessary. When you consider the time allotted for the lesson, the depth of detail, and the degree of understanding desired, you will probably find that the scope of the interview should be limited.

16.4.8 The outline will also suggest question areas. Place yourself in the position of the students and decide what they need to know in order to increase their understanding of the expert’s attitude or experience. You need not write out specific questions for the interview at this point; instead, establish in your own mind the general areas of questions to be covered.

16.5 Coordination. Three major coordinating steps precede the actual teaching interview lesson. Two of these steps involve meetings between instructor and expert, while the other deals with the students themselves.

16.5.1 Preview the Subject with the Expert. The first coordinating step involves interaction between the instructor and the expert. The aim of the initial contact should be the previewing of the subject of the interview, where the essential facts and the specific topics or subject areas to be covered are discussed. However, you may not want to give the expert the actual questions you will ask since you want the interview to be spontaneous. A common outline of the lesson may be prepared with the expert which can serve as a tentative guide for the interview itself. Decide upon any visual aids that you will prepare or provide, whether they are for your own requirements or for the guest to use.

16.5.1.1 One of the most important considerations in the preview is to help the expert gain a better appreciation of which areas of subject content are to be covered. You should add or delete items that either the expert does not feel qualified to discuss or may wish to avoid in public discussion, eliminating any potentially embarrassing situations which inhibit a feeling of mutual trust. Remember that an interview lesson is not an interrogation in which the expert is to be badgered into an admission of guilt or error, nor is the interview lesson an opportunity to make the expert appear foolish, ignorant, or upset.

16.5.1.2 Mutual considerations during coordination will lead to good rapport which is essential to the successful outcome of the interview lesson. If you cannot arrange a face-to-face meeting, the topics for the interview can be arranged by correspondence or by telephone. Building rapport and establishing a good working relationship will have to wait until shortly before the lesson begins.

16.5.2 Announce the Visitor’s Appearance to the Class. The second coordinating step involves the students themselves. The interview should not be a surprise. Motivate your students by announcing that a guest will be visiting the class. You may distribute to the students a short biographical sketch of the expert or a brief outline of the lesson to be presented. This material will help arouse student interest and curiosity and may be highly motivational as well. Students may become more involved if you ask them for questions to be used during the interview. When the students know who is coming, what the expert’s qualifications are, and what the subject is, the interview has a better chance for success.

16.5.3 Meet with the Expert. The final coordinating step is a short meeting between expert and instructor shortly before the actual interview presentation. This final meeting gives the expert a chance to become physically adjusted to the interview situation and to see the classroom and its equipment. This meeting also helps develop informality and cordiality which are particularly important, especially if the expert is meeting the instructor in person for the first time. The instructor should put the expert at ease and establish a relaxed and permissive atmosphere for the interview lesson. In
addition, last minute changes in the interview outline can be made.

16.6 The Interview Lesson. The interview lesson (See sample lesson plan for a teaching interview at Attachment 8.) is not a series of short speeches, nor is it solely a question-and-answer period. We only need to recall the informality and spontaneity of the popular TV talk shows to understand the atmosphere sought in a teaching interview.

16.6.1 Arrangement of the classroom is as important as in other methods. You and the expert should have enough desk or table space. Students should be able to see and hear both of you without effort. You may choose to be seated to start the lesson or you may remain standing depending on which is more comfortable and appropriate. Normally, you should sit after the questioning begins. If possible, arrange a “warm-up” session in private with the expert just before the interview lesson. If this is not possible, begin the interview with easily answered questions which are geared toward opening up the subject and the person, such as “When did you first become interested in ecology?” or “What led to your interest in military history?” A preliminary conversation is a smooth way to ease the expert into the main thrust of the lesson, but avoid mere social pleasantries.

16.7 Introducing the Interview Lesson. Like any other well organized lesson, the introduction of an interview lesson focuses attention on the subject, prepares students to recognize the value of listening, and provides them with a good idea of how the interview will proceed. Introduce the guest yourself so you can stress the qualifications that are pertinent, but keep the introduction simple and take care not to embarrass the guest by overstatement. Make sure you have accurate details. The introduction is the time to announce that you will have a question-and-answer period at some point during or following the lesson. It is also critical that you present a thorough overview. Do not forget that you are overseeing for both the students and the expert. The overview gives the students a “road map” for the lesson and serves to remind your expert of exactly what is to be addressed.

16.7.1 Normally, students are aware that you have invited a guest to class, and they will be anxious to meet and hear from the expert. You should therefore try to involve the expert in the lesson as early as possible. Be brief in your attention and motivation steps, while not slighting their importance and effect. Introduce the class to the expert if you feel it will enhance the setting. This is an optional procedure, but it often helps in channeling the expert’s comments toward student needs. The expert’s involvement in the lesson should start as an integral part of the introduction.

16.8 Conducting The Interview. The development section of the interview lesson centers on the conversation between the instructor and the expert. The instructor’s task is to serve as a stimulus to conversation by asking questions which bring out ideas from the expert in support of the lesson objective. As in the guided discussion, you should plan the lesson so that it will develop along certain lines to satisfy the specific learning objective. For this reason, carefully plan the leadoff question for each main point. When you ask the leadoff questions, ask them as planned. This will ensure that you are headed in the right direction.

16.8.1 Even though your lesson is somewhat structured, you must be careful not to become so directive that conversation is stifled. However, the interview is controlled at all times, even to the extent of tactfully interrupting the expert if necessary. By remaining natural, friendly, permissive, and conversational, you can show genuine interest in both the guest and the subject. Listen to what is being said, and be prepared to ask for further clarification, examples, details, and other support material if required, or to pursue new lines of discussion when necessary. Notes taken during the lesson will be helpful when the time comes to summarize.

16.8.2 Your job as instructor, then, is to bridge the gap between the expert and the students. You interpret what the expert says and provide clarification, when needed, for the students. However, avoid using such phrases as “What you’re saying is...” or “Let me clear up what you’ve just said...” You can ask the expert to clarify points without implying poor communication. You are the best judge of students’ needs and also of how well the information given in the interview is satisfying those needs. Divide your attention, therefore, between looking at the expert and monitoring the students for any cues that would prompt you to seek further clarification from the expert. Careful positioning of the chairs will eliminate any awkwardness in directing eye contact to both the expert and the students.

16.8.3 Your questions are the vehicle for achieving the learning objective of the lesson and satisfying students’ needs. The successful instructor organizes questions in a definite sequence relating to the subject’s central theme and the lesson objective. Questioning sequences may follow any acceptable organizational pattern (chronological, spatial, topical and so forth) so long as that pattern is appropriate to the lesson.

16.8.4 Each question should be clear and definite for both the expert and the students. The expert should not have to guess about what the question means, what it implies, or what kind of answer should be given. If the expert seems to be having difficulty with a question, you can restate or rephrase it. Questions which are lengthy, involved, and ambiguous hardly ever produce the best possible response. Questions which are simple, precise, and direct are better for communicating with the expert. Questions which contain unfamiliar or technical vocabulary may be misunderstood by the students or, for
that matter, by the expert, and should be avoided. In addition to your planned questions, don’t hesitate to use spontaneous questions to get the lesson back on track and to explore new ideas and points. You should have an interim summary before going on to another main point, but you may also wish to use interim summaries to curtail and redirect discussion if the expert gets off track.

16.8.5 Remember to ask questions that direct attention to ideas, elicit comments, and seek explanations which clarify ideas in depth. Some questions perform these tasks better than others. Questions which are thought provoking and require the expert to explain the responses are better for promoting discussion. With an outgoing, talkative expert, you may not have a problem keeping the conversation moving. However, with a quiet, reserved expert, you must ensure that the questions prompt more elaborate responses than simple agreement or disagreement. Questions phrased using “how” or “why” tend to promote more thought and discussion. They will more readily seek out the expert’s special knowledge or opinions on the subject. Additional examples of questions which will open up conversation include: “What are your ideas concerning…?”, “What is your opinion of…?”, “Why do you feel…?”, and “How do you view…?”.

16.8.6 The instructor must also continually remember that the purpose of the interview is to aid student learning. Therefore, assess the expert’s responses on the basis of student understanding and follow up as necessary when the replies are vague, confusing, or incomplete. Carefully plan your follow-up questions, but be prepared to bypass some of them when the guest has already covered the point involved. If appropriate, ask them verbatim from the lesson plan. However, you must be ready to modify a follow-up question based on the expert’s comments which preceded it. Be sure to plan a sufficient number of questions to keep the interview lively. Follow-up questions such as “What are some other examples?”, “Under what circumstances would that apply?”, or “What is the basis for your opinion?” are useful for clarification.

16.8.7 The instructor may also guide the conversation by repeating phrases which the expert has already used. This technique invariably causes the expert to expand ideas further. Nodding to answers is reassuring and encourages the expert to continue. Certain neutral questions may also be used to obtain a more complete clearer response. Examples of neutral questions include: “What do you have in mind?”, “Why do you feel that way?”, and “Why do you think so?”

16.8.8 You should allow adequate time for the expert to reflect on questions, to decide on answers, and to word replies. The short gaps in the conversation which these pauses will create are not harmful either to the expert or the students. Actually, they will give the expert a chance to gather thoughts and give a more complete response than if a follow-up question is asked too quickly. In addition, the students will have a chance to finish notes and do reflective thinking.

16.9 Ending The Interview. The instructor’s role in concluding the teaching interview is important. Schedule a question-and-answer session before the final summary, because you will want that summary to include any pertinent comments made in response to the students’ questions. A brief interim summary may follow the last main point and then the question-and-answer period may begin. You may choose to stand up or remain seated for the conclusion, depending on your personal teaching technique. Summarize the ideas presented by the expert and show how they support your conclusion and the lesson objective(s). Remotivate the students to retain and build upon the insights gained during the lesson. This remotivation can occur as a separate step or as part of the summary. Finally, close the lesson by thanking the expert. Do not thank your guest until you are ready to dismiss the class; once you do, the lesson is over as far as both the students and the expert are concerned.

16.10 Sample Lesson Plan For A Teaching Interview. The sample lesson plan at Attachment 8 focuses on one key principle (the lesson objective) and two supporting principles (main points). Note the wording of the objective, the fact that the samples of behavior provide evidence of comprehending the overall objective, and that the main points add up to the conclusion stated in the objective. Pay particular attention to phrasing the questions and the way the summary in the conclusion is developed. Notice too, the similarities between this plan and that for a guided discussion (Chapter 14).

16.11 Summary. The teaching interview is essentially a method of instruction through which expert resource persons can be used efficiently in the classroom. This method gives the instructor an opportunity to be more flexible and vary presentation modes of teaching, at the same time satisfying planned learning objectives. The degree of success in the use of the teaching interview depends on a good lesson plan and questions which will guide the expert’s responses. If you understand the strengths of this method and when it may be used well, you will improve your use of guest speakers. The teaching interview requires little preparation on the part of the guest compared to preparing for a lecture. As such, you will most likely find many individuals enthusiastic in their willingness to help you present a dynamic teaching interview lesson.
Chapter 17

THE DEMONSTRATION-PERFORMANCE METHOD

17.1 Introduction. The demonstration-performance (D-P) method is a proven method for teaching mental or physical skills which require student practice for skill mastery. The method is based on the principle that students learn best by doing. A person learns to swim by swimming, to drive by driving, and to teach by teaching. Skills requiring the use of tools, machines, and equipment are suited to this instructional method. Equally well suited are skills which require mathematical computations and those which are a combination of mental know-how and physical dexterity, such as taking fingerprints and fitting earplugs.

17.1.1 The science teacher uses the D-P method to teach laboratory procedures. The shop foreman teaches the apprentice almost entirely by some version of this method. The instructor pilot uses it to teach flying skills. The professor of medicine uses it to teach surgical skills. In each case, the instructor demonstrates the particular procedure to the students and then acts as a supervisor while they practice the skill. During the practice period, the instructor points out errors and helps students eliminate rough spots and/or errors in their performance. In the D-P method, the instructor tells and shows students how to do the skill, they practice under the instructor’s supervision, and they are evaluated on their performance against predetermined criteria.

17.2 Planning And Developing A Demonstration-Performance Lesson. The D-P lesson or block of lessons consists of explanation, demonstration, performance-supervision, and evaluation phases. If all these phases are included in one continuous block or period of instruction, they are preceded by an introduction and followed by a conclusion.

17.2.1 Introduction. The introduction to a D-P lesson generally consists of the three elements recommended for all lessons—attention step, motivation step, and overview. The attention and motivation steps are the same as those discussed in Chapter 6, Developing the Teaching Plan. However, the overview for a D-P lesson is somewhat different. In a D-P lesson, students need to know not only what they will learn, but also how they will learn it, that is, how the lesson will proceed and how they will be evaluated. Where there is potential for physical harm to students, the overview must also include safety procedures. Since beginning students often run the risk of injury while working with unfamiliar tools and equipment, instructors should continually stress safety throughout a lesson, even if only slight hazards are involved.

17.2.2 Body: Explanation Phase. In the explanation phase the instructor tells the students how to perform the skill. This explanation should be planned as a short lecture with the nature of the task determining the appropriate organizational pattern. Most skills lend themselves to a sequential pattern where the skill is explained in the same step-by-step order normally used to perform it. When the skill being taught is related to previously taught or already known material, the known to unknown strategy may be used. When teaching more than one skill in the same lesson, the simple to complex strategy works well. By starting with the simplest skill, students build confidence and are less likely to become frustrated when faced with building to more complex skills.

17.2.2.1 Another important consideration in the explanation phase is the language used. Instructors should attempt to speak at the level of the learner and avoid unnecessary jargon and technical terms that the students may not understand. Instructors should take care to clearly describe the actions that students are expected to perform. Clear communication is the key. It is neither appropriate nor effective for instructors to try to impress the students with their expertise by using language which is unnecessarily complicated.

17.2.2.2 Instructional aids are particularly important in a D-P lesson. The best instructional aid is the actual equipment to be used. Other useful aids are charts, mock-ups and models. When using aids, be sure they are readable, accurate, and that all students can see them.

17.2.3 Body: Demonstration Phase. In the demonstration phase (which may be combined with the explanation phase) the instructor shows the students how to do the skill. With a simple skill, the explanation and demonstration phases may be combined, but with a complicated or dangerous skill, the two phases are often better separated. For example, students will probably understand a combined explanation or demonstration of flag folding, but they would probably need separate steps to construct visual aids using Harvard Graphics.

17.2.3.1 In the demonstration it is very important that the instructor demonstrate the skill correctly and safely the first time. When the skill is demonstrated incorrectly, the instructor may lose credibility, and students will have to unlearn the incorrectly presented material before they can learn it correctly. Learning incorrectly the first time often interferes with later learning.

17.2.3.2 The skill should be demonstrated in the same sequence in which it was explained, avoiding confusion among the students and reinforcing the steps. Since the students generally imitate the instructor’s performance, the instructor must demonstrate the skill exactly the way the students are expected to practice it, including all safety procedures that the students must follow.

17.2.4 Body: Performance-Supervision Phase. Before the students actually begin to practice the skill, the
instructor must decide how much control to use. In the independent approach, the students practice the entire skill after seeing the demonstration, going from step to step at their own individual rate. In the controlled approach (“by the numbers”), students practice each task step (or small group of task steps) after seeing it demonstrated. With dangerous or difficult skills, the controlled approach is recommended for the first practice as a minimum. In each case, the students should practice the entire skill independently as many times as practical to achieve mastery before they are evaluated. In many cases, overlearning to ensure proficiency may be desirable.

17.2.4.1 Each student’s work must be supervised to ensure safe, correct performance. If any common error or safety hazards develop, the instructor should stop the group and reteach the area of difficulty. Students should be permitted to work on their own as much as possible without unnecessary interruption or too much assistance. The instructor should avoid distracting or non-purposeful talking or wandering. However, the instructor should not hesitate to interrupt if a student has made a mistake or is about to make a mistake. The time to identify errors is during the learning activity rather than the evaluation phase. If some students are more proficient than others, the stronger students may assist the less proficient ones. The stronger students may also be able to make some comments or suggest techniques which can be used by all students. Weaker students often make comments concerning their areas of difficulty which are an excellent source of information for improving subsequent instruction. In a self-paced environment, proficient students should not be held back when they are able to perform better and more quickly than their peers.

17.2.5 Body: Evaluation Phase. The most important consideration in the evaluation phase is the development of an appropriate rating instrument or written test (see Chapters 21 and 23). To be valid, the rating device must accurately measure achievement of the criterion objective. If, for example, the conditions of the objective state that the skill will be accomplished without assistance, then the instructor must cover or remove all instructional aids, erase the chalkboard, put away work sheets, and ensure that the students actually do the skill without references.

17.2.5.1 When beginning the evaluation phase, instructors should give clear complete instructions to the students. They should review the task steps, if necessary, and emphasize acceptable standards (time, accuracy, quality, etc.). They must allow for enough time, equipment, and supplies to evaluate all students on all standards.

17.2.5.2 At the conclusion of the evaluation phase, instructors should record the student performance on a suitable form and reveal the results to each student. Students will naturally be interested in their individual performance; however, the instructor must withhold comments that may influence other students until all have completed the evaluation. Regardless of how well a skill is taught, there may still be failures. The rule is that “success motivates,” so instructors should always be positive in revealing results. When pointing out areas that need improvement, instructors should offer concrete suggestions that will help. If possible, they should avoid ending the evaluation on a negative note or criticizing a student in front of other students. Afterwards they should evaluate overall student achievement of the lesson objective and revise the instruction as necessary for future classes.

17.2.6 Conclusion. The conclusion to a demonstration-performance lesson consists of the three elements recommended for all lessons—summary, remotivation and closure. The remotivation and closure are generally the same as discussed in Chapter 6, Developing the Lesson Plan. In the summary, instructors should review the task steps with emphasis on any areas of difficulty experienced by the students. Further instruction or comments on areas of difficulty experienced by several students may be added. Areas of difficulty experienced by only one or two students may be better addressed on an individual basis.

17.3 Factors To Consider When Using The Demonstration-Performance Method.

17.3.1 Lesson Content. A D-P is best used for teaching mental or physical skills which require student practice for mastery. It is not recommended for cognitive or affective lessons in which student practice is not required.

17.3.2 Evaluation. One advantage of the D-P method is that evaluation is a part of the lesson format. The criterion objective dictates the evaluation procedures. If the criterion objective is complete, clear, and concise, there should be no surprises for the student during the evaluation.

17.3.3 Student-Instructor Relationship. When using the D-P method, the instructor must be aware of individual differences among students and be willing and able to give as much or as little assistance as required by each student. Students may work independently, or the instructor can provide close, individual attention.

17.3.4 Time. The majority of time in a D-P lesson should be devoted to supervised practice. There is no alternative to providing sufficient time for student practice. If the students do not require practice to learn the skill, then another method is probably more appropriate.

17.3.5 Equipment And Materials. The instructor should have all handouts, equipment, and materials ready before the lesson begins. The room or work area should be arranged to facilitate maximum use of space, safety, and close supervision as needed.
17.3.6 **Student Role.** Many skills cannot be performed on an individual basis and teams or partners must be assigned. Only through intensive practice can groups know exactly what to do and how to do it. If the activity is normally accomplished as a team effort, it should be practiced and evaluated as a team effort.

17.3.7 **Group Size.** In many skills the size of the class or the number of work stations is critical. All students must be able to see the demonstration, and the group must be small enough so that the instructor can effectively supervise all students during the practice session. All students must have sufficient access to needed equipment, supplies, and materials.

17.4 **The Sample Demonstration-Performance Lesson Plans.** The lesson plans at Attachment 9 illustrate a format for demonstration-performance lessons from among many that are acceptable. The objective, task steps, and actual teaching plan arrangement may be varied to meet the administrative requirements of different schools or situations. On the attached plans, the criterion objective is broken down into three elements (performance, conditions, and standards) rather than written in narrative form. This separation of the elements specifies instructional intent clearly and may be easier to write than a narrative format in some circumstances.

17.4.1 A complete script is not desirable for the actual teaching plan. Write down enough on the teaching plan so that it will key you to the major points of the lesson. If other instructors will use the plan, spell out the examples and details more completely than if only one instructor uses it.

17.4.2 The Process/Product Evaluation Sheets shown as Part III of the sample lesson plans at Attachment 9 are one of many possible formats for recording the results of student evaluation. The important thing to remember when designing formats for lesson plans and evaluation sheets is to use those that will work for the particular situation within the administrative constraints of the individual school.

17.5 **Summary.** The D-P method provides students with the opportunity to perform skills or processes which have been explained and demonstrated under controlled conditions and close supervision. Through this supervised performance, the student gains necessary skills to apply on the job or in later lessons.

17.5.1 When using the D-P lesson, the following factors must be carefully considered: lesson content, evaluation, student-instructor relationships, time, equipment and materials, instructor preparation, student roles, and class size.

17.5.2 A successful demonstration-performance lesson requires a thorough explanation, a proper demonstration, student practice with close instructor supervision to eliminate student mistakes, and a valid evaluation of student performance. If these four primary phases are effectively planned for and carefully implemented, students will have the maximum opportunity to master the skill taught.
Chapter 18
SELECTION OF TEACHING METHODS

18.1 Introduction. After deciding exactly what to teach in a lesson, the instructor must determine how to teach it and what instructional method to use. Selection of an appropriate method is an integral part of lesson planning. Certain limiting factors may prevent an instructor from using certain instructional activities. In addition to considering the lesson objective, the instructor must consider the background and abilities of the adult learners, their motivation and learning styles, the number of learners, the time allotted to the lesson, and available facilities.

18.1.1 The final selection of an instructional method may be a compromise between the method that is most suitable to the outcome (an ideal approach) and the method that is possible under the circumstances (a realistic approach). Many variations, combinations, and adaptations can be made of any method or methods of teaching; in fact, the number of possibilities is limited only by the instructor’s imagination. For this reason, the instructor should recognize the many available opportunities to help students accomplish desired outcomes—whether process or product.

18.1.2 In previous chapters, we surveyed many methods in general and examined five methods in detail. This chapter may help us determine which method of teaching could and should be used under a given set of circumstances.

18.1.3 The decision about which teaching method to use comes in the design phase of the instructional systems development (ISD) process (see AFMAN 36-2234). In determining the means for teaching the block or period of instruction, course planners need some systematic way to deal with the available options. Use of the teaching methods grid or decision table (Table 18-1) may help you decide. The remainder of this chapter explains this table and describes how to use it.

18.1.4 The intersection of the factors listed in the left column and the methods listed in the other columns provides the key. The explanation of the key is located in the upper left corner of the table. Broad general descriptions are used in the key because a comment that is too specific could be misleading.

18.1.5 We can use the grid both for evaluating existing courses and planning new ones. The grid is a synthesis of options proposed by several qualified educators and their estimates based on research, logic, and practical experience. So, we must use the grid with caution because these generalizations may not be appropriate for a specific situation or for combinations of methods. The recommendations are only guidelines.

18.1.6 First, the instructor should consider the primary domain of learning involved, the cognitive, the psychomotor, or the affective. In the cognitive domain, the grid considers knowledge and comprehension levels but groups the remainder of the taxonomy levels together as “higher levels.” Generally the same teaching methods work for application, analysis, synthesis, and evaluation. Similarly, the affective domain is divided roughly into lower levels (receiving and responding) and higher levels (valuing, organization, and characterization). The psychomotor domain also has a taxonomy, but for purposes of this grid, it is divided simply into motor and mental skills.

18.1.7 All who plan instruction must deal with the realities of their situation—resources, space, class size, etc.. These items are grouped together as factors and constraints. Instructor expertise is always a consideration, particularly when the instruction contains complex procedures or involves high levels of cognitive and/or affective learning. Class size is another important factor, and if very large, class size may cause planners to select a less desirable method than they would prefer. Evaluation becomes more difficult at the higher levels of learning. But some methods provide ways for instructors to evaluate during the learning process. Case studies and other simulations are good examples. Similarly, some instructional methods permit instructors to respond to individual student needs better than others. The lecture, for example, rates low in providing opportunities for instructors to modify their instruction in order to help the fast or slow learner. Small group methods, on the other hand, lend themselves to more individualized student treatment.

18.1.8 Many other critical factors and constraints affect the selection of teaching methods. These additional considerations may be as significant as those discussed above, and often combine to create even more difficult decisions regarding the selection of appropriate teaching methods. Among the other significant factors which affect the selection of teaching methods are the: need for a specially equipped facility, amount of time needed to develop instruction, cost to develop and maintain both the hardware and software which support the method, and availability of support people to develop and maintain the hardware and software necessary to use the method effectively.

18.2 Assumptions. To realize the most practical value from this grid, we should be aware of five assumptions.

18.2.1 The terms and categories follow the definitions and conditions found in the accompanying chapter narrative. Terms used in a specific course or school may be defined differently. Most terms, however, are consistent with AFMAN 36-2234 and the taxonomies of Bloom and Krathwohl.

18.2.2 The periods or units of instruction being analyzed are assumed to be relatively short, from one period to a
short block of instruction. Extended periods of instruction present many considerations beyond the scope of this grid.
Table 18.1. Teaching Methods Grid or Decision Table

Key

HR - Highly recommended
r - recommended
nr - not recommended
c - comprehension level
h - higher level
lg - large class
sm - small class
Indiv - Individual

<table>
<thead>
<tr>
<th>DOMAINS AND LEVELS</th>
<th>PRESENTATIONAL METHODS</th>
<th>STUDENT VERBAL-INTERACTION METHODS</th>
<th>APPLICATION METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>HR r nr HR HR nr nr nr r r nr nr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
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<td></td>
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</tr>
<tr>
<td>Higher Levels</td>
<td>nr nr nr nr r r nr nr HR nr HR HR</td>
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<tr>
<td>Skill Development</td>
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<tr>
<td>Motor Skills</td>
<td>nr nr HR nr r nr nr nr nr nr nr r nr</td>
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</tr>
<tr>
<td>Mental Skills</td>
<td>nr nr HR r HR r nr nr nr r nr r nr</td>
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<tr>
<td>Affective</td>
<td></td>
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<tr>
<td>Lower Levels</td>
<td>r HR nr r r r r r HR r HR HR r</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Levels</td>
<td>nr nr nr nr nr nr nr nr HR r HR HR</td>
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<tr>
<td>FACTORS AND CONSTRAINTS</td>
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<tr>
<td>Minimum Level of Instructor Expertise</td>
<td>c c h h h h h h n/a h h c h h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Size</td>
<td>lg lg sm Indiv Indiv sm sm sm Indiv sm sm sm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation Inherent in Method</td>
<td>no no yes no yes yes no no yes no yes yes</td>
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</tr>
<tr>
<td>Responsive to Individual Needs</td>
<td>no no yes yes yes yes yes yes yes no yes yes</td>
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</tbody>
</table>
18.2.3 The methods are analyzed in their “pure” form, that is, not combined with other methods. The greater the combination of methods, the more we must exercise caution in using this grid. A method which is not recommended as an exclusive approach to instruction may be highly recommended in combination with another method.

18.2.4 A reasonable quality of materials and adequate teaching skills must be available. Poorly prepared materials and weak instructor skills have a serious negative effect on all recommendations. Conversely, the “great teacher,” the “master” of a particular method, or extremely well prepared instructional materials may create an impact well beyond those normally expected.

18.2.5 The learners dealt with in this chapter are “adult learners.” Adult learners tend to be task oriented, highly motivated, possess necessary prerequisite skills for a given learning situation, and often prefer interactive methodologies.

18.2.6 With an understanding of these assumptions, the grid can be of considerable value as a basis for evaluating methods of instruction. While these assumptions may affect the interpretation of the grid, the grid’s recommendations should be useful for all schools and courses under most normal situations. At the least, these recommendations will help identify periods or blocks of instruction which may require further analysis.

18.2.7 A school may find itself with an effective instruction system, where the methods used are as good as or better than those recommended. However, situations which are markedly different from these recommendations should be carefully examined to ensure that the methods chosen are not simply a result of an error in judgment or blind luck.

18.3 Definition Of Terms. The following definitions should be kept in mind as the basis for the ratings given for the methods discussed further on.

18.3.1 Cognitive Domain—Lower Levels
18.3.1.1 Knowledge—The recall of previously learned material (facts or theories) in essentially the same form taught.

18.3.1.2 Comprehension—Seeing relationships, concepts, principles, and abstractions beyond simply remembering material. Typically involves translating, interpreting, and estimating future trends.

18.3.2 Cognitive Domain—Higher Levels
18.3.2.1 Application—The ability to use learned material in new and concrete situations, including the application of rules, methods, concepts, principles, laws, and theories.

18.3.2.2 Analysis—The ability to break down material into its component parts so that the organizational structure is understood, including the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved.

18.3.2.3 Synthesis—The ability to put parts together, forming new patterns or structures, such as a unique communication (a theme or speech), a plan of operations (a research proposal), or a set of abstract relations (schemes for classifying information.)

18.3.2.4 Evaluation—The ability to judge the value of material for a given purpose. Learning in this area is the highest in the cognitive hierarchy because it involves elements of all the other categories, plus conscious value judgments based on clearly defined criteria.

18.3.2.5 Skill Development—Although skill development is not normally considered a domain of learning, it is useful here to differentiate between those skills which are primarily motor in nature and those that are primarily mental.

18.3.2.6 Motor Skills—Those skills associated with neuromuscular responses which are learned primarily through physical repetition (such as typing, most athletic skills, shopwork).

18.3.2.7 Mental Skills—Those skills in which cognition is of primary emphasis (such as math skills, computer operation, speaking, writing).

18.3.2.8 Affective Domain—Lower Levels
18.3.2.9 Receiving—The getting, holding, and directing of the student’s attention, from the simple awareness that a thing exists to selective attention on the part of the learner.

18.3.2.10 Responding—The student not only attends to a particular phenomenon but also reacts to it in some way, such as acquiescence (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). Includes instructional objectives related to “interests” or “disinterests.”

18.3.3 Affective Domain—Higher Levels
18.3.3.1 Valuing—The worth or value a student attaches to a particular object, phenomenon, or behavior, ranging from acceptance of a value to commitment. Includes instructional objectives related to “attitudes” and “appreciation.”

18.3.3.2 Organization—The bringing together of different values, resolving conflicts among them, and building an internally consistent value system. Includes instructional objectives related to an integrated, coherent “philosophy of life.”

18.3.3.3 Characterization by a Value Complex—Pervasive, consistent, and predictable behavior (life style) developing from a value system which controls behavior for a significant period of time. Instructional objectives focusing on personal, social, and emotional adjustment are in this category.

18.3.4 Factors and Constraints.
18.3.4.1 Minimum level of instructor expertise. The minimum level of proficiency in the cognitive domain required to teach a particular method of instruction effectively. Unless an instructor is just delivering a
lesson planned by an expert designer, most methods require the instructor to be at the application level or higher. In several instances throughout this chapter, the “one level higher rule” is recommended. Roughly translated, this rule cautions that instructors should be at least one cognitive level higher than the level of learning of the lesson being taught. If knowledge-level material is being taught, instructors should be at least at the comprehension level (or higher). If application level objectives are being used for a lesson, instructors should be at least at the analysis level of learning (or higher).

18.3.4.2 Class size. The optimum number of students for teaching a particular method instruction. Recommended numbers (where applicable) are given in the narrative for each method. With advanced electronic media often used in today’s classroom, class size is extremely difficult to estimate.

18.3.4.3 Evaluation inherent in method. Does the method itself provide the basis for evaluating attainment of objectives, or is a follow-up evaluation device required?

18.3.4.4 Responsiveness to individual needs. Does the method allow for active student participation and produce opportunities to express viewpoints? Does the method allow for different levels of student achievement or allow students to work at their own pace?

18.4 Recommendations For Teaching Methods. The remainder of this chapter is a detailed narrative describing the rationale for the ratings (see Table 18-1) given for various teaching methods based on the above definitions.

18.5 Lecture

18.5.1 Domains and Levels—Cognitive Domain

18.5.1.1 Knowledge (HR)—Highly recommended when the basic purpose is to disseminate information and the material is not available elsewhere. It works well for arousing interest in a subject and in organizing content for presentation in a particular way for a specific group. It is especially suitable for content which must be continually updated or revised by the expert. However, the instructor should realize that material presented will be remembered for only a short time, unless it is reinforced through use of another teaching method or real-life experience.

18.5.1.2 Comprehension (r)—Probably the most efficient at the knowledge level, but it may also be used at the comprehension level, particularly when the lecture is informal. Recommended if the student-faculty ratio is too high for small group activities. A more formal approach is recommended for a very specialized subject area if faculty expertise is at too low a level to use small group activities effectively.

18.5.1.3 Higher Levels—Many adult learners can increase their level of cognitive learning even at the higher levels. Learner motivation, need, and prerequisite skills are factors which must be considered. For all practical purposes, the expertise of the instructor (or at least of the resource person who designed the lesson) must be at least one level higher than the educational outcome of the period.

18.5.2 Domains and Levels—Skill Development

18.5.2.1 Motor skills—Limited use because the lecturer is primarily a “saying” method which makes it less appropriate for instruction in “doing.” The explanation phase of a demonstration-performance lesson used in teaching psychomotor skills might be presented as a formal or informal minilecture, and the one level higher rule applies.

18.5.2.2 Mental skills—Useful in the introductory phases of mental skills for such topics as rule formation, formulas and factual material associated with the use of equipment. Although such material could also be taught through reading or programmed texts, the informal lecture, with its inherent use of questions, might be more effective in dealing with differing student backgrounds and complex factual material.

18.5.2.3 Affective—A lecturer may develop a rational argument aimed at producing actual changes in overt student behavior. However, passive participation by the students is likely to lead to little more than an awareness of the new material and perhaps some intellectual conviction about appropriateness of the new behavior. It may be used quite successfully for reaching lower affective levels, such as an informal lecture near the end of a block of instruction. Adult learners, however, may respond to higher level affective lessons. Their affective orientation may be such that they are “looking for” more stimulation to increase their already strong affective commitment. Going from receiving to characterizing during a lecture or series of lectures is unlikely. However, over a period of time, it would be quite possible for an adult learner to increase his or her affective commitment to a cause or a principle by using just the lecture method as a tool.

18.5.3 Factors and Constraints.

18.5.3.1 Minimum Level of Instructor Expertise (h)—For example, if a lecture is to the knowledge level, instructor expertise at the comprehension level is the minimum requirement. Otherwise, the at least one-level higher rule applies.

18.5.3.2 Class Size (lg)—As long as the instructor can be seen and heard, the size of the class is not important. Under certain circumstances, an informal lecture to a small group may be just as defensible as a formal lecture to a larger one. In a very large hall, if students cannot be close enough to make eye contact with the lecturer, communication may suffer.

18.5.3.3 Evaluation Inherent in Method (no)—Very little opportunity to estimate how well the students are learning the material exists, except in an informal lecture to a group of reasonable size.
18.5.3.4 Responsive to Individual Needs (no)—Except in an informal lecture to a small group, lecturing usually does not allow students to formulate questions and have the questions answered before proceeding to the next area of instruction.

18.6 Controlled Conversation
18.6.1 Domains and Levels—Cognitive Domain
18.6.1.1 Knowledge (r)—While these methods are cautiously recommended to teach factual information, many other methods are probably better suited at this cognitive level.
18.6.1.2 Comprehension (HR)—Especially suited for providing the bases for abstractions, for airing multiple points of view, and for drawing together data to form generalizations for the student to arrive at conclusions. These methods are suited to the development of student comprehension.
18.6.1.3 Higher Levels—Since there is little requirement for the students to put any abstractions to use in new situations, these methods are not generally recommended for the higher cognitive levels. For adult learners, however, these methods may provide an excellent basis for use at the higher levels particularly in combination with other methods.
18.6.1.4 Skill Development (nr)—Generally not suitable for developing motor or mental skills.

18.6.2 Domains and Levels—Affective Domain
18.6.2.1 Lower Levels (HR)—One great strength of indirect discourse is the development of lower level affective outcomes. Activities such as panel discussions, teaching interviews, and dramatizations go a long way toward encouraging student reception and response.
18.6.2.2 Higher Levels—While it is possible to obtain valuing under certain circumstances, the higher affective levels are often beyond the scope of methods of controlled conversation because, with the exception of question-and-answer periods, active student involvement and application are usually not possible. Such methods are generally not the first choice but may prove to be effective at the higher affective levels with a group of adult learners in just the “right” situation.

18.6.3 Factors and Constraints
18.6.3.1 Minimum Level of Instructor Expertise (h)—The methods of indirect discourse can best be used to develop knowledge and comprehension-level understanding. Often, however, they are suited to the higher levels of learning as long as the minimum level of instructor expertise follows the one-level higher rule.
18.6.3.2 Class Size (lg)—While there is no optimum class size for these methods, an advantage of indirect discourse is that it can be used for extremely large groups of students, as long as they can see and hear. These methods have also been very successful with small groups (8-12).
18.6.3.3 Evaluation Inherent in Method (no)—The measurement or evaluation of student learning is not an inherent part of indirect discourse. The teacher has no way of knowing at the end of the lesson whether the students have learned. Some additional form of evaluation is necessary to determine that students have met the planned objectives. The only exception would be a question-and-answer period where the nature and quality of student questions might be an indirect way of evaluating students. Not all students, however, may get to ask questions and others may choose not to ask them.

18.6.3.4 Responsive to Individual Needs (no)—If these methods do not include a question-and-answer period, as is often the case, they are not very responsive to individual needs. Issues or questions of interest will never surface unless students are allowed to pursue them in some way. By themselves, the methods of indirect discourse do not permit students’ needs to be satisfied.

18.7 Demonstration-Performance
18.7.1 Domains and Levels
18.7.1.1 Cognitive—Methods of teaching which rely heavily on demonstration are often not efficient and effective ways of transmitting cognitive subject matter. While factual information is often transmitted during the course of a lesson involving demonstration, such methods are generally not recommended for achieving cognitive objectives other than mental skills. For mental skills, the demonstration-performance method is often used at both the lower as well as the higher levels.
18.7.1.2 Skill Development (HR)—Particularly well suited to the development of both physical and mental skills. Lessons which rely on teacher demonstrated skills generally lend themselves to precisely stated objectives which are easy to measure and require practice to acquire. Although the method is usually associated with psychomotor skills, it is also effective with mental skills, such as computation, writing, and construction of graphs.
18.7.1.3 Affective—Caution should be used for lessons designed primarily to affect attitudes. Although a change in attitude may come about from any learning experience, other methods may lead to attitude change more directly. One notable exception is technical training, which often seeks to develop positive attitudes for factors like safety and accuracy during demonstration lessons.

Participation in lessons such as these would make the use of the demonstration-performance method highly recommended.

18.7.2 Factors and Constraints
18.7.2.1 Minimum Level of Instructor Expertise (h)—Considerable proficiency in the skill being demonstrated is critical to the success of this method. As observation is usually an important element in demonstration-performance, instructor error in the physical or mental
to straight reading. Given certain prerequisite skills, reading is often quite effective for developing certain motor and mental skills for adult learners.

18.8.2 Domains and Levels—Affective

18.8.2.1 Lower Levels (r)—Whether attitudes can be influenced through reading depends on such factors as the writer’s skills and the learner’s predisposition. Therefore, reading is recommended for teaching the lower level of the affective domain (receiving and responding), but there is no assurance that any of the higher levels will be reached.

18.8.2.2 Higher Levels—Because of individual differences, it is difficult to be sure that reading materials will actually lead to the desired affective objective. But, we all can identify with the adult learner who is deeply moved or profoundly affected by a written work. Reading, by itself, will not provide evidence of change at the higher affective levels. It may, however, be the vehicle for significant progress up the affective developmental ladder. Adult learners at the very highest levels can plan their own reading programs for learning.

18.8.3 Factors and Constraints

18.8.3.1 Minimum Level of Instructor Expertise (h)—Because the instructor’s only control in this method is the selection of what students read or the direction of their research, the instructor’s expertise should be at the higher levels of the cognitive taxonomy.

18.8.3.2 Class Size (Indiv)—Class size is a factor in reading only when all members of a class must have access to a limited number of copies of a particular reading. With preplanning and modern methods of duplication, such problems are easy to avoid. Some techniques for making reading materials more available to students are textbook issue (especially a “walking library”), reserve book rooms or shelves, classroom bookshelves, the reproduction of microforms into readable copy, and multiple library copies. For an effective research program specialized facilities such as libraries, archives, reference materials, and staff are essential.

18.8.3.3 Evaluation Inherent in Method (no)—Evaluation is not built into the method so the instructor must provide evaluation separately.

18.8.3.4 Responsive to Individual Needs (no)—Although reading is highly responsive to the needs and differences of individual students, the instructor must not neglect the factor of student motivation. Many students do not like to read or have not developed disciplined study habits. These factors may be more significant than the relatively few students who have problems with comprehension or reading speed. Because the instructor is normally not present when the reading takes place, controls and well defined goals are all the more important.

18.9 Self-Paced Methods

18.9.1 Domains and Levels
18.9.1.1 Cognitive (HR)—The wide-ranging applications of the various self-paced methodologies indicate potential for all of the cognitive levels. Great numbers of learners have mastered basic factual information as well as advanced concepts and principles through the use of programmed instruction and mediated objectives from simple knowledge to complex tasks requiring application level and beyond. Materials and methods such as these are very tolerant of learners, permitting them to select their own pace of learning, review the material as they see fit, and redo the lesson until the material has been mastered. These characteristics allow self-paced methods to accommodate individual learning rates, styles, and methods for cognitive objectives.

18.9.2 Domains and Levels—Skill Development

18.9.2.1 Motor Skills (r)—Successfully employed in motor skill development, but particularly well suited for the development of mental skills.

18.9.2.2 Mental Skills (HR)—A combination of self-paced materials and instructor intervention is strongly recommended as a highly efficient and effective approach to mental skill development. The same characteristics of these methods which make them well suited for general cognitive development also make them appropriate for mental skill development.

18.9.3 Domains and Levels—Affective

18.9.3.1 Lower Levels (r)—Most of the methods which have man-material or man-machine interaction rather than human interaction may be cautiously recommended for affective development. Self-paced methods may enhance a student’s attitude towards the subject matter, but they are unlikely to effect change in value systems or to help reach higher affective levels.

18.9.3.2 Higher Levels—On the other hand, it is possible to construct a self-paced methodology that will enhance a learner’s abilities to progress up the lower levels of the affective taxonomy. As more and more progress is made in the use of computer learning applications, it is more likely than not that the higher levels of the affective taxonomy will be affected by such applications.

18.9.4 Factors and Constraints

18.9.4.1 Minimum Level of Instructor Expertise (h)—Preparing materials for use in the self-paced methods requires a very high level of instructor expertise in the subject matter, perhaps rivaled only by simulation and case study methodology. Self-paced methods also require considerable technical skill in their design. Programmed instruction and modules demand careful attention to a fairly rigid set of rules as well as considerable development time and field testing. This requirement for both subject matter and technical expertise puts the various self-paced methods among the most difficult, time-consuming, and costly to produce. The educational benefits realized from the methods must be carefully weighed against these factors.

18.9.4.2 Class Size (Indiv)—By the nature of their construction, self-paced exercises are directed towards individualized learning. Because most of these exercises are capable of being mass-produced, large audiences can be reached by these methods, although the mode of delivery is individualized.

18.9.4.3 Evaluation Inherent in Method (yes)—A basic ingredient in all self-paced instruction is ongoing evaluation of learner progress towards established learning objectives. Many forms of self-paced instruction have carefully prepared systems for pre-, post-, and formative testing. Often the evaluation step is so intermingled in the instructional materials that the learner may not consider it to be a “test” in the usual sense.

18.9.4.4 Responsive to Individual Needs (yes)—Particularly responsive to student needs and differences. Properly prepared, the methods can incorporate such sound learning principles as positive reinforcement and immediate feedback. These principles allow students with various needs and motivation levels to be successful. In addition, various technical treatment such as branching programs (special tracks) provide additional capacity to deal with individual needs and differences.

18.10 Questioning

18.10.1 Domains and Levels—Cognitive

18.10.1.1 Knowledge (nr)—Although possible at the knowledge level, not generally recommended because most questioning results in too much recitation and response in an elementary, rote-learning classroom manner. Other methods may be more productively used for the presentation and reinforcement of knowledge-level material.

18.10.1.2 Comprehension (HR)—Lends itself best to material at this level because the instructor can lead the student or class to form concepts, test them, and see their interrelationships through a series of skillfully chosen questions.

18.10.1.3 Higher Levels (r)—Although it is possible to question at the higher cognitive levels (application, analysis, synthesis, and evaluation), these levels lend themselves to more student interaction than is common with one-on-one questioning. Questioning can be used to stimulate thinking at the higher levels as a preliminary step for the student.

18.10.2 Domains and Levels—Skill Development

18.10.2.1 Motor Skills (nr)—Except at very low levels of physical skill development where an instructor wants to check on simple knowledge of facts or procedures, questioning by itself does not develop motor activity.

18.10.2.2 Mental Skills (r)—An effective technique for developing mental skills. Inductive questioning, deductive questioning, and the Socratic Method are often
chosen as the best ways to foster the development of mental skills.

18.10.3 Domains and Levels—Affective
18.10.3.1 Lower Levels (r)—Questioning often draws the attention of the learner to a new topic or area of study in a very effective fashion. The interaction of the question and answer routine tends to focus the affective concern of the learner on the chosen topic. There are no guarantees, but the interaction often causes (if that’s possible) the receiving and responding of an adult learner to a new or different topic for discussion.

18.10.4 Factors and Constraints
18.10.4.1 Minimum Level of Instructor Expertise (h)—For fully exploiting the potential of the questioning method, instructors should be at the evaluation level, that is, highly skilled, because the method requires immediate evaluation of student responses and expert competence in the subject to see the logical consequences of a line of reasoning or to form new problem solving approaches. Instructors with a specially analytical mind who enjoy the give and take of lively interchange will find this method effective in achieving instructional objectives.

18.10.4.2 Class Size (sm)—Although reportedly some law schools use the questioning method to good purpose in very large lecture halls (100 and more students), the method would seem to lend itself best to one-on-one or small group (8-12) instruction.

18.10.4.3 Evaluation Inherent in Method (yes)—The fact that instructors receive immediate response to their questions and are in a position to evaluate these responses before proceeding to the next question rates this aspect very high.

18.10.4.4 Responsive to Individual Needs (yes)—If the instructor is able to use a number of spontaneous questions instead of relying on planned questions, the method can be very responsive to student needs and differences.

18.11 Non-Directed Discussion
18.11.1 Domains and Levels
18.11.1.1 Cognitive—Although the peer-controlled seminar can successfully discuss lower level or even higher level cognitive materials, there is also the danger that the seminar will pool ignorance. Clearly defined objectives as required by ISD and a means of measuring their achievement can, however, provide the focus for learning at any cognitive level. Such learning can be substantial for a group of adult learners.

18.11.1.2 Skill Development (nr)—Does not lend itself to developing either motor or mental skills.

18.11.2 Domains and Levels—Affective
18.11.2.1 Lower Levels (r)—A basic use for the peer-controlled seminar is receiving and responding to affective material. The great difficulty in writing affective classroom objectives, though requires caution. A possible use of professional military education might be for seminar discussion following a guest speaker (such as a war hero or a popular leader) whose primary reason for addressing the group was motivational. If properly motivated, the group might share and reinforce the affective experience among themselves, but without strong motivation and interest event this limited objective might not be met and the session might just as easily deteriorate into free discussion.

18.11.2.2 Higher Levels (r)—Under the proper conditions and with a group of adult learners, nondirected discussion can be used to further affective learning at the higher levels. Motivated adults pursuing a common goal can share a powerful learning experience with or without an instructor being present to direct the flow of an unstructured discussion. The obvious caution still exists as with the lower affective level, but student-controlled discussion can be and is a powerful tool for affective development.

18.11.3 Factors and Constraints
18.11.3.1 Minimum Level of Instructor Expertise (n/a)—Not applicable, because of the instructor’s limited or passive role in a peer-controlled seminar which is, of course, one of its weaknesses. If qualified students are available and properly supervised, such seminars can still be highly successful.

18.11.3.2 Class Size (sm)—The small group (8-12 students) is probably the most common and workable size for the peer-controlled seminar. Any larger class would probably become too unwieldy.

18.11.3.3 Evaluation Inherent in Method (no)—With the instructor playing a passive role there is little evaluation in the usual sense. However, it is possible to obtain evaluation information if an individual or group product is required.

18.11.3.4 Responsive to Individual Needs (yes)—As the seminar is entirely run by the students, it is obviously responsive to individual interests, but not necessarily to their educational needs. There is the danger, however, that the natural leaders in the group will dominate the class to the exclusion of weaker students to their detriment.

18.12 Guided Discussion
18.12.1 Domains and Levels—Cognitive
18.12.1.1 Knowledge—Not particularly recommended for simple recall of factual information. Other methods such as the lecture, reading, or self-directed instruction are more efficient for reaching this level. On the other hand, for many learners, such results can be enhanced by participating in guided discussions because they can
interact with the content rather than passively taking lecture notes.

18.12.1.2 Comprehension (HR)—Designed primarily for this level and is one of the most efficient ways of reaching it. The method develops concepts and principles through group process and the unobtrusive guidance of the instructor. Properly conducted, the guided discussion also ensures that each student learns at this level, as the instructor can draw out an individual student who may not be participating voluntarily. Unlike free discussion, which probably has no objective and which develops solely by the natural direction the group happens to take, the guided discussion is highly structured, with planned questions which lead the group to a specific, predetermined instructional objective.

18.12.1.3 Higher Levels—Rarely reaches the higher levels of learning as students are not required to put the concepts they have learned to use in new situations as in some of the application methods. But, once again caution must be exercised with a group of adult learners. It is not unusual for such a group to pursue problem solving (and its component skills of analysis, synthesis, and evaluation) during a discussion which is “guided.” The goals of the group, their motivation, their prerequisite skills, etc., must be taken into account when looking to the guided discussion as a tool for developing the higher cognitive levels.

18.12.2 Domains and Levels—Skill Development

18.12.2.1 Motor Skills (nr)—As there is little student “doing” in the guided discussion, only verbal interaction. This method is not generally recommended for teaching motor skills.

18.12.2.2 Mental Skills—Once the need to display physical (motor) skills is taken away, the situation for using the guided discussions may change dramatically. As with any method of instruction involving a large amount of verbal interaction, mental skills may be greatly affected. The direction of the learned change may be small or quite significant, the speed of the change is variable, and the function of prerequisite skills becomes unusually significant. While caution should be exercised when using guided discussion with mental skills, to overlook it out of hand would be a mistake.

18.12.2.3 Affective—By participating in a guided discussion, students are exposed to the opinions of others and are forced to defend their personal positions. For this reason, the method is more generally suited to receiving, responding and valuing than to organization and characterization. The method can and often does work at the higher levels as well, however, and should be considered when lesson planning for higher affective outcomes.

18.12.3 Factors and Constraints

18.12.3.1 Minimum Level of Instructor Expertise (h)—Although it is possible for instructors in guided discussions to be at the comprehension level, ideally they should be at the higher cognitive levels. One primary responsibility of instructors is the ability to judge the worth of student responses, since achieving the planned objective is totally dependent on the use of student responses to form the generalization. Since instructors cannot possibly use all student responses, they must have the ability to select those which are most relevant to the concept or principle under discussion. As the method is a new one for most instructors, a certain amount of training is necessary, but once an instructor has the basic idea, there is no difficulty in applying the technique to different situations.

18.12.3.2 Class Size (sm)—Although 8-12 students might be considered an optimum size, the method can be used very satisfactorily with a slightly larger or smaller group. However, as the size of the group moves above the optimum, it becomes somewhat harder to control the discussion, thus calling for more instructor expertise in conducting discussions.

18.12.3.3 Evaluation Inherent in Method (no)—Since students are not normally asked to actually formulate and verbally express their own generalizations, some other type of follow-on evaluation device is necessary. However, if time is available and if students can be asked to express their own generalizations, then instructors might be able to evaluate achievement of the objective.

18.12.3.4 Responsive to Individual Needs (yes)—Does an excellent job of meeting individual needs. Each student is encouraged to express opinions on issues and to ask questions about issues raised by others.

18.13 Practical Exercises—Individual Project

18.13.1 Domains and Levels—Cognitive

18.13.1.1 Knowledge and Comprehension (r)—Can be used to teach at these levels, but they do not require the method’s full potential. Usually students will need to acquire mastery at these levels before the project starts through other means such as reading.

18.13.1.2 Higher Levels (HR)—One of the best methods for ensuring learning at the higher levels of application, analysis, synthesis, and evaluation—all of which are difficult to reach by most other means. Properly directed, individual research gives the students maximum flexibility to pursue interests at their own speed, while at the same time allowing them to reach their capabilities and maximum insights. Individual projects combine well with other methods such as the research seminar which allow the student to work independently and also interact with peers and the instructor.

18.13.2 Domains and Levels—Skill Development

18.13.2.1 Motor Skills—Generally not recommended for the development of motor skills as a stand-alone methodology. While students may sharpen such skills while working on a project, other instructional methods, such as demonstration-performance may be more efficient.
18.13.2.2 Mental Skills (r)—May be useful in developing mental skills, and the skill could be an integral part of the desired objective. Individual projects are not as highly recommended for mental skills as is the demonstration-performance method. The level of expertise of the adult learner may be the deciding factor. It may boil down to the issue of individual expertise: the more the expertise, the more appropriate the individual project as a learning methodology.

18.13.3 Domains and Levels—Affective
18.13.3.1 Lower Levels (r)—Students could be influenced affectively during an individual project to pay attention (receive) and actually take some action (respond) to the material. However, for the most part, receiving and responding skills are assumed to be already present before a student undertakes a project. Higher Levels (HR)—An excellent means by which attainment of the higher affective levels may be judged. Whether a student values certain materials, techniques, or ideas is often easy to determine during the conduct of a project. The same can be said of organization and characterization as well. Frequent contact between student and instructor are an important part of the method, and there is opportunity for regular feedback and guidance. The instructor who is properly attuned to what to look for will find indicators of the higher affective levels in this method.

18.13.4 Factors and Constraints
18.13.4.1 Minimum Level of Instructor Expertise (h)—Since the higher cognitive levels are desired in this method and since students will be required to sift through and evaluate data, equipment, or persons, it is essential that the instructor be operating at the higher levels of the cognitive taxonomy.
18.13.4.2 Class Size (Indiv)—The actual instruction and interaction between student and teacher is usually on a one-to-one basis. There is a practical limit to the number of individual projects which can be supervised at one time. An outstanding but time consuming method.
18.13.4.3 Evaluation Inherent in Method (yes)—Because student and teacher interact regularly and because finished portions of the project are evaluated and feedback is given as the endeavor proceeds, it is clear that student progress is monitored constantly. Obviously, knowledge of what students must be able to do and how they are doing it is readily available.
18.13.4.4 Responsive to Individual Needs (yes)—With the continual interchange between instructor and student, instructors will find it easy to identify and deal with students’ special weaknesses, interests, and needs.

18.14 Practical Exercises—Field Trip
18.14.1 Domains and Levels
18.14.1.1 Cognitive—With some exceptions, field trips are typically used for affective purposes rather than for measurable cognitive development. For this reason, it may be difficult to visualize how comprehension, application, and the higher levels can be developed in the student as the result of a field trip. Certainly some cognition may be developed—in some cases a great deal of cognition—but one would not highly recommend the field trip for this purpose since there may be other more appropriate methods (for example, lecture, reading, etc.) available.

18.14.1.2 Skill Development (nr)—Typically provides no opportunity for the development of either motor or mental skills.

18.14.1.3 Affective (HR)—Highly recommended as a method to influence all levels of student affect. The field trip experience may gain the attention of some students (receiving) and evoke responses in others (responding). Value or worth may be seen in an object or idea as the result of a field trip and, while it is difficult to attain, this method can be a strong factor in the achievement of even the highest affective levels.

18.14.2 Factors and Constraints
18.14.2.1 Minimum Level of Instructor Expertise (c)—An instructor need not be at the highest cognitive levels to participate in a useful field trip for students. However, the instructor must be at the comprehension level at least in order to make proper use of the method. The selection of the field trip location and activities, the asking of meaningful questions during the trip, and the possible discussion of the trip afterward would all require comprehension on the part of the instructor. Since the field trip may be used primarily for affective purposes, it is recommended that the instructor be at the higher levels of affective taxonomy as well.
18.14.2.2 Class Size (sm)—Many variables determine optimum class size for a field trip, but the number of students per instructor should be small. All students need to observe and experience the important elements of the field trip and be able to interact with either the instructor or an expert at the field trip site.
18.14.2.3 Evaluation Inherent in Method (no)—As an experiential teaching method, formal evaluation is generally not possible. Some additional form of evaluation would be necessary to measure achievement of the instructional objective.
18.14.2.4 Responsive to Individual Needs (no)—Generally speaking, not a method which meets an individual student’s needs. The typical field trip is a highly structured and scheduled affair which leaves little time for students to satisfy their needs with regard to the topic. The addition of a question-and-answer period helps in this regard, as do post-field trip discussions.

18.15 Practical Exercises—Simulation
18.15.1 Domains and Levels—Cognitive
18.15.1.1 Knowledge (nr)—Not usually recommended for imparting knowledge to students. As a matter of fact, knowledge is presumed to be a prerequisite for this method in most cases.
18.15.1.2 Comprehension (r)—While simulation can be a vehicle through which the development of comprehension can occur, most simulations assume a prerequisite of comprehension level functioning.

18.15.1.3 Higher Levels (HR)—One strength is the provision of an opportunity for students to operate at the highest cognitive levels within a low risk environment, as in war games, role-playing, and computer simulations in general. Most simulations require some sort of analysis, synthesis, and evaluation, while practically all simulations require the application of concepts and principles in new situations.

18.15.1.4 Skill Development (r)—Hardware simulators (such as a cockpit or missile trainer) are excellent adjuncts to both physical and mental skill development (coordination in flight, locations of instruments and controls, emergency procedures).

18.15.1.5 Affective (HR)—Another strength is the direct relevance to affective development. Simulation can be instrumental in the achievement of all affective levels. For example, observing or participating in a simulation may be responsible for student attention and action (receiving and responding). Since the simulation deals with putting learned material to use, the higher affective levels are also addressed. Students begin to see worth or value in certain principles, ideas, equipment, etc., and this insight is the stepping stone to the higher affective levels.

18.15.2 Factors and Constraints

18.15.2.1 Minimum Level of Instructor Expertise (h)—The instructor and/or instructional designer in a simulation must be at the highest cognitive level possible to use these methods properly. Since the students are often operating at the highest levels, it is essential that the instructor also be with them at these levels. Though more passive in this method than in some others, the instructor must be ready to act and answer upon request or whenever the situation dictates.

18.15.2.2 Class Size (sm)—While there may be large numbers of students involved in any given simulation, there must be few students per instructor during the simulation itself. Without this guidance, students will flounder and not get out of the simulation what they might and should get.

18.15.2.3 Evaluation Inherent in Method (yes)—Most simulations provide immediate feedback to instructor and student alike. Unless one is interested in measuring knowledge or comprehension prerequisites or postsimulation outcomes, the proof of learning in a simulation is the adequate handling of whatever task is involved, and often no other evaluative device is required.

18.15.2.4 Responsive to Individual Needs (yes)—Because of the simulator-student and instructor-student interaction and immediate feedback, simulations do provide for individual student needs. Various simulations or portions of simulations can be run and repeated until adequately dealt with by the student (achievement of instructional objectives). Weaknesses and strengths can be quickly identified and worked with as appropriate.

18.16 Practical Exercises—Case Studies

18.16.1 Domains and Levels—Cognitive

18.16.1.1 Knowledge (nr)—Not recommended for teaching at this level as its efficiency compared to other methods is poor.

18.16.1.2 Comprehension (r)—Although the case study can be used to teach to this level, normally other methods such as the guided discussion or the controlled conversation methods are more efficient.

18.16.1.3 Higher Levels (HR)—One of the best teaching methods for reaching the higher levels of the cognitive domain. Very effective both for applying a single principle or concept and for evaluating a situation involving total analysis and synthesis. The primary limitation is the absolute necessity for students to have a thorough comprehension of the concepts and principles involved before the case study begins. For this reason, the method is often used as a “capstone” to other methods at the end of a block of instruction.

18.16.2 Domains and Levels—Skill Development

18.16.2.1 Motor Skills (nr)—Not recommended in this area, as the demonstration-performance is a far more efficient means of developing motor skills.

18.16.2.2 Mental Skills—Cases can be adapted to include skills which may have their roots in other methods: guided discussion, simulation, demonstration-performance, etc.. Such simple, logical adaptations, designed to suit an audience of adult learners, are opportune moments for a creative teacher of adults to gain the maximum effect for learning in a group of motivated adults. Statistical applications for a case study on total quality management (TQM), application of ISD principles in an USAF curriculum development case, etc., are just a few examples of how mental skills development can be worked into a case study situation.

18.16.3 Domains and Levels—Affective

18.16.3.1 Lower Levels (r)—The use of the case study in this domain very closely parallels its use in the cognitive domain. Although a good method for reaching lower level objectives, other methods such as the guided discussion and field trips may be more efficient if the affective objectives are solely at the lower levels.

18.16.3.2 Higher Levels (HR)—Highly recommended for the higher levels as students are forced to recognize the role of systematic planning and objective approaches to problem solving. They are also forced to defend positions which in many cases are a synthesis of their own value systems.

18.16.4 Factors and Constraints

18.16.4.1 Minimum Level of Instructor Expertise (h)—Because of the high levels associated with this method,
the instructor should be at the higher levels in order to evaluate student responses. The factor of instructor expertise is one of the primary limitations of the case study method in schools with large faculties where all students are receiving the same high level of instruction in seminars demanding more from all instructors than may be possible.

18.16.4.2 Class Size (sm)—Class size in the case study method is perhaps more a function of time than any other one factor. All students must be prepared to present their thoughts on the subject under consideration. Time must be available for other students or the instructor to critically analyze the proposals presented by each student. Although some authors writing on the case study recommended 8-12 students as an optimum number, a variation is used quite satisfactorily in large classes where adequate time and facilities are available. The average seminar size in AF professional military education schools is generally very well suited to the use of this method.

18.16.4.3 Evaluation Inherent in Method—Since students must give their own proposals or at least critically analyze the proposals of others, the instructor has an excellent opportunity for on-the-spot evaluation of student achievement of objectives. Under optimum conditions, no follow-up evaluation may be necessary. In a great number of instances, written or selection tests are successfully used to measure achievement of learning outcomes.

18.16.4.4 Responsive to Individual Needs (yes)—Since students are free to develop their own approaches to the situation, the method is easily accommodated to individual student needs, differences, and creativity.

18.17 Summary. The selection of teaching methods grid can be of real value in determining the appropriateness of proposed or existing methods of teaching. Used with some caution, the recommendations within the grid will be useful for most schools and courses. Such recommendations might form the basis to identify periods or blocks of instruction which may require further analysis.

18.17.1 A situation which is inconsistent with the recommendation of this grid is not necessarily a poor one. The methods already being used may be as good as or better than those recommended. However, situations which are markedly different from these recommendations should be examined to ensure that the methods chosen are not a result of error or inertia but are the result of creative teaching and the presence of adult learners.

18.17.2 This grid is recommended for use in any educational setting. The impact of methodology upon learning can be significant. Appropriate methodology should enhance the learning of knowledge, skills, and attitudes. This selection of teaching methods grid can be of value to maximize the achievement of objectives in the educational setting.
Chapter 19
VISUAL AIDS AND INSTRUCTIONAL MEDIA

19.1 Introduction. In the preceding chapters, we learned that the selection of a method for a particular teaching situation is far from an accidental process. In order to reach our teaching objective most efficiently, we must carefully consider the advantages and limitations of each method. The same care is needed for the selection of instructional aids that will support our lesson and make our teaching task easier. The purpose of this chapter is to assist us in selecting visual aids and other instructional media.

19.2 Instructional Aids. Besides giving support for our teaching, instructional aids have other roles. Some media aids can be used to “teach” an entire lesson, as often occurs with television or computers. Courses which rely heavily or primarily on audio and visual materials to deliver instruction must be particularly concerned about the validity of their course ware. But for most Air Force instruction, aids will be used primarily to support classroom lessons, and the material in the chapter should be sufficient.

19.2.1 In its broadest interpretation, aids (or instructional media) include anything which assists students in their learning, even instructors and textbooks. In this chapter, however, we will look first at the more basic forms of media (instructional aids) which give audio or visual support in a classroom setting. Even though many of the media covered will be familiar, we will try to present techniques that will improve their usefulness. Later in this chapter we will cover some of the more technical media applications in areas other than classrooms, such as learning centers and computer-assisted and computer-managed instruction. While detailed coverage of all aids is beyond the scope of this manual, we will try to describe the primary advantages and disadvantages of each and suggest references for further study where appropriate.

19.3 Selecting Instructional Aids. What are the factors an Air Force instructor must consider in selecting instructional aids? Ideally, the type of aid should be determined by the lesson objective. For example, if a learning outcome requires students to identify or recognize an item or process, the instructor would likely select a medium which visually displays the item or process.

19.3.1 Having made this decision, the next step is to determine which form of visual aid is best by asking the following questions: Must the actual item or process be seen or will a replica do as well? Is motion required? Is color required? Will a large number of students view the visual aid at the same time and place or will time and location vary? Have you surveyed existing aids to determine whether the materials you require are already available? Is the equipment available to display the visual aid?

19.3.2 The answers to these questions will help us select our aids. Frequently, trade-offs will be necessary. For example, the cost of producing a color film may be prohibitive, or a closed circuit television system may not be available. Because the availability of equipment and material may dictate the teaching method we select, it is important to combine the method and media selection process. When a long lead time or budget limitation is involved, the media selection process may have to occur early in the instructional system development process.

19.3.3 Specific techniques for lettering, making transparencies, and constructing many of the visual aids discussed here can be found in AU-1 (Communications Skills), Volume VIII, Easy Visual Aids.

19.3.4 Chalkboards. Chalkboards are made of slate, composition, plastic, metal, or even glass. Several companies now sell chalkboard paint, which contains small particles of ground slate. This material can be applied to any smooth, flat surface which will accept paint. Some of these paints also contain iron oxides that enable magnets to stick to the chalkboard surface. In this way, visual aids with small magnets taped to them can be stuck to the board and removed as needed during the lesson. This technique is a great time-saver for the instructor.

19.3.4.1 Another device which can be used with the chalkboard is the template, of which there are two types; (1) a thin piece of cardboard cut into any desired shape such as a square, a triangle, or a circle, which can serve as a pattern to be traced, and (2) a piece of paper with a drawing on it with holes punched in the lines with a pencil point. When placed against the chalkboard and dusted with an eraser, a dotted outline of the drawing will appear on the chalkboard.

Table 19.1. Guidelines for The Use of Chalkboards

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<td>1.</td>
<td>Make lettering large enough to be seen by the students in the last row.</td>
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<tr>
<td>2.</td>
<td>Make only one point at a time. A complete outline on the chalkboard tends to distract students and makes an logical presentation difficult. If writing has been prepositioned, it should be covered and then revealed one step at a time.</td>
</tr>
<tr>
<td>3.</td>
<td>Erase information which is not being used. A cluttered chalkboard with scattered unrelated material is confusing.</td>
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<tr>
<td>4.</td>
<td>Stand to one side to avoid hiding an item with the body.</td>
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19.3.8.1 The term chart includes any printed material which gives information in tabular form. There are several types of charts which can be used in presenting data: the pie chart, the flow chart, distributions, components, and flow. They are easy to construct and can be produced in the same manner as pictures. In addition, they can be drawn on the chalkboard or duplicated. Care must be taken to display only a small amount of material and to make the diagram as simple but meaningful as possible.

19.3.8.2 Charts, diagrams, and graphs can be used effectively to show relationships, chronological changes, distributions, components, and flow. They are easy to convey upon the type of information the instructor wants to convey.

19.3.9 Models, Mock-ups, and Cut-aways. A model is a copy of a real object. It can be an enlargement, a reduction, or the same size as the original. The scale model represents an exact reproduction of the original, while simplified models do not represent reality in all details. Some models are solid and show only the outline of the object they portray, while others can be manipulated or operated. Still others, called cut-aways, are built in sections and can be taken apart to reveal the internal structure. Whenever possible, the various parts should be labeled or colored to clarify relationships.

19.3.9.1 A mock-up is a three dimensional, specialized type of a working model, made from real or synthetic materials. It is used for study, training, or testing in place of the real object, which is too costly or too dangerous, or which is impossible to obtain. The mock-up may emphasize or highlight elements or components and eliminate nonessential elements for learning.

19.3.9.2 Production and equipment costs are limiting factors to consider in developing and using models, mock-ups, and cut-aways. Depending on the nature of the representation, costs can vary from low to high. Scale replicas, for instance, are often very expensive. In general, if a two-dimensional representation will satisfy the instructor’s requirement, it should be used.

19.3.10 Simulations. Most Air Force instructors are familiar with some type of simulator, such as a flight or navigation trainer. For our discussion, a simulator is usually any electro-mechanical device, which has the form, sound, and even the appearance of the actual equipment. Simulators, which allow the student to have “hands-on” experience with the equipment, are normally used when it would be safer, less costly, or would provide better instruction than the actual equipment. Simulators provide a realistic setting and permit a high degree of transfer of learning when the student switches to the actual equipment. The primary limiting factors are availability and cost.

19.3.11 Overhead Transparencies and Projector. An overhead transparency is usually made from acetate or plastic which has been prepared for us on an overhead projector. If hand drawn transparencies are needed, materials such as heavy-duty, clear plastic bags, document protectors, and reprocessed x-ray film can be used in a variety of ways, instructors should actively search for suitable materials and keep an updated file.

19.3.7.1 Pictures are valuable to the instructor because they provide a common experience for students, visual details when necessary, and in the case of photographs, a realistic representation of objects, places, and persons. If visual recognition is critical, photographs are effective. Because pictures are inexpensive, widely available, and can be used in a variety of ways, instructors should actively search for suitable materials and keep an updated file.

19.3.7.2 To maximize the effectiveness of pictures, an instructor should insure that the size and distance do not distort the picture or detail required and that only critical elements are represented. If simplification or exaggeration of a component is important, illustrations or drawings should be considered.

19.3.8 Charts, Diagrams, and Graphs. The term chart includes any printed material which gives information in tabular form. There are several types of charts which can be used in presenting data: the pie chart, the flow chart, the organizational chart, and so forth. The type of chart selected for use depends to a large extent on the type of information the instructor wants to convey.

19.3.8.1 A graph is a symbolic drawing which shows relationships or makes comparisons. The most common types are the line graph and the bar graph. The selection of a graph for use in any given situation again depends upon the type of information the instructor wants to convey.
used in place of commercially produced acetate. In addition, transparencies can be made from existing printed material by using a thermoprocess machine and special film.

19.3.11.1 The overhead projector has many advantages. The equipment can be placed at the front of the room, allowing the instructor to maintain eye contact with the students. The brilliant light source concentrated at a short distance makes it possible to use the projector in lighted areas. Transparencies are easily and economically produced ahead of time, or the instructor can write on a blank transparency as the lesson progresses, much like on a chalkboard. Students can write on their own transparencies and have the work considered by the whole class at once. Additional transparencies can be overlaid onto the original to show development or buildup of an event or display. Overlays can also be cut into various shapes and moved about in relation to the base transparency. Thus, relative motion can be displayed—a useful technique, for example, for displaying dial indications or the fitting together of several parts of a component. Finally, the overhead projector is simple to operate and requires little maintenance. Two disadvantages are that most projectors are bulky to handle and store and that the fan which cools the projector maybe noisy.

19.3.11.2 As with any equipment placed in the front of the room, instructors should ensure that the projector does not obstruct the students’ line of sight. The projector usually works better on a low stand, chair, or table. The projection angle should be adjusted to eliminate the image distortion called “keystoning” which results in a trapezoidal image instead of a rectangular one.

19.3.12 Opaque Projector. Vastly different from other instruments, the opaque projector reflects light from the surface of the picture or object onto a regular projection screen. The height of usable objects is limited to the space between the top of the lowered projection plate and the body of the projector, only a couple of inches. The area of the object or picture is limited to a 10-inch square.

19.3.12.1 The scope of materials available is practically limitless when instructors have the equipment and a satisfactory room darkening system available. A leaf, a piece of cloth, a portion of a student theme, a postage stamp, coins, typed material, and textbook illustrations are representative of the items that may be projected.

19.3.12.2 By using the opaque projector, a small cartoon, picture, or other illustration can be enlarged by projection onto wrapping paper, poster paper, or a chalkboard. This enlargement can then be traced and made into an effective chart or drawing.

19.3.12.3 Opaque projectors are especially valuable in enlarging diagrams and small charts for display purposes. Since the material projected requires no special preparation, the cost of production is very low.

19.3.12.4 Many of the limitations of the overhead projector are also true of the opaque projector, with the addition that the classroom must be completely darkened.

19.3.13 Filmstrips and Filmstrip Projectors. The filmstrip is a piece of 35-millimeter film on which individual slides or frames appear in sequence. Some filmstrips are accompanied by a tape or disc that contains narration and a signaling device that indicates when to advance the filmstrip to the next frame. Depending on the type of projector, the film advances either manually or automatically.

19.3.13.1 The filmstrip provides the instructor with an organized presentation which is always the same. Individual frames may be held on the screen for as long as necessary for discussion. The equipment and filmstrips are inexpensive, small, lightweight, and easy to operate and store. If students are trained to use the equipment, they can progress at their own rate. A final advantage is that there are usually many filmstrips readily available from commercial sources as well as film libraries.

19.3.13.2 A significant disadvantage of filmstrips is that the sequence is fixed, thus limiting flexibility. They are not suitable when motion is required and lack the appeal of motion pictures and television. To make a homemade filmstrip, the pictures must be taken in exact sequence, requiring considerable advanced planning.

19.3.14 Slide Projector. One of the most popular and widely used instructional aids in the Air Force is the slide projector. Frequently a slide presentation is accompanied by an audio cassette recording, adding another dimension to the presentation. As with the filmstrip, this audio recording may contain a signaling device which, when used with a special recorder, will automatically advance the slides. Before using the equipment, the instructor should verify that the sound-slide program is synchronized.

19.3.14.1 The greatest advantage of the slide is ease in production and cost. With the use of a camera and appropriate 35-millimeter film, an instructor can have a visual representation available for presentation in a matter of hours. These slides can be combined in any sequence with other “home” or commercial slides, thus providing a flexibility and versatility not found with filmstrips. Because they are not permanently arranged, slides can be easily updated, removed, or rearranged.

19.3.14.2 The sound-slide presentation is not suitable for use when we need visual representation of motion. Also, it is difficult to accommodate individual differences when used in a group setting. A darkened room is preferred unless the presentation is in a small area such as a learning center carrel.

19.3.15 Motion Pictures. The motion picture has been widely used for training and education throughout the
Air Force. Most 16-millimeter film is stored on reels, while 8-millimeter film is stored on reels or self-contained cartridges. Both can be either sound or silent and color or black and white. Projectors for reel type films vary greatly, particularly in the threading pattern. Newer projectors are self-threading. The 8-millimeter cartridge and special projector have further simplified the use of motion pictures because an operator merely inserts the cartridge and removes it when the film is completed.

**19.3.17.1** The speech compressor has many advantages, the primary one being the reduction of listening time. Experience has shown that a student can listen to familiar, nontechnical material at a much faster rate than for material which is unfamiliar or technical. Compressed tapes are especially effective for review. The regular cassette tape the compressor uses can be played on any ordinary cassette playback unit. Although speech compressors are presently expensive, the cost should decrease as the method becomes better known. If listening time is not a factor, the purchase of a speech compressor may not be appropriate.

**19.3.17.2** If it is important that the student be able to control the rate of listening, the speech compressor itself must be used for listening. A prerecorded compressed tape may be too fast or too slow for the listener and, therefore, lose some of its advantages. To date there is no known method of training students to increase their listening rate as can be done with reading.

**19.3.18** Television. The use of television in training and education continues to receive increasing emphasis in the Air Force. Televized material is usually presented in two forms: Either “live” or via videotape recordings (reel-to-reel tape or cassettes) through a closed circuit system. A simple, closed circuit system requires a camera, monitors, and an interconnecting network. However, many systems are more elaborate. Through their use, material can be distributed to large numbers of students and locations at the same time. The capability of presenting audiovisual material simultaneously at several locations is unique to television.

**19.3.18.1** Another advantage of TV is the versatility of videotape. Events can be seen as they happen or placed on videotape for later viewing. Specialists in any area can be videotaped and presented “live” to the student. If a teacher feels it is necessary that all students receive the same material presented the same way, television will allow this standardization. However, we may not wish to use TV exclusively in place of live presentations. Students often react more positively to live lectures, with supporting visual support, than a lecture seen on TV. Using videotape recordings as support during lectures and other live presentations is also very effective.

**19.3.18.2** With its record and playback capability, television has proven to be as effective for evaluation in a variety of training situations as for teaching. Recordings of many kinds of student activities can be played back for the students to evaluate their performance either individually or collectively. This technique, often called self-confrontation, has applications in many training areas. Anyone who wishes to evaluate performance (as a teacher, a trainee, or an athlete, for instance) will find TV invaluable.

**19.3.18.3** Some of the problems with using TV for educational purposes are caused by the habits most students have developed from watching commercial programs. First, students are accustomed to watching professional productions with expensive and elaborate sets, proper lighting and editing, and highly paid talent. Locally produced educational TV normally cannot equal professional productions with expensive and elaborate programs. First, students are accustomed to watching commercial programs. Second, students have developed from watching commercial programs. Third, students have developed from watching commercial programs. Fourth, students have developed from watching commercial programs.

**19.3.16.1** The primary disadvantage of the tape recording is that the sequence is fixed. It is possible to skip over parts of presentations, but the instructor must take care to note the place on the tape either with a piece of paper or a counter. Periodic cleaning of tape recorders is necessary to maintain quality of recording.

**19.3.16** Audiotape Recordings. The use of audiotapes—reel-to-reel and cassette—and tape recorders has become commonplace equipment in most homes and schools. Lectures by specialists and experts can be recorded for widespread distribution or for later playing when the lecturer is not available. Tape recordings are inexpensive and easily stored. At some schools all lecture presentations are recorded on cassettes and stored in the learning center for use by faculty and students. Both reel-to-reel and cassettes can be erased and used over again when the existing recording is obsolete. Like videotape recorders, audiotape recorders can be used as diagnostic or evaluation instruments in improving speech. Recorders are easy to operate both in the record and playback mode. Cassette recording can also be used in conjunction with slides (see the slide tape discussion).

**19.3.15.1** Motion pictures have many advantages. Events can be recorded as they happen and shown later as often as necessary. Previewing of film allows the instructor to select only appropriate portions necessary.
effort will allow. Instructors should be aware that there are few shortcuts to producing a good TV presentation. 

19.3.18.4 A second problem arising from the students’ prior experience with commercial TV is the tendency for them to be inattentive and passive during the presentation. Very few TV programs which students watch at home require any concentration or study. Many students expect to be entertained rather than learn from TV.

19.3.18.5 Another factor an instructor must consider before selecting TV as the medium to present material is that the seeing and hearing rates of students are fixed. This does not provide well for individual differences in learning rates. Also, great care must be taken to reduce the time the “talking head” is seen on the screen. Unless standardization of material is absolutely necessary, a teacher should refrain from just talking before a TV camera. Too often this has happened in past programming and has been found to be ineffective. An imaginative TV production crew can help “translate” a lecture into video terms.

19.3.18.6 Finally, there is the issue of color vs black-and-white TV presentations. Practically speaking, color is not necessary unless the material presented requires its use, e.g., a chemical reaction in which a color change is important to understanding the process. However, today’s average TV viewer, who has been constantly exposed to color productions, considers black and white dated and, therefore, not worth watching.

19.4 Use Of Media In Individualized Instruction. Our discussion of instructional aids has so far centered around their use in classroom settings. No treatment of the subject would, however, be complete without at least a brief look at technology as it applies on a more individualized basis. Certainly, media applications go much further than will be covered here. However, our limited look at programmed instruction, learning centers, and basic computer capabilities represent typical media uses encountered in Air Force instructional environments.

19.5 Programmed Instruction. After instructional material has been programmed the programmer must present it to the student by means of some type of “holder.” At this point the teaching machine and the textbook come into the picture.

19.5.1 But the programmed text or teaching machine is limited primarily to teaching knowledge-level material. Teaching skills or performance may require the use of actual job equipment or a simulator as the “teaching machine.” It is important that the instruction take place in an environment which duplicates the operational environment as closely as possible.

19.5.1.1 Programmed Textbooks. Many authorities are convinced that a programmed textbook is sufficient for most programmed instruction. Programmed texts have been developed for a wide variety of subjects, including, grammar, spelling, composition, almost every area of mathematics, electricity-electronics, foreign languages, accounting, management, computers and data processing, and medicine.

19.5.1.2 Teaching Machines. Within recent years technology has invaded the classroom. Many electronic and mechanical devices are being mass produced and sold on the basis that they will allow students to learn “more and faster.” One commercial organization guarantees not only the level of learning its students will achieve by taking its courses, but specifies the amount of time it will take to reach that level. The method of instruction involves programmed instruction presented by teaching machines.

19.5.1.2.1 A teaching machine is an electronic or mechanical device that presents instructional material to students on an individual basis. Students have their own machines and receive instruction as fast as they can absorb it. Assuming, of course, that the student needs the instruction to begin with, machines provide truly student-centered instruction, which is both individualized and self-paced.

19.5.1.2.2 Teaching machines are produced with great differences in complexity and special features; however, they all represent some form of tutorial teaching. They present each student with problems, exercises, questions, and answers. The difference between teaching machines and most other instructional methods is that teaching machines provide immediate feedback to students. They can correct errors immediately because they make students aware of their progress during each phase of instruction. Thus, teaching machines differ from other media in three ways: (1) Students must respond continuously and actively, providing explicit practice and testing of each step of what is to be learned, (2) Students know as soon as possible whether responses are correct, so that errors can be corrected, and (3) Students proceed on an individual basis at their own rate—faster students advancing through an instructional sequence very rapidly, slower students being tutored as slowly as necessary, with almost infinite patience to meet their special needs.

19.5.1.2.3 The nature of teaching machines and programmed instruction provides a channeling of student activity into a relatively narrow chain of experiences. Students have available only a small portion of the lesson at any one time and cannot advance or regress unless that action is programmed into the lesson (or machine).

19.5.1.2.4 In presenting a program, a teaching machine provides immediate feedback on all student responses. Unlike a programmed text, students cannot see the feedback before responding. Students are therefore forced to subject themselves to all the conditioning designed into the programmed lesson.

19.5.1.2.5 Teaching machines usually maintain a record of student performance. This record can be used to
analyze progress and serve as a basis for determining future studies. Collectively, a group of student records may be used to determine what curriculum changes may be required.

19.5.1.2.6 Many feel that the teaching machine provides a constant motivational factor to the student. The student is challenged to “beat the machine.” Others claim that this fascination wears off after a time, and once it does, the machine is no more effective than a programmed text.

19.6 Learning Centers. A learning center is a facility containing a number of study carrels equipped for individual instruction. A resource library where instructional packages are readily available is an integral part of a learning center.

19.6.1 The instruction is often self-paced, although not necessarily so. Furthermore, a learning center takes full advantage of modern technology by providing students the opportunity to receive instruction closely tailored to their needs. Instead of a teacher, some mechanical or electrical device delivers the instruction. By being relieved of some traditional tasks, the teacher has more time to monitor student progress and to manage curriculum. Borrowing from computer jargon, the equipment is referred to as “hardware;” the films, slides, and tapes that contain the actual lessons are referred to as “software.”

19.6.2 The physical configuration of a learning center is quite different from the traditional classroom. Each student has space and equipment that enables lessons to be delivered on a one-to-one basis. A study carrel provides the physical isolation that can aid in maintaining attention and concentration.

19.6.3 The learning center provides instruction with equipment that the students control in the privacy of their own carrels. Students then perceive the instruction as intended for themselves alone even though others may see the same lesson. Viewing television lessons on individual monitors located in each carrel also gives the illusion of individual instruction. By perceiving the instruction as individual in nature, students generally improve their acceptance of the instruction and improve their attitude toward the lesson.

19.6.4 Learning center instruction is also self-paced in most cases, even if the instruction is not programmed. Students have the option of stopping and going back. Through the use of such media as sound film or videotape cassettes, planners can subdivide a broad area into small, easy to digest segments referred to as “single concepts.” Students can view any or all of the media as they or the instructor decide. The decision as to which media to aptitude for the subject, and capacity to learn.

19.7 Computers in Education. Most people are aware of the computer’s application in business and industry. The functions of accounting, billing, maintaining inventories, and retrieval of personal data are widely accepted. However, the adoption of the computer for educational purposes is a relatively recent development. In general, the computer we use for management and scientific functions can also be used for education.

19.7.1 Time Sharing Systems. Most installations for computerized instruction use a time-sharing computer arrangement. A number of individual terminals are connected into a single, central computer (Figure 19.1). The central computer may even have some other primary function other than instruction. For instance, a bank could use the computer for its accounting needs. The bank could then lease the time it does not use to a school for instructional purposes, thereby providing an educational service and helping to meet the cost of the computer installation.

19.7.1.1 The individual terminals take several forms. First, students may use a standard teletype unit and communicate with the computer in typewritten messages. Students type communications, and the computer controls the printing mechanism by a series of electronic signals. The teletype unit prints the computer’s instruction on a role of teletype paper, as it does the student’s replies.

19.7.1.2 The second device is the video terminal. Students view printed instruction on the face of a cathode-ray tube (CRT). They respond through a standard keyboard, and the responses appear on the CRT. There is no hard copy of the lesson. Depending on the type of video terminal and auxiliary equipment used, the rate at which the print appears on the screen will vary from that of the teletype terminal to far beyond most human reading abilities. The noise level of the teletype is high, while on the video noise level is negligible.
19.7.2 Computer Assisted Instruction (CAI). The predominant methodology used in CAI is Programmed Instruction, using a branching technique. Superficially, the job the computer does is about the same as that of a programmed textbook. However, the inherent capabilities of a computer enable the programmer to develop branching systems far beyond the capabilities of any textbook. The instructional programmer can take more variables into account and provide programs that will meet the needs of a broader range of students. Conventional textbook branching techniques usually require the student to respond to multiple-choice questions. The student follows a branch of the program according to his or her answer choice. Computer queries can be left open ended and the computer can be programmed to deal with a large number of possible replies and branching possibilities. CAI also has a speed advantage because the student is not required to leaf back and forth through a text to follow the program. The computer makes the branching choice and presents the required information almost instantaneously. Thus, the computer adds power to the concept of programmed instruction.

19.7.2.1 Another popular CAI method is following a problem solving process. This method is particularly applicable in teaching and diagnosis of malfunctions of any system. Therefore, this method is used to teach medical diagnosis, management systems analysis, and analysis of the malfunctions of electronic and mechanical systems. CAI is also applicable to the simulation of potentially destructive or expensive activities such as war games.

19.7.3 Computer Managed Instruction (CMI). Using a computer only for CAI does not capitalize on its greatest potential. The power of a computer lies in the speed at which it can process data, its ability to perform complex tasks, and its capacity to store and retrieve files of data. CMI is the concept that brings the full capability of the electronic computer into the educational situation.

19.7.3.1 First of all, the computer can help administer students, the curriculum, staff, and facilities, and, at the same time, much of the day-to-day management. The computer can devise schedules, test students, and assign them to study appropriate lessons. The computer can present instructional material, follow student progress, and make decisions on the particular instructional sequence to present. It can combine any number of criteria to assist in making instructional decisions. Interested instructors and managers can receive periodic reports on any area of interest or order the computer to retrieve and analyze data at will. Decisions in all departments of a school can be made based on current, accurate information. Basically, then, the computer can eliminate many of the time consuming tasks, handle routine matters, and provide instructors and administrators with tools and controls previously unavailable.

19.7.3.2 In operation the instructional program presents students with information about a particular system. Students make attempts at analyzing situations, while getting more and more definitive information from the computer and as a result of their own efforts. The computer may give additional information as a hint to help or the student may have the option of asking for additional information. The computer effectively critiques all of the student’s efforts, providing immediate feedback.

19.7.3.3 Just as in other applications, the computer in education is just as effective as it is programmed to be. A well-designed instructional program can be extremely effective, whereas a poorly designed program can actually be detrimental to the achievement of an educational objective.

19.8 Student/Instructor Roles In Mediated Instruction

19.8.1 The Student. Traditionally in the learning process, students are predominately passive during the initial intake of information. The active period is limited to taking notes while the instructor lectures. After class, students develop their own system of studying, but even homework has usually not been exploited to give the student proper, corrective feedback. In fact, about the only planned “activity” in which students normally engage has been testing. Thus, the important need for feedback on a student’s progress usually has come too late in the form of “pass” or “fail” grades.

19.8.1.1 Creative curriculum design and well-planned support facilities can provide students with an active, interesting, and rewarding learning experience. Students can receive instruction tailored to their needs, be active during all phases of instruction, and receive immediate feedback on the progress. Difficult learning tasks can be elaborated upon and reviewed, while simple ones can be learned quickly and students can move on at their own pace.

19.8.1.2 However, when taken away from the traditional classroom setting, most students miss personal contact with the instructor, even though it may be no more than being in the same room and listening to the instructor. Students also lament the loss of contact because of no opportunity to ask questions or discuss material. Even a small amount of personal contact with the teacher seems to satisfy this need for personal contact. Therefore, occasional individual counseling sessions should be planned in the curriculum as well as scheduled periods for group discussion.

19.8.2 The Instructor. The role of the instructor becomes more rather than less complicated in mediated instruction. Instructors must still teach in this environment, although they may not occupy center stage as often. One-on-one teaching and problem solving
become the rule. We teach individuals rather than sometimes anonymous “classes.” Constant, often intense, interpersonal relationships may demand a level of counseling skills higher than that for traditional large group instruction. We will probably have to have an even stronger knowledge of our subject than usual because we will be available for questions and problems. The individualized nature of mediated instruction increases the opportunities for more personalized teaching and learning. The learning packages which deliver the bulk of instruction are just the beginning, not the end, of mediated instruction.

19.8.2.1 The individual student, rather than the body of subject matter, must remain the focus of attention. Those of us who teach courses with heavy media usage must remember that the media are generally used to free us from repetitive, low-level instructional tasks. But media cannot replace us completely. Media cannot interpret itself to the student who is having trouble with vocabulary. Media are not able to come up with an unprogrammed example when a student is still having trouble with a new concept. Even the most sophisticated media package is not able to express genuine human interest and concern over the problems of a student. If we do not have anything left to teach or assistance to render after the media does its job, we probably were not needed as teachers in the first place.

19.8.2.2 Many of us would prefer to keep away from these mediated learning experiences. Students do not come to us when things are going well; they need us only when they have problems. Problem solving for instructors, like all forms of problem solving, is difficult and demanding. Simple stock answers often do not work. There is a sense of security in teaching large groups that we lose when we go to one-on-one instruction. We cannot give general answers to specific questions. We cannot deal impersonally with personal problems. We may have to learn and use a whole new set of skills in addition to those we have as large group instructors. Students who need help in one-on-one instruction need much more than information givers. They need real teachers who have the technical knowledge and counseling skills to help them solve their very real, personal, instructional problems.

19.8.2.3 Instructors who teach laboratory classes know how much more difficult their job is compared to those who just lecture. We can lecture on a subject with no more knowledge than the script of our lecture. But when we open the lecture to questions, conduct a discussion or most demanding of all, go one-on-one with a student who needs help with a mediated learning experience, then we need the real experts. No instructors are more called on to show their subject matter expertise. There is no way to hide a lack of instructor expertise in one-on-one teaching in support of mediated instruction.

19.8.2.4 Instructors who teach in heavily mediated courses often need more skill in interpreting and testing objectives than do instructors who teach large groups. Mediated instruction is generally characterized by precisely written objectives and test items which we have finely tuned to measure those objectives. Because of this precision, instructors with a heavily mediated course may be called upon regularly to interpret objectives and test items. Those instructors who actually develop media packages must become especially skillful with writing objectives and test items as well as with the special skills demanded to produce the media. Those instructors who administer but do not create mediated instruction need especially good curriculum development skills so that they can give high quality feedback to those who must revise and improve the course.

19.8.2.5 Instructors in mediated learning experiences have as many demands placed on them as in any other difficult teaching situation. In-depth subject matter expertise and expert counseling skills are just the beginning. We have to deal with a different role model, one that requires us to be managers of learning and problem solvers rather than just givers of information. It is a tough role but one which is essential if we are to provide the most efficient and effective instruction to our Air Force students.

19.9 Summary. Instructional System Development is a systematic process for planning and conducting instruction. Analysis, design, development, and evaluation are carefully considered in achieving instructional goals. Audiovisual aids can contribute greatly to instructional effectiveness. The text suggests a variety of methods and the considerations of the instructor in electing to use them.

19.9.1 Both advantages and disadvantages must be considered in applying communications media to education, especially educational television, programmed instruction, and teaching machines. Learning centers combine media at study carrels for individual instruction. Learning may also be aided by computers, through sophisticated programmed instruction, computer managed instruction, and other applications.
20.1 Introduction. Instructors continually evaluate their students in one way or another. And this practice is necessary and important because it provides the instructor with the necessary feedback to judge whether the teaching is effective or not. The evaluation may be part of a formal testing program, or it may be quite informal. It may be as elaborate as a simulation of a real-life problems or situations, or as simple as questioning a single student. Teachers may evaluate just to see how students are progressing, or may need to give grades and make pass or fail decisions. So, in this sense, every instructor must be an evaluator.

20.1.1 Not all instructors, however, are involved in actually writing and preparing tests, but they usually give tests or, at least, make informal evaluations of students in and outside of class. All instructors, therefore, should be thoroughly familiar with evaluation procedures and principles that govern the creation of test items in order to determine whether students are successfully learning the material presented to them.

20.1.2 We will now propose a process for writing test items and testing instruments that are informative and relevant—two criteria for telling us what the student has learned. Figure 20-1 illustrates the four-step process for writing student-centered objectives and tests; a process first introduced in Chapter 3 and the theme of much of this manual. This chapter on evaluation and the four chapters that follow require our understanding of material presented in earlier chapters, specifically chapters 3 through 5 and 7 through 10.

20.1.3 The four-step process includes all the steps necessary to plan and prepare student-centered objectives and tests, and each step affects the others. Level-of-learning objectives (Step 1) are of little value in planning if we can’t write them as behavioral outcomes (Step 2) because the behavioral outcomes are the visible representations of the objectives. These behavioral outcomes, in turn, provide the basis for precise criterion objectives (Step 3), descriptions of how these outcomes will be demonstrated by the student on the test. Test items (Step 4) flow naturally from the criterion objective because in the criterion objective we will have spelled out all conditions, behaviors, and standards for the test item. A change in any of these steps has a ripple effect on the other steps. Since all of the steps in this process are interdependent, a general or specific objective is not complete until we write test items to measure it.

20.1.4 We need, then, to master skills of constructing and analyzing tests and other measurement tools. While all instructors may not require the same depth of understanding as the evaluation specialists, they all need basic evaluation skills to help them do their best in the classroom. We teach more efficiently when we understand the way our students will be evaluated. We tend to teach the learning outcomes more directly when we understand the way the outcomes will be measured. Whether or not we have the opportunity to write test items, we must understand evaluation terms, principles, and practices. Our students expect us to prepare them for evaluation. Therefore, it is our obligation to know as much about their evaluation system as possible so we can teach better, counsel more effectively, and be more responsive as Air Force instructors. In addition, even if we do not construct our own tests, with a knowledge of these principles we are better able to provide feedback to evaluation specialists on behalf of our students.

20.2 Nature Of Evaluation. Evaluation is an important part of the learning process. In educational evaluation we define, observe, measure, or judge learned behavior. Once instruction begins, we need to evaluate constantly to determine what and how well students learn. Only with this information can we intelligently plan or modify our instruction.

20.2.1 Educational evaluation is a systematic process of judging how well individuals, procedures, or programs have met educational objectives. However, we can evaluate only learned behavior that we can see, hear, or in any other way sense. Moreover, through such observations, we can include only samples of student behavior as a basis for judgment. To be reliable and effective, then, the samples we evaluate must be representative of the student’s overall ability in the measured area.

20.2.2 Furthermore, that evaluation must, above all, be a fair one. We instructors see students differently because of differences in our expectations, intelligence, learning ability, aptitudes, attitudes, job knowledge, and ability to verbalize. We have to try to control the effects these differences might have when we establish and operate an evaluation program. Failure to recognize our differences and their effects on our judgment can result in unfair and inaccurate requirements for measuring student achievement.

20.2.3 Besides the issue of fairness, we need to insure that our observations are objective. We can often observe the students’ progress toward course objectives in class discussions, interviews, term papers, laboratory exercises, special projects, and tests. But this is where care is needed. It is important that we weigh all such observations dispassionately in our overall evaluation program. Only by taking this precaution can we minimize the effects of our subjective judgments that often influence informal day-to-day evaluations and make them invalid. Otherwise, we may tend to remember only favorable student responses which indicate progress toward learning goals and overlook unfavorable
responses or, remember an unpleasant situation with another student which overrides our judgment of a current brilliant essay response. To avoid the pitfall of subjectivity in the classroom, we need to follow a systematic approach in evaluating student achievement, such as that shown in Figure 20.1. An evaluation program which is planned in advance is less subject to the personal bias of individual instructors. Planned systems of evaluation will measure what was taught because it was planned to be taught rather than what might or might not have been taught at the whim of the instructor. Figure 20.1, Four-Step Process for Writing Student-centered Objectives and Tests

**20.3 How We Evaluate.** We use data from evaluation programs in two ways: (1) to compare students to stated objectives and (2) to compare students to each other. If our goal is to compare the achievement of our students to specific objectives, we should use criterion-referenced or objective-referenced testing and analysis programs. ISD encourages criterion-referenced testing and analysis. In contrast to this type of evaluation, there are norm-referenced programs for comparing the performance of individual students to the group. These programs usually result in rank ordering students, typically represented by letter grading. We must understand the characteristics of each method to determine which to adopt.

**20.3.1 Chapters 21 and 23 describe proper techniques for constructing paper-and-pencil tests and performance rating instruments.** Although we use similar construction principles for norm-referenced and criterion-referenced evaluation programs, the analysis techniques are quite different. Chapter 23 will deal with criterion-referenced test analysis procedures and Chapter 24 will cover norm-referenced procedures. Measurement instruments constructed for use in one system may be used in the other, but normally we do not use a single set of instruments for both criterion- and norm-referenced analyses.

**20.4 Characteristics Of Evaluation.** The instruments we use to measure achievement must be reliable, valid, objective, comprehensive, and capable of differentiating. Any given test or rating scale may possess each of the characteristics in varying degrees. However, few Air Force tests are completely valid or invalid, or completely reliable or unreliable. Our role as evaluators is to select those instruments with the highest levels of these characteristics that give us the most useful evaluative information in a given setting. What follows is a detailed explanation of each characteristic.

**20.4.1 Reliability.** A reliable measuring instrument is one that yields consistent results. If a tape measure provides identical measurements each time we use it to measure a certain length, we consider it a reliable measuring instrument. An unreliable instrument will not yield consistent results. An altimeter that isn’t set to the local barometric pressure, a steel tape that expands and contracts with temperature changes, or cloth tapes affected by humidity will not yield reliable measurements.

**20.4.1.1 No instrument is completely reliable, but some instruments are more reliable than others.** We can sometimes determine the relative reliability of certain instruments, however, to aid our selection of testing media. For example, we can determine, to some extent, the reliability of a thermometer by using it to take several readings of the temperature of a fluid that is maintained at a constant temperature. Discounting our own reading errors, we ought to suspect the thermometer’s reliability if we don’t get consistent readings.

**20.4.1.2 Reliability means the same whether we apply the term to balances, thermometers and altimeters, or educational tests and ratings.** It refers only to the consistency of results obtained from a given instrument.

Figure 20.1. Four-Step Process for Writing Student-Centered Objectives and Tests
However, measuring the reliability of a rating scale or examination is a more complex problem than measuring the reliability of a mechanical device. If we use the same calipers at different times to measure the bore of the same cylinder, our results should be almost identical each time because the size of the cylinder does not change appreciably between measurements. However, change occurs often during educational evaluation wherein knowledge, understanding, and skills do not remain constant. For example, in educational settings, students change between two attempts on the same test because they gain new knowledge and understanding. Therefore, applying the reliability test too strictly might lead us to the wrong conclusions. Where repeated testing might reflect growth in knowledge we might judge that the differences point to the unreliability of the test.

**20.4.1.3** The reliability of a measuring instrument is equally important in criterion-referenced and norm-referenced testing. The results must be consistent whether students are judged against an absolute standard or compared with one another.

**20.4.2 Validity.** A measuring instrument is valid when it measures exactly what it was designed to measure. Mechanics who use a micrometer to measure the diameter of a bearing must be sure that the contacting surfaces of the bearing and the micrometer are free from grease and dirt; otherwise, they will measure the coating in addition to the diameter of the bearing, and the measurements will be invalid.

**20.4.2.1** Although a measuring instrument may be highly reliable, it does not necessarily follow that it is valid. In other words, an instrument may simultaneously have a high reliability and a low validity. The instrument with maximum consistency (high reliability) may not measure what we intend it to measure. For example, merchants who use false scales may obtain reliable measurements but invalid results, at least from the customer’s point of view.

**20.4.2.2** An educational test must exhibit the same characteristic of validity that we expect of other measuring instruments. If we want an examination to measure the ability of students to apply a skill, it must measure the ability to manipulate appropriately, and not simply the ability to recall facts about the skill or merely explain the significance of the activity. If we design an examination to measure how well students understand the operation of a four-cycle internal combustion engine, we should make sure we’re not just measuring their ability to read the specifications sheet.

**20.4.2.3** We can determine the validity of a measuring instrument by comparing it with a criterion or standard that is relevant to the test or test item. For example, when the purpose of the test is to measure a special aptitude (ability or talent), the test is valid if it requires the student to demonstrate that aptitude under realistic conditions. No written test can validly measure aptitude for piloting an airplane. However, written tests can more validly measure one’s ability to navigate since that skill is primarily a pen-and-paper planning process. The only valid tests for demonstrating aptitude to pilot a plane is a physical test performed in the plane itself or in a simulator (the former yielding more reliable judgments than the latter because of slightly different handling characteristics). Sometimes, we verify the validity of a measuring instrument by comparing results with later on-the-job performance. The real objectives of Air Force instruction, after all, are usually aimed at improving job performance. If the course objectives relate to job performance, then subsequent job performance may be the criterion for determining the validity of tests used in a course. We can verify our tests by testing our students again, after they graduate, or by giving the tests to experts in the same field.

**20.4.2.4** At times, our goal in Air Force schools is not to improve performance at a specific job, but rather to raise the overall intellectual ability of the students or to improve their judgment. Most advanced courses, in military and civilian non-technical schools, seek this type of educational outcome, and many measuring instruments used in these schools measure achievement that cannot be related to specific job performance. Consequently, it is hard to determine validity. In these instances, the best we can do is identify analytical steps, processes, and actions that, if accomplished correctly, will lead to the types and quality of judgment we expect.

**20.4.2.5** It should be clear by now that when we state objectives in terms of specific abilities, the test should require students to demonstrate these abilities. Likewise, when we state objectives in terms of factual knowledge, understanding, and application, the test should have students demonstrate behavior we are willing to accept as evidence of their achievement. Therefore, we must be able to translate objectives into demonstrable or measurable outcomes for measuring either type of knowledge.

**20.4.2.6** It is possible to bridge the gap between intellectual activity and observable results when well-written criterion objectives provide the necessary elements for writing valid test items. A criterion objective is a precise description of a student-centered learning outcome for a planned program of instruction. It describes the conditions, performance, and standards for assessing the attainment of criterion-referenced objectives and is used as a means of designing the content of a test question (see Chapter 5).

**20.4.3 Objectivity.** This third characteristic of evaluation relates to the ability to grade with a relative absence of personal judgment or subjectivity. The bias of the rater or test scorer should not affect the score. For example, a supervisor in a civil engineering squadron
must select three workers for a team to complete an emergency construction job. Six available people are called into the office for an interview and evaluation. The supervisor can compare their weight, height, age, and other physical characteristics which can be rated equally objectively. But these measurements do not tell the supervisor enough because one also needs to know something about the workers’ experience level and needs to judge just how much experience will qualify them to do the job right the first time. The supervisor needs to know how well they work under stress, their emotional stability, their attitude toward work, etc. In making these evaluations, the supervisor must try to be objective, but personal considerations, attitudes, and judgments will undoubtedly influence the evaluation of all considerations that are not directly measurable. Thus, part of the evaluation lacks objectivity because the judgments about personal qualities, attitudes, and the effect of experience on ability are subjective. These subjective judgments need to be discounted in the decision as much as possible. 20.4.3.1 In classroom measurement, essay tests tend to be subjective because our opinions of a student’s organization, handwriting, seriousness, etc. may influence the grade we give the test. The grades we give on an essay test may vary from day to day, student to student, or from one scorer to another. The more objective we can make the criteria for judging a test’s score, the better graders we will be because students of comparable ability will, then, have a better chance of receiving comparable or equal grades. This requirement may preclude, in the case of essay questions, judgments of writing style or word choice and force us to look at measurable items such as inclusion of required facts and definitions, order of presenting material, etc., to ensure objectivity.

20.4.4 Comprehensiveness. A measuring instrument must liberally sample the skills or knowledge being measured. Suppose, for example, the owners of grain elevators want to classify the grade of carloads of wheat. If they analyze a bushel of wheat from the top of each carload, they will have a poor test—one that is not sufficiently comprehensive. A judgment based on this measurement cannot be safely applied to entire carloads; the wheat at the bottom of the car may be infested with insects. But, if the owners take 50 test tubes of wheat from different positions in the carload, they may analyze less than a bushel of wheat, but they will have a more comprehensive evaluation of the contents of the car. By the same token, a contender who only fights rookies or spars with one partner can never really arrive at the conclusion that he’s ready for the title fight because he doesn’t have enough data to make that judgment. He hasn’t been matched against different skill levels or styles of boxing to comprehensively measure his ability. 20.4.4.1 Similarly, in classroom measurement, a test or rating must liberally sample the skills representative of the stated instructional objectives. An exam should not test just one area of the curriculum in-depth at the expense of other areas which also need evaluation. Just as the owner of the grain elevator must select samples of wheat from different positions in the car, we must be sure that we include a representative and comprehensive sampling of course objectives. In the ideal case, we would measure all course objectives. Usually, though, we have a lot of material but only limited testing time available. Sometimes we write too many noncritical objectives rather than focusing on those which are critical and this would have the same effect of not sampling comprehensively. If we try to limit our objectives to those important enough to measure, we can construct an evaluation program which tests a much larger sample of our more important objectives. In any case, we must deliberately take comprehensive samples of as many objectives as possible.

20.5 Differentiation. We must construct measuring instruments that detect significant differences in ability. Suppose, for example, that a machinist wishes to measure bearings that are slightly graduated in size. If we use a ruler to measure the diameters of the bearings, the differences among them may not be obvious. But if we take measurements with a micrometer, we can easily differentiate between the diameters of the first and second bearing, the second and third bearing, and so on up the scale. Similarly, we can design classroom tests to differentiate among our students. There are two methods of differentiation we need to recognize.

20.5.1 Norm-referenced Differentiation. This is the comparison of items to each other. For example, one goal the machinist might have in taking the measurements is to arrange the bearings from smallest to largest. When we want to show the relative difference in sizes of the bearings, our measurement is norm-referenced. In a norm-referenced evaluation program, a test or rating must measure small, and sometimes relatively insignificant differences among the elements we’re measuring. When we need to be able to use the data from our evaluation to rank order or give a letter grade to students to distinguish the higher achievers from the lower, our goal is to be able to compare individual performances to each other to show relative position within a group (comparing to a norm). Often we make this comparison without caring whether or not the individual or the group has actually met the stated objectives, or there is no stated learning objective.

20.5.1.1 When we construct a test or rating scale to differentiate achievement for norm-referenced analysis, we look for three features; (1) a range of scores, (2) different levels of difficulty, and (3) the distinction between students who are generally low and those who are generally high in achievement. Such a basis for judgment has little significance beyond helping us give letter grades or achievement rewards. These judgments
certainly do not tell us what the student has learned or whether the student has learned what we had hoped.

20.5.2 Criterion-referenced Differentiation. This is the comparison of elements or items to a standard. A more significant way our machinist might have used the measurement of the bearings is to compare each bearing to a standard to find out whether it meets established tolerances. The question, then, is “Does each of the items being measured meet the tolerances?” In the classroom we should ask whether each student met the stated objective rather than how the student compared to the average. The former approach to testing distinguishes criterion-referenced testing from most traditional (norm-referenced) testing programs. The primary function of differentiation in criterion-referenced testing is to make a clear distinction between those students who have mastered an objective and those who have not. Rank ordering or letter grading is of secondary importance.

20.6 Determining Means Of Measurement. An effective measuring instrument must be based on all five of the characteristics we’ve covered—reliability, validity, objectivity, comprehensiveness, and differentiation. In determining appropriate methods of measurement, we must select instruments which include the largest representation of these essential characteristics. Now let’s turn to another important consideration in evaluation—the purpose of the evaluation. The purpose we have for using an evaluation instrument depends on the unique circumstances of the school, the instructor, and the students.

20.7 Reasons For Evaluation. Why are we testing? Do we test to improve instruction, to pinpoint student deficiencies, to identify specific degrees of skill achievement, or to predict success on a future job? Our answers to these questions will determine the procedures needed to reach these goals. If we are evaluating solely to assign grades, measuring instruments will be much simpler. In Air Force schools, however, our primary reason for evaluating usually is to determine whether students can perform a job (represented by our stated objectives). Our task, then, is to ensure that there is a strong correspondence between the objective and the tasks required by the job.

20.8 Nature Of Required Behavior. In order to determine whether an objective realistically represents the job our graduates will be tasked to perform, we must ask the following questions. Can the students’ behavior be realistically represented by word or pictures on a pen-and-pencil test? Must students perform in real situations for the evaluation to be valid? Do students need an active or a passive knowledge of the material in our course? Will they respond in much the same form as we taught them or do we want them to translate or synthesize the material in some way? Do we need to modify our curriculum and course materials to get the kind of evaluation that we really need? An important consideration to remember is that physical performance and essay testing will require more time to accomplish and evaluate, so we must plan for them if they are necessary.

20.8.1 When the knowledge, activity, or skill is important to protecting life or safety or if it threatens the destruction of an expensive piece of equipment, then we should expect the student to perform correctly the first time, every time on the job. In some fields, such as medical or maintenance, students must, at least, perform the critical element of the required skill under realistic conditions for evaluation. Less important or less critical skills may be evaluated by use of a pencil-and-paper test.

20.9 Time And Facilities Available. Are the students required to perform the skill during the learning process in order to certify learning, such as in the case of flight training? If so, we must use evaluation as an extension of the learning activity. If students are not required to demonstrate the exact skill during the learning process, we can save time by not having to design a formal evaluation using on-the-job conditions. This flexibility can save us time, space, and money through our ability to use simulation. In either case, the facilities and equipment available for evaluation are an essential factor to consider when we answer the questions above. Time may also influence the decision. For example, how much time must we set aside for evaluation by each means, and do we have the time available to evaluate the objective fully? Sometimes our answers will influence our needs and our constraints will determine our capabilities.

20.10 Availability Of Qualified Faculty. When choosing the best means of evaluating what we have taught, we must consider the qualifications of the faculty. Can the teachers judge student performance using a rating scale? Can they judge the responses of students effectively using less objective instruments such as essay tests and other supply type tests?

20.10.1 Only when these factors have been considered and weighed can the instructor or evaluator choose the best means of testing students. Quite likely, no single means will accomplish all purposes. Under such circumstances, the instructor must use a variety of measuring instruments or compromise by accepting less from the evaluation program than the ideal.

20.11 Summary. Educational evaluation is the systematic process of judging how well individuals, procedures, or programs have met educational objectives. Criterion-referenced testing is concerned with determining educational effectiveness and is, therefore, inseparable from the learning process itself. Every effective instructor must be an evaluator because it is through evaluation—internal or external, formal or informal—that the instructor will get the required feedback that tells whether the instruction is successful. The process begins with a clear definition of objectives,
regardless of the means of evaluation. In practice, testing and performance ratings are almost the exclusive means used to estimate how well students achieve objectives. A secondary purpose of evaluation may be to rank or to give letter grades to students as some measure of general achievement through norm-referenced testing and analysis.

20.11.1 The evaluation process must be systematic and continual. Unplanned or disorganized observations usually lack the desirable characteristics of comprehensiveness, validity, and reliability. To be usable, evaluative judgments must be presented in a form that can be properly interpreted by the school, the instructor, and the student. No matter what means we use, the test should possess, to the maximum degree possible, the five characteristics of evaluation: reliability, yielding consistent results; validity—measuring what it is supposed to measure as defined by the objective; objectivity—eliminating personal biases of the scorer; comprehensiveness—measuring a representative sample of instructional objectives or behaviors associated with one objective; and differentiation—detecting significant differences in student achievement, particularly between those who have and have not mastered instructional objectives.

20.11.2 The basis for choosing one measuring instrument over another is the degree to which they exhibit the five characteristics of effective evaluation. To evaluate students correctly, a variety of methods should be used. In choosing between any two equally valid means of evaluation, the instructor should decide on the basis of simplicity.
Chapter 21
CONSTRUCTING AND ADMINISTERING CLASSROOM TESTS

21.1 Introduction. Undoubtedly, written tests are the most frequently used means of measuring how well students achieve learning objectives. Ideally, the test items we write will be so mechanically sound that only students who have mastered our course content will be able to answer them correctly. Others, including “test-wise” students, will be able to do no more than guess. Writing such items is not easy, but the results of writing sound test items are highly rewarding. In Chapter 22 we will learn more about how to write test questions that measure our instructional objectives. This chapter contains general suggestions for preparing test items and specific suggestions for writing selection items (multiple-choice, matching, and true-false) and supply items (essay, short answer, and completion). The relative advantages and disadvantages of selection and supply items are also discussed in detail. To further assist your understanding of test-construction principles, a poorly written test item and a corrected example follow the discussion of each type of test item. Finally, this chapter also addresses important considerations involved in structuring and administering written tests, and the scoring of supply items. Approaches to the scoring and grading of selection items are discussed in Chapter 25, Norm-Referenced Analysis.

21.2 Suggestions For Preparing Any Test Item. The following are general suggestions to consider when writing test items of any type.

21.2.1 Keep the wording simple and direct. Test items are not the place to show off one’s vocabulary. State items in the working language of the student and the job.

21.2.2 Avoid tricky or leading questions. Many people attempt to write “tricky” items in hopes that only the better students will pick up the trick. Unfortunately, they may not and, therefore, do not receive credit for items they are actually able to answer.

21.2.3 Keep all items independent of other items on the test. No item should give away the answer to another question. Also, the answer to one item should not depend on having to know the answer to another item.

21.2.4 Crucial words or phrases in the stem should be underlined, capitalized, italicized, or otherwise highlighted. If possible, avoid negatives altogether; it is amazing how many people miss negatives even when they have been capitalized and underlined.

21.2.5 Include sketches, diagrams, or pictures when these will present information to the student more clearly than words.

21.2.6 In summary, be fair, clear, and straightforward. If we write and use enough good test items, we will identify the students who have mastered our curriculum and those who have not.

21.3 Selection Test Items. Selection test items require students to select the correct response from a list of responses. Multiple-choice, true-false, and matching are examples of selection items.

21.3.1 Selection test items have three major advantages. First, since students only have to identify the correct answer, two or more people can score selection items without letting personal bias or opinions affect the result. These items lend themselves well to scoring by clerical assistants or a computer.

21.3.2 Second, selection items take comparatively little time to answer. Students only have to read the item and choose between the responses provided rather than write out their answers. Thus, in a given period of time we can give students more selection items to answer than we could give them supply-type items. If testing time is limited, this enables instructors to test course material more comprehensively.

21.3.3 Finally, selection items can be readily analyzed statistically. Since answers to selection items are either right or wrong, statistical analysis is relatively easy. The quantitative measures referred to in Chapters 24 and 25, such as the ease index and the differentiation index, can be machine computed quite easily.

21.3.4 A distinct disadvantage of selection test questions is the possibility of successful guessing. Students have a fifty percent chance of correctly answering true-false items and about a twenty-five or thirty-three percent chance (depending on the number of choices) of answering multiple-choice items correctly. The percentage for matching items depends upon the format. To offset this weakness, test writers should adhere to the mechanics for writing good test items which help minimize successful guessing.

21.4 Multiple-Choice Items. The multiple-choice item can be used to measure student achievement and works equally well when a test problem has one correct answer or one best answer from an assortment of plausible answers. When possible, completion and essay items should be used to measure such student behaviors as explain, define, and describe. If constraints on the testing program do not permit use of supply-type questions, multiple choice items may prove to be a suitable alternative.

21.4.1 Constructing Multiple-Choice Items. Certain standard terms are used in the construction of multiple-choice items. The preliminary sentence that poses the question or states the situation is known as the “stem.” Possible answers that can be selected by the students are known as “alternatives.” The correct answer is the “keyed response,” and incorrect answers are called “distractors.” Distractors are designed to attract less
informed students away from the correct answer. The example in Table 21.1 illustrates this terminology.

Table 21.1. Comparison Between the Two Major Types of Test Questions

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>SUPPLY</th>
<th>SELECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low chance for guessing</td>
<td>Student has to furnish information—no help provided</td>
<td>Student may be able to guess answer or eliminate incorrect ones</td>
</tr>
<tr>
<td>Cover a lot of material in a short period of time</td>
<td>Varies with the different supply type tests. The completion test can cover more of a given topic than the essay test which provides only a limited sample</td>
<td>Generally true. A large sampling can be obtained within a regular class period. The multiple choice may not give the adequacy of the sample of the T-F or matching tests, though</td>
</tr>
<tr>
<td>Easy to score</td>
<td>Needs evaluator to make judgment, even with short answer questions</td>
<td>A definite advantage is the machine scored answer sheet</td>
</tr>
<tr>
<td>Easy to construct</td>
<td>Except for the essay, which requires an extremely well worded question to test the required level-of-learning, the supply type test item is no more difficult than the selection type test item to construct</td>
<td>The multiple choice test is more difficult to construct than all other type test items extreme care must be taken in writing stems and distractors. T-F and matching are relatively easy to construct</td>
</tr>
<tr>
<td>Measures all levels-of-learning</td>
<td>The essay is the best type test item for this factor. Completion types items are useful for lower levels only</td>
<td>Well constructed multiple choice items can measure all levels, while T-F is primarily for lower levels only</td>
</tr>
<tr>
<td>Can be statistically analyzed</td>
<td>Cannot be statistically analyzed. Variety too great</td>
<td>All easily analyzed</td>
</tr>
</tbody>
</table>

Stem: The communication process consists of which of the following sets of elements?

Alternatives:

a. Words, figures, and signs
b. Symbol, receiver, and learner
c. Student, teacher, and receiver
d. Symbol, receiver, and source

Figure 21.1. Multiple-Choice Alternatives

difficult to design more than five plausible alternatives (alternatives that appear correct to a student who has not mastered the subject matter).

21.4.3 Properly designed multiple-choice items do not permit students to easily guess the correct answer. An effective and valid means of diverting the less informed student from the correct response is to use incorrect answers commonly made by students as distractors.

21.4.2 Multiple-choice items usually provide three, four, or five alternatives (Figure 21.1). In most instances, it is

21.4.4 Questions designed to measure the knowledge level-of-learning should provide only one correct alternative; all other alternatives should be factually incorrect. In questions designed to measure achievement at higher levels of learning, some or all alternatives should appear to be reasonably acceptable responses, but one alternative should be a better response than all the
others. In either case, instructions to students should direct them to select the correct or best alternative.

### Table 21.2. Stems

In preparing or revising the stem of a multiple-choice item, the instructor should observe the following general principles.

- Write the stem so it clearly represents the central problem or idea. The function of the stem is to set the stage for alternatives.
- Place in the stem only the material that is relevant to the idea or to the solution of the problem, unless selection of relevant material is part of the problem.
- Make sure the stem does not reveal the correct response.
- Avoid clue words or phrases. Include in the stem language common to all alternatives to avoid repetitious wording and save reading time for the student.
- Avoid any wording unnecessary to answer the question.
- Avoid negative statements whenever possible because they often confuse the student.
- Exercise caution when using the articles “a” or “an” at the end of the stem. These articles may reveal the correct response if all alternatives do not conform grammatically to the stem.

### Table 21.3. Alternatives

The alternatives are as important as the stem. In preparing or revising the alternatives to a multiple-choice item, the instructor should observe the following principles.

- Make sure that incorrectness is not the only criterion when developing distractors. Distractors may include any of the following: (1) a response that relates to the situation and sounds plausible but is incorrect, (2) a common misconception, (3) a statement that is true in itself but does not satisfy the requirements of the stem, or (4) a statement that is either too broad or narrow for the requirements of the stem.
- Avoid clue words. Students with experience in taking tests usually recognize that statements containing such words as “all,” “always,” and “never” are likely to be false. Similarly, statements containing such words as “usually” or “sometimes” are likely to be true.
- Make sure that all alternatives are approximately the same length. We often use longer statements in the correct alternatives than in the incorrect ones, and this may be a clue to the correct answer.
- When alternatives are numbers, list them in ascending or descending order of magnitude.
- Make all alternatives plausible to the student who has not achieved the required level of learning in the subject matter being tested.
- Place correct alternatives in random positions throughout the total test. The instructor should avoid a consistent pattern of correct answers within a test or in a series of tests.
- Avoid use of the alternative “all of the above,” and use “none of the above” with extreme caution. The “all of the above” option makes it possible to answer or guess the answer to the item on the basis of partial information by noting other correct or incorrect alternatives. The “none of the above” option may be measuring nothing more than the ability to detect incorrect answers, which is no guarantee the student knows what is correct.

### 21.4.5 Examples of Multiple Choice Items

Multiple-choice items may be written in a variety of forms, as shown in the following examples.

#### 21.4.6 Stem written as a question

(Table 21.4) This is usually a better form than the incomplete stem, because it is simpler and more natural.

#### Table 21.4. Stem Written As A Question

What is the purpose of the Oak Leaf Cluster? To
a. be awarded in lieu of a repeat decoration.
b. denote the award of a decoration in lieu of a ceremony.
c. denote presentation of a decoration at an official ceremony.
d. use with miniature ribbons on the mess dress uniform.

21.4.7 Stem written as an incomplete statement. (Table 21.5) Care must be exercised in using this form to avoid ambiguity, clues, and unnecessarily complex or unrelated alternatives.

Table 21.5. Stem Written As An Incomplete Statement

The order in which military persons enter staff cars is
a. according to the commander’s desire.
b. ascending according to rank.
c. descending according to rank.

21.4.8 Multiple response. (Table 21.6) In this form, more than one of the alternatives is correct and students are instructed to mark all correct answers.

Table 21.6. Multiple Response

Why are summer days hotter than winter days? In the summer,
a. the Earth is nearer the sun.
b. days are longer than nights.
c. the sun shines almost straight down on the earth.
d. the Earth’s axis is at a greater angle to the sun.

21.4.9 Definition. (Table 21.7) Two varieties of this form are shown. The form illustrated by the first item is normally more difficult for the instructor to prepare and for the student to choose the correct response. The criterion objective used to describe the first item would be quite different than that for the second item.

Table 21.7. Definition

Validity is defined as a
a. the degree to which a test item measures the objective from which it was written.
b. a consistent percentage of right answers for a test item over several administrations.
c. the process of developing a test item which does not allow for personal bias to be present.

or
The degree to which a test item measures the objective from which it was written is a definition of
a. Validity.
b. Reliability.
c. Objectivity.

21.4.10 Stem supplemented by an illustration. (Table 21.8) This form is useful for measuring the ability to read instruments, identify objects, use principles in hypothetical situations, and so forth.

21.4.11 The negative variety. (Table 21.9) This form always emphasizes the negative word.

21.4.12 Association. (Table 21.10) This form is useful if a limited number of associations must be made. (Matching items serve better if a large number of related associations are required.)

21.4.13 Problem-situation. (Table 21.11) A problem-situation format poses a realistic set of circumstances leading to a problem for students and asks them to find the correct or best solution from among the alternatives. The problem-situation may require that students recall and select facts or it may require more analytical and reflective thinking.
To refuel an F-106, where is the fuel nozzle inserted?

a. 1
b. 2.
c. 3.
d. 4.

Table 21.9. The Negative Variety

Which is NOT a surface-to-surface missile?

a. Minuteman.
b. Polaris.
c. Pershing.
d. Bomarc.

Table 21.10. Association

Which of the following is a rotary wing aircraft?

a. OV-10 Bronco.
b. UH-1 Huey.
c. T-38 Talon.
d. C-130 Hercules.

Table 21.11. Problem-Situation

Certain principles should be followed in developing the problem-situation format:
Make both the situation and the problem realistic. Whenever possible, an actual situation should be presented. Make both the situation and the problem specific. Allow no confusion regarding details or requirements. Limit problems so that students may respond to them in the allotted time. In the interest of economy and efficiency in testing, construct several test items to exploit as many aspects of a single situation as possible. Add unimportant details at times to determine the student’s ability to select the important facts. Do not present a situation previously presented to the student.

21.4.14 The situation should, however, require the use of applicable course content. As the problem-situation format is discussed under other types of items in this chapter, refer to the principles described above to assist you in the development of this useful format. (Table 21.12)

Table 21.12. Example of Problem-Situation Format

The following is an example of the problem-situation format used with the multiple-choice item type. Sgt Smith and Sgt Jones are in the same academic section. Every time the instructor asks a question these two individuals banter and bicker among themselves trying to prove the other incorrect. This disrupts the entire class, and no one concentrates on the subject at hand. According to the text, which type of military discipline should the instructor use?

a. Preventive—the instructor should educate the students on behavior appropriate for the classroom.
b. Corrective—the instructor should separate the disruptive individuals before the situation becomes uncontrollable.
c. Punitive—the instructor should warn the individuals that if disruptive behavior continues punishment will follow.

21.4.15 Suggestions for Writing Multiple-Choice Questions. The checklist in Table 21.13 contains suggestions for constructing sound multiple-choice questions. This checklist can be used as a guide for writing multiple-choice questions, as well as for analyzing one that has already been written. The multiple-choice question which follows violates one or more of the suggestions included in the checklist. An analysis of the checklist and then a corrected version of the question are given. It is good practice to use the checklist to identify errors, to rewrite the items, and to compare the rewrite to the corrected version. Read the first question on the checklist and then see if the item is satisfactory. Do this in order for all seven questions.

21.4.15.1 Checklist Analysis: Using the checklist discussed earlier, let’s analyze the mechanical soundness of the test item in Table 21.14.

21.4.15.1.1 Question 1. Are key words and negatives in the stem emphasized? NO. Normally such words as “probably,” “most likely,” “best,” and “no” in the stem are capitalized, underlined, or otherwise brought to the student’s attention as having particular importance in the context of the test item. Depending on the writer’s intent, almost any word in the stem may be a key word.

21.4.15.1.2 Question 2. Is the stem simply and clearly worded: Frequently, this issue is open to subjective
judgement. In this case, however, it is obvious we should

Table 21.13. Checklist

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Key words and negatives emphasized?</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Simply and clearly worded?</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>Free of clue words and giveaways?</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>ALTERNATIVES Brief—all common wording in stem?</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Only one clearly correct/best answer?</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>All distractors plausible?</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>All about same length or arranged by length?</td>
</tr>
</tbody>
</table>

Table 21.14. Test Item

An instructor wants to use a written test to ascertain a student’s organizational ability. Vis-à-vis other types of tests, of the following the instructor would probably use an

a. multiple-choice test.

b. true-false test.

c. essay test.

d. performance rating test.

check NO. A good way to keep the stem simple is to ask other instructors if they understand it.

21.4.15.1.3 Question 3. Is the stem free of clue words and giveaways? NO. “Essay test” is the only answer that agrees grammatically with the article “an” in the stem.

21.4.15.1.4 Question 4. Are alternatives brief and is all common wording in the stem? NO. “Test” is unnecessarily included in all alternatives. Eliminating repetition in the alternatives often gives the student a more clear and concise answer from which to choose.

21.4.15.1.5 Question 5. Is there only one clearly correct or best answer? We must understand the material ourselves to make this judgement. The best way to assure that there is only one correct or best answer is to write out why it is correct and why the distractors are incorrect. This explanation is called the “rationale.” Writing out a rationale for each item not only helps assure one best answer, but also aids us or other instructors administering the test to explain the answers. In this item, YES, there is one best answer.

21.4.15.1.6 Question 6. Are all distractors plausible? Except in obvious cases, this can be a real judgement call. We frequently learn whether distractors are really plausible or not only after the test is given. Then we can see how many students selected each alternative. In this particular item, the last distractor (Alt d) is not plausible. A performance rating test is not a written test. NO.

21.4.15.1.7 Question 7. Are alternatives about the same length or arranged by length or other logical order? YES. However, inexperienced test item writers usually make the correct answer the longest answer. This is often because they wish to be fair by spelling out the correct answer as accurately as possible. No such effort is required to make an incorrect answer more incorrect. It is also frequent practice to “hide” a correct answer in the middle of the alternatives. The tendency toward writing longer correct answers can be reduced with practice. The tendency to hide answers can be eliminated by arranging alternatives in logical order. When no other logical order is apparent, arrangement in alphabetical order or by length will suffice. In this item, the alternatives could have at least been arranged alphabetically.

21.4.15.2 We’ve answered NO to Items 1, 2, 3, 4, and 6 on our checklist and have the appropriate changes to our corrected item in Table 21.5.

Table 21.15. Corrected Item

A student’s ability to organize material can BEST be measured by using which type of written test?

a. Completion

b. Essay

c. Multiple-choice

d. True-false

21.5 Matching Test Items. The matching item, with several variations, presents many of the advantages of the multiple-choice item. It is particularly useful in measuring understanding of closely related concepts or facts. The matching item is actually a collection of related multiple-choice items. Thus, the matching format provides a more compact form for measuring the same learning and can allow the more efficient use of testing time.

21.5.1 Constructing Matching Test Items. The instructor should observe the following principles in constructing matching test items.

21.5.1.1 Give specific and complete instructions. Do not make students guess what is expected of them.

21.5.1.2 Test only essential information; never test for unimportant details.

21.5.1.3 Use closely related materials throughout an item. When students can divide the set of alternatives into distinct groups, the item is reduced to several multiple-choice test items with just a few alternatives and increases the possibility of guessing the correct answer.
21.5.1.4 To minimize guessing by elimination, make all alternatives plausible.
21.5.1.5 Arrange the alternatives in some logical order. An alphabetical arrangement is common.
21.5.1.6 If alternatives are not to be used more than once, provide three or four extra to reduce guessing.

21.5.2 Examples of Matching Items. Like multiple-choice items, matching items can be constructed in a variety of forms: equal columns, unequal columns, inference matching, cause-and-effect matching, and coded alternatives for scientific reasoning.

21.5.2.1 Equal columns. When using this form, the instructor should plan to use items in the response column more than once, or not to use them at all, to preclude guessing by elimination.

Directions: In the blank before each base in Column A, write the letter corresponding to the name of the state where it is located in Column B. Each state may be used more than once; some not at all.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>State</td>
</tr>
<tr>
<td>_____ 1. Eglin AFB</td>
<td>a. Alabama</td>
</tr>
<tr>
<td>_____ 2. England AFB</td>
<td>b. Florida</td>
</tr>
<tr>
<td>_____ 3. Plattsburg AFB</td>
<td>c. Indiana</td>
</tr>
<tr>
<td>_____ 4. Maxwell AFB</td>
<td>d. Louisiana</td>
</tr>
<tr>
<td>_____ 5. Grissom AFB</td>
<td>e. New York</td>
</tr>
<tr>
<td>_____ 6. Wright-Patterson AFB</td>
<td>f. Ohio</td>
</tr>
<tr>
<td>_____ 7. Griffis AFB</td>
<td>g. Tennesee</td>
</tr>
</tbody>
</table>

Figure 21.2. Example of Equal Columns

21.5.2.2 Unequal columns. This form is preferable when alternatives may not be used more than once.

21.5.2.3 Inference matching. The item below would probably measure learning at the comprehension level.

Directions: Write, in the parenthesis before each statement, the number of the location in Column B to which the statement in Column A applies. Each location may be used once, more than once, or not at all.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(    ) 1. The eastern end of this island is located directly south from the easternmost part of the United States.</td>
<td>1. Bermuda</td>
</tr>
<tr>
<td>(    ) 2. Would be crossed in a direct flight from Key West to the Panama Canal.</td>
<td>3. Haiti</td>
</tr>
<tr>
<td>(    ) 3. Etc. to a maximum of nine statements.</td>
<td>5. Nicaragua</td>
</tr>
</tbody>
</table>

Figure 21.3. Example of Unequal Columns

21.5.2.4 Cause and effect matching. This is a useful form to measure learning at the comprehension level.

Directions: Which of the following characteristics of a good test are implied or referred to in the statements below? Fill in the space on your answer sheet corresponding to the letter of the term which you believe is implied or referred to by the speaker. Each of the characteristics may be used once, more than once, or not at all.

a. Differentiation
b. Validity
c. Objectivity
d. Comprehensiveness

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ 1. “Well, I’ve finally finished constructing this test and it contains items at all levels of difficulty.”</td>
<td></td>
</tr>
<tr>
<td>_____ 2. “After grading this test, I have the feeling that even the students who did well don’t understand the subject material.”</td>
<td></td>
</tr>
<tr>
<td>_____ 3. “Thirty test items cover this entire unit?”</td>
<td></td>
</tr>
<tr>
<td>_____ 4. “I wonder if this test will really tell me what the students know about the subject matter?”</td>
<td></td>
</tr>
<tr>
<td>_____ 5. “Be sure you follow the key because it is the only fair way to judge students.”</td>
<td></td>
</tr>
</tbody>
</table>

Figure 21.4. Example of Inference Matching

21.5.2.5 Code alternatives for scientific reasoning. This type of matching item can be used to differentiate the achievement levels of better students. Items of this type
normally measure achievement at least to the comprehension level.

21.5.3 Suggestions for Writing Matching Items.
21.5.3.1.1 The sample test in Figure 21.8 violates one or more of these checklist questions. Again, please use the checklist to analyze this sample test.
21.5.3.2 As we can see by entering NO in Questions 1 through 8 in Table 21.15, what this item primarily needs is a set of instructions plus a little cleaning up. Check the corrected version in Figure 21.9.

Directions: Listed below are certain facts followed by several statements. Fill in the space on your answer sheet corresponding to the letter (a, b, or c) which represents the best statement of the relationship between each statement and the fact which precedes it.

a. The statement is the cause of the fact.
b. The statement indicates a result of the fact.
c. The statement is not related to the fact.

Fact: A flash of light occurs.

Statement:
1. A roar of thunder can be heard.
2. Electricity passed between clouds and the earth.

Fact: Metals, generally speaking, expand when heated.

Statements:
3. Like poles of a magnet repel each other.
4. After driving the car for several miles, the individual found it difficult to remove the spark plugs.

Figure 21.5. Example of Cause and Effect Matching

Directions: Below are some hypotheses and methods for testing them. On your answer sheet, fill in the space corresponding to the following conditions:

a. if the item directly helps to prove the hypothesis true.
b. if the item indirectly helps to prove the hypothesis true
c. if the item directly helps to prove the hypothesis false.
d. if the item indirectly helps to prove the hypothesis false.
e. if the item is unrelated to proof or disproof of the hypothesis.

Hypothesis: Thunder causes rain.
1. Observations show that, during a rain storm, it always begins to rain immediately after a clap of thunder.
2. The meeting of cool and warm air masses simultaneously causes thunder and precipitation.

Hypothesis: High temperatures for a few days cause rain.
3. Heated water in a pan evaporates.
4. Many desert areas exist with virtually no vegetation.

Figure 21.6. Example of Code Alternatives for Scientific Reasoning
Figure 21.7. Checklist for Writing Matching Test Items

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Clear what is to be matched?</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Where and how to match?</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Indication of number of times each alternative can be used?</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>One column contains more entries than the other?</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Spaces provided for responses?</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Column requiring more reading on the left?</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Each column composed of similar materials and appropriately titled?</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Alternatives arranged in some logical order (alphabetical, numerical, or chronological?)</td>
</tr>
</tbody>
</table>

When one or both of these last two suggestions is ignored, it usually means there is one and only one correct response in the second column to each problem posed in the first column. Therefore, students who can match any alternative find it easier to match remaining alternatives.

Table 21.16. Questions to Ask

| Question 1. | Makes clear what is to be matched? NO |
| Question 2. | Indicates where and how to match? NO |
| Question 3. | Shows number of times alternatives may be used? NO |
| Question 4. | One column is longer than the other? NO |

In the sample question, students may have to read through the long definitions in the second column several times over to complete the question.

| Question 5. | Provides space for responses? NO |
| Question 6. | Column requiring more reading than the other is on the left? NO |
| Question 7. | Each column composed of similar materials and appropriately titled? |
| Question 8. | Similar materials? YES. Titled? NO |
|             | Alternatives arranged in logical order? NO. As in multiple-choice items, alphabetical order or length is useful when no more logical order is obvious. |

21.6.1.1 True-false items have probably been used and misused to a greater extent than any other selection test question type. Too often, instructors merely scan text material, select statements more or less at random, and then insert negatives in approximately one-half of the statements to make them false. They mistakenly believe that they can justify answers to these items by referring students to pages in the text. When tests are constructed in this manner, the principal attribute measured is photographic memory. Tests of this sort have brought objections to selection tests in general and true-false items in particular.

21.6.2 Constructing True-False Items. The instructor should observe the following principles in constructing true-false test items. Include only one idea in each true-false item.

21.6.2.1 Do not make part of a statement true and another part false.

21.6.2.2 Avoid the use of negatives. They confuse the reader.

21.6.2.3 Avoid involved statements. Keep wording and sentence structure as simple as possible. Make statements clear and definite.

21.6.2.4 Whenever possible, use terms that mean the same thing to all students. Short, simple statements will increase the likelihood that the point of the item is clear and that passing or failing it will be determined by the students’ learning, not their reading ability.
INSTRUCTION: Match the legal instruments in Column B to their definitions in Column A in the space provided. Each instrument may be used once, more than once, or not at all.

A—Definitions

1. _____ Establishes rights, privileges, rules and punishment for military personnel.

B—Legal Instruments

   a. Code of Conduct
   b. Command Regulations
   c. Status of Forces Agreement
   d. Uniform Code of Military Justice

2. _____ Implements controls over duties, customs and privileges of military personnel in a foreign country.

3. _____ Provides for controls over duties, customs, and privileges of military personnel in a foreign country.

---

21.6.2.5 As a rule, avoid absolutes, such as “all,” “every,” “only,” “no” and “never.” Such unequivocally true or false statements are rare, statements containing absolutes are usually false. Similarly, avoid statements containing “some,” “any,” and “generally,” which are most frequently true. These terms are often called “hedgers.”

21.6.2.6 Avoid patterns in the sequence of responses because students can often, identify sequence patterns. Instructors sometimes deliberately use patterns to make hand scoring easier. This is poor practice.

21.6.2.7 Make statements brief and uniform. Some instructors unconsciously make true statements longer than false statements. Students are quick to take advantage of this tendency.

21.6.3 Examples of True-False Items. True-false items may be written in the forms shown in the examples in Figure 21.10 thru 21.13.

21.6.3.1 Other items of this general type have also been devised to reduce guessing to a minimum. These include adding to the basic true-false choice the choices of “sometimes true—sometimes false,” and similar variations. In addition, this type of item can be made more difficult and discriminating by requiring the student to suggest what will make false statements true.

21.6.4 Suggestions for Writing True-False Items. Here is another checklist which summarizes the principles for constructing mechanically sound true-false items.

21.6.4.1 The true-false item in Table 21.18 violates one or more of the principles of sound construction in the above checklist.

| T | F | Winds circulate clockwise around a high pressure area in the Northern Hemisphere |

Figure 21.10. Declarative Statement

| T | F | stock is constructed of high grade walnut. |
| T | F | is chambered for a .223 caliber cartridge. |
| T | F | may be set to fire either automatic or semi-automatic. |
| T | F | disassembly kit is stowed under the butt plate. |

Figure 21.11. Cluster

| T | F | Nail “A” will make a stronger joint than nail “B.” |

Figure 21.12. Statement with Illustration

Directions: Indicate your answer in the space provided to the left of each statement, as if the statement is

a. true and the reason is correct for the statement.

b. false and the reason is incorrect.

c. true and the reason is incorrect.

d. false and the reason is correct.

_____ Statement: Aluminum is used in transportation

   Reason: Aluminum is light and strong.

_____ Statement: most items made of metal corrode.

   Reason: Many metals corrode.

Figure 21.13. Double True-False
Table 21.17. Checklist

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>ITEM FORMAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Short and simply stated?</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Tests only one idea?</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Free of absolutes and/or hedgers?</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Stated positively?</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Totally true OR false?</td>
</tr>
</tbody>
</table>

Table 21.18. Sample Item

<table>
<thead>
<tr>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, the characteristic of evaluation which is never violated by experienced writers of selection test items is validity, and this is a function of training and experience.</td>
<td></td>
</tr>
</tbody>
</table>

21.6.4.2 Checklist Analysis: Using the checklist provided earlier as a guide, let’s examine the above true-false item for quality of construction

21.6.4.3 Question 1. Is the item short and simply stated? NO. Although the words used in the item may well be understood by the informed student, the sentence structure is awkward and fragmented, making it difficult for the student to grasp its meaning.

21.6.4.4 Question 2. Does the item test only one idea? NO. The item addresses two distinct points, one regarding the violation of a certain characteristic of evaluation and the other regarding a possible explanation for such a violation. Not only is this confusing to students, it creates problems in interpreting what students understand or do not understand about that question’s content.

21.6.4.5 Question 3. Is the item free of absolutes and hedgers? NO. In this question, the hedger “In general” and the absolute “never” are not only misleading and imprecise, but are also contradictory. Avoid these types of terms whenever possible.

21.6.4.6 Question 4. Is the item stated positively? YES.

21.6.4.7 Question 5. Is the item totally true or false? NO. This is a frequent occurrence when attempting to test more than one idea with one item, as discussed in Item 2 above.

T F Improved validity of test items is the most frequent result of training the writers of test questions

21.7 Supply Test Items. A supply test item requires students to furnish their own answers. They are not given alternative responses from which to choose. The basic forms of supply questions are completion, short answer, and essay. Supply test items are mechanically easier to construct than selection items, but are far more difficult to evaluate.

21.7.1 When the ability to express ideas or original thinking are to be measured, supply items have a distinct advantage over selection items. The ability to solve problems and to think creatively are seldom worthwhile end products in themselves; it is usually necessary to communicate the solutions or ideas to others, frequently in writing. When development of the ability to write clearly is a legitimate objective of a course, supply items may be used effectively. Test items that call for a written discussion, such as the essay form, also give students an opportunity to express themselves—something students often like to do.

21.7.2 It is difficult to construct a supply item for which comparable scores can be given by several equally competent instructors. This difficulty in attaining objectivity often leads to reduced test reliability. It is not usually possible for clerical assistants to score supply test items. Understanding of subject matter area covered by the test is usually required. As a rule, this means that the instructor must score supply items. The supply item also requires considerably more time to score than a selection item.

21.7.3 Another disadvantage of the supply item stems from the ability of students to think and read more rapidly than they write. Consequently, in a given time block, this type of test may be less comprehensive than a selection item test.

21.8 Completion Items. Completion items require the student to provide one or more words omitted from a statement. When the correct word or words are supplied in the proper blank, the statement is complete and true.

21.8.1 It requires the student to supply at least part of the idea expressed in the statement.

21.8.2 It virtually eliminates the possibility of guessing.

21.8.3 It is a time-saving device in comparison with the essay test.

21.8.4 The completion item can be used in testing student ability to make verbal associations of the who, what, when, where and why types. However, since it is difficult to construct items that require but one correct response, the scoring of completion items is normally less objective than scoring of selection items. Even after determining that a given response is correct, instructors frequently must decide to give part or full credit for responses that they did not anticipate. For this reason, as explained further later in this chapter, they should make a complete scoring key (for any supply item) at the same time they prepare the item.
21.8.5 Constructing Completion Items. Instructors should observe the following principles in construction of completion questions.

21.8.5.1 Construct a completion item so it contains only one blank in each sentence. Multiple blanks in a sentence can quickly lead to ambiguity and, therefore, to reduced validity and reliability.

21.8.5.2 Write the statement so that the blank appears at or near the end of the item. This arrangement provides the student with necessary information to fill in the blank without having to read through the item twice.

21.8.5.3 Be sure there is only one correct or best response for each blank. In the interest of scoring objectivity and overall test reliability, both the students and the instructor should have a clear understanding of the criteria for acceptable responses.

21.8.5.4 When testing comprehension and higher levels of learning, word completion statements differently from the way they were worded in texts or lectures. If they are not expressed in different words, the test will measure a level of learning no higher than the knowledge level, regardless of the form of the question or the subject matter.

21.8.5.5 Make all blanks uniform in length. Blanks adjusted to the length of the anticipated response may provide a clue to the correct answer. Directions for completion items should state that the length of the blanks does not indicate the length of the nature of the response. They should also indicate whether a single blank always requires one word or whether short phrases may sometimes be supplied.

21.8.5.6 For convenience and accuracy in scoring, include on the test page a separate series of blanks arranged in a vertical column. Students should be instructed to provide their responses in these blanks rather than in the blanks within the items.

21.8.6 Examples of Completion Items. Completion test items may be constructed either as incomplete statement or as sentences or paragraphs with key words omitted. The following are acceptable examples of completion test items.

21.9 Incomplete statement. This type is more difficult for the student than the direct question form of short answer item. The instructor must constantly be on guard to avoid ambiguous, incomplete statements, such as “Columbus was born in…,” which could be answered with a city, country, or year.

21.9.1 Sentence or paragraph completion. Omit only key words or phrases. Avoid copying from textbooks.

21.9.2 Suggestions for Writing Completion Items. The brief checklist in Table 21.20 can be of assistance in implementing the principles for writing sound completion items.

21.9.2.1 The question in Table 21.22 violates one or more of these checklist items.

21.9.2.2 Checklist Analysis

21.9.2.2.1 Question 1. Is there a total of one or two blanks at or near the end of the sentence? NO. As blanks increase in a completion item, so does the ambiguity of that item. Also, blanks at the beginning of the sentence cause students to reread frequently in attempting to grasp the sense of the statement.

Table 21.20. Example 2

| The (1)__________ of a sound varies (2)__________ as the square of the distance from the source. |
| 1. ___ 2. ___ |
| or |
| In 1795, Napoleon was given command of a small army in (1) ____. The wonderful genius of the young leader made the (2) ____ campaign the decisive factor. By rapid movements he separated (3) ____ and (4) ____ forces. In eleven days he forced (5) ____ to conclude peace. |
| 1. ___ 2. ___ 3. ___ 4. ___ 5. ___ |

Table 21.21. Checklist

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>ITEM FORMAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Blank(s) at or near end of sentence?</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Blanks approximately same size?</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Blank(s) related to key terms?</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Worded so that response possibilities are limited?</td>
</tr>
</tbody>
</table>

Table 21.22. Sample Item

| ______,________,________,________, and are usually presumed to be the most common functions of management taught by educators in ________. |

21.9.2.2.2 Question 2. Are blanks approximately the same size? NO. The variable lengths of blanks may
provide clues to the keyed responses and may confuse students unnecessarily. Keep blanks the same length and provide clear instructions regarding their use.

21.9.2.2.3 Question 3. Are blanks related to key terms? Probably NO, although it would depend upon the actual keyed responses. It appears that the blank at the end of this item is requesting something less than key information.

21.9.2.2.4 Question 4. Is the question worded so that response possibilities are limited? NO. Besides the fact that the information requested in the final blank may be interpreted by students in a number of ways, the lack of a source reference in the sentence would seem to permit student opinions as acceptable responses.

Table 21.23. Sample Item

<table>
<thead>
<tr>
<th>What are the two main classifications of rocket fuel?</th>
<th>and</th>
</tr>
</thead>
</table>

or

Who was the first Secretary of Defense? __________

Table 21.24. Association

After each level-of-learning, write the name of the author of the taxonomy from which that level was drawn. (Bloom, Krathwohl, or Simpson)

<table>
<thead>
<tr>
<th>Responding</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided response</td>
<td></td>
</tr>
<tr>
<td>Synthesis</td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td></td>
</tr>
<tr>
<td>Adaptation</td>
<td></td>
</tr>
<tr>
<td>Characterization</td>
<td></td>
</tr>
</tbody>
</table>

21.10 Short-Answer Items. In general, the short-answer item as a type of supply test item includes features of both the completion and the essay item. It may be used in measuring ability to recall facts, basic concepts, and principles.

21.10.1 The advantages and disadvantages of the short-answer item are essentially the same as those of completion questions. However, the short-answer item often tests ideas more fully, since the recalled idea must be stated in a more complete form.

21.10.2 Constructing Short-Answer Items. Instructors should observe the following principles in constructing short-answer test items.

21.10.2.1 Be specific. The student should know exactly what is expected. If the instructions are not specific, test results are likely to be unreliable and invalid.

21.10.2.2 Be sure that each required answer involves a simple idea, concept, or fact. Otherwise, a meaningful evaluation of student responses becomes quite difficult.

21.10.2.3 Be sure students know how complete to make their responses. Usually, the wording of the item can provide this information. Sometimes, the amount of space will indicate the length of the response. However, the amount of space provided for a response should not be a clue to the correct answer; it should serve only as a guide to the desired length of the response.

21.10.3 Examples of Short-Answer Items. Short-answer test items may be constructed in the following forms: direct question, association, short explanation, list, and pictures or diagrams.

21.10.4 Direct question. This form is usually easier for the average student than a completion item since it helps eliminate ambiguous elements.

21.10.5 Short explanation. This form can be used to obtain maximum comprehensiveness with a minimum of guessing.

Table 21.25. Short Explanation Sample

Explain, in one sentence, a significant contribution that each of the following men made to the development of military aviation.

| General Benjamin Foulois |          |
| General Billy Mitchell |          |
| Captain Eddie Rickenbacker |          |
| General James Doolittle |          |

21.10.6 List. This form is especially useful for informal classroom teaching.

Table 21.26. List Sample

List at least four significant reasons why flying safety practices are important.

a. ____________________________
b. ____________________________
c. ____________________________
d. ____________________________
e. ____________________________
21.10.7 **Picture or diagram.** Pictures or diagrams often add clarity, speed the testing process, and make testing more interesting and valid.

21.10.8 Since short answer items are so similar in construction to essay items, suggestions for writing short answer items are included in the next section.

21.11 **Essay Items.** Any sharp differentiation between short answer and essay items would be a compromise at best. Fortunately, such a distinction is not necessary. The difference between the two forms is perhaps more noticeable in the length of responses than in the wording of the items themselves.

<table>
<thead>
<tr>
<th>Table 21.27. Picture or Diagram Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Directions:</strong> Study the drawing at the right and write your answer to each question in the appropriate blank.</td>
</tr>
<tr>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>____ 1. What is the horizontal distance from point A to point B?</td>
</tr>
<tr>
<td>____ 2. What is the volume of the polyhedron?</td>
</tr>
<tr>
<td>____ 3. Etc.</td>
</tr>
</tbody>
</table>

21.11.1 The essay is probably the least efficient form of item for measuring simple recall (knowledge level of learning). It should be used only when students are required to think reflectively or creatively, to organize knowledge in the solution of a problem, and to express their solution in writing.

21.11.2 The major disadvantage of essay items is the scoring. For this reason, instructors should make a complete scoring key for each essay item when they first prepare it. The construction and use of the scoring key will be explained later in this chapter.

21.11.3 One of the difficulties in constructing essay items is that the process appears too easy. Like selection items, however, essay items with good scoring keys are quite difficult to construct.

21.11.4 **Constructing Essay Items.** Before preparing an essay question, instructors must understand the objectives to be measured. They must also give clear instructions concerning the kind and length of required responses. Items of equal value on a test should be balanced in difficulty. Instructors should not offer students a choice of questions; unless all students provide answers to the same test items, they cannot evaluate the students’ achievement of the same objective.

21.11.4.1 Generally, use essay items for purposes for which they are best suited, that is, to measure achievement at the comprehension or higher level of learning.

21.11.4.2 State the items clearly so that students will know exactly what type of discussion is required. It is a mistake to use vague essay questions in an effort to test ingenuity. If the items are skillfully designed, students will have ample opportunities to apply their ingenuity and creativity. Essay test items should mean essentially the same thing to all students who have achieved the desired level-of-learning. Revise or eliminate all items with a double meaning.

21.11.4.3 Whenever possible, increase the number of test items and reduce the amount of discussion required for each. This will not only make scoring easier, but will also probably increase the comprehensiveness of the test.

21.11.4.4 Suggest a time limit for each item; indicate the desired length of response, or otherwise limit responses.

21.11.4.5 As part of the instructions to students, explain how each item affects the final score of the overall test and the possibilities of partial credit for each item. Every student should understand the criteria used in the scoring process.

21.11.4.6 Avoid making the answer to a first item the basis for a second item. Items linked in this manner may cause students to miss an entire series of test items although they may be wrong on just the first. It is nearly impossible to interpret results in such situations.

21.11.5 **Examples of Essay Items.** Essay items may be designed and classified in various ways. One classification can be made according to the type of response required of the student. Seven major types of essay items based on this classification are shown in the following examples:

21.11.6 **Comparison.** In 100 words or less, compare norm- and criterion-referenced measurement. This question is worth 20 points and no partial credit will be awarded. Up to five points may be deducted for grammar and organization.

21.11.7 **Decision.** Defend the assertion that the death penalty should be abolished. You will have 20 minutes to answer this question. The question is worth 25 points and partial credit may be awarded. No points will be deducted for spelling and grammar.

21.11.8 **Causes or Effects.** In the space provided below, discuss how institutional racism inhibits social progress in the United States. Support your answer with specific examples. The value of this question is 15 points with partial credit available. Spelling, grammar, and organization will not be graded.

21.11.9 **Explanation.** In 250 words or less, explain the principles involved in airfoil lift. This question is worth
30 points; partial credit is available. Up to three points will be deducted for spelling, grammar, and organization.

21.11.10 Summary. Summarize in 300 words or less the functions of management. Your answer should be supported with specific, personal examples. This question is worth 50 points with partial credit available. Up to 10 points may be deducted for organization, clarity, and grammar.

21.11.11 Illustration. In the space provided below, illustrate the peculiarities of high-speed aerodynamics. Limit your answer to verbal descriptions and use examples when appropriate. This question is worth 25 points with partial credit available. No points will be deducted for spelling, grammar, or organization.

21.11.12 Another classification of essay items can be made according to format. The essay item in Table 21.26 represents an attempt to present a realistic situation and to guide the student’s response.

21.11.13 Suggestions for Writing Essay or Short Answer Questions. The checklist in Table 21.27 summarizes several of the principles for constructing sound essay and short-answer items. Guidelines for the scoring of these types of supply items are provided later in the chapter.

Table 21.28. Essay Item

Read the following situation, then answer the two questions provided. Question 1 is worth 10 points; question 2 is worth 15 points. Partial credit is available. For full credit, your answer should contain specific, relevant support for all conclusions made. No points will be deducted for spelling, grammar, or organization.

SITUATION: Captain Henry Jones is a management analyst at Randolph Air Force Base. You are the comptroller. Five months ago the maintenance squadron commander requested a study of his maintenance control system. You gave Captain Jones the assignment. He is young and aggressive and, although he had no maintenance experience, you felt he could handle the job. A recent check on his progress showed the following developments.

1. He had not completed any studies but showed varying degrees of progress on seven different studies, with “three more in the planning stages.” Of the seven, two were held up because of a deadlock between Captain Jones and the officers in charge of the areas in which he was making the studies. The two officers in charge stated that he did not understand maintenance problems and that his recommendations were faulty. The other five studies were apparently stagnant.

2. Captain Jones had established requirements for nine temporary reports from maintenance squadron activities to provide him with data in various maintenance areas. The requests for these reports had been initiated at different times.

Directions: Respond to each of the following questions in no more than two handwritten pages. You will have approximately 45 minutes to complete the exam. Your answers will be evaluated on their content alone, and from 0 to 20 points may be awarded for each answer.

QUESTIONS:
1. In what respect did Captain Jones err most seriously?
2. In the present situation, how can the two studies which have been held up because of nonconcurrence be best completed?

Table 21.29. Checklist

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Item stated clearly?</td>
</tr>
<tr>
<td>2</td>
<td>Point value of the item clearly indicated?</td>
</tr>
<tr>
<td>3</td>
<td>How much response is expected (in time, words, or space)?</td>
</tr>
<tr>
<td>4</td>
<td>Whether or not partial credit is available?</td>
</tr>
<tr>
<td>5</td>
<td>Factors other than content affect the score (e.g., grammar, organization, neatness, spelling)?</td>
</tr>
</tbody>
</table>

21.11.13.1 The principles for the construction of each are virtually the same. Use the checklist to analyze the mechanical quality of this item.

Table 21.30. Short Answer or Essay Item

ITEM: Discuss the concept of discipline as it relates to the Air Force environment.

21.11.13.2 Check List Analysis

21.11.13.2.1 Question 1. Is the item stated clearly? NO, not really. “Discuss” by itself does not describe adequately the nature of the desired response. The words “discipline” and “environment” are particularly ambiguous and require more specific direction for the student.

21.11.13.2.2 Question 2. Is the point value of the item clearly indicated? NO. Students need to be appraised of the relative weight of the item in the overall test, just as the scoring procedures of other item types are revealed.

21.11.13.2.3 Question 3. Is the length of the expected response indicated? NO. Instructions to students should
include a realistic guide in terms of time, words, or space for adequately answering the item.

21.11.13.2.4 Question 4. Does the item address partial credit? NO. Particularly in an essay item, partial credit may be available. Specifically on what basis that credit will be awarded is of interest to the student.

21.11.13.2.5 Question 5. Are factors other than content indicated which will affect the score? NO. Sometimes the total score for the item is not based on the content of the response alone; grammar, spelling, neatness, and organization may be factors considered important enough to score in an essay item. If such factors will be judged, let the student know what and how much.

21.11.13.3 We have answered “No” to all five questions on our checklist.

In no more than 500 words, explain the relationship between the concept of self-discipline and the accomplishment of the Air Force mission. Provide support for your statements in the form of specific examples, both hypothetical and real. This question is worth a total of 25 points, five points of which will be for organization and grammar. Partial credit may be awarded.

Figure 21.16. Corrected Item

21.12 Assembling The Test. Once the desired test items have been prepared, we should pay careful attention to putting the overall test together. All information required to identify the test should be printed on the first page or the cover page, or this information may be filled in by the students. The name and location of the school, name of the course, section number, date, and student code number are often included.

21.12.1 A complete set of instructions, which may be provided in written form, orally, or by visual aid, should specify what text and other references or tools may be used during the test and the time allowed for parts or for the total test. The instructions should include a statement of the number of items in the test and should indicate clearly how each student should respond. It is often a good plan to give a sample item with the correct response. The instructions should also tell whether to proceed individually from part to part or from page to page or whether to wait for a signal or further instructions. Students should also be told the procedure to follow when they have completed the test. If reliable testing data is to be compiled for administrative purposes, testing instructions should be kept uniform from class to class.

21.12.2 Test items should be placed on the page so that each item stands out clearly from the others. For example, true or false items two lines long should be single-spaced, but two spaces should be left between items. A space should separate the stem of multiple-choice items and the list of alternatives. The alternatives should appear in a single column beneath the stem and should be indented beyond the paragraph margin.

21.12.3 If tests are to be machine-scored, precautions must be taken to see that the items can be used with machine-scored answer sheets. Special answer sheets can be designed for specific test objectives, while stock answer sheets generally can be used for true-false items, for multiple-choice items with five or less alternatives, and for matching items with 15 or less alternatives.

21.12.4 As nearly as can be anticipated, items should be arranged in ascending order of difficulty within groups. Items of known difficulty which have been used before are readily arranged in order of difficulty. Students are put at ease when they find relatively easy items in the early portion of the test.

21.12.5 A test should be designed to ensure that most students can complete it. When many students cannot complete a test, much of its efficiency is sacrificed and student morale is likely to suffer. On the other hand, it may not be desirable that all students complete the test before the end of the allotted time. In that event, a large portion of the group may have to wait for the remainder to finish. If students are allowed to leave as they complete a test, as in some room arrangements, they may distract and confuse those who are still working.

21.13 Administering The Test. Although the decision of whether to administer a test does not always rest with instructors, we are often allowed to decide when to test. Instructors should arrange for tests to be administered in the morning when students are fresh and alert, rather than in the afternoon when they are tired and less likely to be at their best. The selection of a place to administer the test is equally important for reliable testing results. In a quiet, well-lighted, well-ventilated room with a comfortable temperature, students are more likely to perform at their best. Ample working space is particularly important when separate answer sheets are used and when the students may have to make computations on scratch paper. If students are uncomfortable or if they are distracted by physical surroundings, their scores can be expected to suffer. Also, since some students are affected more than others, scores will be less reliable.

21.13.1 Instructors should arrive at the examination room well in advance of the class to assemble their test materials. Some instructors prefer to have test papers and other materials in place before the students arrive. Extra tests, answer sheets, and pencils should be available. In administering the test, instructors should provide clear and concise instructions to avoid confusion. When they understand exactly what they are supposed to do, students are less likely to become nervous or tense. Therefore, their test scores will represent a more accurate picture of their achievement.
21.13.2 Whether instructors win the confidence of their students in the testing situation depends largely upon their personality and upon the effectiveness of their teaching. They should make every effort to encourage the students and put them at ease.

21.13.3 Although carefully written directions for taking the test should be a part of the test, instructors may wish to give oral directions as well. Before beginning the test, they should invite the students to ask questions concerning procedures and they should make it clear whether questions may be asked of the instructor after the test begins. Any errors, misprints, omissions, or other defects in the test should be found and explained beforehand.

21.13.4 If the test has time limits, these should be announced and observed. Students should be told whether they are free to turn in their papers and leave the room during the period or whether they must remain seated until all materials are collected.

21.14 Scoring Supply Items. The procedure for scoring supply items should be explained at the time students take the test. The explanation should include a discussion of the relative weight of each item or problem and its separate parts. With this information, the students can determine how to allocate their time and effort.

21.14.1 Scoring supply items often presents serious difficulties. For reliable test results, the rating assigned to a given paper must be comparable when it is scored by several competent instructors. If one instructor assigns a “Poor” score to a test paper and another instructor assigns a “Good” score to the same paper, the grades may express instructors’ bias and not student proficiency.

21.14.2 To achieve scores that are as objective and reliable as possible, the instructor should arrange for more than one person to score each paper. Supply items require a great deal of time to grade, and, since they are highly subjective, they are difficult to evaluate. Instructors may be tempted to assign the best grades to students who use their phraseology or who have otherwise done well in the course.

21.14.3 The principles for achieving objectivity apply to completion, short-answer, and essay test items. Since the essay test is the most difficult test to score objectively, this section includes a detailed discussion of the principles involved in scoring essay tests.

21.15 Scoring Essay Test Items. After instructors are satisfied that the essay item is carefully and accurately prepared, the next task is to make certain that as much objectivity as possible is used in grading the responses. The effectiveness of an essay examination depends to a large degree on how well it is graded.

21.15.1 In grading essay responses, one must (1) use appropriate methods to minimize biases, (2) pay attention only to the significant and relevant aspects of the answer, (3) be careful not to let personal idiosyncrasies affect grading, and (4) apply uniform standards to all the papers. Undoubtedly, the uniformity of grading standards (hence the reliability of the scores) is probably the most crucial aspect of essay grading. For without uniformity, there is no valid way to measure achievement of objectives.

21.15.2 Decide in advance what qualities are to be considered in judging the adequacy of the answer. If more than one distinct quality is to be appraised, make separate evaluations of each. In an essay test, instructors are generally trying to appraise the achievement of objectives that are directly and explicitly related to the content areas, such as knowledge of facts, principles, and theories of the content area and the application and development of these to novel situations and problems; they may also wish to appraise the development of generalized skills of writing such as logical organization, English usage, and spelling. These two dimensions are quite different and should be rated separately and reported to the student separately. There are two reasons for this separation: (1) to enable the instructor to make a judgment of the extent to which the student is achieving the distinctive objectives of the subject matter and (2) to reveal to the student whether any deficiency in answering the question is due to weakness in subject matter or weakness in written expression or both.

21.15.3 Prepare an answer guide or model answer in advance showing what points should be covered. This measure should help provide a common frame of reference for evaluating each paper and is especially important if the scoring of the papers is spread across a number of different days. After the preliminary guide has been prepared, it should be checked against a sample of responses. No ratings should be given to this sample of papers; the purpose of this step is to determine the adequacy of the scoring guide. If the check reveals that students have consistently interpreted the question at a consistently lower level than the scoring guide, then the specifications of what represents an acceptable answer should be revised to correspond more closely to the performance. Instructors frequently object to this procedure as representing a lowering of educational standards, but it is not. In the majority of cases, differences between the original scoring guide and student answers are due to lack of clarity in the original question or the instructor’s unrealistic expectations of what students can do within the limits of the testing time.

21.15.4 Read all answers to one item before going on to the next. Reading the answers for the same item for all students before going on to the next item accomplishes two purposes; (1) instructors can maintain a more uniform set of standards of grading across papers, and (2) instructors are less likely to be influenced in their judgment of the quality of the answer to another item by how the student has answered the previous one.
21.15.5 Grade the papers as anonymously as possible. The less one knows about who wrote an answer, the more objectively one can judge what was written.

21.15.6 Write comments and correct errors on answers to essay items. A test is most effective for motivation and learning when students get prompt, specific information on their strengths and weaknesses. If instructors make a tally of the types of comments and types of errors, they will also gain valuable information to judge the effectiveness of their teaching.

21.15.7 Try to score all responses to a particular item without interruption. One source of unreliability is that the scores may vary markedly from one day to the next and even from morning to afternoon of the same day. We would be very unfair to our students if we allowed a personal argument with a spouse, a migraine headache, or an upset stomach to influence the grades we give students for their answers. Our scoring is valid only to the degree that it is based on the quality of the subject’s answer and not on the reader’s disposition at a particular moment.

21.15.7.1 Although we recommend that all responses to a particular item be read at the same time, we also suggest that there be short breaks during the reading period. There must be some short diversionary periods so that the reader will not become fatigued.

21.15.8 If possible, have two independent readings of the test. A double reading by two independent readers will make the scores more reliable. If independent readings are done, the scores should not be recorded on the test booklet, but should be written on a separate sheet. Seeing the scores from the first reading could markedly influence the grades on the second reading, and thus defeat the aim on maintaining independent scoring.

21.15.9 The sample essay test question below provides us with a sample essay item and instructions. Instructions for answering an essay item should include the length of the essay, time allowed, worth of the item, whether or not partial credit will be given and whether or not spelling, organization and grammar will be graded.

Table 21.31. Sample Essay Test Question

| ITEM: |
| Explain how implementing a Management by Objectives (MBO) system might improve worker performance and organizational effectiveness. |

| INSTRUCTIONS: |
| Answer this question in 150-200 words using specific hypothetical or actual examples where appropriate. This question is worth 20 points; up to 5 points may be deducted for organization, grammar, and spelling. Partial credit may be awarded for the content section of the question. |

21.15.10 The sample scoring key for essay test items (Table 21.30) lists the most important elements of an answer.

Table 21.32. Sample Scoring Key for Essay Test Items

| For full credit the student should address, with specific examples, the following significant teaching points. |
| a. MBO is a good motivational tool for the supervisor, although it does not guarantee success (5 points). |
| b. MBO can have a positive impact upon the meeting of individual and organization needs (5 points). |
| c. Increased involvement and participation of workers with the job goals and objectives lead to an increase in satisfaction, creativity, and productivity (5 points). |
| d. Grammar, spelling, punctuation, etc. (5 points). |

21.15.11 The key is helpful to remind instructors about the ideas which they should look for in an answer. However, the instructor’s knowledge is still needed to judge the quality of the answers.

21.16 Summary. A primary purpose for testing is to improve instruction and, thereby, to increase learning. The grades derived from testing are, at best, a secondary testing objective.

21.16.1 Two broad categories of test items are selection and supply. The selection category includes true-false, multiple-choice, and matching items, all of which provide alternatives from which the student must choose. The supply category includes completion, short-answer, and essay items, all of which require the student to supply whatever information is requested. The advantages of selection test items are a high degree of objectivity in scoring, the capability of measuring the acquisition of large numbers of facts, ideas, or principles in a relatively short time, and convenience in the development of statistical analyses.

21.16.2 Supply items have a distinct advantage over selection items when the ability to express ideas or original thinking are to be measured. When properly constructed, either selection or supply items can measure learning at any level. The problem-situation variety of either supply or selection test items can measure learning at the higher levels. It can aid in differentiating among students of high achievement and in estimating the degree of learning achieved by students.

21.16.3 The actual writing of test items is one of our most difficult tasks. We must understand the basic concepts involved. When assembling items for a test, the instructor should include a complete set of instructions. Students should know exactly what is expected of them, the relative value of test items, and time limits. Normally test items should be arranged in order of
difficulty, starting with the easiest, and grouped according to subject matter and item type.

21.16.4 Instructors should understand the effects of physical facilities, temperature, humidity, lighting, time allowed, and time of day on the reliability of test results. Similarly, they should understand the function of oral instructions preceding a test. For reliable test results, the circumstances surrounding each testing session must be consistent.

21.16.5 A test may be valid, reliable, and comprehensive, but if it is not scored properly, individual scores are useless. To increase objectivity, model answers and a scoring key should be used to score a test with supply-type items. One of three basic procedures can be used to score a test with selection items. Whatever the method of scoring, students should be told specifically about the method at the time the test is administered. Obviously, if a good test is to be used effectively, scoring is a vitally important procedure.
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Chapter 22
MEASURING LEARNING OUTCOMES

22.1 Introduction. An orderly process for writing sound objectives and worthwhile test items was introduced in Chapter 3, Writing Student-Centered Objectives and Tests. This approach to planning for learning outcomes, the Four-Step Process of Writing Student-Centered Objectives and Tests (Figure 22.1), produces behavioral objectives and criterion-referenced tests as required by AFMAN 36-2234. While some of us may combine steps of this process or emphasize some steps over others, the four-step process is a sound planning model for Air Force instructional objectives and tests.

22.1.1 The Four-Step Process for Writing Student-Centered Objectives and Tests works well for most Air Force instruction with the possible exception of wholly physical skills. The four-step process will produce sound objectives for cognitive and affective learning as well as job tasks which include but are not limited to physical skills. Wholly physical skill objectives, aimed at developing dexterity or manipulative tasks (touch typing, shooting a firearm, or athletic skills), might be best developed by entering the four-step process at Step 3. If physical skill alone is the object of learning, it may be unnecessary to use a taxonomy (Step 1) or to sample behavioral outcomes (Step 2).

22.2 Overview And Review. Although the four-step process has been illustrated at several points throughout this manual, this chapter will show additional, more complete applications. We will illustrate the process applied to a knowledge-level lesson objective, a comprehension-level concept objective, a comprehension-level principle objective, and an application-level lesson objective. Further, we will illustrate the process through which several criterion objectives and test items may be written from a single sample of behavior.

22.3 The Four-Step Process Applied To Figures 22.2 - 22.5. Each of these figures is organized to illustrate all steps of the four-step process. Although the subject matter varies, each figure contains an appropriate example of the kind of information that is generated by each step in the process. The following general comments may be helpful in interpreting these figures.

22.3.1 Step 1. Each figure contains an acceptable level-of-learning objective. Illustrations include a knowledge-level objective (Figure 22.2), a comprehension-level concept objective (Figure 22.3), a comprehension-level principle objective (Figure 22.4), and an application-level objective (Figure 22.5). These objectives are consistent with the instruction contained in Chapters 4, 7, 8, and 9.

22.3.2 Step 2. Several samples of behavior are included for each level-of-learning objective. There is no significance to the number or order of these samples. Nor is there any significance to the specific sample of behavior used to take the illustration on to Steps 3 and 4. Each sample could be treated in a similar way in Step 3 and several test item types could have been used in Step 4. (See Figure 22.6 for further illustration of how a single sample can generate any of several test item types.)

22.3.3 Step 3. These criterion objectives are rather detailed. Each is complete with the elements of conditions, performance, and standards. Some assumptions about conditions or standards might shorten these examples. In all cases, however, the criterion objective is used to bridge the gap between the sample of behavior and the test item by providing specific details about the way student behavior is to be tested.

22.3.4 Step 4. These criterion-referenced test items have high content validity. Each figure shows a clear trail from the level-of-learning objective to the test item. As products of the first three steps, these test items are to be used to provide evidence of the achievement of the level-of-learning objective. The test items measure what they are intended to measure.
22.4 Summary. The Four-Step Process for Writing Student-Centered Objectives and Tests is a valuable planning tool. Almost all cognitive and affective objectives easily lend themselves to this treatment as do many complex tasks involving psychomotor skills. We may combine, skip, or rearrange these steps, but they will generally work best when done as described and in order. 

22.4.1 General objectives which specify a level of learning in some acceptable taxonomy give us a starting point (Step 1). We then name the samples of behavior which we will accept as evidence of learning (Step 2). By adding details about the testing situation, such as conditions and standards, we can further clarify the behavioral outcomes of learning by writing criterion objectives (Step 3). Test items are then written to specification and provide us with the evidence of learning we said we would accept (Step 4). * 

Table 22.1. Additional Four-Step Process References

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>Chapter 3. An illustration of all four steps of the process applied to a lesson objective on leadership.</td>
</tr>
<tr>
<td>2</td>
<td>Chapter 4. A partial illustration of the process emphasizing Steps 1 and 2.</td>
</tr>
<tr>
<td>3</td>
<td>Chapter 5. A partial illustration of the process emphasizing Step 3 as it builds upon Steps 1 and 2.</td>
</tr>
<tr>
<td>4</td>
<td>Chapters 7-9. Considerable detail on Steps 1 and 2 of the process at the various levels of the cognitive domain.</td>
</tr>
<tr>
<td>5</td>
<td>Chapter 10. An introduction to the way in which the process may be applied to the affective domain; includes a sample lesson plan which illustrates the four-step process.</td>
</tr>
<tr>
<td>6</td>
<td>Chapter 13. Includes three sample lecture lesson plans (knowledge and comprehension level) which illustrates the four-step process.</td>
</tr>
<tr>
<td>7</td>
<td>Chapter 14. Includes a sample guided discussion lesson plan (comprehension level) which illustrates the four-step process.</td>
</tr>
<tr>
<td>8</td>
<td>Chapter 15. Includes two sample case study lesson plans (comprehension and application level) which illustrate the four-step process.</td>
</tr>
<tr>
<td>9</td>
<td>Chapter 16. Includes a sample teaching interview lesson plan (comprehension level) which illustrates the four-step process.</td>
</tr>
<tr>
<td>10</td>
<td>Chapter 17. Includes two sample demonstration-performance lesson plans (knowledge and comprehension level) which illustrate an alternative way to use the process when one behavioral outcome is being emphasized to the exclusion of other samples of behavior (see Chapter 5, Examples 1, 3, and 7 for further explanation of this shortened and limited-use version of the four-step process).</td>
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</tbody>
</table>
LEVEL-OF-LEARNING LESSON OBJECTIVE. Know the fundamentals of the US Air Force Instructional Systems Development (ISD) model.*

SAMPLES OF BEHAVIOR

1. Define Instructional Systems Development (ISD).
2. List the phases of the ISD process.
3. State the purpose of ISD.
4. Label each phase of the ISD model when given a blank graphic.

CRITERION OBJECTIVE

Given the term Instructional Systems Development (ISD) and a statement which appears to be its correct definition according to AFMAN 36-2234, select a true or false response to indicate whether the definition is, in fact correct.

CRITERION REFERENCED TEST ITEM (True/False)

ISD is the Air Force procedure for replacing live classroom instructors with slide and tape presentations.

T (   ) F (   )

(Key: False)

* This example could also be the first objective of a multi-objective plan which reads: Know (1) the fundamentals of the US Air Force ISD model, (2) principal tools needed to deal with the model, and (3) status of the educational profession in dealing with each element of the model.

Figure 22.2. The Four-Step Process Applied to a Knowledge-Level Lesson
Table 22.2. Analysis of Figure 22.2

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>This knowledge level lesson is typical of many factual lessons taught for recall or recognition. The lesson might be an introduction to a larger block of instruction which would look at ISD in much more depth, or it could be a one-time lecture to make students aware of the model. In this objective, &quot;fundamentals&quot; is a &quot;catch all&quot; term used to save space and keep the objective relatively short. The writer of this objective could have spelled out which fundamentals (process for assessing needs, format for writing objectives, etc.), but the objective could have become so long as to be unreadable. An outline of the lesson plan would show which fundamentals were to be included in the lesson. Refer to Chapters 4 and 7 for further discussion of knowledge-level objectives.</td>
</tr>
<tr>
<td>2.</td>
<td>The samples of behavior listed here describe the behavioral evidence of learning. These behaviors, and others equivalent to them, can be used to show mastery of the level-of-learning lesson objective (Step 1). Students may be asked to recall or recognize any of this information essentially as it was taught to them. For the purpose of illustration, Sample of Behavior #1 is carried on to Steps 3 and 4 of the process. Each of the other samples will work equally well as long as the anticipated learning outcomes are limited to recall or recognition activities. Refer to Chapters 4 and 7 for further discussion of samples of behavior and sampling knowledge-level lessons.</td>
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<tr>
<td>3.</td>
<td>The sample of behavior is described in greater detail in the criterion objective. By knowing that this factual information is to be tested through true-false questions, we can write a very specific criterion objective. Although students will not be permitted to actually define ISD, they will show that they can recognize a correct definition contained in a true-false item. The criterion objective is correct in that it requires the behavior from Step 2 (defining or recognizing a definition) and the level of learning from Step 1 (knowledge or recall-recognition). Refer to Chapter 5 for further discussion of criterion objectives.</td>
</tr>
<tr>
<td>4.</td>
<td>This test item is written to the specifications of the criterion objective (Step 3). Although a true-false test item was designated in the criterion objective, several other test item types could have been used to measure this same sample (Step 2). See Figure 22.5 for an illustration of how the same sample of behavior may be used to generate several test item types. By answering this item correctly, students will be meeting the criterion objective and providing some evidence that they have reached the lesson objective (Step 1). If more evidence of mastery is needed, students may be tested on additional items which measure other behavioral samples of learning at the same level of learning (Steps 2 and 3). Refer to Chapter 21 for further discussion of writing appropriate test items.</td>
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LEVEL-OF-LEARNING LESSON OBJECTIVE. Comprehend the behaviorist learning theory concepts of chaining, shaping, and reinforcement.

SAMPLES OF BEHAVIOR

1. Define each concept in terms other than those used in class.

2. Identify new examples of each concept.

3. Compare the critical attributes of each concept to those of the other concepts.

4. Explain why an apparent example of any of these concepts is or is not a correct example.

5. List the critical attribute(s) missing from a scenario which would be necessary to illustrate a given concept.

CRITERION OBJECTIVE

Given the behavioral concepts of chaining, reinforcement, or shaping and three possible but untaught examples, one of which is correct, select the correct example.

CRITERION REFERENCED TEST ITEM (Multiple Choice)

An example of reinforcement is

( ) a. Offering a child 50 cents to clean a room.

( ) b. Patting a dog on the head after it performs well.

( ) c. Threatening to punch a man in the nose if he says another word.

(Key: b)

Figure 22.3. The Four-Step Process Applied to a Comprehension-Level Concept Lesson
Table 22.3. Analysis of Figure 22.3

<p>| Step 1. | This objective identifies several concepts which are to be taught for understanding. The comprehension level-of-learning, called for in this objective, requires more than simple recall or recognition. This objective is more difficult to achieve than the knowledge-level objective of Figure 22.2, because students who comprehend concepts must be able to exhibit more demanding evidence of learning. The lesson objective names three separate concepts rather than just one or two. This is neither good nor bad. It is an indication, however, that the instructor feels that the amount of time devoted to the lesson is sufficient to develop comprehension of all three concepts. Refer to Chapters 4 and 8 for further discussion of comprehension-level lesson planning and concept teaching. |
| Step 2. | Students may be asked to show their understanding of these concepts on a written test which cannot be answered by recall or recognition. Students must go beyond the facts taught to them and generalize to new and unfamiliar material. For the purpose of illustration, Sample of Behavior #2 is carried on to Steps 3 and 4 of the process. Each of the other samples will work equally well as long as the anticipated learning outcomes require students to be able to generalize on the three concepts taught. Refer to Chapters 4 and 8 for further discussion of samples of behavior and sampling concept objectives. |
| Step 3. | The sample of behavior is described in greater detail in the criterion objective. By knowing that these concepts are to be tested through multiple-choice questions, we can write very specific criterion objectives. Although students will not be permitted to actively give new examples of the concepts, they will show that they can recognize new examples contained in a multiple-choice item. The criterion objective is correct in that it requires the behavior from Step 2 (identifying or giving new examples of the concepts) and the level-of-learning from Step 1 (comprehension). Refer to Chapter 5 for further discussion of criterion objectives. |
| Step 4. | This test item is written to the specifications of the criterion objective (Step 3). For whatever reasons, a multiple-choice test item was designated in the criterion objective. Several other test item types could have been used to measure this same sample (Step 2). See Figure 22.5 for an illustration of how the same sample of behavior may be used to generate several test item types. By answering this item correctly, students will be meeting the criterion objective and providing some evidence that they have reached the lesson objective (Step 1). If more evidence of mastery is needed, students may be tested on additional items which measure other behavioral samples of learning at the same level-of-learning (Steps 2 and 3). Refer to Chapter 21 for further discussion of writing appropriate test items. |</p>
<table>
<thead>
<tr>
<th>STEP 1</th>
<th>LEVEL-OF-LEARNING LESSON OBJECTIVE. Comprehend that the management style of a person may need to vary from situation to situation to be most effective.</th>
</tr>
</thead>
</table>
| STEP 2 | **SAMPLES OF BEHAVIOR**
1. Explain why a given situation may dictate a different management style by the same manager than another situation.
2. Describe the relationship between the various management styles and the applications for which they are considered most appropriate or inappropriate.
3. Predict probable effects of inappropriate management to specific situations.
4. Discuss the underlying assumptions to the notion of situational management styles.
5. Identify management styles which are probably inappropriate for given situations. |
| STEP 3 | **CRITERION OBJECTIVE**
Given a scenario which describes a management action which is a stereotype of a managerial style, explain why the style is probably appropriate or inappropriate to the situation based on guidelines developed in class. |
| STEP 4 | **CRITERION REFERENCED TEST ITEM**
SCENARIO: Lt Col Donald White is an experienced manager with many years of operational experience. He has had two combat tours and is much decorated. His record indicates that he is considered a good manager. His management experiences include supervising large numbers of enlisted persons and junior officers as well as clerical and technical civilians. He has recently been assigned to manage a small unit of professional civilians engaged in very advanced weapons research. As he prepares to assume his command, Lt Col White concludes that he probably ought to stick with the management style that got him where he is today. He is somewhat authoritarian but has always been respected by his subordinates. He feels comfortable with this style, has been successful with it in the past, and sees his management skills as being highly transferable from situation to situation.  
TEST ITEM: (Essay) Is Lt Col White likely to encounter a problem when he brings his previously successful management style to the new situation? Why or why not? Explain your position in about a page of analysis. While spelling, grammar, etc., are not to be counted, serious writing errors may affect the readability of your overall answer. |

Figure 22.4. The Four-Step Process Applied to a Comprehension-Level Principle Lesson
Table 22.4. Analysis of Figure 22.4

| Step 1. | This objective describes a principle in the form of a statement of relationship between two concepts; (1) the style of a manager, and (2) the situational aspects of management. Other generalizations usually stated in this way include rules, laws, and regulations. This objective may be more difficult to achieve because it specifies comprehension and requires prior understanding of the two concepts involved. The relationship between the concepts is the focus of this objective. Students will be required to show evidence of their ability to translate, interpret, or extrapolate using this principle to meet the objective. Refer to Chapters 4 and 8 for further discussion of comprehension-level lesson planning and the teaching of principles. |
| Step 2. | Students may be asked to show their understanding of this principle on a written test which cannot be answered by recall or recognition. Understanding of each of the concepts is not sufficient. Students will have to provide evidence that they can go beyond the discrete concepts and generalize to new instances where the principle (relationship) is applicable. For the purpose of illustration, Samples of Behavior #1 and #5 are carried on to Steps 3 and 4 of the process. Each of the other samples will work equally well as long as the anticipated learning outcomes require the students to be able to generalize on the principle taught. Refer to Chapters 4 and 8 for further discussion of samples of behavior and sampling principle objectives. |
| Step 3. | The sample of behavior is described in greater detail in the criterion objective. By knowing that this principle is to be tested through an essay item with a scenario, we can write very specific criterion objectives. Although a well-written multiple choice item could be used to test this sample, the essay item offers the additional advantage of being able to ask the students to explain their answer. The criterion objective is correct in that it requires the behavior from Step 2 (identifying inappropriate relationships between the concepts) and the level of learning from Step 1 (comprehension). Refer to Chapter 5 for further discussion of criterion objectives. |
| Step 4. | This test item is written to the specifications of the criterion objective (Step 3). For whatever reasons, an essay test item was designated in the criterion objective. Several other test item types could have been used to measure this sample (Step 2). See Figure 22.5 for an illustration of how the same sample of behavior may be used to generate several test item types. By answering this item correctly, students will be meeting the criterion objective and providing some evidence that they have reached the lesson objective (Step 1). If more evidence of mastery is needed, students may be tested on additional items which measure other behavioral samples of learning at the same level of learning (Steps 2 and 3). Refer to Chapter 21 for further discussion of writing appropriate test items, especially the sample essay test question and the sample scoring key for essay test items, for illustrations of a scoring key for an essay item. |
LEVEL-OF-LEARNING LESSON OBJECTIVE. Apply a decisionmaking model to solve common Air Force management problems.

SAMPLES OF BEHAVIOR

1. Solve selected management problems for which a decisionmaking model is considered appropriate.

2. Explain why a selected management problem is not an appropriate application for a particular decision-making model after recognizing that it is not appropriate from an inspection of a case study scenario.

3. Determine whether the solution to a real or hypothetical Air Force management problem is consistent with a solution derived from applying a decisionmaking model and explain any differences in the solution in terms of the processes used to generate them.

4. After determining that the proposed solution to a given management problem is inconsistent with a model, estimate the consequences to the organization as a result of the shortcomings in the proposed solutions.

CRITERION OBJECTIVE

Given an Air Force management problem involving the ineffective or inefficient use of human resources, generate at least two alternative solutions which show the correct application of a decisionmaking model; in addition to the acceptable alternatives, students must show reasonable evidence of the correct application of each of the steps of the model to the specific management problem.

CRITERION REFERENCED TEST ITEM

SCENARIO: The student would be provided with an appropriate scenario involving the ineffective or inefficient use of Air Force human resources such as the “Too Busy to Manage” case contained in the first lesson plan in Chapter 15.

TEST ITEM: Select and use an appropriate decisionmaking model to generate at least two alternative solutions to this problem. Write down your thoughts as you go through each step in the process. There will be no penalty for errors in spelling, grammar, etc., unless they interfere with the ability to understand what you have written. Your alternative solutions and your thought processes will be evaluated in terms of the model you have selected and used as we have interpreted it in class. There are no “school solutions” to this problem, but you must provide sufficient evidence to support your selection and use of the model.

Figure 22.5. The Four-Step Process Applied to an Application-Level Lesson
Table 22.5. Analysis of Figure 22.5

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>This objective demands a much higher level of understanding than any of the previous examples. To select and apply a decision-making model in this objective, students must already know a great number of facts and understand several concepts and principles. Because of the nature and complexity of the task, the objective is at the application level-of-learning. Students who are able to correctly apply a management model are functioning with a good deal of understanding. Refer to Chapters 4 and 9 for further discussion of application-level lesson planning.</td>
</tr>
<tr>
<td>2.</td>
<td>Answering a question about the concepts and principles at work in this model is not a sufficient indicator of learning. To satisfy this objective, students must actually select and apply a model to a decision-making situation. They must be able to put into practice what they appear to understand in theory. For the purpose of illustration, Sample of Behavior #1 is carried on to Steps 3 and 4 of the process. Each of the other samples will work equally well as long as the anticipated learning outcomes require the students to be able to apply the model taught. Refer to Chapters 4 and 9 for further discussion of samples of behavior and sampling application level objectives.</td>
</tr>
<tr>
<td>3.</td>
<td>The sample of behavior is described in greater detail in the criterion objective. By knowing that this behavior is to be tested through an essay item with a scenario, we can write very specific, but meaningful, criterion objectives. Although a well-written multiple choice item could be used to test this sample, the essay item offers the additional advantage of being able to ask the students to explain their answers. The criterion objective is correct in that it requires the behavior from Step 2 (solving a problem using a model) and the level of learning from Step 1 (application). Refer to Chapter 5 for further discussion of criterion objectives.</td>
</tr>
<tr>
<td>4.</td>
<td>This test item is written to the specifications of the criterion objective (Step 3). For whatever reasons, an essay test item was designated in the criterion objective. Several other test item types could have been used to measure this sample (Step 2). See Figure 22.5 for an illustration of how the same sample of behavior for an illustration of how the same sample of behavior may be used to generate several test item types. By answering this item correctly, students will be meeting the criterion objective and providing some evidence that they have reached the lesson objective (Step 1). If more evidence of mastery is needed, students may be tested on additional items which measure other behavioral samples of learning at the same level of learning (Steps 2 and 3). Refer to Chapter 21 for further discussion of writing appropriate test items, especially the sample essay test question and the sample scoring key for essay test items for illustrations of a scoring key for an essay item.</td>
</tr>
</tbody>
</table>
LEVEL-OF-LEARNING LESSON OBJECTIVE
Comprehend the concepts of Perennialism, Essentialism, Progressivism, and Reconstructionism as they relate to education.

SAMPLES OF BEHAVIOR
1. Define each concept.
2. Identify examples of each concept.
3. Compare the critical attributes of each concept.
4. Predict the reaction of a person identified with each of the concepts to a specific educational issue or innovation.
5. List the critical attributes missing from a scenario which would be necessary to illustrate a given concept.

CRITERION OBJECTIVE (For True/False Test Item)
Given a scenario which contains the essential elements of information for predicting the reaction to a specific educational issue or innovation by an Essentialist, Perennialist, Progressivist, and Reconstructionist and a prediction, select a true or false response to indicate whether the prediction is, in fact, correct.

CRITERION OBJECTIVE (For Matching Test Item)
Given (1) a scenario which describes a situation involving a specific educational issue or innovation, (2) a list of the educational philosophies identified in AI-620, and (3) a three alternative response which predicts the reaction of these philosophies to the specific issue, match the educational philosophy and the logical prediction correctly.

CRITERION OBJECTIVE (For Multiple Choice Item)
Given a scenario which contains a specific educational issue or innovation and three alternative predictions for the reaction of one of the major schools of educational philosophy according to AI-620, select the most logical prediction.

CRITERION OBJECTIVE (For Completion/Fill-in Test Item)
Given a prediction of one of the major schools of philosophy to a specific educational issue or innovation contained in a scenario but which is incomplete or has words omitted, write in the words necessary to complete or fill in the prediction correctly.

CRITERION OBJECTIVE (For Short Answer/Essay Test Item)
Given a scenario which describes a situation involving a specific educational issue or innovation and a list of the educational philosophies, correctly predict the reaction of each to the situation described.

SCENARIO: All questions below are based on the following scenario:
Audiovisual specialists do not need to know geometry or trigonometry to do their jobs. The audiovisual specialist course director, Captain Richard Kline, believes that all personnel should take geometry and trigonometry to increase their mental faculties. He has prepared a course proposal to submit to the school’s curriculum committee.

CRITERION REFERENCED TEST ITEM (True/False)
The curriculum committee, with a past voting record which is clearly Perennialist in nature, will probably support the proposal to require all audiovisual specialists to take geometry and trigonometry.

T ( ) F ( )

CRITERION REFERENCED TEST ITEM (Matching)
Match the predicted responses to the situation described in the scenario in column B with the major schools of educational philosophy listed in column A by placing the appropriate letter in the space provided. Each of the responses may be used once, more than once, or not at all.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Responses</td>
</tr>
<tr>
<td>( ) 1. Essentialism</td>
<td>a. “Yes, require all students to take these subjects.”</td>
</tr>
<tr>
<td>( ) 2. Perennialism</td>
<td>b. “No, students should not be required to take these subjects.”</td>
</tr>
<tr>
<td>( ) 3. Progressivism</td>
<td></td>
</tr>
<tr>
<td>( ) 4. Reconstructionism</td>
<td>c. There is insufficient information given to predict the reaction of a committee with this educational policy.”</td>
</tr>
</tbody>
</table>

CRITERION REFERENCED TEST ITEM (Multiple Choice)
From the situation described in the scenario, predict the vote of the curriculum committee:

( ) a. A committee with a Perennialist philosophy of education will support the proposal
( ) b. A committee with a Perennialist philosophy of education will not support the proposal
( ) c. There is insufficient information in the scenario to make a prediction.

CRITERION REFERENCED TEST ITEM (Completion/Fill-in)
In the situation described above, the vote of the curriculum committee with a Perennialist philosophy will be ____________________.

CRITERION REFERENCED TEST ITEM (Short Answer/Essay)
What will be the vote of a curriculum committee in the situation described above if the committee is clearly:
(1) Essentialist
(2) Perennialist
(3) Progressivist
(4) Reconstructionist

Figure 22.6. The Four-Step Process Applied to a Comprehension-Level Concept Lesson Showing Several Test Item Types Generated by the Same Sample of Behavior
Table 22.6. Analysis of Figure 22.6

1. In general, the analysis of Figure 22.3 applies to this figure as well. This is another example of a lesson in which several concepts are to be taught, then tested. These concepts happen to be philosophical theories as they relate to education. This general objective format applies equally well to several alternative theories of management, different doctrines of strategy and tactics, or alternative concepts of leadership.

2. This figure is unique from the previous examples in that it illustrates how the same sample of behavior (Step 2) can generate several alternative criterion objectives and test items. The criterion behavior in this sample is to “predict.” Whether the students let us know of their predictions by circling, checking, matching, filling in, or writing them out is not important. The sample of behavior is particularly valuable to the student as a study guide if we change test item formats from time to time, or if we intend to test the same behavior with more than one item type.

Each of the samples in all five illustrations (Figures 22.2 through 22.6) could be developed into the whole range of test items in the same way as shown for this one sample. We must again realize that the significant student behaviors for this objective include define, identify, compare, predict, and list. The actual student behaviors required to complete the answer to the test item—select, match, and write—are of no particular consequence. This illustration should further emphasize the importance of well-stated and appropriate samples of behavior. Again, regardless of the test item type, the ability to predict is what is important about the several test item examples in Figure 22.6.
Chapter 23
EVALUATION BY RATING

23.1 Introduction. When we evaluate student performance and traits, instructor observation and judgment are often the only satisfactory bases for evaluation. A paper-and-pencil test can measure understanding of administrative procedure, but we must exercise judgment to determine how well procedures are administered. It is possible to devise examination items to determine a supervisor’s understanding of management principles, but we need judgment to determine how well the person actually applies those principles on the job.

23.1.1 Rating instruments should be valid and reliable. Rating instruments are valid when they measure the trait or ability they are supposed to measure. Instructor ratings are reliable when they measure traits or abilities consistently. We determine the validity of a rating and supporting rating instruments in much the same way as we determine the validity for any measurement of learning. We may need to establish content, concurrent, or predictive validity for a rating instrument. Validity is the most important characteristic of rating instruments as well as other measures of learning. Refer to the section on validity in chapter 24 for further discussion of ways to establish validity.

23.1.2 The reliability of ratings is not difficult to determine. If we are rating supervisors on their ability to manage, we ask a number of qualified people to observe the performance and rate the supervisor. The extent to which the observers agree on the ability being rated is a measure of reliability. We can consider the rating highly reliable if the observers are in complete agreement.

23.1.3 Several people will rarely agree on the adjective describing the exact quality of a performance. Two observers who agree on the high quality of a performance may use different words to describe it in the rating. For example, in using the rating scale superior, excellent, good, fair, and unsatisfactory, one observer might describe a performance as “excellent” and the other describe the same performance as “superior.” Each may be trying to say the same thing in different words.

To avoid the apparent unreliability that arises from semantic difficulties, the instructor may use a scale that has numbers instead of words, such as:

```
|1|2|3|4|5|6|7|8|9|
```

Figure 23.1. Rating Scale

23.1.4 Observers using this scale to rate a performer on ability to drive a car might circle 9, if they thought the car was driven in the best possible manner; 1, if in the worst possible manner; 5, if average; and so on. However, simple numerical scales of this sort may provide observers with too meager a frame of reference. Numbers may mean the same things to an observer as the words did in the previous example. Numbers do have the advantage of appearing to be equally spaced, easier to rank, and easier to tabulate.

23.2 Rating Methods. For the purpose of rating student performance, the instructor must assign an absolute value to the trait, performance, or ability of a student without reference to the performance or ability of any other student. In effect, the instructor rates the person, trait, or performance according to a fixed scale. Our instructional objectives specify the scale to be used in the rating and the fixed point at which the rated performance is acceptable. Regardless of the number of points on a rating scale, we should divide the scale at some point into acceptable and unacceptable zones. Gradations within those zones are indications of how acceptable or unacceptable the instructor rated the performance when compared to the standard. The acceptable and unacceptable data from these ratings can be analyzed in the same criterion-referenced way as other test data. See chapter 24, Criterion Referenced Evaluation.

23.2.1 Numerical Scale. The simplest form of rating scale is the numerical scale. Any number of points on the scale are feasible, but an odd number is commonly used so that the center figure can stand for average or passing. The number of points on the scale should depend upon the number of differentiations required and upon the ability of instructors to differentiate.

23.2.1.1 Most instructors are able to make at least five differentiations, which break a group into those who far exceed standards, slightly exceed standards, meet standards, fall slightly below standards, and fall far below standards. Few trained instructors can reliably make more than nine differentiations. As a result, most rating scales contain five to nine points.

23.2.2 Descriptive Scale. The descriptive scale uses phrases to indicate levels of ability. Figure 23.1 shows a descriptive scale for rating pilot ability. Five levels of ability are described. Such a scale is more versatile than the numerical scale because the degrees of excellence can be varied to suit the occasion. For example, suppose an instructor wants to evaluate a particular student trait. He or she feels that all the students are notably satisfactory, but the course instructor wants to know to what degree each is better than satisfactory. A numerical scale might be useful, except for the common impression that the lowest numbers on the scale indicate very inferior performance. By using a descriptive scale, like the one shown in Figure 23.2, the instructor has a better frame of
reference. Here only the lowest rating possible is labeled unacceptable. All other ratings indicate degrees of acceptability. If we had used a numerical scale in this instance, instructors might have tended to shift ratings to the high end of the scale.

23.2.2.1 A good choice of descriptive phrases helps to reduce rating errors. If instructors do not use extreme descriptions, the categories at the end of the scale are less objectionable.

23.2.2.2 The major disadvantage of the use of descriptive scales is a semantic one. An “excellent” problem solver does not mean the same thing to all instructors. Another disadvantage is the difficulty in selecting phrases which describe degrees of performance that are equally spaced. When the scale shown in Figure 23.2 is used, most people feel there is less distance between “excellent” and “superior” than between “fair” and “good.” Well-written instructional objectives, with clearly defined standards for each point on the scale, can help to lessen this problem.

23.2.2.3 Graphic Scale. The graphic scale is a combination of the numerical and descriptive scales. Besides a numerical scale, various adjectives or phrases are set below a continuous horizontal line, which represents the range of the ability or trait being measured. In using the graphic scale, the instructor must consider the numerical range of the scale, the phrases which describe the various positions on the scale, and the point on the scale which is used to separate acceptable from unacceptable performance.

23.2.3.1 Three typical forms of the graphic scale are shown in Figure 23.3. In example A, the instructor is given instructions for judging the energy level of students. The instructor is instructed to mark the scale after considering energy and application to duties on a daily basis. These instructions help reduce rating errors and encourage instructors to consider the same things about each student.

23.2.3.2 Example B in Figure 23.3 shows a graphic scale in which certain types of behavior are described for each point on the scale. With most scales, the instructor must not only observe but also evaluate to form a rating. People can observe more accurately than they can evaluate what they have observed. The difficulty of evaluation increases errors of rating. When ratings can be based on observations alone, reliability is greatly improved. With the scale in example B, the instructor is required only to record, not evaluate, the actions of the person being rated. Hence, this type of graphic scale incorporates much objectivity. If a trained instructor observes accurately and records honestly in using this scale, most rating errors should be eliminated. In preparing this type of scale, the instructor must make sure that the behavior described for each point is actually an improvement over that for the point just below it. In each case, distances between the points should appear to be about equal.

23.2.3.3 The scale in example C is similar to that in example B except that descriptive phrases are not provided for all points on the scale. In some respects this is an improvement. Many times instructors feel that the rating should fall somewhere between two points. Such a rating is possible with this form of the graphic scale. The fuller descriptions in example C increase the likelihood that observed behavior can be pinpointed on the scale. Generally speaking, the more detailed the descriptions, the better the rating results. At some point, however, the descriptions may be too long to print directly on the rating form. At that point, brief descriptors may be used as reminders of the more detailed descriptions published elsewhere.

![INSTRUCTIONS: Place a check mark in the scale above the word that most describes the student being rated.](https://example.com/image.png)

Figure 23.2. Descriptive Scale for Rating Student Performance
Example A
Industry: Consider energy and application to duties day in and day out.

Example B
Cooperation: Demonstration of willingness to work with others.

Example C
Initiative: Action taken on own responsibility.

<table>
<thead>
<tr>
<th>UNSATISFACTORY</th>
<th>Satisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lazy</td>
<td>Diligent</td>
</tr>
<tr>
<td>Indifferent</td>
<td>Energetic</td>
</tr>
<tr>
<td>Untiring</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cooperation</th>
<th>Creates</th>
<th>Indifferent to friction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get along with most people.</td>
<td>A harmonious team worker.</td>
<td></td>
</tr>
<tr>
<td>Actively promotes harmony in working with others.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Slow to act, even when a decision is much needed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waits for others.</td>
<td>Takes needed action without delay.</td>
</tr>
<tr>
<td>Lets opportunities pass.</td>
<td>Volunteers for some tasks.</td>
</tr>
<tr>
<td>Does not volunteer.</td>
<td>Undertakes all routine jobs without supervision.</td>
</tr>
<tr>
<td>Reticent</td>
<td>Dependable</td>
</tr>
<tr>
<td></td>
<td>Anticipates needs. Works ahead and prepares for possibilities.</td>
</tr>
<tr>
<td></td>
<td>Actively seeks opportunities.</td>
</tr>
<tr>
<td></td>
<td>Eager.</td>
</tr>
</tbody>
</table>

Figure 23.3. Examples of Typical Forms of the Graphic Scale

23.2.4 Checklist. The checklist is sometimes considered a separate rating method, but actually it is a two-point rating scale. A checklist is useful for rating ability to perform a set procedure. It is also a simple method of rating skills when the purpose is to determine whether students have reached a certain minimum level, without regard to degrees of acceptable or unacceptable performance. Figure 23.4 shows a position of a checklist which might be used for rating instrument flying proficiency. In using the scale, the instructor indicates whether the completion of each step was satisfactory or unsatisfactory. Breaking a performance into many observable elements eliminates or reduces many rating errors.

23.2.4.1 Reliability is usually high in checklist rating because of the “go” or “no go” nature of the decisions required. For example, if apples are to be sorted into a hundred different categories, ranging from rotten to top quality, the possibility of error would be enormous. If the categories are reduced to rotten, partially rotten, fair, good, and excellent, the number of possible errors is greatly reduced. Fewer choices require fewer and less refined judgments. When the number of choices is reduced to two, rotten or sound, the chance for either error or bias is still further reduced, and reliability and objectivity improve correspondingly. Because of its many broad differentiations, the checklist is comparatively reliable.

---CHECKLIST---

INSTRUCTIONS: If the performance is satisfactory, place a + sign in the space provided. If the performance is unsatisfactory, place a - sign in the space.

1. Maintains constant heading .................. ——
   (within 5 o of course)
2. Maintains constant altitude .................. ——
   (within 50 feet)
3. Can make a timed turn (gyros caged) ... ——
   (within 10 o of new heading)
4. Can make a steep turn ...................... ——
   (within 50 feet of altitude)

Figure 23.4. Checklist for Rating Proficiency in Instrument Flying
23.2.4.2 On the debit side, however, only a limited amount of information can be obtained from a checklist. For example, the checklist in Figure 23.4 does not indicate how far above or below standard the satisfactory pilot performed each maneuver. For purposes of an instrument check, the information obtained would be sufficient to determine whether each pilot has reached a certain minimum level of proficiency but little else.

23.2.5 Product Scale. At times, we rate the tangible product of a performance, rather than the performance itself. Figure 23.5 shows a product scale for rating the ability to fly an instrument trainer. We require the pilots being tested to fly a pattern which corresponds to the pattern shown at A. At the completion of the exercise, we compare the pattern produced to the patterns on the scale.

23.2.5.1 If followed carefully, this procedure can eliminate nearly all rating errors. The scale provides a tangible standard which a rater can use to measure the product. Product scales tend to reduce or eliminate most rater errors.

23.2.6 Forced Choice. Another approach to performance rating is the forced choice technique which uses two to five descriptions of behavior in each block. Both favorable and unfavorable statements may be included in a block. Most rating instruments contain 25 to 30 blocks. Figure 23.6 shows a single block containing four descriptions—two favorable and two unfavorable. The rater is asked to select the statement that is most characteristic and the one that is least characteristic. Although the favorable and unfavorable statements are easily distinguished, the rater does not know whether A or B receives more credit.

23.2.6.1 The decision is so precise that the observers are usually forced to ignore their general impression and think back to specific instances of behavior. Because the rater reports behavior without being permitted to judge the quality of the behavior, reliability is greatly improved.

23.2.6.2 An objection to the forced-choice technique is that considerable research is necessary to produce a scale for any given purpose and to devise a fair method of keying the responses. For example, before the scale is constructed, items that are known to differentiate between good and poor performances are paired with items that do not differentiate. Both items in the pair must be shown to have approximately equal appeal to the rater. Because of such factors, instructors seldom try to construct forced-choice rating scales.

23.2.7 Other Rating Scales. The scales which have been described so far are probably the most common. Except for the forced-choice, most of the scales considered (or variations of them) can be designed by classroom instructors. Naturally, they should be constructed carefully to serve specific purposes and keyed to carefully written instructional objectives.

23.2.7.1 It is possible but quite difficult to use these more sophisticated rating scales in a criterion-referenced situation. Generally speaking, better data for criterion-referenced testing is obtained through numerical scales, descriptive scales, graphic scales, checklists, and product scales.

23.3 Constructing The Rating Device. The process for constructing a rating instrument involves certain general steps which will naturally vary according to the type of scale being made. In all cases, however, the type of rating scale to be used is dictated by the performance or trait to be measured as described in the instructional objective.

23.3.1 Determine Objective and Purpose. The initial step is the same as that for constructing any other measuring instrument—to determine the objective and carefully define it in terms of observable behavior. See chapter 3, Writing Student-Centered Objectives and Tests. An objective may be to determine a student's
effectiveness in a particular skill, to evaluate the level of achievement in performing a complex task, or to predict the proficiency in applying what has been learned. After the objective has been clearly defined, the task is to determine not only what to evaluate (the objective), but also why the evaluation is to be made (the purpose).

**Table 23.1. Rating Scales**

<table>
<thead>
<tr>
<th>Rating Scales</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sociometric Techniques</strong></td>
<td>This allows individuals to rate themselves or rate others according to their performance in a group. Some sociometric techniques are useful to evaluate social traits and attitudes. Others can be applied in the classroom to judge the amount or quality of participation by students in projects and discussions. Some techniques employ diagrams, often called sociograms, which are easy for an instructor to use.</td>
</tr>
<tr>
<td><strong>Q-Techniques</strong></td>
<td>This is a type of rank order scaling. It rates traits as well as performances of students and teachers. Often the rater sorts and scores a predetermined set of descriptive terms or makes a selection of terms after a specific period of observation.</td>
</tr>
<tr>
<td><strong>Semantic Differential Scale</strong></td>
<td>These depend upon key words with opposite meanings. The words are placed at opposite ends of a line with numbers representing a spectrum of values, in this manner:</td>
</tr>
<tr>
<td></td>
<td>autocratic 1 2 3 4 5 6 7 8 democratic</td>
</tr>
<tr>
<td></td>
<td>Surprising success has been reported by researchers working with such scales.</td>
</tr>
<tr>
<td><strong>Self-Anchoraging Scales</strong></td>
<td>These use the rater’s opinion as a point of departure and are frequently written for self-evaluation. One might begin: Here are the numbers 1 through 10. Let 1 represent the untrained beginning instructor, and let 10 represent the ideal master instructor. Now circle the number which you feel best represents your ability level as an instructor today. From this point, instructors can estimate their ability in the past and future or even estimate the abilities of others.</td>
</tr>
</tbody>
</table>

**23.3.2 Select Traits or Factors.** This step requires careful consideration of the job which the subject is now or will be doing. In the light of the objective and purpose of the rating, what traits or factors determine the success or failure of the person being rated? Selected traits or factors must be critical, observable, distinguishable, specific, differentiating, and limited in number.

**23.3.2.1** Select only traits or factors that are critical or essential to the person’s success. If promptness is not a trait that must be considered to determine a degree of proficiency do not include it. On the other hand, if it is essential and an objective of your course, it must be included to make the rating valid. The fact that a trait is highly important or desirable in a rating is no guarantee that it is essential.

**23.3.2.2** Select traits or factors that are observable. Ratings must be based on what instructors can see, rather than on their interpretation of the situation. Base the rating upon an eyewitness report, rather than upon circumstantial evidence.

**23.3.2.3** Select traits or factors that are distinguishable. If the traits are so closely related that a rating on one ensures a similar rating on the other, logical error and loss of comprehensiveness will lower the validity of the rating.

**23.3.2.4** Select traits or factors that can be defined in terms which have the same meaning for all instructors.

**23.3.2.5** Select traits or factors that are specific and definite, rather than vague or general in nature.

**23.3.2.6** After studying the traits that seem to meet the criteria, eliminate those which do not differentiate. If all people possess the trait and all who possess it have it to the same degree or level, it can serve no useful purpose in the rating scale.

**23.3.2.7** The number of traits may vary from four to 10. Fewer than four rarely provides an adequate sampling—
that is, there are nearly always at least four appropriate critical factors in a human performance of any kind. More than 10 traits usually tend to overlap. At any rate, instructors will be overburdened if they are expected to watch for too many factors. Accurate observations of a critical sampling are superior to sporadic observations of a bulky list of traits.

23.3.3 Define Traits. The traits or factors selected must be clearly and accurately defined in terms of observable behavior which is pertinent to the situation. Definitions should show what students do rather than how well they do. For example, voice (as used by a drill instructor) might be appropriately defined as “volume and clarity in giving commands.” Such comments as “uses voice well” or “an able and effective communicator” are inadequate. The first gives no guidance as to what is to be considered under voice and the second is, in itself, an evaluation.

23.3.4 Determine Degrees of Success. The levels of performance should relate to the purpose of the evaluation and the instructor’s ability to differentiate. If the pulse of the rating is to identify only three groups—poor, average, and good—there is no justification for using a five-point scale. If the nature of the evaluation is such that the rater can identify or distinguish between only two levels of performance, a scale of seven or more levels of attainment would be inappropriate.

23.3.5 Describe Degrees of Success. Each degree of success or level of performance in each trait or factor should be described in terms of observable behavior. These word pictures indicate how well the person performs. Quality of performance rather than frequency should be stressed.

23.3.6 Assign Weights. Determine how important each factor is and weight it accordingly. It is possible that all factors are not of equal importance.

<table>
<thead>
<tr>
<th>POINT VALUE</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Technical</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>35</td>
</tr>
</tbody>
</table>

Table 23.2. Example Of A Rating System For Two Duty Assignments, One Administrative And The Other Technical

23.3.6.1 The weight given each factor can be determined by pooling the opinions of several persons thoroughly familiar with the situation with performance requirements specified in the instructional objective or supporting documents. These weights should be examined after the scale has been used. Then it will be possible to determine if the ratings actually differentiate between those who are effective and those who are ineffective on the job.

23.3.7 Validate. A validation study is a method or procedure used to examine, review, and improve the rating instrument itself. In the validation of a rating scale, the following considerations are important.

23.3.7.1 Base the study on a significant number of cases, normally 50 to 100. With small groups, it may be necessary to use the scale several times before attempting to validate it.

23.3.7.2 In order to determine the reactions of raters, compare the ratings of one individual made by several raters, as well as the ratings of several individuals made by a number of raters.

23.3.7.3 Note variations in ratings and determine the cause. The most common causes of variations are poor definition of traits, inadequate description of levels of performance, and improper weighting. See Chapter 20, Introduction to Evaluation, and Chapter 24, Criterion-referenced Evaluation.

23.3.7.4 Validation of the rating scale is a continuous process. If the instructor does not analyze, critique, and improve the rating instrument, it will not serve its intended purpose.

23.4 Common Rating Errors. Instructors may differ in their ratings when scales are used to record observations and judgments of quality. These differences are often called rating errors. Numerous attempts have been made to identify and categorize the errors that occur when rating scales are used. Some errors appear to be caused by the design of the scale, some occur only with certain groups of observers, and some happen with individual observers. Some observers are subject to errors when rating all persons, some when rating certain groups, and some when rating only certain individuals. Other errors occur only when certain traits or attributes of students are rated.

23.4.1 Errors can be classified into four broad groups: error of central tendency, error of standards, error of halo, and logical error. The first two kinds of errors, central tendency and standards, affect all students rated by an instructor who is subject to either of the errors. The third type of error, halo, affects only certain students within a group. The fourth, logical error, appears only when two or more traits of students are being rated. These common errors may all be reduced, and some may be eliminated through the training of instructors and the careful design of a rating scale.
23.4.1.1 Error of Central Tendency. Many instructors hesitate to give either extremely good or extremely bad ratings and tend to group their ratings close to the center of the scale. Central tendency occurs most commonly with inexperienced instructors. Even with experienced instructors, this error may appear when rating personal qualities or abilities that are difficult to identify, such as teaching ability or personality. An analysis of a number of ratings made by a single instructor may reveal the error of central tendency. Using a nine-point scale, an observer made 100 ratings of administrative ability, all of which were either 4, 5, or 6 (Figure 23.7). In a sample of 100 people, it could be assumed that administrative ability would vary more and that the observer made an error of central tendency.

23.4.1.1.1 Some observers place too many ratings at the extremes and too few near the center of the scale, but this tendency is rare. Although the error is the opposite of central tendency, it may be considered in that category.

23.4.1.2 Error of Standards. Some instructors tend to overrate or underrate because of the differences in their standards. Standards of physical measurement are fixed units—inches, centimeters, ounces, and grams. But in rating with only mental standards for comparison, there may be as many different standards as individual instructors.

23.4.1.2.1 Well-trained and experienced instructors usually distribute their ratings similarly. This agreement in ratings usually indicates that similar standards are used. Inexperienced and untrained instructors are less likely to have similar distributions.

23.4.1.2.2 Thirty persons, representing an average group, were simultaneously rated on a single trait by instructors A and B who had different interpretations of the standards of acceptability for that trait. The differences in standard are reflected by the ratings in Figure 23.8. If A and B were to rate an additional group of 30 persons, their standards should probably be more nearly alike. As A and B receive more training and gain experience in rating this trait, their distributions should tend to agree more closely, particularly as they relate to the point of acceptable or unacceptable behavior.

23.4.1.2.3 If instructors A and B were already experienced raters, it would appear that A has a strict interpretation of the standards and B has a lenient interpretation. If experienced instructors have consistent yet quite different interpretations of standards training should reduce the differences. One partial administrative correction procedure would be either to add a certain number to all of A’s ratings or to subtract that number from all of B’s; another would be to add to A’s ratings and subtract from B’s. An effective correction procedure can be determined after comparing the ratings given by A and B with the ratings of several other competent instructors. Better still, the course director can inform instructors A and B of their error in standards, give them further training, and encourage them to make more consistent yet correct ratings.

23.4.1.3 Error of Halo. Instructors sometimes allow their rating of performance to be influenced by their general impression of the student. Such an impression is usually formed on the basis of observations or knowledge that have little or nothing to do with the rating. If allowed to influence judgment, this outside influence would result in an upward or downward shift of all
ratings. This shift is called an error of halo. If instructors are favorably impressed, they may rate students too high. If they are unfavorably impressed, the shift is toward the low end of the scale. It should be noted that halo error can be either favorable or unfavorable, and that it may affect only certain persons being rated.

23.4.1.3.1 Halo error can be traced to the likes, dislikes, opinions, prejudices, and moods of raters. When considering friends or close acquaintances, instructors may tend to give undeserved high ratings on all favorable traits. Such a halo error is often called error of leniency.

23.4.1.3.2 Some people believe that close-set eyes show dishonesty. An instructor who holds this belief is likely to be affected by it when rating a student with close-set eyes. Some people have preconceived concepts about certain racial groups. They may believe that one group is industrious, another thrifty, yet another excitable. Others have an aversion to or a special liking for religious groups. All these preconceptions may influence instructors. When halo error is traced to such sources, it is sometimes called error of stereotype.

23.4.1.3.3 Jones and nine other instructors simultaneously rated six persons on teaching ability. In Figure 23.9, all 10 instructors agreed reasonably well on the teaching ability of five of the six persons rated. All but Jones agreed on the teaching ability of the sixth (E). Apparently Jones allowed some general impression regarding E to influence the rating unduly.

![Figure 23.9. Halo Error - Ten Ratings of Six Persons (0 indicates Jones’ Ratings; X the Others)](image)

23.4.1.3.4 The error of halo may be suspected in some situations, but frequently goes undetected. Halo errors can be positively identified only when many competent and experienced instructors rate a number of persons under identical conditions. Usually only extreme cases are detected, even under controlled conditions. The simultaneous use of a large number of instructors is often uneconomical and administratively inadvisable. Even when halo error has been identified, its reappearance cannot usually be predicted. It is the most difficult error to overcome.

23.4.1.4 Logical Error. A logical error may occur when two or more traits are being rated. It is present if an instructor tends to give similar ratings to traits which do not necessarily go together. For example, some instructors may think that a person who is industrious is also efficient, or that a person who is prompt is also industrious. Industrious persons may often be efficient, but not necessarily so.

23.4.1.4.1 The term logical error is used to mean that the traits are related in the mind of the person making the error. The relationship may not appear to be logical to someone else. As a matter of fact, the instructor who exhibits an error of this sort is probably not really aware of it.

23.4.1.4.2 Six observers (A, B, C, D, E, and F) rated a certain person on four traits—industry, promptness, efficiency, and courtesy. Their ratings are shown in Figure 23.10. On three of the traits the six observers agree reasonably well. However, E gave a much higher rating on efficiency than did the other observers. Since E assigned the same rating to both efficiency and industry, it appears that the instructor thinks industry and efficiency are much the same, a logical error. There may be many reasons for this error: E may not have had adequate opportunity to observe the performer’s efficiency, may have an erroneous conception of efficiency, or may not be able to distinguish between efficiency and industry. In any event, in rating efficiency, E and the other instructors have not rated the same thing; in effect, E rated either efficiency or industry twice.

23.5 Improving Ratings. Ratings can be improved and errors reduced or eliminated by using well-constructed scales, but greater improvement is possible through the training of raters. Satisfactory reliability can be achieved only when an instructor has gained experience in rating and is familiar with all causes of error. Instructors should thoroughly understand the common rating errors, correct rating procedures, and the various rating techniques. The more an instructor knows about causes of unreliability the easier it is for that instructor to avoid errors.
Summary. Since rating contains, by definition, a subjective element, it is subject to the following types of errors: logical, central tendency, standards, and halo. Despite these possible errors, the rating process may be the most effective method available for the evaluation of a person’s overall ability or the quality of performance. Because of common rating errors, differences in ratings may indicate the ability of the instructor to rate rather than the actual differences between the people rated. In view of that possibility, frequent analysis of rating results is necessary.

Instructors can further improve ratings through careful consideration of the various steps in the construction of the rating scale, and most important of all, by thorough and continuous training.

23.6.1 For additional examples of rating instruments, see chapter 10, Writing and Measuring Affective Objectives; the lesson plans which follow Chapter 17, The Demonstration-Performance Method; and the appendix to Chapter 26, Using Feedback in the Classroom.

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![Logical Error Ratings by Six Observers, A Through F](image-url)
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Chapter 24
CRITERION-REFERENCED EVALUATION

24.1 Introduction. Tests should measure how well students meet our instructional objectives. From true or false tests to simulated war games, we gather measurement data to compare student performance to what we intended to teach. Before we start to teach, tests tell us which students need some or all of what we have to offer. During the course of instruction, tests tell us and our students how they are progressing. At the end of instruction, tests tell us whether individuals have achieved each instructional objective. Whether given before, during, or after instruction, a test which measures carefully written measurable objectives is said to be a criterion-referenced test (CRT).

24.1.1 Some of the special devices we use to report and analyze CRT items are the focus of this chapter. Generally speaking, these devices are different from the ones we have used for many years, or they are old approaches to test analysis with a new point of view brought on by our increasing use of student-centered objectives. For one thing, we are no longer as concerned about using test data to rank order students or to give comparative grades (such as A, B, C). So-called norm-referenced testing (see Chapter 25) is of secondary importance. The primary concern is to measure, report, and analyze student performance as it relates to specific, significant instructional objectives.

24.1.2 The placing of norm-referenced testing and analysis in a secondary role may be the most difficult concept to accept in this manual. See Chapter 25 for a detailed discussion of the use of test data in norm-referenced applications. Most of us have experience with normative testing systems. We have consciously or unconsciously grown to expect tests and test data to be used to rank order or compare students to each other.

24.1.3 We are concerned about how many students passed with a score of 70 percent, or what percentage of test takers are distinguished graduates. But we often forget the primary purpose of evaluation programs in Air Force schools: to measure student achievement of instructional objectives. No other use of test data should interfere with our need to compare what students can do to what they ought to be able to do, as described by our instructional objectives.

24.1.4 It is important, then, to become familiar with the ways we can obtain, report, and analyze criterion-referenced test (CRT) data. Chapters 3-5 and 20-23 describe in detail the techniques needed to obtain CRT data from well-written objectives and tests. In the remainder of this chapter, we will discuss useful ways in which CRT data may be reported and analyzed.

24.2 A CRT Reporting Format. We have better ways to report CRT data than percentage test scores or traditional letter grades. Neither of these old standbys tells us what we really need to know. Yes, they do tell us how our students performed relative to others in the class. But the more important question is: Did any or all of the group members reach the course objectives? Relative grading does not report that critical piece of information.

24.2.1 A better way to present CRT data is a simple reporting grid. Already in use in many schools, such a grid lists the objectives to be mastered along one axis and the names of individual students along the other. As each student passes a measure of each objective, an appropriate notation is recorded in the correct square on the grid. If overall class performance on specific objectives is of interest, we can tally individual scores and report the number or percentage of the group who have achieved the objectives.

24.2.2 Table 24.1 illustrates a quite simple reporting format for CRT test data. In this example, CRT test results show how each student is progressing in the course based on performance on CRT’s. Each CRT gives us pass or fail or “go” or “no go” data of each student for each objective. Student A achieved two of the objectives but failed an attempt at passing a CRT on the third objective. Student D attempted and passed a CRT on each of the four objectives. Student E failed the CRT for objective 1 and has been unable to go on to the other objectives.

24.2.3 We can make many sophisticated variations to this simple grid, but the basic idea remains the same. In order to analyze the effectiveness of our instructional program, we need to test and report CRT data for each student on each objective.

24.2.4 Table 24.2 is a more sophisticated reporting format but achieves the same basic purposes as table 24-1. Actual test scores are reported in Table 24.2, and the standard for passing is shown. For example, student D scored only 43 on objective 1 and failed because a minimum passing score of 85 is required by the instructional objective. This student passed objective 2 with a score of 13, with 9 listed as the minimum passing score. Student D also scored what appears to be a very fine 98 on objective 3 but failed that objective because the standard is 100. On the fourth objective, student D received a passing rating for a task which has no numerical value and which is simply rated “pass” or “fail.” Overall, student D failed, or at least has not yet satisfactorily completed, the course of study. The data on the far right of the grid show that school minimum passing grade is at least three of the four stated objectives. Student D achieved only two objectives—one short of the required minimum. Student D performed well above standard and well above all other students in the group on objective 2. But since test results on
individual objectives are not averaged, outstanding performance on one objective cannot make up for poor performance on others. No averaging, grading on a curve, or use of other leveling devices is another significant difference between CRT analysis and more traditional normative techniques.

24.2.5 An even more detailed display of CRT data is illustrated in Table 24.3. This table displays two important additional items of data not found in Tables 24.1 and 24.2. (1) The number of behavioral samples (keyed to the actual number of the test item) used to measure achievement of the objective, and (2) The level of performance on the test items (mastery level) which is required to show satisfactory achievement of the objective.

24.2.6 In the example in Table 24.3, student #226638 has attempted to pass three objectives. The data from this grid reveal that objective 1 was not passed but objectives 2 and 3 were (see bottom line of grid, MASTERY DECISION). The data reported for each objective support the pass or fail decision. Five different samples of behavior were tested for objective 1 (samples 1-5). Each of these samples was tested by a single test item (items 8-12). The pass or fail data for objective 1 show that this student failed items 8 and 10 but passed items 9, 11, and 12. The mastery level for this objective is set at 4 of 5 items passed. Therefore, the student failed to achieve objective 1, and this is so indicated by the word “No” on the bottom indicating the mastery decision.

24.2.7 Data for objective 2 reveal that this student did pass the objective by answering 4 of 5 test items correctly. As the minimum standard is 4 of 5, a “Yes” is entered on the bottom indicating the mastery decision.

24.2.8 The student also passed objective 3, but the data reveal that the test on this objective was put together a little differently and the mastery level has changed. Only two samples are being measured for objective 3, although there are four test items. This may be a math objective where more than one problem is typically tested on the same math function. Also note that there are only four test items for this objective instead of five as for objectives 1 and 2. We can test any number of behavioral samples with any number of test items we choose. In objectives 1 and 2, we tested five samples each with one test item for each sample. For objective 3, we tested only two samples but used two test items for each sample. In each case, the number of samples tested and the number of test items is a value judgment on our part. It is a value judgment in the sense that there may be no precise statistical data or job data which help us make a decision on the number of samples to be tested. We may have to rely heavily on expert opinion to decide what level of performance is acceptable and what level is not.

24.2.8.1 CRT And Group Performance. Close in importance to the data on individual students is data on the performance of the group. Table 24-2 gives us totals about the class as a whole so we can evaluate course effectiveness. CRT analysis shows that no objective was mastered by all of the students—an important fact for school managers. Further, students achieved only 10 of 16 objectives (4 students X 4 objectives). These data may raise further questions about the effectiveness of the curriculum or at least about the efficient and effective use of Air Force resources.

24.2.8.1.1 Tables 24.1 through 24.3 report individual student achievement of course objectives. We determine how well students have mastered these objectives by tests which measure carefully stated objectives. This display of CRT data for analysis reports the outputs of these courses. We can make the grids more sophisticated, if required, by adding items such as the number of attempts to pass each CRT, the dates of the CRT, and the length of instructional time between CRT’s.

24.2.8.1.2 Some of the data from these grids could be used to rank order student performance so as to arrive at comparative grades or distinguished graduates. However, these uses of the data should not interfere with the primary purpose of CRT analysis: to account for the performance of each student on each objective. One unique way, then, to use the data from these figures to compare students is to rank them by the number of objectives achieved rather than the average of their test scores or letter grades. Based on CRT data, the ranking for students in Table 24.2 is (1) student C, (2) student B, (3) student D, and (4) student A.

<table>
<thead>
<tr>
<th>Student</th>
<th>Objective 1</th>
<th>Objective 2</th>
<th>Objective 3</th>
<th>Objective 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>B</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>C</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>D</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>E</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 24.2. Detailed Reporting Format for CRT Test Data

<table>
<thead>
<tr>
<th>Objective</th>
<th>RAW SCORE</th>
<th>STD P/F</th>
<th>RAW SCORE</th>
<th>STD P/F</th>
<th>RAW SCORE</th>
<th>STD P/F</th>
<th>P/F</th>
<th>P/F</th>
<th>TOTAL OJB'S PASSED</th>
<th>MINIMUM COURSE STANDARD</th>
<th>COURSE GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>80</td>
<td>F</td>
<td>5</td>
<td>9</td>
<td>F</td>
<td>97</td>
<td>100</td>
<td>P</td>
<td>1</td>
<td>3 of 4</td>
<td>Fail</td>
</tr>
<tr>
<td>Student B</td>
<td>85</td>
<td>P</td>
<td>11</td>
<td>9</td>
<td>P</td>
<td>100</td>
<td>100</td>
<td>P</td>
<td>3</td>
<td>3 of 4</td>
<td>Pass</td>
</tr>
<tr>
<td>Student C</td>
<td>97</td>
<td>P</td>
<td>9</td>
<td>9</td>
<td>P</td>
<td>100</td>
<td>100</td>
<td>P</td>
<td>4</td>
<td>3 of 4</td>
<td>Pass</td>
</tr>
<tr>
<td>Student D</td>
<td>43</td>
<td>F</td>
<td>13</td>
<td>9</td>
<td>P</td>
<td>98</td>
<td>100</td>
<td>F</td>
<td>2</td>
<td>3 of 4</td>
<td>Fail</td>
</tr>
<tr>
<td>Totals</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Pass</td>
<td>3 Pass</td>
<td>2 Pass</td>
</tr>
</tbody>
</table>

Table 24.3. Summary Table of Mastery or Non-mastery by Curriculum Objectives for a Single Student

| STUDENT RECORD #226638 | OBJECTIVE 1 BEHAVIORAL SAMPLE | TEST ITEM # | PASS/FAIL |  | OBJECTIVE 2 BEHAVIORAL SAMPLE | TEST ITEM # | PASS/FAIL |  | OBJECTIVE 3 BEHAVIORAL SAMPLE | TEST ITEM # | PASS/FAIL |
|------------------------|--------------------------------|--------------|-----------|  |--------------------------------|--------------|-----------|  |--------------------------------|--------------|-----------|
| 1                      | 8                              | F            | Fail      |  | 2                              | 16           | P         | Pass | 1                              | 1            | P         |
| 2                      | 9                              | P            | Pass      |  | 3                              | 22           | F         | Fail  | 1                              | 2            | P         |
| 3                      | 10                             | F            | Fail      |  | 6                              | 23           | P         | Pass  | 2                              | 7            | F         |
| 4                      | 11                             | P            | Pass      |  | 7                              | 24           | P         | Pass  | 2                              | 17           | P         |
| 5                      | 12                             | P            | Pass      |  | 8                              | 30           | P         | Pass  |                                |              |           |
| SUMMARY MASTERY LEVEL (PASSING) | 4 of 5           |             |           |  | 4 of 5                         |              |           |       | 3 of 4                         |              |           |
| MASTERY DECISION (PASS?) | Yes                           |             |           |  | Yes                            |              |           |       | Yes                            |              |           |

24.2.8.2 The Ideal CRT Pretest or Posttest Situation. Ideally, none of the students who come to our schools for group instruction should already be masters of our course objectives. If they are able to perform at the level described in our instructional objectives, they don’t need the school. By the same token, all students who complete our course should, ideally, have mastered all of the instructional objectives. If the objectives really satisfy Air Force needs and if we really teach and test with a focus on the objectives, we should have all students meet all objectives. This is an ideal we may never achieve, but it is an ideal toward which we work.

24.2.8.2.1 If too many students show up in our classrooms already knowing what we intend to teach, we are wasting time and resources by making them take the course. To reduce the number of students who show in a pretest that they do not need some or all of our school, we can take some of the following actions.

24.2.8.2.1.1 More carefully describe prerequisites and course objectives to eliminate overlap between courses.

24.2.8.2.1.2 Design special tracks for individuals through self-paced, individualized instruction rather than lock-step group instruction.

24.2.8.2.2 If we must use large group instruction with instruction time as a constant, we may have to settle for less than 100 percent of the student body achieving all course objectives. We should not take lightly, however, the figure that we do settle for. It may be more reasonable to accept a lesser goal because of scarce resources, limited time, or lack of specific student motivation or aptitude. The effectiveness of group instruction is often judged by arbitrary standards such as 90 percent of the students will achieve 90 percent of the objectives (or 80 percent of the students will achieve 80 percent of the objectives). These figures may seem far more reasonable than the 100 percent of the students achieving 100 percent of the objectives, but we must realize that the 90 percent/90 percent standard means that we are satisfied with the course if 81 percent of possible objectives are achieved (90 percent of possible objectives X 90 percent of the student body to achieve them). In applying the 90 percent/90 percent criterion to a course with 20 objectives and 50 students (a possible total of 1,000 objectives to be achieved), we would need

24.2.8.2.1.3 Provide exemption procedures which allow students to skip some or all of a course while still receiving credit based on a pretest.

24.2.8.2.2.1 If too many students show up in our classrooms already knowing what we intend to teach, we are wasting time and resources by making them take the course. To reduce the number of students who show in a pretest that they do not need some or all of our school, we can take some of the following actions.

24.2.8.2.1.1 More carefully describe prerequisites and course objectives to eliminate overlap between courses.

24.2.8.2.1.2 Design special tracks for individuals through self-paced, individualized instruction rather than lock-step group instruction.
to accomplish only 810 objectives overall (18 objectives X 45 students) to consider group instruction to be successful.

24.2.8.2.3 There are no statistical techniques to tell us what pretest and posttest percentages are acceptable. Statistics do not make decisions for us; they simply give us data for decision making. Value judgments are ours to make, and we need to make a value judgment on acceptable pretest and posttest percentages. We can arrive at these value judgments in many ways, some of which have little or no educational basis. The decisions may be influenced by personnel problems, economic factors, or other considerations.

24.3 CRT Item Analysis. Since the term criterion-referenced was first introduced in 1962, there has been a great deal of research to improve methods of evaluating student performance against established standards as opposed to the traditional norm-referenced methods of evaluating students comparatively. As a result of that research, there have been a number of different statistical formulas developed to use in CRT Item Analysis. We will look at two formulas that are very effective in giving us useful data in determining the effectiveness of criterion-referenced evaluation programs.

24.3.1 Ease Index (EI). As indicated earlier, the ideal CRT situation includes a pretest and a posttest. These will give us information about what the students know about our objectives before taking our course (nonmasters) and then measures how much was learned as a result of our course (masters). To make this comparison, we must look at each individual test item to get an idea of how easy or difficult the item is. If a majority of our students are answering a particular item correctly, this indicates that the students know the objective tested (provided it is a well-constructed and valid test item, see Chapter 21).

24.3.1.1 The EI is found by identifying the number of students who correctly answered the test item (R) divided by the number of students who took the test (N). This total is then multiplied by 100 to give a percentage.

Table 24.4. Ease Index Formula

| R = Number who answered item correctly, divided by, N = Number who took the test, multiplied by 100. | 20/100 = .20 = 20% EI |

24.3.1.2 This formula is frequently used for both criterion and norm-referenced evaluation. Although the statistical results will be the same, the interpretation of the results will differ (see Chapter 25 for norm-referenced interpretation).

24.3.1.3 In the above case, the 20 percent EI tells us that the students generally found this test item difficult. For a pretest, this may well be an indicator that the students need to be taught the material. If this were the EI for a test item after the material has been taught, it might indicate that there was limited learning of this particular item. However, it is important to remember that the numbers are only an indicator. They do not identify or solve problems. They should get our attention to give us an idea of how our educational program is working.

24.3.1.4 When using the EI with a pretest in CRT, an EI of 50 percent or above on a given item in a pretest is considered unacceptable. The 50 percent point is an arbitrary number and the actual cut-off point or standard for a pretest item is a decision that depends on the school objectives, curriculum, and a wide variety of data.

24.3.1.5 When using the EI with a posttest in CRT, an EI of less than 80 percent may be considered unacceptable. After having taught the material, if we have constructed test items well, the students should perform much better on the test. Much like a 50 percent EI on a pretest (nonmasters), the 80 percent EI for a given item on a posttest (masters) is an arbitrary figure. This figure may vary depending on a number of educational factors and value judgments.

24.3.1.6 By looking at the EI of individual test items on pretests and posttests, we can gain a great deal of generalized information that becomes valuable in managing an educational program. As a result of using the EI formula, we can gain insight into how much educational growth has taken place.

24.3.2 Differentiation Index (DI). The Cox & Vargas differentiation index simply measures the difference between the EI of a test item on the pretest and that same item on a posttest. More often than not, when using criterion-referenced analysis, the same test items are used for the pretest and posttest. Although this is not the only method used in CRT item analysis, it is a very effective method and provides very usable data.

24.3.2.1 The Cox & Vargas DI is found by subtracting the EI of a given test item on the pretest from the EI of the same item on the posttest. The difference is an indicator of the growth for that item from the pretest to the posttest. Once again, it is critical to keep in mind that the statistics from any test item analysis are only indicators that problems may exist. They do not identify the nature of these possible problems. When using written evaluation instruments, a number of concerns that should be looked at are the construction of the item, its validity, how the material is taught, and other factors which influence test taking. However, statistical analysis does give us some strong indicators and wave a red flag to get our attention when potential problems are indicated in individual test items.

24.3.3 The Ideal CRT Item Situation. The ideal situation for any individual CRT item is much like that for the overall test. When any group of students arrives at our school, we should test them to determine their need for our instruction. We may find that they know...
nothing about one, several, or all of our objectives. The less they know, as shown by the pretest, the more ideal the situation; the more they need our course. Our selection and screening procedures have worked.

24.3.3.1 In the previous section on the ideal overall pretest and posttest situation, we discussed objectives as a group and the value judgments involved in setting an overall pretest or posttest standard. As we look at individual CRT items which measure objectives, however, we need to examine the items one by one. An analysis of group performance on each item in a CRT can be a powerful tool for managing the curriculum. In Table 24.5 we have data on three test items from a CRT pretest and posttest. In this example, each test item happens to sample different objective, but the same discussion would apply if all test items measured the same objective.

Table 24.5. Percent of Correct Responses to Test Items

<table>
<thead>
<tr>
<th>Objective 1</th>
<th>Objective 2</th>
<th>Objective 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Item #1</td>
<td>Test Item #2</td>
<td>Test Item #3</td>
</tr>
<tr>
<td>Pre 20%</td>
<td>Post 56%</td>
<td>Pre 67%</td>
</tr>
</tbody>
</table>

24.3.3.2 The data for test item #1 show that just 20% of the students coming in to the course knew the material well enough to correctly answer the item. Whether this percentage is too high or too low depends on the value judgments we make. But it is a reference point to which we can make comparisons. An obvious comparison comes about when we see that only 56% of the students correctly answered that same test item on the posttest. Only 36% more of the students were able to pass this CRT item on the posttest than on the pretest (56% post - 20% pre = 36% growth). This growth does not seem high enough when we compare the 56% posttest percentage with the ideal 100% posttest goal. On the other hand, 56% group performance on the posttest may be acceptable in a short course on a less-than-critical objective. However, 36 percent growth is neither bad nor good by itself. Questions need to be asked about the curriculum, the selection procedures, or the evaluation program if only 56% of our students can respond correctly to a posttest item which measures an objective. Is the test item bad, is the objective poorly taught, or is 56% an acceptable posttest achievement percentage considering the possible high level of learning involved? Obviously, the answers to these questions might not be easy.

24.3.3.3 Data for test item #2 of Table 24.5 comes from the first test item in Table 24.5. First, a very high entry percentage may raise the question of appropriate content. By itself, the 67% is neither good nor bad, but such a high percentage of correct answers in an incoming group might have curriculum implications concerning the need for the course, the level of the curriculum, or the screening of potential students. The small 4% growth figure from pretest to posttest may have more to tell us. It is hard to imagine a case involving an Air Force school where such a growth figure would be acceptable. Whether in relative terms (4% growth on this individual test item) or absolute terms (71% of the ideal of 100%), this posttest statistic tells us something about our curriculum or the delivery of instruction—and it probably isn’t something good.

24.3.3.4 The third test item from Table 24.5 comes much closer to the pretest and posttest ideal. It appears that the vast majority of our incoming class needs this instruction (100% - 12% correct on pretest = 88% potential growth for class). Of that potential of 88%, we were able to accomplish quite a bit, actually 77% class growth. This is probably good growth and is certainly superior to either of the other sets of test item data.

24.4 Group CRT Data As A Management Tool. To the extent that what we want in the way of group performance differs from what we actually get, we have a curriculum problem of some type. We may be able to do a better job managing our curriculum by paying special attention to group or aggregate CRT test item data. In the following hypothetical example of an attempt to improve a curriculum through test item management, the variables which may be different in each of our own situations are (1) the acceptable group percentages for pretest and posttest items, (2) the time to respond to curriculum problems revealed by test item analysis, and (3) the individual curriculum responsibilities in cases of unsatisfactory test item data. This example is typical of what can be done to improve the management of curriculums by improving the use of group CRT item data.

24.5 Characteristics Of CRT Evaluation. As we report and analyze CRT data, we assume that we are using good tests and test items to get data. Good CRT tests and test items must have each of the critical characteristics demanded of all effective evaluation devices (see Chapter 20). CRT items must be reliable, valid, objective, comprehensive, and capable of differentiating. These characteristics are the same as those we have always demanded from Air Force measurement devices, but the characteristics take on a new and unfamiliar look to instructors who have only worked with norm-referenced testing (NRT) (see Chapter 25).

24.5.1 Reliability. A reliable CRT test item or other measure is one that yields consistent results. In other
words, will the same person taking the test twice answer the test items much the same way. Reliability is not generally a severe problem with performance rating as long as conditions in the evaluation situation remain constant. Reliability can be a problem in paper-and-pencil testing, however, because good test item construction is a difficult task.

**24.5.1 CRT items with poor reliability are easy to spot if we recognize the symptoms. If students who are about equal in knowledge or ability have scores which vary widely on a criterion-referenced test or test item, we may have an unreliable exam. Likewise, if we test the same student twice on the same CRT test or test item (within a short period of time), and he or she passes once and fails the next time, we may have an unreliable exam. In neither of these cases could we say with certainty that the exam is not reliable, but we should be suspicious. We can use statistics to help us write reliable CRT’s.**

**24.5.2 Validity.** For a test to be valid, it must measure exactly what we intended it to measure as defined in our objective.

**Table 24.6. Three Usable Approaches**

1. **Content validity**— Does the CRT measure what the instructional objective specifies?
2. **Concurrent validity**— Does one CRT compare favorably with another, already validated CRT?
3. **Predictive validity**— Can student scores on one CRT be used to predict success on a second CRT?

**24.5.2.1 Content validity.** Content validity is probably the easiest and best way to assess whether or not the CRT measures the objective. We can establish content validity by examining the test and comparing the items to carefully written objectives. No statistical test is used to establish content validity. If subject matter experts feel that it measures what the objectives call for, it is valid. If they do not, it is not valid.

**24.5.2.1.1** This technique for establishing validity is practical and useful for Air Force instruction. A test of content validity is a reputable technique and should be rigorously applied. The usefulness of content validity as a tool in a school will vary with the quality of the objectives. The test may validly measure the objectives, but valid measurement of worthless objectives yields valid but worthless data for the school.

**24.5.2.2 Concurrent validity.** If we already have another good CRT measure of what we want to test, we can determine the degree of association between the results of the first CRT and the new one that we want to use. To the extent that they are related, we have established their level of concurrent validity. We may wish to determine a level of concurrent validity between our own exam on management and a nationally recognized exam which has been accepted as valid. We may wish to check the validity of a newly developed multiple-choice management exam against a very time consuming but valid essay exam which is now in use. A statistical test is required to establish a level of concurrent validity.

**24.5.2.3 Predictive validity.** We can establish predictive validity for our CRT in much the same fashion as we can determine concurrent validity. When we have two CRT measurements of what we believe to be the same skill or knowledge taken at a considerable length of time from each other, we may wish to determine how well the first CRT predicted success on the second CRT. We may wish to see how our school posttest predicts success on the job as measured by supervisor ratings. Or we may wish to determine how well a pencil-and-paper test can be used to predict future success on a performance exam. In these and similar situations, we can use various statistics to establish predictive validity between two CRT’s as long as they are both scored on a pass or fail basis and the tests are separated by a substantial period of time.

**24.5.3 Objectivity.** One of the most obvious benefits of CRT is the positive effect upon objectivity in testing. While it is almost impossible to remove all personal bias from measurement, CRT allows us to come closer to that ideal. We can improve the objectivity of a CRT by insuring that objectives are appropriate and well written. Further, careful attention to content validity greatly improves objectivity. To the extent that any element of the objective is ambiguous, the CRT has the potential to lose its objectivity. Instructor bias may creep into any measurement situation. For help with this problem, refer to Chapters 21, 22, and 23.

**24.5.4 Comprehensiveness.** CRT should be comprehensive by its very definition. Since CRT’s measure instructional objectives our tests should be comprehensive by the very act of finding out whether we accomplished what we set out to accomplish. Ideally, we should be 100% comprehensive in our testing programs. Any objective worth stating should be important enough to teach and to measure. There may be some reason to have some objectives which are not measured, but we should be able to justify each case. If our objectives represent our needed and desired learning outcomes and we test them, we have a built-in mechanism to ensure comprehensiveness.

**24.5.5 Differentiation.** We can use statistical tests to help us tell whether our test items can tell the difference (differentiate) between persons who have mastered our course and those who have not. Masters of our course include our graduates, those persons exempted from our course because of equivalent training or experience, and those acknowledged experts already working in the field for which we are preparing our students. Non-masters
are essentially any group of students or potential students who do not possess or are not supposed to possess the knowledge and skills we teach.

24.5.5.1 If our test items cannot differentiate those who are graduates of our course from those who are getting ready to take it, we probably have some sort of curriculum problem.

Table 24.7. Possible Problems

<table>
<thead>
<tr>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Poor selection of students—too many students coming to our course already possess the skills we intend to teach.</td>
</tr>
<tr>
<td>2. Poor curriculum and instruction—there is little growth on the part of the students during our course.</td>
</tr>
<tr>
<td>3. Poor test items—something in our test items may be causing qualified students to perform poorly while not affecting unqualified persons.</td>
</tr>
</tbody>
</table>

24.6 Summary. To report and analyze criterion-referenced test data correctly, we need to use techniques which are different from those we traditionally use. The need to change techniques comes about because CRT is concerned with comparing a student’s performance with instructional objectives rather than with the level of performance of other students.

24.6.1 An appropriate display of CRT data will assist us as we analyze the results of our instruction. A reporting format which accounts for individual student achievement for each significant instructional objective is a valuable tool. This reporting format may be as simple as a grid listing each student on one axis and each objective on the other. It may be so complex as to need computer support to keep track of and analyze instructional variables such as learning time and attempts at mastery.

24.6.2 Except for extreme examples, the passing or failing point in a CRT situation is quite subjective. We must often settle for less than perfect performance on our examinations. Time, money, student characteristics, and other variables often affect our standards negatively. Although pretest scores of 0 and posttest scores of 100% are ideal, we must often accept less than the ideal. The extent to which we exceed the ideal score at entry or fall short of the ideal at exit is a subjective decision. Many complex variables affect that decision.
PU -- THROW THIS PAGE OUT
25.1 Introduction. Schools which use evaluation data to compare the performance of one student with the group use some form of norm-referenced analysis. Awards to the commandant’s trophy winner, the best writer, distinguished graduates, and similar rankings of outstanding groups or individuals are usually the product of norm-referenced analysis.

25.1.1 Norm-referenced analysis is a classification or label applied to the use of evaluation data for comparing students to each other rather than to a specific instructional objective. Many different statistical techniques can be used to evaluate students' scores on written tests and performance rating instruments. In some schools, especially in professional military education programs, there has been a tradition of identifying and rewarding the best performers in each class by comparing students on many different tasks. Norm-referenced analysis is characterized by using data to compare students to the “norm” or average. Any or all of the following items may be used for the purpose of comparing students: written test scores, grades on writing and speaking assignments, grades in drill and ceremonies, grades in physical training, and numerical estimates of various leadership traits.

25.1.2 Let us consider the following hypothetical case to help us distinguish between criterion- or objective-referenced analysis (see Chapter 24) and norm-referenced analysis. Suppose that we will have 50 students in a 1-week course and we will use only one evaluation instrument, a final written test of 100 questions. If we set minimum passing at 70 percent of the objectives being tested and compare student scores to the 70 percent standard, we will be using a form of criterion-referenced measurement. If we are more interested in rank ordering our students than holding them to a specific cut-off score for passing, the process would be called norm-referenced measurement. If we set a minimum standard for passing and we also desire to rank order students for the purpose of recognizing the students who performed better than others, then we are using both criterion-referenced measurement and norm-referenced analysis.

25.1.3 This chapter presents several statistical measurements and procedures which are commonly used to compare students with each other. The advent of inexpensive calculators with many functions has decreased the need to be thoroughly familiar with the computations for most statistical measures. However, understanding how to compute various functions helps to reinforce the meaning of statistical concepts.

25.2 Grading Methods. This section is concerned with several grading methods. The basic data used throughout the examples are the final school grades made by 150 students in a hypothetical Air Force school. Whatever grading method is used, a frequency distribution of scores should be established first. The scores may be the result of a single administration of the test or they may have been accumulated over a period of time.

25.2.1 Construct the frequency distribution of the scores made by the 150 students (Figure 25.1) as follows: Step 1. In column 1, list the scores obtained by the group from the highest to lowest. Step 2. In column 2, enter tally marks for each score. Step 3. In column 3, record the number of tally marks for each of the scores. Because this column tells how frequently each score occurred, it is known as the “frequency column (f).” The total of this column should be the total number of persons in the group. This frequency distribution (columns 1 and 3) is used in computing grades in the remainder of this chapter.

25.2.2 Rank-Order Grades. Rank-order grades are best computed from the basic frequency distribution shown in Figure 25.1. Figure 25.2 shows the rank order which would be assigned to all 150 students. Two students tied for the highest rank in the class. If evaluation instruments had the capability of making finer differentiations between the two students, one would have ranked first and the other second. Since it is not possible to differentiate between them on the basis of available information, they should both receive the same rank-order grade.

25.2.2.1 In cases of a tie, it is customary to assign all members the median rank of the tying group. The highest two would therefore be assigned the rank-order grade of 1.5/150. Since seven students tied for the ranks three through nine, each would receive the rank-order grade of 6/150.

25.2.2.2 To find a rank-order grade of tying students, the instructor should follow this procedure: (1) note the lowest and highest ranks of those in the tying group; and (2) average these two ranks.

25.2.2.3 For example, 25 students received scores higher than 43, and 12 students received 43. The highest person in the group receiving 43 would therefore have a rank of 26; the lowest, 37. The rank-order grade for each of these 12 students is computed as follows:

\[
\text{Rank - order grade} = \frac{1}{2} \left( \frac{26 + 37}{150} \right) = \frac{1}{2} \left( \frac{63}{150} \right) = \frac{31.5}{150}
\]

25.2.2.4 In computing rank-order grades, the following formula may be used.

\[
\text{Rank - order grade} = \frac{1}{2} \left( \frac{T + B}{N} \right)
\]

25.2.2.5 Here \(T\) is the rank of the student at the top of the tying group; \(B\), the rank of the student at the bottom of the tying group; and \(N\), the total number in the class.
25.2.2.6 The formula may be used to obtain the rank-order grade for the eight students with the score of 44:

\[ \text{Rank-order grade} = \frac{1}{2} \left( \frac{44 + 25}{150} \right) \]

\[ = \frac{21.5}{150} \]

Figure 25.1. Tabulation of a Frequency Distribution

<table>
<thead>
<tr>
<th>School score</th>
<th>Tally marks</th>
<th>Number of students (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>2</td>
<td>1.5/150</td>
</tr>
<tr>
<td>46</td>
<td>7</td>
<td>6/150</td>
</tr>
<tr>
<td>45</td>
<td>8</td>
<td>13.5/150</td>
</tr>
<tr>
<td>44</td>
<td>8</td>
<td>21.5/150</td>
</tr>
<tr>
<td>43</td>
<td>12</td>
<td>31.5/150</td>
</tr>
<tr>
<td>42</td>
<td>11</td>
<td>43/150</td>
</tr>
<tr>
<td>41</td>
<td>15</td>
<td>56/150</td>
</tr>
<tr>
<td>40</td>
<td>12</td>
<td>69.5/150</td>
</tr>
<tr>
<td>39</td>
<td>8</td>
<td>79.5/150</td>
</tr>
<tr>
<td>38</td>
<td>12</td>
<td>89.5/150</td>
</tr>
<tr>
<td>37</td>
<td>12</td>
<td>101.5/150</td>
</tr>
<tr>
<td>36</td>
<td>10</td>
<td>112.5/150</td>
</tr>
<tr>
<td>35</td>
<td>7</td>
<td>121.5/150</td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>125/150</td>
</tr>
<tr>
<td>33</td>
<td>7</td>
<td>129/150</td>
</tr>
<tr>
<td>32</td>
<td>6</td>
<td>135.5/150</td>
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<tr>
<td>31</td>
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<td>140.5/150</td>
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<tr>
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<td>4</td>
<td>146.5/150</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>149/150</td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>150/150</td>
</tr>
</tbody>
</table>

25.2.2.7 We would say that the rank order of eight students with a score of 44 is 21.5 out of 150 students.

25.2.3 Percentile-Rank Grades. The percentile rank for a specific score is defined as the percentage of persons in the reference group who obtained scores equal to or less than the given score. Thus, if a raw score of 50 equals a percentile rank of 87, called the 87th percentile, then 87 percent of the people in the reference group obtained scores equal to or less than 50. A percentile rank of five indicates that only five percent of the group obtained equal or lower scores. A percentile rank involves percentages of people and indicates a student’s relative standing in percentage terms.

25.2.3.1 Scores on the Airman Classification Test and the Air Force Officer Qualifying Test are reported in percentiles. By contrast, percentage scores express performance in terms of percent of content mastered. A percentage score of 85 means that a student answered 85 percent of a test correctly.

25.2.3.2 Percentile rank grades are computed from a frequency distribution in much the same way as are rank-order grades. The main difference is that percentile-rank grades are computed from the lower end of the scale.

25.2.3.3 Probably the easiest method of converting a frequency distribution into percentile-rank grades is by using the basic distribution of student scores. These steps can be followed.

25.2.3.3.1 Step 1. Construct a cumulative frequency column (column 3 in Figure 25.3) which shows the number of students below the score given. For example, no one scored below 27. Therefore, the entry in column 3 for 27 is zero. Since one student had a score lower than 28, the entry in column 3 for 28 is 1. Since two students scored below 29, the entry in column 3 for 29 is 2. This process is continued to the top score. Obviously, the top entry in column 3 is 148. The cumulative frequency for the top percentile rank can be checked against the total number in the distribution.

25.2.3.4 Step 2. Construct a column (column 4, Figure 25.3) which shows the number of students below a particular score, plus one-half the number of students obtaining that score. Entries for column 4 may be obtained by adding 1/2 the number in column 2 to the entry in column 3. For example, in Figure 25.3 the entry...
in column 4 for the score 36 is 38 because \[ + 33 = 38.0 \]
For the score 41, the entry is 94.5 because \[ + 87 = 94.5 \]

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>School score</td>
<td>Number of students</td>
<td>Number of students below each score</td>
<td>Column 3 ( \frac{Y}{N} \times 100 )</td>
<td>Centile-rank grade</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>148</td>
<td>150.0</td>
<td>99</td>
</tr>
<tr>
<td>46</td>
<td>7</td>
<td>141</td>
<td>150.5</td>
<td>96</td>
</tr>
<tr>
<td>45</td>
<td>8</td>
<td>133</td>
<td>150.0</td>
<td>91</td>
</tr>
<tr>
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<td>8</td>
<td>125</td>
<td>150.0</td>
<td>86</td>
</tr>
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<td>150.0</td>
<td>79</td>
</tr>
<tr>
<td>42</td>
<td>11</td>
<td>102</td>
<td>150.0</td>
<td>72</td>
</tr>
<tr>
<td>41</td>
<td>15</td>
<td>87</td>
<td>150.0</td>
<td>63</td>
</tr>
<tr>
<td>40</td>
<td>12</td>
<td>75</td>
<td>150.0</td>
<td>54</td>
</tr>
<tr>
<td>39</td>
<td>8</td>
<td>67</td>
<td>150.0</td>
<td>47</td>
</tr>
<tr>
<td>38</td>
<td>12</td>
<td>55</td>
<td>150.0</td>
<td>41</td>
</tr>
<tr>
<td>37</td>
<td>12</td>
<td>43</td>
<td>150.0</td>
<td>33</td>
</tr>
<tr>
<td>36</td>
<td>10</td>
<td>33</td>
<td>150.0</td>
<td>25</td>
</tr>
<tr>
<td>35</td>
<td>7</td>
<td>26</td>
<td>150.0</td>
<td>20</td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>25</td>
<td>150.0</td>
<td>17</td>
</tr>
<tr>
<td>33</td>
<td>7</td>
<td>18</td>
<td>150.0</td>
<td>14</td>
</tr>
<tr>
<td>32</td>
<td>6</td>
<td>12</td>
<td>150.0</td>
<td>10</td>
</tr>
<tr>
<td>31</td>
<td>4</td>
<td>8</td>
<td>150.0</td>
<td>7</td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>6</td>
<td>150.0</td>
<td>5</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>2</td>
<td>150.0</td>
<td>3</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>1</td>
<td>150.0</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>0</td>
<td>150.0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 25.3. Computation of Percentile-Rank Grade

25.2.3.4.1 Step 3. It is now a simple matter to compute the percent of the total group which lies below the middle of each of the scores. To do this, divide each entry in column 4 by the total number of students, and then multiply by 100. For example, for a score of 36 the percentile rank would be 25, obtained as follows:

\[
\frac{38}{150} \times 100 = 25
\]

In other words, the 10 students with a score of 36 receive a percentile-rank grade of 25; they are at the 25th percentile. The 15 students who had a score of 41 receive percentile-rank grades of 63 since

\[
\frac{94.5}{150} \times 100 = 63
\]

25.2.3.4.2 Step 4. These arithmetical procedures can be expressed by the following formula:

Percentile Rank = \( \frac{Y + \frac{f}{2}}{N} \times 100 \)

Here Y is the number of students below a particular score; f, the number of students receiving that same particular score; and N, the total number of students in the class. Usually the decimal portions of percentile-rank grades are not considered important; consequently, percentile rank is usually reported to the nearest whole percent.

25.2.4 Percentile-Group Grades. Many methods of percentile-group grading are used, and instructors may invent one to suit their needs. However, all students in a group with identical scores should receive the same grade. Whatever groups are used, some of the dividing lines are almost sure to fall where they will separate the members of a group who have the same score. In such a situation, it is necessary to decide on which side of the group the line should be placed.

25.2.4.1 A basic distribution of scores may be grouped in several ways (Figure 25.4). In the first method, (A), the class is divided into four groups. The top 20 percent of the class is labeled superior; the next 30 percent, above average; the next 40 percent, satisfactory; and the bottom 10 percent, unsatisfactory. Since 20 percent of 150 is 30, a count from the top of the distribution should include 30 students. The 30th student from the top is among the 12 students who received a score of 43. If the dividing line is placed just above this group, only 25 are within the top 20 percent. If the dividing line is placed so as to include the whole group with a score of 43, then 37 students would be within the top 20 percent. Since 25 is closer to 30 than 37, the dividing line is placed between the scores 43 and 44. Obviously the position of this dividing line will vary with instructors, and, for the individual instructor, it is likely to vary according to mood and general impressions. In method A, subjectivity is involved even more in identifying the low 10 percent. Since 10 percent of 150 is 15, a count from the bottom of the distribution should include 15 persons. This dividing line falls at the middle of the group which received a score of 32, making an arbitrary decision necessary.

25.2.4.2 Method B is similar to method A with these exceptions: five groups are used, the percentages are intended to be symmetrical, and letters instead of adjectives are used to identify the groups. In method C, the class is divided into 10 approximately equal groups.

25.2.4.3 Arithmetic Mean. The arithmetic mean of a set of scores can be found by totaling them and by dividing the sum by the number of scores. For example, the mean of 103, 101, 98, and 98 is 100.

\[
\frac{103 + 101 + 98 + 98}{4} = 100
\]

The method of computing the mean might be further illustrated by considering grades obtained from the class of 150 students (Figure 25.5). The numbers in column f tell how many students obtained each raw score. The mean is computed in the following steps.

25.2.4.3.1 Step 1. Arrange the raw scores of the test in numerical order from highest to lowest without repeating identical scores. (Call this column X.)

25.2.4.3.2 Step 2. In a column opposite each score list the number of students who made that score. (Call this the f, or frequency column). Total this column to determine N, the number of students in the class.
<table>
<thead>
<tr>
<th>School score (raw score)</th>
<th>Number of students (f)</th>
<th>Percentage groupings</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>A</strong> 20%, 30%, 40%, and 10%</td>
<td><strong>B</strong> 10%, 20%, 40%, 20%, and 10%</td>
<td><strong>C</strong> Tenths</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>D</strong> Quarters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>2</td>
<td>High (Superior)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>46</td>
<td>7</td>
<td>High 20%</td>
<td>20% (A)</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>8</td>
<td>Next 10%</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>8</td>
<td>Next 20%</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>012</td>
<td>Next 30%</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>11</td>
<td>Next 40%</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>41</td>
<td>15</td>
<td>Next Average 50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>8</td>
<td>Next Average 40%</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>38</td>
<td>12</td>
<td>Next Average 60%</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>12</td>
<td>Next Average 70%</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>10</td>
<td>Next Average 80%</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>35</td>
<td>7</td>
<td>Next Average 90%</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>Next Average 100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>7</td>
<td>(Satisfactory)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>6</td>
<td>(D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>4</td>
<td>(Unsatisfactory)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>Low 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>Low 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>(F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 25.4. Computation of Several Percentile-Group Grades with Different Percentage Groupings

25.2.4.3.3 Step 3. Multiply each score by the number of students who made that score (fX column). Since the figure shows that two persons obtained a score of 47, this score should appear twice in the list of scores. To save space, 94 (47 multiplied by 2) can be entered in column fX opposite 47. The next entry is 46 times 7, or 322. The column is completed in this manner.

25.2.4.3.4 Step 4. Find the sum of column fX. This is the sum of all 150 scores obtained on the test. In the example, the sum is 5,830.

25.2.4.3.5 Step 5. Divide the sum of scores (5,830) by the number of scores (150) to obtain the mean. The result is usually reported to the nearest tenth.

\[
\frac{5,830}{150} = 38.867 \text{ or } 38.9
\]

The mean can be computed by the following formula:

\[
M = \frac{\sum fx}{N}
\]
<table>
<thead>
<tr>
<th>Test score X</th>
<th>Frequency f</th>
<th>fX</th>
<th>Deviation d</th>
<th>d²</th>
<th>fd²</th>
<th>Standard Score d/s</th>
<th>T-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>2</td>
<td>94</td>
<td>8.1</td>
<td>65.6</td>
<td>131.2</td>
<td>1.76</td>
<td>68</td>
</tr>
<tr>
<td>46</td>
<td>7</td>
<td>322</td>
<td>7.1</td>
<td>50.4</td>
<td>352.8</td>
<td>1.54</td>
<td>65</td>
</tr>
<tr>
<td>45</td>
<td>8</td>
<td>360</td>
<td>6.1</td>
<td>37.2</td>
<td>297.6</td>
<td>1.32</td>
<td>63</td>
</tr>
<tr>
<td>44</td>
<td>8</td>
<td>352</td>
<td>5.1</td>
<td>26.0</td>
<td>208.0</td>
<td>1.10</td>
<td>61</td>
</tr>
<tr>
<td>43</td>
<td>12</td>
<td>516</td>
<td>4.1</td>
<td>16.8</td>
<td>201.6</td>
<td>.89</td>
<td>59</td>
</tr>
<tr>
<td>42</td>
<td>11</td>
<td>462</td>
<td>3.1</td>
<td>9.6</td>
<td>105.6</td>
<td>.67</td>
<td>57</td>
</tr>
<tr>
<td>41</td>
<td>15</td>
<td>615</td>
<td>2.1</td>
<td>4.4</td>
<td>66.0</td>
<td>.45</td>
<td>55</td>
</tr>
<tr>
<td>40</td>
<td>12</td>
<td>480</td>
<td>1.1</td>
<td>1.2</td>
<td>14.4</td>
<td>.23</td>
<td>52</td>
</tr>
<tr>
<td>39</td>
<td>8</td>
<td>312</td>
<td>.1</td>
<td>.0</td>
<td>.0</td>
<td>.02</td>
<td>50</td>
</tr>
<tr>
<td>38</td>
<td>12</td>
<td>456</td>
<td>-.9</td>
<td>.8</td>
<td>9.6</td>
<td>-.19</td>
<td>48</td>
</tr>
<tr>
<td>37</td>
<td>12</td>
<td>444</td>
<td>-1.9</td>
<td>3.6</td>
<td>43.2</td>
<td>-.41</td>
<td>46</td>
</tr>
<tr>
<td>36</td>
<td>10</td>
<td>360</td>
<td>-2.9</td>
<td>8.4</td>
<td>84.0</td>
<td>-.63</td>
<td>44</td>
</tr>
<tr>
<td>35</td>
<td>7</td>
<td>245</td>
<td>-3.9</td>
<td>15.2</td>
<td>106.4</td>
<td>-.85</td>
<td>42</td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>34</td>
<td>-4.9</td>
<td>24.0</td>
<td>24.0</td>
<td>-1.07</td>
<td>39</td>
</tr>
<tr>
<td>33</td>
<td>7</td>
<td>231</td>
<td>-5.9</td>
<td>24.8</td>
<td>243.6</td>
<td>-1.28</td>
<td>37</td>
</tr>
<tr>
<td>32</td>
<td>6</td>
<td>192</td>
<td>-6.9</td>
<td>47.6</td>
<td>285.6</td>
<td>-1.50</td>
<td>35</td>
</tr>
<tr>
<td>31</td>
<td>4</td>
<td>124</td>
<td>-7.9</td>
<td>62.4</td>
<td>249.6</td>
<td>-1.72</td>
<td>33</td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>60</td>
<td>-8.9</td>
<td>79.2</td>
<td>158.4</td>
<td>-1.93</td>
<td>31</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>116</td>
<td>-9.9</td>
<td>98.0</td>
<td>392.0</td>
<td>-2.15</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>28</td>
<td>-10.9</td>
<td>118.8</td>
<td>118.8</td>
<td>-2.37</td>
<td>26</td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>27</td>
<td>-11.9</td>
<td>141.6</td>
<td>141.6</td>
<td>-2.59</td>
<td>24</td>
</tr>
<tr>
<td>150</td>
<td></td>
<td>8,830</td>
<td></td>
<td></td>
<td>3,234.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean = \( M = \frac{\sum fX}{N} = \frac{5,830}{150} = 38.9 \)

Standard deviations = \( S = \sqrt{\frac{\sum fd^2}{N}} = \sqrt{\frac{3234.0}{150}} = \sqrt{21.6} = 4.6 \)

**Figure 25.5. Computation of Mean, Standard Deviation, Standard Scores, and T-Scores**

Here \( M \) is the mean; the Greek letter sigma, the “summation of” \( f \), the frequency; \( X \), a test score, and \( N \) the number of scores.

**25.2.4.4 Standard Deviation.** The same frequency distribution of grades (Figure 25.5) is used here to show how to find the standard deviation of any distribution. The following method is used.

**25.2.4.4.1 Step 1.** Determine how much each test score deviates from the mean. (Call this column \( d \).) This figure can be obtained by subtracting the mean from the test score. For example, \( 47 - 38.9 = 8.1 \), the deviation of highest score; and \( 27 - 38.9 = -11.9 \), the deviation of lowest score. Note that the deviation of all scores below the mean is negative.

**25.2.4.4.2 Step 2.** Square the deviation. (Call this column \( d^2 \).) If \( 8.1 \) (the deviation of the test score 47) is multiplied by itself (that is, squared), the product is 65.6. The column is completed in this manner.

**25.2.4.4.3 Step 3.** Multiply the frequency of each score by the deviation squared for the particular score. (Call this column \( fd^2 \).) Just as the test score is multiplied by the frequency in finding the mean, the square of the deviation is multiplied by the frequency to find the standard deviation.

**25.2.4.4.4 Step 4.** “Standard deviation” may be defined as the square root of the average of the squares of the deviations from the mean of the distribution. Compute the standard deviation of this distribution by using the following formula:

\[
s = \frac{\sum fd^2}{N}\]

Here \( s \) is the standard deviation; \( f \), the frequency; \( d \), the deviation of a score from the mean; and \( N \), the number of scores. The total of column \( fd^2 \) is 3,234.0. This total divided by the number of scores in the distribution (150)
results in 21.6. The square root of 21.6 is 4.6. Therefore, the standard deviation for this distribution is 4.6. (The standard deviation is usually reported to the nearest tenth.)

25.2.4.5 Standard Score. Now it is a simple matter to find the standard score corresponding to any given raw test score. Standard scores (SS) are defined as scores expressed in terms of their standard deviation distances from the mean. This definition may be expressed in terms of the following formula:

\[ SS = \frac{X - M}{s} = \frac{d}{s} \]

Here X is the test score, M is the mean, and s is the standard deviation. The basic formula can be reduced to d/s, since d is the amount each raw score deviates from the mean and is the same as X - M. To calculate the standard score (d/s column), divide the amount each score deviates from the mean (d column) by the standard deviation. For example, the test score 47 expressed as a standard score may be found as follows:

\[ SS = \frac{X - M}{s} = \frac{47 - 38.9}{4.6} = \frac{8.1}{4.6} = 1.76 \]

25.2.4.6 T-Scores. Standard scores can be converted to T-scores, which have a mean of 50 and a standard deviation of 10. (NOTE: T-scores are usually reported to the nearest whole number.) This conversion is expressed in the following formula:

\[ T = \frac{d}{s} \times 10 + 50 \]

For example, the test score 47 expressed as a T-score would be found in the following manner—

\[ T = \frac{d}{s} \times 10 + 50 = \frac{8.1}{4.6} \times 10 + 50 = 17.6 + 50 = 68 \]

In actual practice, the labor of computing standard deviation, standard, and T-scores is reduced considerably by using a slide rule or calculator. Instructors will find many shortcuts as they become more familiar with the process.

25.2.5 Grading Methods Compared. To compare grading methods, suppose that two students in a class of 90 received the scores shown in Table 25.1 in five subjects. The raw scores tell nothing whatever about the real proficiency of either of these students in the five subjects. It is only possible to draw conclusions about their comparative standings. Inspection reveals that Frank Brown excels John Doe in three of the five subjects, but there is no way of knowing the quality of the difference. If the scores of the two students are averaged, John Doe has the higher average. It might, therefore, be inferred that John Doe is the better student, if the five subjects are equally important.

25.2.5.1 In Table 25.2, Brown’s and Doe’s rank-order grades are shown. These rank-order grades give more information than the raw scores alone. Differences in rank order are not proportional to differences in ability; however, there is a tendency to infer such a relationship.

Table 25.1. Raw Scores Made by Two Students in Five Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Frank Brown</th>
<th>John Doe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice teaching</td>
<td>156</td>
<td>186</td>
</tr>
<tr>
<td>Curriculum construction</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Special laboratories</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Evaluation</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Writing</td>
<td>129</td>
<td>30</td>
</tr>
<tr>
<td>Average Score</td>
<td>68</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 25.2. Rank-Order Scores Made by the Same Two Students in Five Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Frank Brown</th>
<th>John Doe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice teaching</td>
<td>45/90</td>
<td>9/90</td>
</tr>
<tr>
<td>Curriculum construction</td>
<td>11/90</td>
<td>89/90</td>
</tr>
<tr>
<td>Special laboratories</td>
<td>47/90</td>
<td>79/90</td>
</tr>
<tr>
<td>Evaluation</td>
<td>6/90</td>
<td>89/90</td>
</tr>
<tr>
<td>Writing</td>
<td>43/90</td>
<td>42/90</td>
</tr>
<tr>
<td>Average Score</td>
<td>32/90</td>
<td>61/90</td>
</tr>
</tbody>
</table>

Furthermore, although Frank Brown ranked above John Doe in writing, such fine discriminations are not warranted near the center of so large a group.

25.2.5.2 The scores of Brown and Doe were converted to the percentile-rank grades shown in Table 25.3. In general, the situation is the same as with the rank-order grades. Again, the apparent difference in writing abilities of two students is not genuine.

25.2.5.3 The mean and standard deviation of the distribution of the 90 scores in each of the five subjects were computed and are recorded in Table 25.4. When these values were compared with the scores of Brown and Doe, their T-score grades for each of the five subjects were obtained. If the normal probability curve and the scales shown in Figure 25.6 are kept in mind, a clear picture of the proficiency of each student relative to that of other students is obtained.

25.2.5.4 Frank Brown is average, or well above average, in all five subjects. John Doe, on the other hand, is above average in only one subject, and clearly below average in three subjects. Furthermore, Brown’s mean T-score is well above the average of the total group, whereas Doe’s
25.2.5.5 When grades in several subjects are to be weighted and then expressed as a single composite grade, the grades should be based on standard scores; the instructor can then be sure that each subject has been truly weighted in accordance with the weighting factor. For example, if scores in each subject are first converted to T-scores, and each set of T-score grades is multiplied by the weighting factor, then each student’s sum may be used as a measure of his or her relative position in the class. This approach to weighting subjects is shown in Table 25-5 for Brown and Doe.

25.2.5.6 T-scores may be weighted, but the original raw scores and accumulated points should not be weighted; weighting original raw scores may only make weightings less reliable, as in the case of Brown and Doe.

Table 25.4. T-Score Grades Made by the Same Two Students in the Five Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mean Score</th>
<th>Standard Deviation</th>
<th>T-Score Brown</th>
<th>John Doe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice teaching</td>
<td>56</td>
<td>20</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>Curriculum construction</td>
<td>2</td>
<td>4</td>
<td>60</td>
<td>35</td>
</tr>
<tr>
<td>Special laboratories</td>
<td>30</td>
<td>5</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Evaluation</td>
<td>8</td>
<td>3</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Writing</td>
<td>130</td>
<td>36</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Average Score</td>
<td>—</td>
<td>—</td>
<td>54</td>
<td>44</td>
</tr>
</tbody>
</table>

The responses of 150 airmen to a question on a management test are shown in Table 25-6. On the basis of 47 correct answers, the ease index (EI) of this item would be computed as follows:

\[
E.I. = \frac{R}{N} \times 100
\]

Here \( R \) is the number responding correctly and \( N \) is the number taking the test. If everyone answered the item correctly, the numerator and denominator of the fraction would be the same, and the ease index would be 100 percent. If no one in the group answered the item correctly, the numerator would be 0, and the ease index would also be 0. Consequently, the range of the ease index is from 1 to 100 percent. The higher the percentage, the easier the item; that is, an item with an ease index of 80 percent is easier than an item with an ease index of 35 percent.

25.3 Effectiveness Of Individual Test Items

25.3.1 Ease Index of Test Items. The ease index of a test or a particular test item is a measure of how easy that test or item was for the group taking the test. Since the ease of an item is also a measure of its difficulty, it is sometimes called the difficulty index. The distribution of norm-referenced test scores can be adjusted by changing the ease of items or by eliminating some items and selecting others on the basis of their difficulty. If the difficulty level of items has been adjusted properly, the average score of the group should fall between 50 and 60 percent of the maximum possible score, and scores should cover nearly the whole possible range, from the guessing level to almost perfect. This situation is ideal in norm referencing.

25.3.2 Simple Formula for Ease Index. The simplest procedure for determining the ease index of an item is to divide the number of persons who answered the item correctly by the total number of persons who took the test. Multiply this quotient by 100 to convert the result to a percentage figure. The formula for computing the simple ease index (EI) of an item is: \( E.I. = \frac{R}{N} \times 100 \).

The mean T-score is clearly below average. One of the advantages of grades based on standard scores is that they may be averaged fairly. Averages based on other grading methods are open to question. For example, Doe had a higher course average, based on original raw grading methods are open to question. For example, Doe had a higher course average, based on original raw grading methods. You can find an in-depth discussion of the properties and use of the normal curve in any textbook on tests and measurement.

25.3.3 Interpreting the Ease Index. The ease index is only a statistical indicator. It should not be used by itself to judge the worth of an item. Rather it should be used in conjunction with other data. All statistical data (including the ease index) used in comparisons must be based on equivalent groups. For example, an item having an ease index of 85 percent with an advanced group of students might well have an ease index of 45 to 60 percent with a group of basic students.
Table 25.5. Weighted Scores Made by the Same Two Students in the Five Subjects

<table>
<thead>
<tr>
<th></th>
<th>Weight factor (percent)</th>
<th>Frank Brown</th>
<th>Weighted score</th>
<th>John Doe</th>
<th>Weighted score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice teaching</td>
<td>35</td>
<td>50</td>
<td>18.50</td>
<td>65</td>
<td>22.75</td>
</tr>
<tr>
<td>Curriculum construction</td>
<td>10</td>
<td>60</td>
<td>6.00</td>
<td>35</td>
<td>3.50</td>
</tr>
<tr>
<td>Special laboratories</td>
<td>10</td>
<td>50</td>
<td>5.00</td>
<td>40</td>
<td>4.00</td>
</tr>
<tr>
<td>Evaluation</td>
<td>25</td>
<td>60</td>
<td>15.00</td>
<td>30</td>
<td>7.50</td>
</tr>
<tr>
<td>Writing</td>
<td>20</td>
<td>50</td>
<td>10.00</td>
<td>50</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>54.50</td>
<td></td>
<td>47.75</td>
</tr>
</tbody>
</table>

Table 25.6. Distribution of Correct and Incorrect Responses Made by 150 Airmen on a Multiple-Choice Item on a Management Test

<table>
<thead>
<tr>
<th>Groups According to Total Test Score</th>
<th>Number of Responses Incorrect or Omitted</th>
<th>Correct</th>
<th>Total Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>High third (above 65)</td>
<td>22</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>Mid-third (61-65)</td>
<td>38</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>Low third (35-60)</td>
<td>43</td>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>103</td>
<td>47</td>
<td>150</td>
</tr>
</tbody>
</table>

25.3.3.1 An effective norm-referenced test should include items representing a considerable range of difficulty, but most of the items should be of about average difficulty (ease index of 50 to 60 percent). If instructors have a pool of test items, they can select items from it to cover the range of abilities in the class in such a way that the distribution of test scores fills the scale and approximates a normal curve.

25.3.4 Differentiation Index of Test Items. When an item is answered correctly by some students and not by others, it divides the class into two groups. This question arises: In what other way are the two groups different? The really effective instructor wants to know not only those students who answer an item correctly, but also the kind of student who has the ability to answer it correctly.

25.3.4.1 One means of analyzing an item is to determine the total test standing of the students who answer the item correctly. If the students who answer the item correctly are predominantly those with high total test scores, the item is adding to the effectiveness of the test as a whole. It is contributing positively toward the differentiating ability of the test.

25.3.4.2 If students who answer the item correctly are about equally divided between those with high total test scores and those with low scores, the item contributes little or nothing to the differentiation of the test as a whole. In fact, it may detract from the efficiency of the test by unfairly adding to the scores of some students and subtracting from others. The possibility should not be overlooked that the quality of instruction rather than a poor test item could be the reason for little differentiation.

25.3.4.3 In general, the group that responds correctly to any item should be composed principally of students who have high total test scores. This score grouping is particularly necessary if the test is designed to cover material which is closely related. In this situation the test should have high consistency within itself. An item which can be used to separate students who achieve high test scores from those who do not is said to have differentiation ability. For purposes of analysis and comparison, this ability can be represented by an index number.

25.3.5 Computing Differentiation Index. The differentiation index measures the ability of an item to differentiate between students with high scores on the total test and those with low scores.

There are a number of formulas for computing the differentiation index. The formula selected must be the one that best fits the needs of the user. (Some testing authorities use the term discrimination index or validity index when discussing this type of test analysis.)

25.3.5.1 One method of computing the differentiation index is to divide the test papers into groups based upon the overall test scores. If three groups are used to compute the differentiation index of 150 students, for example, the best 50 test papers are placed in the high group, the next 50 papers in the middle group, and the last 50 papers in the low group. The number of students in each group who responded correctly to the item are then counted. For the management test, 50 airmen were in each third of the class. In the high third, 28 airmen answered the item correctly; in the middle third, 12; in the bottom third, only seven (Table 25.7).
25.3.5.2 The number of persons in the low third who answered the item correctly is subtracted from the number of persons in the high third who also answered it correctly. This difference is then divided by one-third the total number of students in the group. (This represents the total number of students divided by the number of groups used. In this case, three groups were used—the number of groups may vary—therefore, N is divided by 3. The formula for computing the differentiation index (DI), when three groups are used is: D.I. = $\frac{H - L}{N/3}$

25.3.5.3 Here H is the number of students in the high third who answered the item correctly. L is the number of students in the low third who also answered the item correctly. N is the number of students who took the test, and 3 is the number of groups. The differentiation index for the example given would be:

$$D.I. = \frac{H - L}{N/3} = \frac{28 - 7}{150/3} = \frac{21}{50} = 0.42$$

25.3.5.4 The index of 0.42 indicates the degree to which the item differentiates between those students who obtained high total test scores and those who obtained low total test scores.

25.3.5.5 Note that the symbols in the formula for the differentiation index duplicate those of the formula for the validity index discussed earlier in this chapter.
However, the indexes represent different things; the difference lies in the criteria used to obtain either index.

Table 25.7. Number of Times Each Alternative Was Chosen as the Correct Response and the Number of Omissions for a Multiple-Choice Item on a Management Test

<table>
<thead>
<tr>
<th>Groups according to total test score</th>
<th>Alternatives</th>
<th>Omissions</th>
<th>Total Item not reached</th>
<th>number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>High third</td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
<tr>
<td>95</td>
<td>65</td>
<td>0</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>Mid-third</td>
<td>64</td>
<td>0</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Low third</td>
<td>60</td>
<td>0</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>0</td>
<td>35</td>
<td>47</td>
</tr>
</tbody>
</table>

* Alternative c is the correct response.

25.4.2 Table 25.7, which lists the responses to a four alternative multiple-choice item will be used to illustrate this type of analysis. This method can be adapted to other types of test items.

25.4.3 When the distribution of the 150 responses to this question are analyzed, the following aspects are worth noting.

25.4.3.1 The item has a substantial differentiation index (0.42), as has been shown. The distribution shows a definite relationship between the total test score and correct responses (alternative “c”). Nearly two-thirds of the airmen who selected the correct response were from the high third of the class in terms of total score. More than half of the airmen in the high third of the group selected the correct response.

25.4.3.2 None of the students chose alternative “a.” Since the item has essentially three alternatives, alternative “a” should be reworded, removed, or replaced. This alternative should be constructed to appeal to some of the 90 airmen who either answered the item incorrectly or deliberately omitted it.

25.4.3.3 Half of the airmen who selected alternative “b” came from the high third of the group. This fact indicates that these Airmen may have been given some misinformation or that they have been misled by the wording of the alternative. Only the correct response should be positively related to the total test score. This alternative should be rewritten.

25.4.3.4 Alternative “d” has been selected most often by airmen in the low third. It is differentiating in terms of the total test and is, therefore, a good distractor.

25.4.4 Data furnished by tabulation, such as that given in Table 25.7, are useful to the test constructor and interpreter. If the item is valid, the data may be interpreted as follows.

25.4.4.1 Students who selected the correct response to the item can be assumed to have achieved that objective of the instruction.

25.4.4.2 Students who selected incorrect alternatives or who omitted the item can be assumed not to have achieved that objective of the instruction.

25.4.4.3 Alternative “a” is ineffective and must be replaced; further investigation is required regarding alternative “b”; alternative “c” is apparently good as it is.

25.4.4.4 Students who reached an item, but omitted it, did so by choice.

25.4.4.5 Subsequent items were omitted because the students failed to reach them.

25.5 Summary. Instructors should use norm-referenced analysis when there is a need to compare students with each other. We may want to provide recognition and awards to students who perform very well. Also, by using norm-referenced analysis of evaluation data, we can identify those students who are not doing well in our classes when their performance is compared with the performance of other students.
25.5.1 Statistical measures used in norm-referenced analysis include rank ordering, percentile ranking, percentile grouping, standard scores, and T-scores. Also, the mean and standard deviation are used to calculate many statistical concepts.

25.5.2 Several important phases are considered in evaluating the worth of a norm-referenced test. When a test is working effectively the scores resemble a normal curve of distribution, having a wide range with the majority of the scores grouped near the center of the distribution. It is useful to analyze individual test items in terms of difficulty level and ability to differentiate. Through proper interpretation and use of this information from each item, the instructor can analyze each test to see if each test item is achieving its purpose as planned.
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Chapter 26
USING FEEDBACK IN THE CLASSROOM

26.1 Introduction. We are familiar with courses which consist of readings, lectures, an assigned paper or project, and tests. In traditional courses like these, individualized comments from instructors to students are limited to grades on papers, quizzes, exams, and the final grade. But comments of this sort come well after students have been evaluated on their course work. If there is any impact on learning, it will come during the next phase or in another course or in some follow-on activity on the job.

26.1.1 Such after-the-fact comments, called summative evaluation, often contribute little to student learning because they come too late for the student to take corrective action. On the other hand, the most important job of an instructor may be to provide information which students can use to improve themselves during the course. Such information, called formative evaluation, guides students while they can still take corrective action and also gives instructors clues to the need for a change in teaching approach.

26.2 Definition And Theory. In order to differentiate between end-of-course grading and information an instructor may provide during a course, many educators use the word feedback. In general, feedback is any information about the results of a process. When we use a computer, for instance, we feed in information and get back feedback. In the social sciences, feedback is the information which returns to the source of a process (or to a preceding stage) so as to reinforce or modify it. If the coach finds that the football team is weak in defensive tactics, for instance, players are scheduled for more blocking practice. In psychological jargon, feedback is called knowledge of results.

26.2.1 In the classroom, then, feedback can be defined as information students receive from their instructor about their performance which will cause them to take self-corrective action and guide them in attaining the goals of the course more effectively.

26.2.2 This notion of feedback or knowledge of results is actually quite complex. Textbooks use such terms as primary versus secondary feedback, extrinsic versus intrinsic, augmented versus summary, and specific versus general. Students receive feedback from at least five sources—the self, the learning task, fellow students, the instructor, and the school. We do not understand completely how the process works in each instance, but the broad outline is clear.

26.2.3 Feedback generally serves one or two purposes—informational and motivational. The first is generally responsible for correcting errors the student commits. The second motivates the student to try harder. Informational feedback should always be motivating, but motivational feedback does not necessarily provide information. A pat on the back or a word of encouragement may motivate a student, but will not necessarily point out errors in that student’s performance.

26.2.4 Feedback seems most effective when narrative comments are accompanied by numerical scores of ratings, especially when students clearly understand the scales or numbers used. Narrative summaries have a higher chance of being biased than scores or ratings, and if the narrative is too specific or if it goes too far the feedback may actually be counterproductive.

26.2.5 It is important to realize that feedback need not always be negative or destructive. In fact, positive feedback is almost always seen as warmer and more sincere than negative feedback, even when given in identical ways. This perception of warmth is significantly related to expanded effort, acceptance of feedback, satisfaction with feedback, satisfaction with student goals, satisfaction with student performance, and satisfaction with the instructor. Students appear to have a tolerance level for criticism, but some perceive an instructor’s attempt to point out weak areas as threatening. This perceived threat often causes defensive behavior on the part of the student which may result in a lack of improvement.

26.2.6 It might appear that the best advice is “to accentuate the positive,” or to discuss positive feedback and ignore the negative. This technique, however, is not the answer. Students reinforced only for success tend to lower their goals in order to ensure success. Criticism may hurt, but praise may not always help.

26.2.7 We cannot reconcile these conflicting statements about feedback more than to say that positive information is more readily received than negative. Negative information generally tends to arouse defensive behavior on the part of the student. Yet, teachers must stress positive aspects of student performance, and, at the same time adequately communicate weaknesses and needed improvement. An emphasis on the positive should enhance student receptivity or acceptance, and, it is hoped, foster some attempts to apply the feedback in the future.

26.3 Giving Feedback To Students. The purpose of feedback is to improve student performance. In its most effective form, it provides constructive advice, direction, and guidance to students in their efforts to raise their performance levels. It is a communication medium in the sense that the instructor can review course standards with the students and provide feedback on their performance in relation to these standards. Students must understand the purpose and role of feedback in the learning process. Otherwise, as we have seen, they may reject the feedback and make little or no effort to improve.
**26.3.1** Feedback can also be used as a device to reinforce learning. Although not all feedback can be used in this manner, the instructor should take every opportunity to use feedback as a means of clarifying, emphasizing, or reinforcing instruction in certain areas. For example, if several students falter when they reach the same step in lesson planning, student feedback may indicate a need for the instructor to repeat an explanation or to give special emphasis to the step in subsequent critiques.

**26.4 Characteristics Of Effective Feedback**

**26.4.1 Objectivity.** Effective feedback focuses on the student and student performance; it should not reflect the instructor’s personal opinions, likes, dislikes, or biases. For example, if a student demonstrates a complicated test construction sequence, it would be unfair to give feedback on personality traits unless they interfere with performance. If a student makes a speech and expresses views that conflict with the instructor’s beliefs, the instructor should give feedback on the merits of the speech, not on the basis of agreement or disagreement with the student’s views.

**26.4.1.1** The “error of halo” is a pitfall in giving feedback, much the same as it is a pitfall in summative evaluation. Instructors sometimes permit favorable or unfavorable impressions of students to influence their judgment. Sympathy or overidentification with a student can be a barrier to objectivity. A conflict of personalities can unwittingly color a judgment. Feedback must be honest to be objective; it must be based on actual performance, not performance as it could have been or as the instructor and the student wish it had been.

**26.4.2 Acceptability.** Students must first accept the instructor before they can willingly accept feedback. They must develop confidence in the instructor’s qualifications, teaching ability, sincerity, competence, and authority. Usually, the instructor has the opportunity to establish rapport and mutual respect with students before the need for giving feedback arises. If there is no such opportunity, however, the instructor’s manner, attitude, and knowledge of the subject must serve instead. Students usually accept feedback when instructors give it and present it with conviction and sincerity. The competent instructor does not rely on rank or position on the faculty as a basis for feedback. Although these are important elements of an instructor’s authority, student acceptance depends on more active and demonstrable qualities.

**26.4.3 Constructiveness.** Feedback is pointless unless a student profits from it. Praise just for the sake of praise has no value unless the only goal is to motivate or improve self-concept. The instructor should identify a fault or a weakness and also provide positive guidance for the student to improve. Negative criticism that does not point toward improvement or a higher level of performance should be omitted from feedback.

**26.4.3.1** Effective feedback reflects the instructor’s consideration of the student’s need for self-esteem, recognition, confidence, and the approval of others. Ridicule, anger, or fun, at the expense of the student, have no place in constructive feedback. Occasionally, the instructor should offer comments to the student in private. In some cases, discretion may rule out any feedback at all. For example, feedback may not help a student impaired by a physical defect where the student is unable to change. Although instructors need to be straightforward and honest, they must also respect the student’s personal feelings.

**26.4.4 Flexibility.** As effective instructors, we should remain flexible in giving feedback. We should avoid mechanical, predetermined techniques and preconceived opinions regarding content, subject matter, and student capability. We should consider the actual content of a student effort or what actually happens during a student activity. We then give feedback on those observed factors that affected performance. Sometimes a good student will do poorly, and a poor student will do well. A friendly student may suddenly become hostile, or a hostile student may suddenly become friendly and cooperative. We should be honest enough to evaluate each effort on its own merits.

**26.4.4.1** Instructors should also be sensitive to student reaction to their feedback. If a student does not respond to a given comment, we should not dwell at length on that area because our criticism will likely fall on deaf ears. On the other hand, if the student shows a keen interest or appears motivated in a given area, we should offer a more detailed analysis of the area and other suggestions for improvement.

**26.4.4.2** Instructors should vary their organization and methods of giving feedback. We may choose to begin with our own comments, continue with a group critique, if appropriate, and finally request individuals to give feedback on their own performances. Additional ideas on organizing and conducting a feedback session are included later in this chapter.

**26.4.4.3** Instructors should also vary their approaches to cope with different situations and adapt the tone, technique, method, organization, and content of the feedback to the occasion and the student. We frequently confront the problem of selectivity—what to say, what to omit, what to stress, and what to minimize. In determining our approach, we must consider the class situation, student ability, subject matter, the time allotted for the feedback, and other factors. Feedback should never be so rigidly designed or executed that the instructor cannot allow for variables.

**26.4.5 Organization.** Unless feedback follows some pattern of organization, a series of otherwise valid comments may lose their impact. Almost any pattern is acceptable if it is logical and understandable to the student and to the instructor. Therefore, the instructor
should tell the student what the pattern will be in order to improve the student’s comprehension of the feedback. For example, an effective organizational pattern might be the sequence of the student activity itself. In certain instances, feedback can begin at the point of failure and work backward through the steps that led to the failure. A successful performance can be analyzed in a similar fashion.

26.4.5.1 Sometimes a defect is so glaring or a strength so obvious that it overshadows the remainder of the student activity and can serve as the focal point of feedback. Breaking the whole into parts or building the parts into a whole has strong possibilities. Whatever the organization of the feedback, the instructor should be willing to change if the student cannot understand it.

26.4.6 Comprehensiveness. Comprehensive feedback need not be extremely long nor must it treat every detail of a student’s performance. As instructors, we must decide whether we can achieve the best results by discussing a few major points or a number of minor points. We should base our feedback either on areas which need improvement or on areas that we can reasonably expect a student to improve.

26.4.6.1 Effective feedback includes both strengths and weaknesses. Only the instructor can determine a proper balance between the two. It is a disservice to students to dwell on the excellence of their performances and neglect areas that need improving.

26.4.6.2 As instructors, we should be specific with our comments and recommendations. Such a statement as “Your second phase wasn’t as good as the third phase,” has little value to the student until the student learns exactly why the second phase was not as good as the third phase. If we have clear supportable ideas in mind, we should express them firmly and authoritatively in terms that can be easily understood. Specific examples followed by practical suggestions are more meaningful than generalities. Students cannot act upon recommendations unless they understand what the recommendations are. At the conclusion of a feedback session, students should have no doubts concerning what they did well, what they did poorly, and, most importantly, how they can improve.

26.5 Methods Of Giving Feedback. The critique of a student’s performance is always the instructor’s responsibility, and we can never delegate it in its entirety. However, we can add interest and variety to our feedback if we exercise our imagination and draw on the talents, ideas, and opinions of others. The following methods for giving feedback may be used individually or in combination.

26.5.1 Instructor Feedback. Most critiquing results from the direct leadership and guidance of the instructor. We conduct workshop sessions to refine skills; we hold individual conferences or critique in front of a group; we examine outlines and drafts; we coach and conduct practice sessions.

26.5.1.1 Group Critiques. Sometimes we give feedback in a one-to-one student-to-teacher setting, but a more efficient way is often within a general class session. Students may make identical mistakes as they perform an exercise or explore new experiences; giving feedback to a group of students means that more aspects of the subject can be covered.

26.5.1.2 Written Feedback. When we write down feedback we can devote more time and more thought to preparing it than we can when giving immediate oral feedback in the classroom. What we lose in spontaneity we often make up for in more complete, carefully considered comments. Written feedback also gives students a permanent record they can refer to as necessary. Rating scales, a form of written feedback, often provide for standardization among instructors which students appreciate.

26.5.1.3 Because so many academic instructors evaluate writing and speaking we have included graphic rating scales and brief but specific guidance for giving feedback in these two subjects (Appendix I).

26.5.2 Student Feedback. Other methods of feedback focus on student leadership under the supervision of the instructor. We often involve students in the feedback session because they learn as they help teach others. Many civilian schools use a system of teachers’ aides or graduate assistants to help with the feedback because direct involvement with students can be extremely valuable; more experienced students can give more effective student-centered feedback.

26.5.2.1 Self-evaluation. One goal of education is to give students enough confidence to be self-critical; allowing them to evaluate their own performances can help with this process. Beginning writing students, for instance, can often spot elementary errors in their own work if they participate in a supervised proofreading exercise. When television facilities are available, an effective way to critique public speaking is for students to see themselves on TV. Giving students a checklist or a scale of some sort often aids them in self-evaluation. When students evaluate their own work, the instructor usually needs to follow up and make sure the feedback is complete and accurate.

26.5.2.2 Student-led Evaluation. Students can give feedback in a variety of different ways, but they must never be put in a position of substituting fully for the instructor. Sometimes a student may lead the discussion in a group feedback session, but the instructor should set the ground rules. The efficiency of this type of feedback may be limited by inexperienced participants, but it may also generate a high level of student interest, participation, and learning. In student-led evaluation, the instructor invites members of the class to comment on student activity or singles out one student to present all
the feedback. Still another technique is to divide the
class into small groups and assign each group a specific
area on which to comment. Using basic criteria and
guidelines issued by the instructor, these groups then
present their findings to the class. Their combined
reports provide comprehensive feedback of individual
and class performance.

26.5.2.3 Whatever the method, the instructor must
remain responsible for the overall quality and
completeness of the feedback. If the students participate
in the feedback, the instructor must make allowances for
their relative experience. Normally we should reserve
time for ourselves at the end of student-feedback sessions
to cover those areas which may have been omitted and
those areas not given sufficient emphasis.

26.6 Summary. Since, by the nature of their job,
instructors are evaluators, they should have the ability to
give feedback in the classroom. Feedback is not part of
the grading process but a step in the learning process.
The purpose of feedback is to improve future
performances of the students and, when possible, to
reinforce learning. Effective feedback stresses student
strengths as well as suggestions for improvement.
Feedback should be acceptable, constructive, flexible,
organized, and comprehensive. Classroom feedback may
be varied for interest, and it may be both written and
oral. Student participation in feedback should be
carefully supervised and instructors should reserve time
for themselves to ensure adequate coverage.

Table 26.1. Ground Rules To Aid The Instructor

1. Establish and maintain rapport with the students.
2. Tell the students the organizational pattern to be used
   in the feedback.
3. Cover the major strengths and weaknesses. Try to be
   specific and give examples if possible.
4. Avoid trying to cover everything. A few well made
   points may be more beneficial than numerous but
   inadequately developed points.
5. Do not extend feedback beyond its scheduled time. A
   point of diminishing returns can be reached quickly.
6. Allow time for a summary of the feedback to
   reemphasize the most important things that a student
   should remember.
7. Try to avoid comments with “never” or “always;”
   most rules have exceptions. Your feedback may be
   wrong.
8. Do not criticize something that cannot be corrected.
9. Do not criticize when you cannot suggest an
   improvement.
10. Avoid controversies with the class, and try not to
    take sides with group factions. Stop the discussion before
    arguments get started.
11. Avoid being maneuvered into the unpleasant
    position of defending feedback. If the feedback is honest,
    objective, constructive, and supported, no defense should
    be necessary.
12. If part of the feedback is written, it should be
    consistent with the oral feedback.
Chapter 27

STUDENT DIFFERENCES

27.1 Introduction. Since we were old enough to notice the world around us, we have seen that people differ. The physical differences are most obvious; psychological differences (personality, motivation, intelligence) are less obvious. Physical and psychological differences among individuals are important concerns in such areas as business, politics, and recreation, but they are especially important in education. Along with objectives, teaching methods, and evaluation, an understanding of our students is one of the most important factors in education.

27.1.1 While there is much research on student differences, firm conclusions are often hard to draw because of conflicting results. Often conclusions about student differences prove to be incorrect or only partially true as additional or more exacting research is conducted. Many educational decisions have been made based on faulty generalizations. Therefore, caution must be our guide as we examine this important area.

27.1.2 Most human differences cluster around a value known as the average. If we look at enough individuals, we find some above and some below the average, resulting in a distribution known as the “normal” curve (see chapter 25). Thus, in measurements of differences in intelligence, the major clustering of cases occurs at a score of 100 (the mean). Intelligence quotients below 70 and above 130 are few in number compared to the cases at or near the mean of 100. Similarly, the clustering of cases on the individual difference of height recently reflected an average of 5'8” for adult males in the United States. When studying human differences, we use measurement techniques to obtain a range and distribution of scores and to describe how individuals differ.

27.1.3 Because students vary so widely on many important dimensions, instructors must be aware of these variations within a single classroom. Educators have normally taken one of two approaches in planning curriculums for students with a wide range of individual differences.

27.2 Match The Method To The Student. This approach recognizes that students differ in abilities and other characteristics that affect their learning. Instructors should not accept teaching methods and curriculums as they stand when they don’t produce the desired learning outcomes. If a student or group of students have trouble succeeding under a given teaching method, the instructor changes or improves the method so that the students will succeed. Special efforts are directed toward helping students who are performing below the average. The instructor also tries to free above average students to move ahead at greater speed to capitalize on their special talents.

27.2.1 However, better teaching methods and means of reinforcing student behavior are not always practical. The costs involved and the difficulty of designing and implementing effective programs are among the drawbacks of this approach.

27.3 Match Students To The Planned Learning Experience. This approach accepts the instructional system as it exists. Failure is minimized by using measures of student differences to predict success. Using tests and other evaluative data, forecasts are made in selecting, guiding, and admitting students to different curriculums, units, or courses of study. The school does not adapt its curriculum to the students. If students have too little ability to succeed in a school, course, or given curriculum, they are not admitted or are placed in an easier curriculum. This approach protects students by keeping them away from situations in which they are not likely to succeed. Information about student differences is used to predict and select. Only students with a high enough probability of success are admitted into the specified level or curriculum.

27.3.1 However, testing and evaluation instruments are often inaccurate or unreliable for predicting success. Students are forced to adapt to the teaching methods rather than having the methods adapted to their needs. Students who fail may not be as much at fault as the methods of instruction used on them.

27.4 Combining The Two Approaches. Some combination of these two approaches is probably superior to either one alone. If a teaching method is not succeeding with a student, then we should use another method. We should not consider teaching methods as fixed or disregard abilities. We should look for some optimal match of students with methods. For students at one level of a given aptitude, one teaching method may yield greater achievement while for students at another level of that aptitude, a second method may yield greater achievement. For instance, a student with fairly low mechanical aptitude might profit most from one-on-one instruction, while a student with higher aptitude may learn as efficiently in a group using the demonstration-performance method. No longer would a search be made for the one best way to teach. Many ways to teach would be investigated, each of which may be “best” for particular types of students.

27.4.1 Too little is known as yet to make possible the widespread design of educational programs based upon a combination of these two approaches. Many educators, however, are currently attempting to meet this need. Instead of arguing about which of two teaching methods is best for everyone, chances are that both claims have some validity for some students. Because of student differences, no one method, test, curriculum, or version
of any teaching-learning activity is likely to be equally successful with all students. Student differences and teaching methods interact to help or hinder learning. Ideally, we should never lose sight of the need to monitor and then match students to methods in some fashion that best fits the individual student.

27.4.2 As we attempt to match methods to student differences, we need to have a basic understanding of group and individual differences and our ability to affect them.

27.5 Group Differences. People are often grouped and studied on the basis of their age, sex, race, or background. When differences are found they are referred to as group differences. For instance, school officials might gather data to compare achievement of male and female members at a military academy or the success rate of black and white undergraduate pilot trainees. Managers might draw conclusions from the accident rate of Air Force pilots under 30 years of age compared with that of pilots over 30.

27.5.1 The results of research on group differences are often of limited use to educators because of the controversy they generate or because one study often conflicts with another. However, useful, tentative conclusions are being drawn in some areas of study, with implications for classroom instructors. For instance, much research has investigated sex differences in the classroom. Although differences in verbal, visual-spatial, and mathematical ability have been found between the sexes, the cumulative research on ability and actual school achievement does not offer sufficient evidence for treating adults differently based on their sex. More important, current findings suggest that instructors should not hold different expectations of cognitive performance for the sexes.

27.5.2 While the extensive amount of research on group differences cannot be summarized in this chapter, here are some guidelines for dealing with these differences in the classroom.

27.5.2.1 Work to Eliminate Stereotypes. Stereotypes are oversimplified, rigid beliefs about categories of people. These beliefs tend to be invalid because they are overgeneralizations. If we believe that all NCO’s conform to the image of the drill sergeant, all second lieutenants are naive, all civil servants are not dedicated, or all fighter pilots are adventuresome, then we are guilty of forming stereotypes. Today, many work positions are filled (and wages set) based upon stereotypes that are fostered by such innocent means as textbooks and TV shows. These communication mediums often show groups of people in stereotypical roles. Such portrayals and values they project may actually interfere with or prevent personal growth for members of these groups.

27.5.2.1.1 While there is no easy way to eliminate stereotyping from our behavior, we need to make a concerted effort to eliminate the hundreds of subtle, seemingly innocuous ways in which people are treated based only upon their sex, race, age, or background. These unsupported beliefs about people can do great harm. An awareness of our own use of stereotypes is a good place to start; we should examine our use of stereotypes and decide how it might be influencing our behavior in the classroom. We should then work to eliminate these unsupported beliefs about people and the influence they might have on our behavior.

27.5.2.2 Use Caution in Using Group Averages. Suppose we read a research article which indicates that adult males are superior to adult females on visual-spatial tasks, or that adult females are superior in tasks which involve understanding and producing language. How might this information have a negative effect on our relationships with students?

27.5.2.2.1 When we speak of group averages or group characteristics, we should be extremely careful in applying these figures or descriptions to an individual student. While the average height of adult males may be 5'8", this average certainly means little when dealing with a 6'4" student in our class. Similarly, great care must be taken when using knowledge that males are superior to females on visual-spatial tasks. Individual students in your class may deviate from the average of their group, and the women may surpass the men in achievement in that particular class. Additionally, expectations come into play. If we expect female students to outperform males in a language class, our expectations may influence actual performance. Students often perform to the level of their instructor’s expectations.

27.5.2.2.2 If we are tempted to apply group averages to individuals, we might consider the comment of a famous British writer who was once asked, “Who has the most brains, man or woman?” His reply was, “Which man? Which woman?” Instead of treating students as members of a group, we should treat them as individuals.

27.5.2.3 Recognize an Instructor’s Limitations. When we focus on group differences in our classrooms, we soon realize that they are a fact of life we cannot change. We cannot alter a person’s age, sex, race, or background. Most students do not want to be treated differently based upon their group membership. Therefore, we can make certain that we do not say or do something that will offend them or cause them to lose interest. At the same time, they deserve to be respected for who and what they are.

27.5.3 In summary, we should be very careful when basing educational policies and classroom practices on group differences.

27.6 Individual Differences. Our students will arrive with different personalities, varying motivation, a wide range of past achievements, and differing abilities. There is little we can do about their past achievements or personalities. However, we can provide an environment
27.6.1 Differences in Motivation. Probably the individual difference that will be of most concern to Air Force instructors is motivation. Motivated students learn more effectively. Unmotivated students are likely to be a disturbing influence on others. Some students will possess an inner motivation, while others will be motivated to learn only when external rewards are offered, such as grades or the opportunity to be a distinguished graduate. Certain students will memorize the textbook if you ask them to since they want to please you. Some students will strive for excellence in all aspects of a course, while others will exert only enough effort to meet the minimum criteria for passing.

27.6.2 The Concept of Motivation. Psychologists use the concept of motivation to account for changes in and the frequency and vigor of a person’s activities. We are always doing something, but some of our activities occur more often than others and continue longer when they do occur. Additionally, some activities are pursued more vigorously than others. Outcomes that usually give rise to pleasant feelings will be pursued; those that usually give rise to unpleasant feelings will be avoided. While a motive cannot be observed directly, when it is activated by a situation we can see its effect on behavior. We say persons are motivated or we speak of their motivation.

27.6.2.1 The concept “motivation” is complex and can be viewed as encompassing other closely related concepts.

27.6.2.1.1 Needs. When students have a need, they lack something that a given activity or outcome can provide. The need to belong, for instance, can motivate a student to seek group acceptance.

27.6.2.1.2 Interests. If students have an interest in a subject, they tend to pay attention to it. The student who is interested in computers is more likely to pay attention to instruction in that subject.

27.6.2.1.3 Values. Students with a particular value have an orientation toward a class of goals considered important in their lives. A student who values patriotism will most likely be motivated in a lesson on the flag or the Code of Conduct.

27.6.2.1.4 Attitudes. Attitudes consist of feelings for or against things (people, objects, ideas). If students like mathematics, they get pleasure out of activities involving mathematics. Students seek activities toward which positive attitudes are held. Attitudes direct and arouse purposeful activity.

27.6.2.1.5 Incentives. Incentives can satisfy an aroused motive. Incentives such as good grades, awards, and selection as a distinguished graduate motivate students who want to achieve.

27.6.2.2 Aspiration. Aspiration is the hope or longing for achievement. A certain level is needed if the student is to make an effort. For instance, the NCO may aspire to be a college graduate and be willing to devote evening hours to completion of degree requirements.

27.6.2.3 Achievement Motivation. The concept of motivation helps to explain why students with the same scholastic aptitude or intelligence perform differently in our classrooms. When students achieve beyond their predicted capability, we speak in terms of overachievement. When they achieve below predicted capability we say they underachieve.

27.6.2.3.1 It will not take us long to note that our students differ in achievement motivation. Students with high and low achievement motivation will perform differently on tasks when working independently. Students low in achievement motivation will need more of our assistance in the form of supervision, direction, and structure. Highly motivated students will require little encouragement or direction when working in areas they value.

27.6.2.3.2 Students high in achievement motivation will persist in task completion and have the desire to complete interrupted tasks. They also have the desire to keep up orderly progress toward distant goals. During group activities, instructors will find these students want to work with partners who can get the job done.

27.6.2.4 Fear of Failure. Not all student motivation comes from the desire to succeed. Some students will be motivated by the fear of failure. In the past, students may have experienced shame, ridicule by peers, or punishment for failure. The resulting fear of failure may be more motivating than a desire to do well. The fear may even keep students from attempting certain activities, or they may be motivated to attempt unrealistic tasks.

27.6.2.4.1 Suppose your course uses programmed instruction with its emphasis on errorless performance. You may find a decrease in motivation among students whose motivation to succeed is higher than their fear of failure. However, you may see an increase in motivation among students whose fear of failure is higher than their motivation to succeed. If you use strict grading with your students, those whose motivation to succeed is high should be more motivated; among students whose fear of failure is greater than their desire to succeed, worse performance will probably result.

27.6.2.5 Affiliation, Power, and Approval. Some students will be motivated by the want and need of friendly relationships with other persons (affiliation). By mixing teaching methods, we can provide opportunities for these students to participate in small groups. Others will be motivated by the desire to influence other persons (power). Opportunities for leadership in group activities can be provided, or we may need to counsel these students on their tendencies to dominate or manipulate others as a cause for their being disliked. Other students will have strong needs for recognition or approval. We will have to give special attention to this group in our
counseling program. We can provide opportunities for these students to participate in classroom activities where their particular talents can be recognized.

27.6.2.6 Motivation and Reinforcement. From the viewpoint of psychologists who emphasize the role of reinforcement in learning, all of us are motivated by the reinforcing consequences of our past behavior. Our motivated students may not have strong motives to learn or be driven by powerful drives and needs; rather, they may be students who have been properly reinforced for certain behaviors in their past. The students may have been rewarded in the proper amount and at the proper time when a certain behavior was exhibited. The truly motivated student may be the person who has learned to get along, for long periods of time, without much apparent reinforcement. From the behavioral perspective, we can motivate students by a great deal of reinforcement in the early stages of learning (for instance, praise for each correct answer) followed with a gradual thinning out or lowering of reinforcement as the student matures.

27.6.2.7 Frustration and Motivation. Incentives such as grades, awards, and distinguished graduate programs provide a degree of control over most students because the expectation of reinforcement is usually met with actual reinforcement. But what happens when such expectations are not reinforced? Suppose we have students working for good grades, wins in some form of athletic competition, or verbal praise. In the past we have reinforced this behavior with these incentives. But, suppose we stop these incentives; the students’ behavior may show changes in energy and direction leading to frustrated behavior: expected grades are not received, the students do not or cannot score points for their team, or students may be moved from a group in which they are doing well to one in which they do not receive their expected reinforcement—frustration results. Similarly, keeping students from finishing a task they are engrossed in because time ran out leads to frustration. Eliminating students from athletic competition with their peer group because their peers are too skilled blocks their chances for reinforcement.

27.6.2.7.1 Frustrating situations like these motivate students because they change student energy level and direction. However, the motivated behavior is usually in a socially undesirable direction resulting in emotionality, withdrawal, regression, overactivity, and aggression.

27.6.2.7.2 As instructors, we should guard against frustrating situations. When we see signs of aggression, withdrawal, or inappropriate displays of emotion exhibited by our students, we should regard such behavior as a cue to the occurrence of frustration. We should make an effort to determine the source of the frustration.

27.6.2.8 Techniques for Motivating Students (Table 27.1). Educational research suggests that the following techniques are useful in motivating students.

27.6.2.8.1 One of the strongest arguments against using tests and grades as motivators is their link with anxiety. When a student’s anxiety is very low or very high, test performance is lowered. Almost always, very high anxiety will hurt performance. However, moderate anxiety motivates in a beneficial way; it assists performance. For students with high anxiety, we should seek ways to lower it in the classroom; for those with low anxiety, we might find ways to raise it to improve performance.

27.6.2.8.1.1 When students receive either a pass or no credit for a course instead of conventional grades (A-F), the result may be decreased effort. Some students may do less work. However, many students and faculty members frequently mention the positive consequences of this type of grading system. There is less pressure on students, they can experiment in new areas, and a healthier attitude develops toward the course. These benefits may outweigh any reduced quality or amount of student achievement occurring under a pass or no credit type of grading. (Table 27.2)
Table 27.1. Techniques for Motivating Students

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
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<tbody>
<tr>
<td>Verbal Praise.</td>
<td>Words such as “good,” “great” and “fine” work as powerful motivating devices when given after a proper response or performance or after a close approximation of a proper response or performance. Verbal praise is easy to use and serves as the most natural of the motivational devices available to an instructor. Praise given after certain behavior increases the frequency of that behavior.</td>
</tr>
<tr>
<td>Written Comments.</td>
<td>Studies indicate that a short encouraging note based on a student’s test performance has a more positive effect on future test performance keep it up. However brief comments are more effective than grades alone in motivating students to do better on future tests.</td>
</tr>
<tr>
<td>Grades.</td>
<td>Students have learned that benefits are associated with getting good grades. Consequently giving tests and assigning grades have come to have the effect of motivating students to learn. Not only do grades affect what is learned they affect how much is learned. They become incentives and reinforcers</td>
</tr>
</tbody>
</table>

27.6.2.8.2 As we work to motivate students and find techniques that work we should take the time to annotate our lesson plan so the techniques can be used the next time the lesson is taught. If a motivational technique does not work it should be dropped from the lesson plan. In time we will have a lesson that motivates as well as teaches.

27.6.3 Differences in Ability. During the 1920’s, the testing movement revealed a wide range of student intelligence quotients in typical public school classrooms. Studies indicated that the brightest students could move at a more rapid pace and learn much more than less able students. The findings raised questions about accepted teaching methods and indicated that many materials, texts, and topics were inappropriate for some students. Educators concluded that any attempt to teach students in a group would likely miss the mark for some students. The findings greatly complicated the task of teachers.

27.6.3.1 As a solution educators turned attention to individualized instruction. Students should work on tasks appropriate to their particular abilities. To the extent possible, they should move ahead at their own pace. Accounting for individual differences in student ability became one of the primary purposes of individualized instruction.

27.6.3.2 Individualized instruction occurs when the goals of instruction, learning materials, subject matter, or methods of instruction are specially chosen for a particular student or a small group of students with common characteristics. The members may be placed in a special seminar and the academic program tailored to their special needs.

27.6.3.3 In the discussion of individualized instruction that follows, instructional approaches or methods that can be used by the classroom instructor are presented. Individualized methods that typically require a reorganization of the school’s curriculum are discussed in Chapter 19, Visual Aids and Instructional Media.

27.6.4 Independent and Self-Directed Study. Air Force instructors may have an opportunity to allow students to work on their own as a supplement to, or replacement for, segments of a course. When this opportunity exists, instructors can provide a student or small group of students with an assignment that lasts for a few hours, several days, or weeks. Students may not be required to attend formal classes during this period.

27.6.4.1 If we use this approach, we should ensure that students clearly understand the objectives, resources available, task steps involved, time allotment, and evaluation techniques prior to the start of the study. The degree of supervision given depends on the maturity and objectives of the students. We may need to supervise and guide the students fairly closely, or they may work almost entirely on their own and be responsible for a finished product which we will evaluate.

27.6.4.2 Research on self-directed study suggests that most students will need some guidance, even if they are going to work independently. Many students are not ready for intellectual independence and will complain if thrown unprepared into an extreme form of self-directed study. The method seems to work best in more advanced courses where students have previously dealt with the same material at a basic level.

27.6.4.3 As instructors, we need to be aware that initial student reaction to self-directed study courses is often unfavorable. However, students do develop more favorable attitudes toward future opportunities for intellectual independence. The unpleasantness from initial exposure to this approach probably comes from the big change in teaching methodology. But the broadening experience eventually makes students accept more independent work. We should keep in mind, when using this approach, that the unfavorable initial reaction may
last and could affect student response to any additional self-directed studies.

27.6.5 Contracting. One variation of the use of independent and self-directed study involves use of contracts between individual students and the instructor. (Table 27.3) The approach can be used for a total course, as a means of supplementing a basic course for all students, or for use with selected students. A contract involves an agreement, usually written, between the instructor and student.

27.6.6 Mastery Learning. This approach to individualizing instruction operates on the premise that time is a crucial variable in the learning process. In using this approach, the instructor fixes the degree of learning expected of students at some mastery level and allows time for learning to vary, so all or almost all students achieve the desired level of mastery.

27.6.6.1 Mastery is defined in terms of a specific set of major objectives that students are expected to exhibit by subject completion. The subject is then broken into a number of smaller learning units. Unit objectives, whose mastery is essential for mastery of major objectives, are defined. Students are allowed to demonstrate mastery of a unit at any time they choose. Brief diagnostic (formative) tests provide feedback to the students and instructor. When unit learning problems are identified, supplementary instructional correctives are applied to help students. These correctives involve use of small group problem sessions, individual tutoring, alternative textbooks, workbooks and programmed instruction, audiovisual methods, academic games and puzzles, and reteaching. The students demonstrate achievement of course objectives through end-of-instruction (summative) evaluation. The instrument used defines mastery in terms of a specific set of skills which each student is expected to have learned by completion of the subject.
### Table 27.2. Benefits Associated With Grading System

| Creative Behavior. | Doing the unexpected or something novel has the effect of motivating by arousing the student’s curiosity. One Air Force instructor established a reputation based upon this technique. During a class period this instructor might appear as an old west gunfighter to emphasize points. The next day the instructor might be dressed as an astronaut. Students looked forward to classes because of the unexpected. Instructors might turn the tables and ask students to prepare a test for them to take. Or students can be asked to prepare test questions for use on the next exam. In a case study the instructor might vary the approach by giving students several solutions to the problem and asking them to determine which is best. |
| Periodic Reinforcement. | Providing reinforcement to students as a course progresses can keep them motivated to the end. If we make early stages of a learning task easy students will have some initial success in task accomplishment. We should introduce the difficulties and complexities of a task gradually and insure that all students have a chance for reinforcement so their appetite will be whetted. This action will require us to know the variety of talents and skills possessed by our students. |
| Familiar Examples. | In chapter 6 the value of examples as support material was developed. Examples when based on the experiences of your students serve to motivate. |
| Building Block Concept. | Building upon what has previously been taught is motivational. Using the cognitive taxonomy of learning we build upon prior instruction. When students see how we use prior instruction to build the current lesson the effect is motivational. We should emphasize that the material we are now learning does not stand in isolation. We will be using it again later in the course or unit of instruction. When possible we should call upon previously acquired facts concepts and principles to develop a current lesson. |
| Computers, Simulations, and Games. | In addition to dealing with higher levels of learning in the cognitive domain the use of simulations games and computers can be fun may provide important learning experiences and usually keeps students highly involved and motivated. Using and even developing such devices are an almost sure way to increase classroom motivation. |
| Classroom Leader Support. | We should try to get the leaders among the students to adopt the goals and objectives of the course. If the formal and informal leaders—not always the same person—in a class support us and our efforts, other students will be motivated to do likewise. |
| Unpleasant Stimuli. | The list of unpleasant stimuli to avoid is long and includes items such as having students sit too long in an auditorium having them try to listen in a room with poor acoustics putting them too far away from a chalkboard or screen not telling them how they are doing in the course until it is too late to do something about it or not meeting their requests for help. These stimuli have a negative effect on motivation and should be eliminated. |

**27.6.6.2** The mastery approach is very student oriented. Students are graded solely on the basis of the final (summative) examination performance. Grades are based upon performance against a predetermined standard and not relative to peer performance. All students who attain the standard receive appropriate grade rewards and there is no fixed number of rewards. Students are given constant feedback through a series of ungraded, diagnostic progress tests, and each student is given all the help needed to learn. The mastery learning approach is particularly effective when students have a wide, but manageable, range of entry skills.
27.6.6.3 While the mastery learning approach has high potential, there are limitations. First, the approach works best when the course requires minimal prior learning or previous learning which most of the students already possess. We would not want to institute the approach in an advanced course if most of the students did not possess certain basic skills or if time or money did not permit us to modify the instructional design to take this into account. The approach may not be able to offset the negative effects of deficient prior learning. Second, the approach has been most successful for subjects which are sequentially learned. The learning of a unit builds upon the learning of all prior units. Finally, the subjects in which mastery learning strategies are most effective tend to be those for which there is a single definite right answer to each question.

Table 27.3. Elements Found in Learning Contracts

| Objective: | Specify in the contract the specific objectives to be achieved. |
| Evaluation Techniques | Agree upon the formal means of evaluation whether a test, oral or written report, or a project. |
| Resources Available | Make the student aware of available resources for starting the learning experience. |
| Task Steps | Establish a series of task steps leading to achievement of the objectives. |
| Checkpoints | Meet periodically with the student to discuss problems and progress. These meetings serve to motivate the student. |
| Deadlines | Establish and require the student to meet realistic deadlines. If the student fails to meet a deadline, counseling is usually required. Renegotiate the contract, if necessary. |
| Reinforcement | When possible, reward the student for contract completion. An opportunity to brief others, participation in a conference, or an opportunity for extended study in an area of interest might serve as the reward. |

27.6.7 Personalizing Instruction. One approach that appears to work successfully with adults involves personalizing instruction. (Table 27.4) Built upon the following concepts of independent and self-directed study, the personalized instruction is supplemented with traditional instructional techniques.

Table 27.4. Benefits of Personalized Instruction

| Individual Pacing | Students can rapidly complete a course, often using a fraction of the time required for group instruction; however, they may use more time than is allotted for traditional instruction within constraints imposed by the administration. Students work to meet established criteria and do not compete against each other. |
| Mastery Oriented | Before students can progress to new material, they must demonstrate mastery of a particular area of instruction. Students are not penalized for failure. If failure occurs, students study the material again before retesting on a parallel form of the test. They continue the cycle until mastery is achieved, which usually means 80 percent or 90 percent correct responses. When students finish the unit of work, a new study guide is provided for the next unit. |
| Tutoring | More advanced students can often serve as tutors for those needing assistance. Encouragement and support are provided. |
| Study Guides | Students are provided with study guides for each unit. The guides contain unit objectives, study references, suggestions for study, experiments and projects that can be undertaken, and sample test items. |
| Supplemental Materials | Lectures, demonstrations, discussions, teaching interviews, case studies, and movies can be provided for motivation or clarification. Normally students attend on a voluntary basis. |
27.6.7.1 Courses taught using these guidelines for personalizing instruction show promising results. Student reaction tends to be positive and examination scores are higher than in courses conducted in a traditional manner.

27.6.7.2 We should attempt conducting such a course only when we have carefully determined the objectives which define the competencies desired in students at the end of instruction. The objectives provide clear goals, and students know what they are responsible for. This knowledge can help overcome negative feelings about the lack of structure which often accompany participation in independent study programs. Many students like the self-pacing which allows them to study where and when they please. They also like the personal interaction with the tutors.

27.6.8 Cognitive Learning Style. Students learn in many ways. They perceive, think, and solve problems differently. The general patterns students use as they perceive, think, and solve problems can be called their cognitive style or cognitive learning style.

27.6.8.1 Learning research is beginning to identify several distinct styles of learning which can affect how much and how well students learn. There are several models for analyzing cognitive learning style in current educational literature. Some deal with preferences students have for learning through passive listening rather than active participation. Other models attempt to link self-concept with willingness to accept group norms or to take risks. Many other personality characteristics are included in these models, and there is considerable research evidence to suggest that various aspects of cognitive learning style should be explored further.

27.6.8.2 Many schools, particularly at the community college level, have employed an analysis of cognitive learning styles for placing students into courses taught differently. There does seem to be an improvement in grades and a reduction in anxiety when students and their learning experiences are matched on the basis of cognitive learning style. There is very little that individual instructors can do, however, to take advantage of differences in learning styles in typical classrooms. Some of the models for determining learning style are very theoretical, and many of the techniques are very sophisticated, time consuming, and expensive. Further, if a cognitive learning style can be determined, we have the additional problem of matching several alternative ways of teaching to the many and varied student cognitive learning styles.

27.6.8.3 The growing interest in cognitive learning style may yet be one of the most fruitful approaches to dealing with individual differences in the classroom. Like so many other attempts to deal with students as individuals, however, the fate of cognitive learning style analysis will depend on results as compared to costs. From what we have learned so far, the approach appears to deserve further serious study.

27.7 Summary. One of the basic themes of psychology is that of human differences—no one is exactly like anyone else. These differences complicate the task of classroom instructors, but they also provide the challenge.

27.7.1 Many educators have chosen to adapt the system to account for differences in abilities and other characteristics that affect student learning. Teaching methods are changed or improved so students can succeed. Other educators have chosen to accept educational systems as they exist and try to minimize failure by admitting students who will most probably succeed. Each approach has shortcomings so attempts are being made by educators to synthesize the two approaches to overcome the effects of student differences.

27.7.2 As classroom instructors, there is not much that we can do to overcome group differences based on sex, age, race, or background. However, we can work to eliminate stereotypes based on these differences, use caution in interpreting group averages, and recognize our own limitations in coping with these differences.

27.7.3 Students vary in their motivation. Many students are motivated by the need to achieve, while others may be motivated more by a fear of failure. The want and need for affiliation, power, and recognition also serve to motivate students. Frustration can motivate students, but the motivated behavior is usually in a socially undesirable direction.

27.7.4 Techniques for motivating students include verbal praise, personal notes on their test performance, grades or similar rewards, creative behavior on the part of the instructor, reinforcement at the appropriate time, use of familiar examples, building upon previous instruction, obtaining classroom leader support, avoiding unpleasant stimuli, and use of computers, simulations, and games.

27.7.5 Differences in ability in a classroom may be met through such means as independent and self-directed study, contracting, mastery learning, and by personalizing instruction.
28.1 Introduction. Appropriate teaching methods are a continuing concern of Air Force instructors. The formal teaching lecture, for example, may place students in a passive role and fail to provide enough incentive or motivation for students to learn. On the other hand, self-paced or individualized instruction, which often provides more incentive or motivation, may not be feasible.

28.2 Small Learning Group Defined. Small-group learning is a way of overcoming limitations of some methods while promoting verbal and nonverbal interaction among instructors and students. A small learning group is a collection of students sharing a common learning objective and occupying a space so limited that there can be direct verbal and nonverbal communication among them. A small learning group might consist of as few as three or as many as 20 students. The upper boundary is arbitrary, but if there are many more than 20 persons the benefits of small group learning are reduced.

28.2.1 The demonstration performance, guided discussion, and case method discussed in this guide are instructional methods generally designed for small-group learning. In addition, all of the other student verbal interaction methods, some of the presentational methods, and most of the application methods discussed in chapter 9 involve small group learning. Each method helps students become socialized and adjust to the learning environment by promoting interaction in the classroom.

28.2.2 Process vs Content. Simply forming small groups of students, however, does not guarantee effective group learning. In all human communication there are two major ingredients—content and process. The first deals with the subject matter or the task the group is working on. In most learning settings, the focus of attention of all persons is on the content. The second ingredient, process, is concerned with what is happening among members while the group is working. Group process or dynamics, deals with such items as norms, cohesiveness, consensus, individual roles, group feeling, needs, and leadership. In many learning groups, too little attention is paid to process, even though it is a major cause of ineffective learning.

28.2.2.1 Analysis of verbal behavior in learning groups indicates that about half of the discussion focuses on process and half on content. Certainly educational content is of prime importance, but process statements that encourage a group’s progress are also important. Attention to process serves to keep students on track by orienting the discussion and satisfying their personal and social needs. Sensitivity to group process will help an instructor diagnose students’ problems early and deal with them more effectively.

28.3 Benefits Of Small-Group Learning. Although small-group learning has some limitations, such as the higher cost of a smaller student-to-instructor ratio, the benefits generally outweigh the limitations. Here are some benefits of small group learning: (1) Most students tend to perform better on many cognitive and skill-oriented tasks when working with others in small groups. The presence of others working on the same problem increases motivation to perform well. This motivation may be lacking with either large groups or individualized learning. (2) Students can gain a clearer understanding of the material when they interact with the instructor and other students. Since much informal learning occurs in families and other groups, students are accustomed to learning in groups. (3) Most students enjoy interacting with others in social, recreational, and educational groups. Satisfaction and enjoyment of learning is increased when participating with others. (4) Students often learn faster in groups than individually. Obviously, such factors as content matter and individual motivation influence whether individuals learn faster in groups.

28.3.1 In spite of the positive influences that a group can have on students, there are other influences that may or may not be beneficial. For example, membership in a group places much pressure on individual students to conform to group norms.

28.3.2 Norms. Every group develops norms—shared expectations of conduct and participation that guide and regulate group behavior. Norms reflect how students expect of one another, and what the classroom activities are, and what the limits are for expressing their own attitudes and values. Usually such norms are not even stated, but are still readily apparent to students who have been in the class even for a short time. In a large lecture class, for instance, instructors have greater responsibility for determining norms than in smaller groups where students and instructors can interact more easily. On the other hand, in small groups instructors must be particularly careful not to impose norms on the group unnecessarily. Group atmosphere or feeling will be improved if students are allowed to help develop norms.

28.3.2.1 Classroom norms become apparent in two ways: (1) certain behaviors either recur often or are avoided; and (2) punishments or sanctions are taken against persons who deviate from the norm. Others may frown, ignore, or even comment negatively about the behavior. Some norms are productive: students should relate their comments to what has been said previously; students should arrive at class on time; the instructor should include all students in the discussion. Some norms, however, are largely counter-productive: Students should talk about whatever they want; the instructor should “put
28.3.4.1 Improving cohesiveness in the learning group: cohesiveness promotes learning. Here are some steps for improving cohesiveness because we want to increase cohesiveness because students have high group loyalty—exhibit higher morale, greater productivity, and more communication.

28.3.3 Cohesiveness. Cohesiveness, or the ability of a group to stick together, is essential in small group instruction. Cohesive groups—groups where students have high group loyalty—exhibit higher morale, greater productivity, and more communication.

28.3.3.1 Morale. The morale of members is related closely to cohesiveness. If the group is important to them, students pay attention to its problems and get more involved in the subject matter. They spend more time on behalf of the group and want others in the group to do well.

28.3.3.2 Productivity. Cohesive learning groups are more productive because class members help one another. If one student is having trouble, others often offer to assist. Students in groups with little cohesiveness often lack initiative and have to wait for instructions from the instructor. They often do only what they are told and no more.

28.3.3.3 Communication. Cohesiveness encourages communication among students and between the students and the instructor. Students feel secure as a part of a group and are not afraid to speak up. The instructor and class leader do not feel threatened when questions are asked. Everyone is interested in the welfare of the group. Groups lacking cohesiveness may be quiet, polite, boring, and even apathetic. Cohesive groups tend to be noisier, are characterized by more disagreement, and often run overtime since there is generally a good deal more discussion on each point raised.

28.3.4 Increasing Cohesiveness. With small group interaction we want to increase cohesiveness because cohesiveness promotes learning. Here are some steps for improving cohesiveness in the learning group:

28.3.4.1 Set obtainable objectives. As discussed elsewhere in this guide, clear obtainable objectives are important to efficient planning and teaching. Course objectives, objectives for large blocks of instruction, and individual lesson objectives not only enhance learning but also increase morale. Achieving an objective rewards a group. Making daily and weekly progress rewards the group regularly. Of course, for objectives to build morale, they must be clearly specified and understood by all, and they must be obtainable.

28.3.4.2 Reward the group. Reaching an objective is in itself a reward for the group, but the instructor can provide incentive and promote teamwork by rewarding the entire group for achieving a goal. Praising the class for good work and planning social affairs recognizing a job well done are ways of rewarding the group. Many classrooms are geared entirely toward rewarding only individuals. Yet as any athletic coach and most experienced teachers know, encouraging persons to look out only for themselves to the exclusion of others leads to trouble. The wise instructor uses both individual incentives and group rewards to enhance small group learning.

28.3.4.3 Build a group tradition. As discussed earlier, once a group is established, norms develop. Norms are a part of group tradition. Other things also happen. Unusual, humorous, or otherwise memorable incidents become a part of the group's history and tradition. By recalling such incidents at class meetings an instructor emphasizes that the group exists over time. Highly cohesive social organizations such as churches and service clubs enact ceremonies and traditions over and over. One instructor built a group tradition and aided cohesiveness by slipping into the classroom early each morning to write a little saying on the chalkboard. When the instructor failed to do so one morning, the seminar group was genuinely disappointed.

28.3.5 Consensus. Certain cohesive groups will express disagreements more openly than less cohesive ones. Such expression is both desirable and expected. But there comes a time when consensus or agreement on issues must come if closure is to result. In learning groups as with other types of groups, success can generally be measured by the group’s ability to reach its objectives. Although consensus in the sense of unanimity may be nearly impossible to achieve, there are some guidelines the instructor can follow to help the group reach general agreement.

28.3.5.1 Clarify the discussion. Make sure that the group’s activity is understandable, orderly, and focused on one issue at a time. Consensus comes more easily if each of the factors is weighed individually and systematically. Encourage each student to stick to the subject, to avoid side discussions, and to clarify the issues with questions so that everyone can have equal understanding. Instructors can keep the discussion focused and prevent the introduction of extraneous or unrelated matters.

28.3.5.2 Use process statements. As suggested earlier, process statements deal with what is happening in the group. While process statements may relate to the content, they serve primarily to stimulate and facilitate
discussion: what you’ve said seems to make sense; how do the rest of you feel?; so far we seem to agree on the first two points; let's move on to the third; have we heard from Joe yet?; or this is really a productive discussion. Questions that ask for clarification and statements that get the class discussion back on track are also types of process statements. When both instructor and students use process statements effectively, agreement will come more readily and learning will be increased.

28.3.5.3 Seek different views. All students should be encouraged to present their views and provide information and evidence to support their views. Expression of a wide range of opinions and views allows a great opportunity for learning to take place. At the same time participation by all students will allow them to have their voices heard and will increase their satisfaction with the discussion and conclusions reached.

28.3.5.4 Remain open to different views. This discussion is clearly the corollary to the preceding guideline. We have all known people who seek the views of others with no intent to be influenced by them: Don’t confuse me with the facts; my mind is made up. When others present irrefutable facts and figures, or even a good idea that you may not have thought of before, don’t be afraid to alter your position or admit that you may have been wrong. Good instructors often learn from their students. Also, instructors can serve as models for the behavior of students in the matter of not being overly opinionated. Studies have shown that low or moderately opinionated instructors and students are held in higher esteem by others than highly opinionated ones.

28.3.5.5 Use group pronouns. Studies show that less cohesive groups—groups which are less successful in reaching consensus—tend to use more self-referent words such as I, me, my, and mine. On the other hand, groups which reach consensus and are more cohesive are more apt to use group referent words such as we, our, and us. As an instructor, talk about the seminar or class as a group. Talk about what we hope to accomplish and how we can work together to achieve our objectives. Do not emphasize what I want done or what is best for my interests. Stress that while all students should be concerned with their own learning, they should also be interested in the learning of others in the group. The roles each student assumes can help with effective functioning of the group and with creating an atmosphere where learning can take place.

28.4 Class Member Roles. In all small learning groups students begin to play different parts or roles after they have been together for a while. When a student becomes comfortable with a role and the rest of the group offers rewards for assuming the role, that student has found a place in the group. The student expects to play the role and others expect it too. This situation is comparable to roles in plays, and interestingly, just as people play different roles in different plays, they also play different roles in different groups. The gregarious life of the class may be quiet, devout, and reserved in church. The person who is ill tempered and bossy at home may be a likeable even-tempered person in the classroom. A student may be outspoken in one class and a good deal more reserved in another where the content matter is less familiar. But here is the basic principle: A student’s role is worked out jointly by the student and the rest of the group.

28.4.1 Student behavior in learning groups is similar to role behavior in other small group situations. Obviously there are many different roles and one person might fill more than one role in a group. Some task roles found often in learning groups are: idea-initiator—proposes new ideas, new goals, possible solutions; information giver—offers facts and information, personal experiences, and evidence useful for the group; coordinator—develops, describes, and shows relationship among facts, ideas, and suggestions. Common roles for group maintenance are: supporter—agrees, praises, shows warmth and solidarity to others; harmonizer—mediates differences between others, finds common ground, reconciles disagreements, conciliates, and suggests compromises; tension reliever—jokes, points out humor in the situation, and puts others at ease by reducing formality and status differences.

28.4.2 Dealing with Nonproductive Roles. Instructors are pleased to have students assume productive roles like those described in the preceding paragraph. With students like these, the learning group becomes more productive for all its members. Often, however, instructors are faced with the problem of students who play nonproductive roles. Here are some common problems and suggestions for dealing with the problems.

28.4.2.1 Monopolizers talk too much and hinder participation by others. If they know a lot about the subject and are eager to be helpful, then don’t embarrass them for you may need them in this role later on. Do not, however, let them monopolize or give long speeches. Politely turn the conversation to another student by asking a direct question. Do not use an overhead question (a question asked of the group as a whole) for most likely a monopolizer will answer. If monopolizers are simply trying to impress others with their knowledge or status, encourage them only when their comments are productive; otherwise, politely interrupt them and move to another student or a different topic. Generally other members of the group will handle the problem for you. Give them positive reinforcement when they do.

28.4.2.2 Arguers take issue with what the instructor and other students say. They may simply have strong personal convictions about the topic. If this is the case, don’t close your mind to some possibly good ideas just because of the opinionated manner in which they are presented. Talk to arguers outside of class and explain
that while you consider their views important for the
group to consider, they must not hinder overall group
effectiveness. Of course, it is possible that arguers are
attempting to gain recognition or perhaps even
attempting to disrupt the group. Try not to get too
excited, and above all don’t let the group become
antagonistic. Remember that the group is at least partly
responsible for a person playing this role. You may want
to talk to other students outside of class and ask them
what they think can be done to understand the person and
help change the behavior.

28.4.2.3 Nonparticipants show reluctance to participate
verbally in class discussions. Although nonparticipation
may result from not being prepared, often students don’t
participate because they feel insecure as individuals or
insecure with the particular group, perhaps due to
perceived status or rank differences. Spend extra time
with these people outside of class. Discover their
interests. In class, ask such students direct open-ended
questions. Make certain the question can be answered
easily, but not with either a “yes” or “no” response.
When these students take part in the class discussion,
give positive reinforcement. Say something such as:
That’s interesting, Mary. We need to hear from you
more often; or, I hadn’t thought of it that way before;
good answer.

28.4.2.4 Clowns don’t take things seriously and as a
result distract others and hinder learning. These students
generally enjoy attention. Encourage them when
tensions mount. Laugh and let them know you admire
their humor. Ignore them when “clowning around” is
not appropriate. They will not like to be ignored and will
soon learn when to and when not to supply humor.

28.4.3 Dealing with Nonproductive Groups.
Occasionally instructors find that rather than having
problems with individual students they have problems
with nonproductive groups. Here are some common
causess.

28.4.3.1 Apathy—lack of enthusiasm, low response rate,
yawning, quietness. Apathy may result from tension
often felt in first meetings of the group, from lack of
interest in the topic, or from a boring instructor.
Whatever the cause, don’t give up too soon. Even
experienced instructors find that their learning groups
sometimes become apathetic. Make time for small talk,
老兵, and humor. Show as much enthusiasm and
energy as possible. Do not give up if first attempts at
motivating the group are unsuccessful. Use explicit and
interesting examples to stimulate interest.

28.4.3.2 Hostility—arguing, sarcasm, personal
antagonism toward other students and the instructor.
Hostility may result from tensions among students,
frustration or dissatisfaction with the school, or perhaps
from some external or seemingly unrelated source.
Dissatisfaction with housing or transportation problems
can transfer directly to antagonism for the school and
even for the learning group. Attempt to alleviate
external and internal problems. Support students who
assume suitable roles. Relieve tension with small talk and
humor. If necessary, bring the situation into the open.
Remind the group of its objectives.

28.4.3.3 Confusion—students ask directions excessively
and complain that they are wasting their time. Listen to
what students have to say and take the time to be
especially understanding and provide needed direction.
Structure will most likely be welcomed as students want
to get to work. Do not emphasize the social aspect of the
group. To do so will only postpone resolution of the
problem.

28.4.4 Student Needs. Individual roles and group
behavior come as a direct response to needs of students in
the group. Although psychologists may disagree on the
number and nature of human needs, two facts important
to the learning group are commonly agreed upon: (1)
Some behavior is goal directed and results from a student
being internally motivated (for example, a student will
study to get a good grade in a course), and (2) other
behavior can be brought about by teachers who are aware
of student needs (for example, a teacher can show how
the subject matter is important to the student). Whatever
the case, student needs trigger behavior, and the
instructors can influence student behavior by knowing
student needs.

28.4.4.1 Probably the best known classification of needs
is the one developed by Maslow. Body—basic
physiological needs for food, water, sleep, and air. Safety
(security)—protection from harm or injury. Belonging—
social need for warmth, acceptance, approval. Self-
esteeem—for self-enhancement, competence, importance.
Self-actualization—for self-fulfillment, accomplish-
ment, having arrived.

28.4.4.2 Maslow suggests that these needs must be
satisfied sequentially. That is, once body needs are
satisfied a person is concerned with satisfying safety
needs. After safety needs are satisfied, then concern is
for belonging and then self-esteem needs. Once the first
four kinds of needs are satisfied, the person is concerned
with becoming self-actualized.

28.4.4.3 Instructors who understand the direct
relationship between student needs and the roles students
play in the group will be better equipped to adjust their
own teaching behavior within the group. More
specifically, instructors will be able to find the most
appropriate role or behavior for themselves in the
learning group.

28.5 The Instructor As Leader. Instructors often need
to assume task and maintenance roles like class member
roles discussed earlier to help the group function
effectively; rather than simply play roles, instructors must
vary their entire task and maintenance leadership
behavior to fit the situation. Task behavior in the
learning group relates to how instructors organize and
define student roles and how the learning is structured by the instructor. Maintenance behavior is concerned with how instructors maintain good human relations with students by using open, supportive, helping actions.

28.5.1 The amount and kind of instructor involvement relate directly to the maturity of the group. In other words, although task and maintenance behavior by the instructor should vary with the situation, there are some predictable ways of how they should vary. (Table 28.1)

28.5.2 The reasons for adjusting leadership behavior to the situation are many, but one of the prime reasons is that student needs change. Remember Maslow's classification of needs presented earlier. Consider the example of student seminar groups at a typical United States Air Force Professional Military Education course; it seems safe to assume that the students arrive with basic needs fairly well satisfied.

Table 28.1. Appropriate Pattern

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<td>1.</td>
<td>High task and low maintenance with a new group.</td>
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<tr>
<td>2.</td>
<td>High task and high maintenance as group begins to mature.</td>
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<tr>
<td>3.</td>
<td>Low task and high maintenance as group reaches greater maturity.</td>
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<td>4.</td>
<td>Low task and low maintenance for fully mature groups.</td>
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28.5.2.1 High task and low maintenance. Students gather in the auditorium to receive briefings and information important to them as new students. They are told where to go, what to do, what is expected of them, and how the school is run. Emphasis is on the task and structure of the school with very little consideration shown to them as individuals. School officials engage in very little maintenance behavior.

28.5.2.2 High task and high maintenance. Soon students are assigned to seminars or small learning groups with a seminar advisor or instructor. Still there is strong emphasis on the task. Students are told about general course requirements, communication skills requirements, and evaluation procedures, but the instructor also exhibits strong maintenance behavior. Students get to know each other and the instructor and begin to feel more at ease. The instructor, knowing that their body and security needs are satisfied, is appealing to their need to belong. Certainly the need for task orientation and structure cannot be ignored early in the course when students need direction, but maintenance behavior is needed to give students a sense of belonging.

28.5.2.3 Low task and high maintenance. As the course progresses students gain confidence. They understand what is required of them and how to meet the requirements. They also feel as if they actually belong to their home seminar learning group. The work may still be demanding, but the atmosphere is more relaxed and the group is cohesive. Now students are striving for a sense of achievement. They want to do more than just belong to the group; they want to be thought of highly by the group. Recognizing the student's need for self-esteem and accomplishment of tasks on their own, the instructor should maintain high maintenance behavior, but reduce task behavior and say in effect: I have confidence in you to make decisions and do the work without my looking over your shoulder.

28.5.2.4 Low task and low maintenance. When the course is nearly over and students have met the objectives, they are ready to graduate. The group will soon cease to meet, and the instructor will no longer lead. At this time very low task and low maintenance behavior by the instructor is appropriate. The group has fully matured and its members will go to their assignments.

28.5.3 The really effective instructor, then, is one who is able to use the correct balance of task and maintenance behavior to ensure that student needs are met and maximum learning takes place.

28.6 Summary. The small learning group is an important part of education. In learning groups the instructor must consider both the content or subject matter of the group and the process or interaction among group members in order to increase the benefits and decrease the limitations of small-group learning.

28.6.1 Every group develops norms which regulate behavior and influence cohesiveness. In cohesive groups, students have high group loyalty and exhibit higher morale, greater productivity, and more communication among members. Group cohesiveness can be increased by setting obtainable objectives, rewarding the group, and building group tradition. Cohesiveness promotes needed consensus or agreement by the group on major points. Consensus is encouraged when the instructor and students clarify the discussion, use process statements, seek different views, remain open to different views, and use group pronouns.

28.6.2 Students play roles in the learning group. Non-productive student roles such as monopolizer, arguer, nonparticipant, and clown, and group problems of apathy, hostility, and confusion need to be dealt with by the instructor. Attention to student needs will help the instructor understand student roles and be able to assume the proper balance of task and maintenance behavior needed to promote a productive learning group.
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Chapter 29
THE INSTRUCTOR AS A COUNSELOR

29.1 Introduction. Effective counseling can improve student performance. Since few Air Force schools have full-time counselors, Air Force instructors should be prepared to counsel students when the need arises. This chapter will assist you in meeting this responsibility.

29.1.1 There are two major purposes of counseling outlined in the professional literature. One purpose is to help people make wise choices and decisions; the second is to help people be better adjusted or promote their mental health. When discussing Air Force academic counseling, our emphasis will be on helping students improve or change their behavior by making wise choices and decisions which will help their academic progress. The second purpose, to promote adjustment or mental health, should be left to professionals in the field of mental health.

29.1.2 In discussing counseling, we will first define the term and classify student requests for assistance. Next, we will examine the helping relationship which is so important in effective counseling. Third, we will discuss techniques and practices taken from three different counseling approaches. The last two sections provide direction for referring students when the need arises and legal guidance concerning confidentiality of information in a military counseling setting.

29.2 Counseling Defined. There are many definitions of counseling, but most of them do not seem appropriate to counseling students in military schools. By extracting three common characteristics from the various definitions, however, we can define counseling as (1) a process (2) involving a helping relationship (3) directed toward improvement or change in student behavior. Let us examine these characteristics in more detail.

29.2.1 Counseling as a Process. Counseling may be viewed as a three-phase process or cycle of helping.

29.2.1.1 Self-Exploration. In the first phase the instructor directs efforts toward establishing a base or building a good relationship with the student. During this phase the student is allowed to explore the problem in depth. The instructor uses listening skills, proper responses, and effective questioning techniques, along with empathy, respect, warmth, and genuineness in building the relationship.

29.2.1.2 Self-Understanding. Once the foundation for the relationship is established, the instructor helps the student gain self-understanding. The instructor assists the student in making some sense out of the many pieces of the puzzle. Although students think about their problems a great deal, they frequently are unable to change their behavior. A student may recognize that nightly visits to the club interfere with academic preparation and yet persist in this behavior. What is missing is commitment to change. Therefore, in this phase the student must not only understand the problem in depth, but make a commitment to follow through with a plan or program designed to correct the inappropriate behavior.

29.2.1.3 Student Action. The final phase may be the most difficult. The instructor and student must devise a plan which the student can follow in resolving his or her problems. The instructor and student consider alternate plans and the possible consequences of these plans before selecting one. The emphasis is on outcomes and achievement of attainable goals.

29.2.1.4 These three phases illustrate counseling as a process. At the core of this process is the helping relationship.

29.2.2 The Helping Relationship. The second characteristic of counseling, the helping relationship, refers to interactions in which the instructor makes a determined effort to contribute in a positive way to the student’s improvement. While shoe clerks, policemen, bankers, and politicians all provide help, the term “helping relationship” is not used to describe their services. Their primary purpose is not to assist in the personal development of the individual. In counseling, we establish a helping relationship by drawing upon ourselves in ways that help students live more in harmony with themselves and others, and with a greater understanding of themselves. The relationship develops because students need assistance, instruction or understanding. Since the helping relationship is so important, most of this chapter will be devoted to this concept.

29.2.3 Improvement or Change in Student Behavior. The third characteristic of counseling, improvement or change in student behavior, describes the goal of counseling. Counseling can be considered successful when some kind of change or improvement occurs in a student’s observable behavior. It is not enough, after counseling, for a student merely to speak of renewed confidence in, for example, lecturing before a group. Such a comment does not allow us to be sure our counseling was successful. However, if the student gets up in front of the class and presents the lecture with a new degree of confidence, then we have observable evidence that the behavior has changed or improved. Or consider a student who could not perform satisfactorily on tests because of a high anxiety level. Observable evidence after counseling intervention would be a report that the student took several tests without experiencing anxiety which interfered with test performance. While we cannot say with certainty that the change was the result of counseling, it is quite probable that counseling intervention contributed to the improved performance.
29.3 Student Requests For Assistance. Students will come to us asking for information, action, or understanding and involvement. If a student asks for information we provide the appropriate verbal response. When the student asks for a handout from our lecture, we take the appropriate action to get it. Neither of these interactions would be classified as counseling. But when students verbalize a request for understanding or involvement, they are generally seeking a helping relationship and counseling is involved. Most students have occasions when they wish to talk with others about matters that are important to them. As instructors we must be alert for these needs even when they are not verbalized. With this type of request, we must be ready to enter into a helping relationship.

29.4 The Helping Relationship. All theories and approaches to counseling stress the relationship between participants as the common ground for the helping process. Such a helping relationship allows the instructor to contribute in a positive way to the improvement of student performance. We often speak of the counselor’s role as facilitating the change. Because the helping relationship is so significant in effective counseling, its key components need to be clearly understood.

29.4.1 The Counseling Environment. The setting in which counseling is conducted has some bearing on whether the relationship will be facilitated or thwarted. Our goal is to provide the atmosphere that will contribute most to communication.

29.4.1.1 Privacy. One of the most important physical considerations is privacy. Students desire and have a right not to be seen or heard by other students, instructors, or others when they enter into a counseling relationship. Nothing will limit the relationship more quickly than knowing others are able to hear or see what is taking place.

29.4.1.2 Chair Arrangement. Little research has gone into the effect of chair arrangement on the helping relationship. What research is available suggests that a seating position across the corner of a desk works well. Another arrangement is comfortable chairs placed close to each other at a ninety-degree angle with a small table nearby. Or you may find that a chair-facing-chair arrangement works better for you. Most students should be comfortable with a distance of approximately 30-40 inches between the counselor and themselves.

29.4.1.3 Avoid Interruptions. The instructor must establish rapport and build trust. Outside interruptions can only hinder. Phone calls, knocks on the door, people who want “just a word” with you, and secretaries who must have you sign this document “at once,” may destroy in seconds what you and the student have tried hard to build over a period of time.

29.4.1.4 Student Folders. Information in a student’s folder can be useful in preparing for a counseling session. However, the folder should be placed in a drawer or removed from view prior to the student’s arrival. Otherwise the student may become more concerned with what is in the folder than in discussing the problem being encountered. As a word of caution, instructors must be careful not to prejudge students based upon information in the folder or to expect certain attitudes, behavior, or achievement from students based upon written comments of other instructors. To properly help students, we must remain objective in our relationship with them.

29.4.1.5 Confidentiality. Students seeking help from instructors may reveal intimate, personal, and sometimes painful details and experiences. Because such highly personal and private revelations may bring embarrassment or ridicule, students do not wish them to be disclosed. They usually assume that others will not have access to their disclosures without their express consent. When a student enters counseling under this assumption, a confidential relationship exists and the instructor is normally obligated to maintain this confidentiality. However, there are legal implications involved in addition to the ethical considerations. A summary at the end of this chapter outlines your legal rights and responsibilities concerning confidentiality when counseling in a military setting.

29.4.2 Stages of a Helping Interview. We might think of the actual counseling interview in terms of stages labeled initiation, development, and closing. Earlier we discussed the development stage in terms of self-exploration, self-understanding and commitment, and action. Let us examine initiation and closing in more detail.

29.4.2.1 Initiation. During this stage you should work to establish rapport. You might focus upon some neutral topic or event known to you and the student. However, avoid trite conversation which may result in an increase in strained feelings, such as “It’s a nice day, isn’t it?” Being friendly, being attentive, and demonstrating interest to reduce student resistance are important, but don’t make the mistake of consuming valuable time with extended idle conversation implying that the weather, sports, or activities are what the student wants to discuss.

29.4.2.1.1 Any opening conversation should be brief. Focus on the student’s reason for being there. Statements such as “Please tell me what you wished to see me about,” “I understand you wanted to see me,” “I’ve asked you to come in because…” or “Please feel free to tell me what’s on your mind” should get you off to a good start. Try avoiding the use of “May I help you?” and “What is the problem you would like us to discuss?” The words “help” and “problem” may hinder development of the relationship.

29.4.2.1.2 Counseling appointments should be initiated on time or a good and sufficient reason provided as to why the appointment was not met. Tell students how much time you have available for the counseling session.
This procedure provides an important framework for the interview and allows the students to orient themselves. If available, 30 to 45 minutes is generally sufficient for counseling sessions. However, few instructors will have the luxury of this much time. Structure the interview according to the time available.

29.4.2.1.3 Initiation ends when the instructor and student understand what is to be discussed and agree that it should be. Although the focus may shift to a more primary concern as the interview progresses, you have agreed to discuss a point and are ready to proceed to the development stage. (The phases in the developmental stage are discussed under Counseling as a Process on page 247.)

29.4.2.2 Closing. Both partners in the interview should be aware that closing is taking place. During this stage no new material should be introduced or discussed. If such information does come out, schedule another counseling session. A concluding statement by the instructor may suffice. Or a short summation of the session with the agreed upon course of action by either the instructor or the student can effectively close out the session. Closing is especially important because what occurs during this last stage is likely to determine the student’s impression of the interview as a whole.

29.4.3 Instructor Attitudes. The essential components of the helping relationship are attitudes rather than skills. For this reason, it has been difficult to analyze what good counselors do in establishing a helping relationship so others can be trained to do likewise. During a counseling session, instructors must communicate the attitudes of acceptance, understanding, and sincerity by their actions, words, gestures, and facial expression. The main skill instructors must develop is that of communicating this understanding of what the student is trying to express, and doing it in a warm, sincere way.

29.4.3.1 Acceptance (Warmth). Different authorities use different terms to describe this attitude or core condition of counseling. Some call it “unconditional positive regard” while others use the term “nonpossessive warmth.” Primarily nonverbal, this instructor attitude is a direct outgrowth of the instructor’s ability not to appear to judge. It involves a willingness to allow students to differ from one another and the realization that the experiences of each student are a complex pattern of striving, thinking, and feeling. The student experiences acceptance as a feeling of being unconditionally understood, liked, and respected. Acceptance—a positive, tolerant attitude on the part of the instructor—is one of the conditions that enables the student to change behavior.

29.4.3.2 Understanding (Empathy). Counseling is basically a perceptual task. It is not possible to learn to say the right thing at the right time without learning to listen, watch, and understand. While listening, instructors must put themselves in the student’s place and try to see the circumstances as the student sees them, not as they look to an outsider. While simple to say, this is an attitude which seems hardest to learn. The first step in communicating this attitude is to listen carefully to what students say about how they feel because of what is happening to them. The next step is to think of words that represent the students’ feelings and their situation. Finally, use words to tell students that you understand their feelings and their situation. For instance, if a student expresses concern about a relationship to an instructor, you might respond with empathy by saying, “Underneath your frustration, I can sense a great deal of anger. You’re giving 100 percent, and instead of appreciating your effort, your instructor expects even more. That’s pretty hard to take.”

29.4.3.3 Sincerity (Genuineness). With this attitude, essential harmony exists between what the instructors say and do and what they really are. Sincerity is the opposite of phoniness. The instructor cannot role-play being a counselor. Each of us can sense from the tone of voice, gestures, or mannerisms of some of the actors used in TV commercials that they are playing a role. They are putting on a facade in saying things they don’t feel. Thus, with this attitude you mean what you say and say what you feel, keeping in mind that you are trying to be helpful to the student.

29.4.4 Interviewing Skills. The following interviewing or communication skills can assist the instructor in developing a helping relationship with students:

29.4.4.1 Attending Behavior. These skills pertain to the physical behavior you exhibit while listening to another person. Your posture, eye contact, and facial expression carry messages to the student while you communicate. Effective attending skills communicate that you are interested. If the skills are ineffective, it is doubtful that a helping relationship will develop.

29.4.4.1.1 Effective attending behaviors show acceptance and respect for students. Eye contact is regular; movement is toward the students and not away. Your posture should be relaxed leaning slightly toward the students. Match your facial expression with your feelings or the students’ feelings. Keep the voice clearly audible, neither too loud nor too soft. Maintain a high energy level so you can stay alert throughout a long conversation.

29.4.4.1.2 Effective attending skills can be developed with practice although your initial efforts may seem mechanical. If you work hard at projecting acceptance, understanding, and sincerity, you will find good attending skills developing quite naturally.

29.4.4.2 Noting Nonverbal Behavior. Student nonverbal responses are more likely to transmit the real message than the spoken one. Facial expression alone can transmit over half the meaning of a message. The nonverbal responses are automatic and the student will not generally be aware of them. However, do not fall into
the trap of believing a certain nonverbal response can mean but one thing. Arms folded across the chest may mean defensiveness, but they may also mean the person is comfortable in that position, is cold, is covertly scratching, or has dirty hands. Nonverbal behavior also varies from culture to culture. Therefore, nonverbal behaviors must always be judged within the context of what is happening in the counseling session and their meaning considered tentative. In counseling sessions the students’ nonverbal behaviors provide clues to possible underlying feelings or motives, but do not serve as proof they exist.

29.4.4.3 Questioning Techniques. Questioning is a common and very overused technique. Used improperly, it tends to make students see the counseling session as an inquisition in which they can sit back and think along the lines indicated by the questions. One question usually leads to another and before long the instructor is searching for additional questions to ask. Or the instructor may ask questions accusingly, arousing fear and suspicion on the part of students, instead of cooperation.

29.4.4.3.1 Used properly, questions can solicit needed information and direct student conversations to fruitful channels. When used, the questions should be open-ended and require more than a “yes” or “no” response. For instance, ask “How did you feel after the test?” instead of “You felt great after the test, didn’t you?” Avoid double-barreled questions such as “Are my questions helpful, and are you learning more about yourself?” Use indirect questions where possible since they inquire without seeming to do so, such as “You’ve been here at the school a week now. There must be a lot you want to talk about.” Another example would be “You must have many thoughts about our new grading system.”

29.4.4.4 Responding. Responding skills allow you to continue to communicate with the students without relying on questions. Through practice instructors can learn to use these responding skills which may seem mechanical at first but with practice become quite natural.

29.4.4.5 Restatement of content is an attempt to convey understanding either by simple repetition of or by rephrasing the communication. In restating you make no attempt to clarify, interpret, or organize what the student has said.

29.4.4.6 Reflection of feeling indicates the instructor’s intent to show that the students’ feelings or experiences are correctly understood. The focus is on student attitudes. Reflection techniques bring to the surface student feelings and attitudes. These techniques also bring problems into awareness without making a student feel pushed by the instructor. The instructor mirrors student attitudes so they can be clarified and understood. When properly achieved, reflection helps students feel deeply understood and clarifies student thinking so the situation can be seen more objectively. For instance, a student might say, “It’s so hard knowing my wife is in the hospital while I’m in school and there’s absolutely nothing I can do.” To reflect feeling, you would respond, “You feel anxious and entirely helpless right now.”

29.4.4.7 The “mm-hm” response accompanied by a nod of the head is one of the most common reinforcing responses. Though not a word, it is a clearly uttered sound. When used, it indicates “Go on. I’m with you. I’m listening and following you.”

29.4.4.8 Silence as a response can be difficult to master. We might consider two times when it is especially appropriate. A pause may come because students are thinking over what they just expressed and interruption would be inadvisable. In another instance, silence may fall just after emotionally-laden expression by students, and quiet acceptance of this pause is appropriate.

29.4.4.9 Clarification is another important response. Perhaps you simplify what students have said to make it clearer, or you try to verbalize ideas and feelings students have had difficulty expressing clearly. When you clarify what students have said or tried to say, you are using this skill. At other times, you may need to have students clarify something they said to you. In this situation, an appropriate response may be a question such as “I’m sorry. I didn’t quite understand your role in the argument. How did it get started?”

29.5 Counseling Approaches. Instructors who do even a moderate amount of counseling should give serious thought to the approach they use. Thought put into the selection of an approach should culminate in a theoretical base from which to operate. While the theoretical base need not be a fully developed, sophisticated theory of the counseling process, it should provide a structure or framework from which to operate. Without that structure a theoretical base, instructors may find themselves floundering during counseling sessions with vague goals and no means of achieving them.

29.5.1 Once developed, a theoretical base will allow you to make comparisons between the body of unique information supplied by the student in counseling and a larger body of generalizations you have about human behavior. Since you must make predictions alone or with the student about the effects of each course of action available to the student, theory provides structure for making appropriate selections. A theoretical base can also tell you what facts you lack to achieve understanding of the student. Finally, it can help you identify reasons for your success or failure as you counsel your students.

29.5.2 Counseling approaches or theories might be categorized in many ways. The behavioral approach might represent one group, cognitive approaches a second, and affective approaches a third. While you may not have the required training or need to fully understand and use these theories, the techniques and practices from
them may be useful in counseling students and in developing your own counseling approach. You may find yourself drawn to an approach because of your own view of people and how they should behave. As you become more knowledgeable, you may find that proper selection of techniques and practices from the different approaches increases the probability of giving appropriate help to your students. With experience, you may develop a theoretical approach that will assist you in giving the best possible help in the counseling situation.

29.5.3 To simplify our discussion we will select one theory from each approach for development.

29.5.4 A Cognitive Approach. Rational-emotive counselors view people as being capable of both rational and irrational (utterly illogical) thinking. A major element in their theory is that our emotions are caused and controlled by our thinking. What we think becomes our emotion.

29.5.4.1 Particularly important to this viewpoint is the concept that much of our emotional behavior stems from “self-talk” or internalized sentences. What we tell ourselves is or becomes our thoughts and emotions. Thus, our negative emotions such as fear, anxiety, embarrassment, and shame come from our thinking process. Simply stated, if we can learn to control our thinking, we can learn to control our emotions.

29.5.4.2 Let us consider an example. Before students get ready to give a speech, they start talking to themselves. The students picture all the things that can go wrong and anxiety starts to build. They continue to picture the worst possible outcomes, and the anxiety increases. Consequently, they then have difficulty performing because of their own irrational thinking which triggered the negative emotion of fear or anxiety.

29.5.4.3 Another common example occurs among students at teacher training schools. The thought of getting up in front of a group of students and teaching a 45-minute lesson produces negative thoughts. They start repeating the things that might go wrong and fear or anxiety starts to build. This negative self-talk continues. If they got up to teach and failed, the experience would be humiliating. If they could not teach the lesson, they would probably fail at the school. If they fail at the school, their entire military career will be affected. If their career starts going badly, the wives and children will be affected. The catastrophic thinking continues until they have worked themselves up into an emotional state that interferes with their school performance.

29.5.4.4 Counselors who borrow from rational-emotive theory would explain to the students how such self-talk brings on the very thing they are trying to avoid. They try to get the students to view the situation realistically. What is the probability that the worst possible thing will occur? What if they should fail the course? It might be in their best interest to know they should not go into a field for which they are not suited. By focusing on the

faulty reasoning, emphasis shifts to eliminating self-talk that stands in the way of student progress and causes negative emotions which students do not have to be experiencing. The brain focuses on one thing at a time. If students change their thoughts from those that are negative to those that are positive, they can learn to control their emotions.

29.5.4.5 At other times students can make themselves miserable through their negative self-talk, telling themselves how much they hate being at your school or attending your course. By learning to view the situation realistically and cutting out the negative self-talk, the students can accept the situation and make the most of the experience.

29.5.5 A Behavioral Approach. Behavioral counseling has many applications in the military academic setting. According to behaviorists most human behavior is learned and is therefore subject to change. If we can change the students’ environment, we can assist in altering their behavior. Our effectiveness in counseling and the outcome of the counseling can be assessed by changes in specific student behavior outside the counseling setting.

29.5.5.1 Basic to behavioral counseling is the principle of reinforcement. Rewards such as praise, affection, grades, and awards are given for appropriate behavior in hopes of getting students to repeat this type of behavior. For instance, if a student is commended for a good class presentation, this reinforcement should motivate the student to prepare well for the next lesson in hopes of again receiving recognition (called positive reinforcement).

29.5.5.2 At other times, a certain student response stops disapproval, criticism, or nagging from others. Thus, this behavior is reinforced by the removal of the disapproval, criticism, or nagging, and the particular response should occur again. For instance, a student does not get along well with other class members and is not accepted by the members. After counseling, the student responds to class members differently, stopping the disapproval. This new form of behavior has been reinforced and should continue to be used by the student (called negative reinforcement).

29.5.5.3 Student behavior that is not reinforced will be eliminated over a period of time. If students are no longer called on when they raise their hands, this form of behavior will eventually be eliminated in that classroom. Students who become overly dependent on an instructor will usually stop this practice if the instructor does not provide reinforcement for this type of behavior.

29.5.5.4 Instructors should also be aware that what they do and say serves to reinforce appropriate or inappropriate behavior. If we nod our head in counseling and say “mm hm,” we are giving positive reinforcement to what students say or actions they have taken. This action encourages the student to continue. But if we do
not like what students say or actions they propose, we should avoid reinforcement with head nods and our responses.

29.5.6.1 When using behavioral techniques in counseling, we should help students outline a course of action during which we know a good chance exists for them to receive positive reinforcement. Thus, there is a good chance for a positive change in behavior. However, if we outline a course of action where the probability of failure is high, then student behavior may get worse or show no improvement.

29.5.6 An Affective Approach. One affective (or humanistic) approach is client-centered counseling. This approach stresses student ability to determine the issues important to them and to solve their own problems. Client-centered counselors see students as basically good and behavior as being purposeful or goal directed. If placed in the proper counseling relationship and given the opportunity, students will choose courses of action that will lead toward actualization of their potential. The instructor’s primary responsibility is to create a helping relationship in which students can gain self-understanding and self-acceptance. Enhancement of the self-concept and actualization of potential are at the core of client-centered counseling.

29.5.6.1 The client-centered approach might be especially effective in situations where students are grappling with personal conflict. Consider, for example, situations in which students must decide to stay in school and complete a course or withdraw to return home to solve or deal with a difficult family problem. Either option is feasible from an administrative standpoint. From your point of view, the student should return home, resolve the problem, and return to complete the course at a later time. However, no one knows the students and their total situation better than they do; consequently, only they can make the most reasonable choice.

29.5.6.2 In these cases, for example, the self-concept of the students may include attitudes about themselves that preclude their being quitters or leaving commitments unfulfilled. What seemed to you the wisest choice would not necessarily be the best one from the internal vantage point of these students. Your task as a client-centered instructor-counselor is to establish a helping relationship in which students know they are accepted and in which they are free to make choices without fear of losing your regard and understanding. In this helping relationship, students will generally choose the course that is best for them.

29.5.6.3 Many military instructors will be dealing with immature students who have never taken responsibility for their own behavior or actions. With these students the client-centered approach is often particularly effective. If certain students consistently ask your opinion on how to handle problem situations, work at establishing a helping relationship with them. Give them the responsibility for resolving the problem situation. Also give positive recognition, if they are successful, as a form of reinforcement.

29.5.6.4 Your own view of people may be similar to that of the client-centered counselor. If so, you will probably be comfortable working at establishing a strong helping relationship with students and allowing them to solve their own problems. When establishing the helping relationship, remember that in the affective approach it is the attitudes of the counselor rather than techniques that facilitate counseling. Thus, with the client-centered approach, your focus will be on the students, not you as the instructor. You should see a decreasing need for your assistance as students mature in problem solving.

29.6 Referral. Referral is the process of finding someone else to help the student. Occasionally you may encounter students who have problems which are not educational or which call for specialized service. Referral to a professionally qualified person is more appropriate than attempting to help solve the problem. Marriage and family concerns, drug and alcohol abuse, and emotional disturbances brought on by stress are common problems instructors encounter among members of their student body where referral is appropriate, or students may need specialized assistance from the legal office, social actions, or another base or community agency. Even though the problem may not be serious, in all of these cases referral action is appropriate, because few Air Force instructors have the required education and training for helping students with these concerns. As teachers, we must recognize when the needs of a student call for assistance beyond the scope of our training.

29.6.1 Instructors should be familiar with the referral possibilities before suggesting this course of action to the student. What kind of special service does this person require? Is it available and, if so, where? First assess the resources of your own school. Perhaps you have staff members who have the professional training required for dealing with a particular concern. Second, determine the extent of services available on your base. A base mental health clinic may be able to handle a variety of problems because of the diverse background of the professionals assigned. The drug and alcohol abuse unit of your social actions office can give specialized assistance, and one or more of the base chaplains may have been trained as counselors. A variety of community services is also available to military personnel and should not be overlooked as referral possibilities.

29.6.2 When referral becomes a consideration, do not hesitate to discuss the situation with your supervisor or someone on your faculty who has professional training. You may need to call base or community agencies for their recommendation.

29.6.3 A student may show resistance, doubt, fear, guilt, or defensiveness when you suggest referral. You must be prepared to cope with these reactions. When suggesting
referral, communicate your acceptance, understanding, and concern just as you did in establishing the helping relationship. Offer to make the contacts and arrangements with the referral resource and assist in any way possible. Arrange for a follow-up with either the agency or the student to determine if you need to help further.

**29.6.4** When suggesting referral, students may indicate they would prefer making their own contact with the referral source. If so, you should attempt to arrange a follow-up procedure to determine how you might be of further assistance. The student may also reject the referral attempt. If so, do not interpret this reaction as a failure on your part. The student may now be more openly facing the problem as a result of the counseling intervention, or the student may have decided upon another course or action.

**29.7 Confidentiality Of Communications.** The following guidance on confidentiality of communications between an instructor and a student was provided by the Air University Staff Judge Advocate’s office on 17 May 1978:

**29.7.1** The military does not recognize any legally enforceable “privileged communication” between a counselor and counselee, as is the case in attorney-client, clergy-penitent, doctor-patient, or husband-wife communications, although a doctor has no privilege to withhold communications concerning criminal acts. A promise by a counselor of confidentiality cannot override the legal requirement to report crimes and a counselor who is told of a criminal act committed or about to be committed must report this information or be personally subject to criminal prosecution. The breach of confidentiality, in and of itself, does not give rise to grounds for legal action in libel or slander; further, the counselor has an absolute privilege from libel or slander actions when testifying in court or before an administrative body.

**29.7.2** A promise of confidentiality restricts the disclosure of such information to only the principal purposes and routine uses for which it is sought. Disclosure of this confidential information will be limited to only those employees who require the information for the performance of their official duties (this also allows access by military law enforcement personnel).

**29.7.3** No civilian jurisdictions recognize a privilege for communications with a counselor, although some allow a privilege for communications with a “social worker,” the definition of which varies and most likely would not include a military counselor in the instructional and academic environment. Disclosure is authorized to, among other groups, a civil or criminal law enforcement activity and to a court pursuant to a valid subpoena.

Counselors would be subject to judicial sanctions when no legal basis for declining to testify or withholding documents exists, and the absolute privilege against libel or slander actions for witnesses mentioned above is applicable also to civilian judicial or quasi-judicial administrative hearings.

**29.7.4** Counselors should consult with their local documentation management office and judge advocate officials to resolve any uncertainty.

**29.8 Summary.** Effective counseling can improve student performance. Therefore, Air Force instructors should be prepared to counsel students when the need arises.

**29.8.1** Definitions of counseling stress that counseling is a process involving a helping relationship directed toward improvement or change in student behavior. The purpose of counseling in the Air Force academic setting is to assist students in making wise choices and decisions.

**29.8.2** All theories and approaches to counseling stress the relationship between participants as the common ground for the helping process. A helping relationship allows the instructor to contribute in a facilitating, positive way to the improvement of student performance. Establishing a proper environment for counseling, developing the interview by stages, projecting proper attitudes in the session, and using appropriate interviewing skills are important considerations in establishing a helping relationship.

**29.8.3** Once fundamentals of the helping relationship are mastered, instructors can give serious attention to developing an approach to counseling. Techniques and practices from different theories can be useful in counseling students and developing a counseling approach. With experience, the instructor may develop a theoretical approach that will assist in giving the best possible help in the counseling situation.

**29.8.4** Instructors must recognize that the needs of students occasionally call for assistance beyond the scope of their training in counseling. Referral is the process of finding someone else to help the student at such times. Instructors should familiarize themselves with sources of assistance both on base and in the civilian community.

**29.8.5** Confidentiality of communications between instructors and students in a counseling relationship is essential. However, there are instances in military settings when confidentiality cannot be maintained. Instructors should contact the nearest base legal office if guidance is needed.
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Chapter 30

SELF-CONCEPT

30.1 Introduction. Educators and psychologists are becoming increasingly aware that the self-concept of students is closely connected to how they learn and behave. Increasing research evidence indicates that lack of academic involvement, misdirected motivation, and low performance in academic subjects characteristic of underachievers, failures, dropouts, and the culturally disadvantaged may be due in part to negative self-concepts. These students have difficulty in the classroom because they do not believe they can do academic work. When these students say, “I’ll never pass this test, I just know it,” they are reflecting something about how they feel about themselves. With this attitude chances are increased that they will not do well on the test. Thus, their performance depends not only on how intelligent they are, but also on how intelligent they think they are.

30.1.1 Current literature and research also suggest a close link between the self-concept and mental health. Such evidence leaves little doubt that the mental health of individuals depends deeply on the quality of their feelings about themselves. Just as individuals must maintain a healthy view of the world around them, so must they learn to perceive themselves in positive ways. It is not the people who feel they are liked, wanted, accepted, and able who fill our prisons and mental hospitals. Rather it is those who feel deeply inadequate, disliked, unwanted, unaccepted, and unable.

30.1.2 Recognizing the importance of the self-concept, instructors should also realize that the self-concept of students can be changed, for better or worse, through their experiences in the academic environment. While successful experiences in schools are no guarantee of a generally positive self-concept, they do increase the probability that such will be the case. In contrast, unsuccessful experiences in school guarantee that these individuals will develop a negative academic self-concept and increase the probability of their developing a negative overall self-concept.

30.1.3 In this chapter we will describe important facets of the self-concept, explain certain environmental forces that have shaped the academic self-concepts of students, summarize the role of defense mechanisms in protecting the self-concept, and identify actions an instructor can take to enhance the self-concept of students.

30.2 Description Of The Self-Concept. All of us have a mental blueprint or picture of ourselves. This blueprint is composed of a system of interrelated ideas, attitudes, values, and commitments which are influenced by our past experiences, our successes and failures, our triumphs, our humiliations, and the way others reacted to us especially during our formative years. Consequently, we arrived at a more or less stable framework of beliefs about ourselves and have proceeded to live in a consistent manner within that framework. This framework is known as the self-concept, although the terms self-perception, self-image, and self-structure are often used to describe the beliefs. Thus, we act like the person we conceive ourselves to be. In fact, it is difficult to act otherwise even with conscious effort and willpower.

30.2.1 Once established, the mental blueprint or picture of ourselves provides a screen through which everything else is seen, heard, evaluated, and understood. The likelihood is increased that our behavior will cause others to respond toward us in ways which validate and support our self-concept. If the self-concept is generally positive, it engenders self-respect and confidence, while a generally negative self-concept leads to feelings of inadequacy and a lack of confidence.

30.2.2 The self-concept may also be thought of as a theory we have about ourselves. Just as we use data from our experiences to make inferences about the world and the people with whom we interact, we also make inferences about ourselves by observing our own behavior and the reactions of other people to us. Our self-theory affects our behavior, but our behavior in turn affects our self-theory—a theory continually being tested and revised.

30.2.3 We might speak of a student’s self-concept in terms of levels in a hierarchy. At the top is the general self-concept representing a set of beliefs students hold about themselves. At the next level are three major areas of self-concept for students: Academic, social, and physical. Finally, we come to specific areas of self-concept related directly to a kind of activity or subject matter area. These specific self-concept areas are probably the easiest to change, while the general self-concept is the most difficult. Under academic self-concept would be specific areas such as mathematics, English, and history abilities. Under social self-concept would be such areas as friendship, dating, and dancing. The physical self-concept would include athletic and handsomeness or beauty self-images. Successes or failures of students directly affect specific self-concepts. The pluses and minuses in specific areas affect the major areas of self-concept which, in turn, affect the overall self-concept.

30.2.4 With this knowledge of what the self-concept is, let us turn to an explanation of environmental forces which may have shaped the self-concepts of students we will be dealing with in the academic environment.

30.3 Formation Of The Academic Self-Concept. While instructors should strive to improve the general self-concept of students, their best chance for success is in improving the scholastic or academic self-concept. Our appreciation of a student’s academic self-concept will be enhanced if we understand the role parents,
teachers, peers, and the school have played in shaping that self-concept.  

30.3.1 Parental feedback and evaluation, caring or lack of it, and acceptance or rejection have a striking effect on how students view their general intellectual ability and ability in specific subject areas. Research suggests that parents who combine caring, acceptance, and high but reasonable expectations are likely to rear children who think well of themselves and who strive to do as well as they can in school. Parents who pay no attention at all to the academic accomplishments or failures of children, or who attend only to the children’s failures and rarely to their successes, are contributing to the development of a negative academic self-concept. Thus, the type and amount of reinforcement coming from parents has a significant effect on children’s academic achievement and their academic self-concept.  

30.3.2 Students who complete secondary school have devoted nearly 20,000 hours to school and related activities. During this long period of time, which includes some of the most impressionable stages of a person’s development, students are being taught the curriculum of the school and another curriculum based on interactions of persons within the school. The latter curriculum teaches students who they are in relation to others and their place in the worlds of people, ideas, and activities. They may learn the latter curriculum more slowly, but it won’t be forgotten as easily as the school curriculum.  

30.3.3 Not only does the school provide the stage upon which most of the drama of a person’s formative years is played, it houses the most critical audience in the world—teachers and peers. And it is here, in the face of their severest critics, that students, whether in kindergarten, graduate school, or Air Force schools, are likely to be reminded again and again of either their failings and shortcomings or of their strengths and possibilities.  

30.3.4 The role of teachers in the development and change of the self-concept is enormous. Research shows that students consider teachers to be “significant others” in their lives. What they say or do is important to the students. Teachers dispense rewards and punishment, acceptance and rejection on a colossal scale.  

30.3.5 Peers also play an important role. By admiring those who succeed in school or seeking their assistance with problems, peers provide positive reinforcement for the academic self-concept. Similarly, when peers ridicule a classmate or point out deficiencies, they are contributing to the development of a negative academic self-concept.  

30.3.6 While students may enjoy a few hours in which they are not judged (relative to others) by teachers, peers, family, and others, there are few school hours in which they are not judging themselves against the standards set by themselves, by the teacher, by peers, and by their family. At no other time in their career as workers, members of families, citizens, or persons engaging in leisure activities will they be judged so frequently by others, and possibly by themselves. These relative judgments arise because almost all of a student’s school learning occurs as a member of a group. Judgments are made frequently because schools have for so long stressed competition as a primary motivational technique. Relative rather than absolute norms are the bases for most judgments.  

30.3.7 Because of the sequential nature of learning tasks and their consistency from year to year, the student tends to remain in much the same position relative to other students. This results in stability of school marks and test performance. In general, the more public and official the judgments (or marks), the greater the effect they are likely to have on the student’s perception of adequacy in the subject. Sooner or later such students are forced to accept some judgment about their capability with group or learning tasks.  

30.3.8 Over a period of time the students gradually acquire a consistent performance as the tasks accumulate in large numbers. If their performance has been adequate, they approach the next task with confidence that they can do it well. If their performance has been inadequate, they come to believe in their inadequacy with respect to this type of learning.  

30.3.9 They approach the next tasks with marked reluctance. If the experience was painful enough, the task will be avoided or at least approached with little enthusiasm or marked dislike. Thus, the student’s personal feelings about a subject or set of learning tasks are much influenced by their perceptions of their adequacy or inadequacy with such tasks. Generally, adequacy or inadequacy for most students is defined in terms of their standing in the upper or lower portions of the local distribution of marks.  

30.3.10 Success (or adequacy) in a school subject opens it up for further consideration and use. Failure in a school subject may effectively close this subject for further consideration. As various indices accumulate, students gradually begin to generalize about their adequacy or inadequacy with school learning tasks. If they have positive experiences, they are likely to develop a generally positive view about school and school learning. If their experiences are negative and learning is regarded as inadequate by the students, and their teachers and parents, they are likely to develop a negative view about school and school learning. If their experiences are negative and learning is regarded as inadequate by the students, and their teachers and parents, they are likely to develop a negative view about school and school learning. All individuals who accumulate experiences of failure (or success) at some point, which varies from individual to individual, will develop a negative or a positive effect toward school. Given a sufficient number of unsuccessful learning experiences, nearly everyone must succumb to an acceptance of a negative or inadequate self-view about learning.
Thus, we might conclude that the academic self-concepts of students in our classrooms were formed primarily during the critical years in elementary and junior high schools. The frequency and consistency with which they received positive or negative feedback from parents, teachers, and peers largely shaped the academic self-concept they bring into our Air Force classrooms.

Once the self-concept is formed, students will attempt to defend this concept of self through the use of defense mechanisms. These mechanisms will influence behavior of students in our classrooms.

**30.4 Self-Concept Defense Mechanisms.** Whether we are aware of it or not, all of us use certain defense mechanisms to preserve or protect our self-systems. In fact, our success in meeting daily stresses and strains of living can be traced to our effectiveness in using certain defenses. However, if we use them to avoid assuming responsibility, to avoid risk taking, or to develop excuses for immature or self-defeating behavior, then they can have a negative effect on our behavior. Their use is normal unless they begin to interfere with the maintenance of self-esteem rather than aiding it.

**30.4.1 Defense mechanisms can best be understood in view of the objective they serve, which is to safeguard the integrity and worth of the self. Some of the most common in the academic environment follow.**

**30.4.2 Compensation.** Here we attempt to disguise the presence of a weak or undesirable quality by emphasizing a more positive one, or reduce tension by accepting and developing a less preferred but more attainable objective for a more preferred but less attainable objective. Students who regard themselves as unattractive may develop exceptionally winning personalities to compensate. Students may say that they would rather spend their evenings working on lesson plans than anything else they can think of when they would rather be with a person of the opposite sex who has resisted their dating requests.

**30.4.3 Projection.** With this mechanism we relegate the blame for our own shortcomings, mistakes, and transgressions to others or attribute our own motives, desires, characteristics, and impulses to others. The athlete who fails to make the team may feel sure the coach was unfair, or the tennis player who examines the racket after a missed shot is projecting blame. When students say, “Everybody will cheat on an exam if given the chance,” they are projecting.

**30.4.4 Rationalization.** Rationalization aids in softening disappointment when we don’t reach our goals and helps us come up with excuses when we do something we believe we shouldn’t but want to anyhow. Heavy smokers rationalize when they say, “The relationship between cancer and smoking isn’t conclusive, and if we should get it in the future, a cure will be discovered by then.” Other students rationalize when they say, “We had to cheat because others were and we might not have passed the course otherwise,” when in reality they didn’t know the material.

**30.4.5 Denial of Reality.** Often we can ignore or refuse to acknowledge disagreeable realities. We turn away from unpleasant sights, refuse to discuss unpleasant topics, deny criticism, and become so involved with work that we don’t have to deal with marital, child-rearing, or other personal problems.

**30.4.6 Reaction Formation.** Sometimes individuals protect themselves from dangerous desires by not only repressing them, but actually developing conscious attitudes and behavior patterns that are just the opposite. A student may develop a who-cares-how-other-people-feel attitude to cover up feelings of loneliness and a hunger for acceptance.

**30.4.6.1 Information on these and other defense mechanisms such as fantasy, repression, displacement, emotional insulation, regression, and introjection can be obtained from a good psychology text. The instructor should recognize that the mechanisms are used to preserve the self, and with learned behaviors they function at relatively automatic and habitual levels and involve some measure of self-deception and reality distortion. Because they soften failure, alleviate anxiety and hurt, and protect our feelings of adequacy and worth, we can consider them normal adaptive reactions unless they seriously interfere with the effective resolution of stress situations.**

**30.4.6.2 While defense mechanisms are learned behaviors, student feelings about themselves are learned responses. Students need to unlearn bad feelings and acquire new feelings. While this is not always easy, it is possible. Through purposeful effort Air Force instructors can enhance the self-concepts of students in their classrooms by helping them acquire new feelings about themselves.**

**30.5 Enhancing The Self-Concept.** Thus far in our discussion, we have reasoned that the past experiences of students can have a vast influence on their current behavior. Their behavior is influenced not only by the accumulation of their past and current experiences, but, even more importantly, by the personal meanings they attach to their perception of these experiences. Their behavior is more than simply a function of what happens to them from the outside. It is also a function of how they feel about themselves on the inside. Although they cannot change what happened to them yesterday, they can change how they feel about it today. They cannot change the event, but can modify the perceptions they have about the event. In this manner, they can change their view of themselves or their self-concept.

**30.5.1 Before examining specific suggestions for improving the self-concept of students, we need to deal with the question of: Which comes first, a change in academic self-concept leading to improved academic performance or improved academic performance leading
to an improved academic self-concept? It does not seem unreasonable to suggest that each is mutually reinforcing to the other to the extent that a positive change in one facilitates a positive change in the other. If students begin an Air Force school with a low level of self-confidence or self-regard and experience sufficient success, we would reasonably expect that their self-concept as far as school ability is concerned would be elevated. However, if students begin an Air Force school with high confidence in their ability to do the academic work and experience excessive failure, their self-concept may be lowered. Under the latter conditions students must shift focus to other areas, usually nonacademic, to maintain self-esteem, or continue to lose self-confidence and self-esteem.

30.5.2 Let us examine some specific suggestions for improving the self-concepts of students in Air Force schools.

30.5.3 Give Recognition. In transactional analysis, the term positive strokes is used. Behaviorists talk in terms of positive reinforcement. Adlerian psychologists use the term encouragement. The concept is similar in each case. When students do something worthy of recognition, instructors need to give positive feedback to the students. Such recognition makes the students feel alive, important, and significant. An achievement, an innovative or creative idea or a good effort all deserve recognition from the instructor. Such feedback is most important in improving any student’s self-concept. Remember that you have the power to help students recognize their strengths and possibilities or to remind them again and again of their weaknesses and shortcomings.

30.5.4 Serve as a Good Model. As an instructor you will have a considerable influence on student self-attitudes, particularly as these attitudes are related to feelings about being able to think, answer questions, and solve problems. You will quickly be established as a significant person in the eyes of most of your students. Perhaps you will be significant because you are the only person in the school environment who makes a particular student feel like an individual of worth and value. While all students deserve to have their total development facilitated by a truly competent human being—their instructor—you cannot teach what you do not know well yourself. As an instructor, you should strive to grow and live fully if you are to help students learn to do likewise.

Research indicates that teachers who have low self-concepts tend to have students in their classrooms who have lower self-concepts, while students in classrooms where teachers have positive self-concepts tend to have students with high self-concepts. Just as leaders must model appropriate behavior for followers, so must instructors be positive models for their students. Thus, effort directed toward improving your own self-concept may lead to an improved self-concept for students in your classrooms.

30.5.5 Stimulate Cooperation, not Competition, Among Students. Modern society places a lot of emphasis on competition. While competition with the self can lead to improved performance as students strive to do their best, competition against others can result in negative perceptions of the self if the students happen to lose more than they win. With cooperation, everyone can experience the success of the group, and no one is viewed as the winner or loser.

30.5.6 Consider Mastery Learning. Mastery learning was discussed in Chapter 27 as a concept designed to meet individual needs of students. Using this approach, a student’s performance is measured against objectives rather than against the performance of other students. The instructor determines mastery, which often means achieving 80 to 85 percent of the course objectives. Time is the most crucial variable. Each student must be provided with sufficient time to achieve mastery. Theoretically, when the proper instruction is provided, along with proper diagnostic techniques and correctives (tutoring, programmed instruction, reteaching), 90 percent of a given group of students will achieve mastery.

30.5.6.1 When used properly with appropriate subjects, mastery learning appears to be able to eliminate most of the effects of individual differences on level of achievement. Each student is provided with an excellent opportunity for success. When grades are given, most students get an “A” or “B” indicating mastery. Mastery learning becomes both a subjective recognition by students of their own competence and public recognition of this competence by the school or society. While approximately 25 percent of students achieve the desired performance standards (“A” or “B”) in conventional group-based instructional programs, research indicates nearly 75 percent of the students are reaching the same performance standards with mastery learning. The impact on the student’s self-concept is significant. Mastery learning seems to have the potential to insure each student a history of successful and rewarding school learning experiences and, in the process, to shape positive affective development.

30.5.6.2 Despite this potential for enhancing a student’s self-concept, mastery learning has limitations that may preclude its use in your educational setting (see Chapter 27).

30.5.7 Have High But Reasonable Expectations For Students. There is a considerable amount of research that suggests students perform up to the expectations that teachers have for them. If teachers or instructors expect students to be good or poor, or well behaved or delinquent, or whatever, then they are likely to encourage and reinforce the very behavior they expected in the first place. If instructors are prejudiced or have a tendency to stereotype students, they are setting up expectations...
which can have a negative effect on student performance. What the research is beginning to tell us is what common sense has always told us, students grow, flourish, and develop better in a relationship with someone who projects an inherent trust and belief in their capacity to become what they have the potential to become.

30.5.8 Recognize Potential in Students. During the past two decades, an increasing number of behavioral scientists have concluded that humans function at 10 percent or less of their potential. For instance, scientists tell us that the human mind can store as many as 600 memories a second for a lifetime of 75 years without the slightest strain. It is estimated that our brain has the capacity to learn as many as 40 languages and would allow us to complete the required courses of dozens of colleges. If these statements on the capacity of the brain are true, new means and methods must be designed to actualize a people’s vast possibilities and latent powers. However, most of today’s physical and cultural environment works in opposition to the development of this potential. A negative self-concept certainly stands in the way of releasing the potential of students. So the next time you have students who tell you they can’t, tell them that they can, and even when you suspect that maybe they really can’t, tell them they can; then who knows, they just might.

30.6 Summary. In this chapter we have seen that the self-concept of students is an important determiner of academic achievement. The beliefs students have about themselves have a significant effect upon how they learn and behave.

30.6.1 Students have an overall self-concept which might be thought of as composed of physical, social, and scholastic self-concepts. The latter are composed of specific self-concepts which represent the areas where the instructor can have the most impact, since they are the easiest to change.

30.6.2 In understanding students, we need to realize the impact that parents, teachers, peers, and the school environment have had in shaping their academic self-concept. While these groups are judging the students, so are the students judging themselves. Once the perceptions of self begin to form, there is a good chance that they will be reinforced over a period of time especially if the students continue to interact with the same groups.

30.6.3 Defense mechanisms are used by students to preserve or protect their self-systems. The common mechanisms encountered in the classroom include compensation, projection, rationalization, denial of reality, and reaction formation.

30.6.4 The self-concept can be changed, and instructors are in a strategic position for enhancing a student’s self-concept. Giving recognition, modeling a positive self-concept, stimulating cooperation and not competition in the group, the use of mastery learning, having high but reasonable expectations, and working to release the potential that exists in each student are suggested means of enhancing the self-concept.
PU -- THROW THIS PAGE OUT
GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS

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Section B--Abbreviations and Acronyms

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<td>AIS</td>
<td>Academic Instructor School</td>
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<td>AR</td>
<td>Anticipated Responses</td>
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<td>CAI</td>
<td>Computer Assisted Instruction</td>
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<td>CMI</td>
<td>Computer Managed Instruction</td>
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<td>CRT</td>
<td>Cathode-ray tube</td>
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<td>FUQ</td>
<td>Follow-up Question</td>
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<td>ISD</td>
<td>Instructional Systems Development</td>
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<td>LOQ</td>
<td>Lead-off Question</td>
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<tr>
<td>LOL</td>
<td>Level-of-Learning</td>
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<td>Main Point</td>
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<td>QAF</td>
<td>Quality Air Force</td>
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<td>SOB</td>
<td>Samples of Behavior</td>
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<tr>
<td>TOOTLIFEST</td>
<td>The objective of this lesson is for each student to…</td>
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Section C--Terms

**Affective Domain**--Major area of learning which deals with acquired attitudes, values, etc.

**Affective Sample Of Behavior Elements**--A statement containing (1) a measurable or observable action verb, (2) reflecting the lesson objective’s level-of-learning, (3) containing a personal (one that describes the person versus one that describes the action) adverb or adverbial phrase, and (4) covering the entire subject matter of the objective. See **Cognitive Sample Of Behavior Elements** and **Sample Of Behavior**.

**Analysis**--Level of cognitive domain (Bloom, 1956) in which students are able to break down complex organizational structures into their component parts.

**Anticipated Responses**--Answers the instructors expect students to give in reply to planned questions.

**Application**--Level of cognitive domain (Bloom, 1956) in which students are able to use learned material in new and concrete situations.

**Attention Step**--Segment of a lesson introduction in which an instructor gains the attention of the students and focuses upon the subject to be taught.

**Behavioral Indicators**--See **Samples of Behavior**.

**Body**--Major section of a lesson in which learning is developed through support material and various teaching exercises to achieve instructional objectives; preceded by an introduction and followed by a conclusion.

**Case Study**--A teaching method in which students encounter a real-life or fictional situation under the guidance of an instructor in order to achieve an instructional objective.

**Characteristics (of a concept)**--See **Critical Attributes**.

**Characterization**--Highest level of affective domain (Krathwohl, 1956) in which students integrate values or value systems into their own life style or philosophy of life.

**Clarification Support**--Type of instructional material used in the body of a lesson to develop learning and clarify ideas; may include definitions, examples, comparisons, statistics, or testimony from experts and trustworthy sources.

**Closure**--The final segment of a lesson conclusion during which instruction is appropriately ended.

**Cognitive Domain**--A major area of learning which deals with acquiring knowledge (as opposed to attitudinal or manual skill knowledge).

**Cognitive Sample Of Behavior Elements**--A statement containing (1) a measurable or observable action verb, (2) reflecting the lesson objective’s level-of-learning and (3) covering the entire subject matter of the objective. See **Affective Sample Of Behavior** and **Sample Of Behavior**.

**Comprehension**--Level of the cognitive domain (Bloom, 1956) in which students begin to develop understanding and are able to translate, interpret, and extrapolate subject matter under study.

**Comprehension-Level Summary**--Segment of a lesson at the comprehension level in which the instructor reviews and expands on key material and develops relationships which lead to a generalization which is or supports the instructional objective.

**Comprehensiveness**--A characteristic of evaluation which requires that the stated objectives of instruction be liberally tested or rated. The quality of a lesson overview or summary which describes a complete preview or review of all teaching points within the lesson.

**Concept**--A class of people, objects, events, ideas, or actions which are grouped together on the basis of shared critical attributes or characteristics, and are called the same name.

**Conclusion**--A major section of a lesson which follows an introduction and body. It should contain a summary, remotivation, and closure.
Condition Statement--The part of a criterion objective which describes the testing environment including those problems, materials, and supplies which will be given (included) or specifically excluded from a measurement situation.

Consistency--Describes the results of a reliable evaluation instrument which remain similar given similar testing conditions (similar students, knowledge base, physical testing situation, etc.) over a period of several uses. See Reliability.

Counseling--A process characterized as a helping relationship between teacher and student directed toward improvement, change, or reinforcement of student behavior.

Creativity--The imaginative recombination of known elements into something new and useful.

Criterion Objective--A precise description of a student-centered learning outcome for a planned program of instruction which describes the performance and describes the conditions and standards for assessment through criterion-referenced testing.

Criterion-Referenced Test--Any test of carefully written measurable objectives to obtain data to compare student performance levels with that specified in the objectives.

Critical Attributes--Necessary characteristics for determining class membership in a concept.

Demonstration-Performance Method--A teaching method in which students observe and then practice a sequence of events designed to teach a procedure, a technique, or an operation. It combines oral explanation with the operation or handling of systems, equipment, or materials.

Demonstration Phase--A phase of the demonstration-performance teaching method during which the instructor shows students how to perform the skill to be learned.

Differentiation--A characteristic of evaluation which requires that tests and rating instruments be capable of making distinctions between selected groups; usually masters or non-masters of specific instructional objectives in criterion-referenced testing or high and low overall test performers in norm-referenced testing.

Direct Question--An instructor-initiated question addressed to a particular student to elicit involvement, to seek an opinion, or to draw out support.

Domain Of Learning--A broad classification of learning types. The three widely accepted domains that are used in this manual are the cognitive (thinking, understanding), affective (attitudes, values), and psychomotor (physical skills).

Educational Objective--See Student-Centered Instructional Objective.

Elements And Cognitive Sample Of Behavior Elements--Cognitive sample of behavior characteristics: (1) measurable, observable action verb; (2) reflecting the lesson objective's level-of-learning; (3) covering the entire subject matter of the objective. Affective sample of behavior characteristics: (1) measurable observable action verb; (2) reflecting the lesson objectives' level-of-learning; (3) containing a personal adverb or adverbial phrase; (4) covering the entire subject matter of the objective.

Evaluation--The systematic process of measuring or observing and judging how well individuals, procedures, or programs have met educational objectives.

Evaluation Phase--A phase of the demonstration-performance teaching method during which the instructor conducts criterion-referenced testing to determine the extent to which students have mastered the instructional objectives.

Examples (in concept teaching)--People, objects, events, ideas, or actions which have all the critical attributes of a particular concept and can be correctly called by that concept name.

Explanation Phase--A phase of the demonstration-performance teaching method during which the instructor tells the students how to perform the skill to be learned.

Extrapolation--A type of learning at the comprehension level (Bloom, 1956) in which students develop sufficient understanding to estimate trends or predict outcomes regarding the subject matter under study.

Feedback For Learning--Information students receive from their instructor about their performance which will cause them to accept guidance and take corrective action to attain the goals of the course.

Follow-Up Question--An instructor-initiated question designed to guide student responses to a previous question by rephrasing the original question to get the same response or by posing a new question that elicits a partial or more specific answer to the original question.

Formal Lecture--A structured and often rehearsed teaching lecture with no verbal participation by students.

Formative Evaluation--An evaluation of student progress toward instructional objectives during the learning experience that is not used to determine criterion- or norm-referenced assessments of student achievement.

General-To-Specific Presentation--The process or pattern of outlining lesson main and subpoints so as to start with the subject of an objective to be taught and then applying this subject in specific instances that support original objective.

Generalization--The result of identifying an example of a concept by matching its critical attributes with those of the original concept.

Guided Discussion Method--A teaching method in which students participate in an instructor-controlled,
interactive process of sharing knowledge and interpreting experiences in order to achieve an instructional objective.

**Hierarchy**--The characteristic of a domain of learning that rank orders the levels-of-learning of which it is composed. See **Taxonomy Of Educational Objectives** And **Domain Of Learning**.

**Higher Levels-Of-Learning**--Those levels of learning above the comprehension level (Bloom, 1956) which may be considered as the practical application of concepts and principles to complex, real problems.

**Informal Lecture**--An often conversational teaching lecture with considerable verbal interaction between instructor and students employing questions and discussion.

**Instructional Media**--All forms of instructional aids which give audible or visual support in a learning environment.

**Instructional Objective**--See **Student-Centered Instructional Objective**.

**Instructional Systems Development**--A deliberate, orderly, flexible, process for planning, developing, conducting, and managing high quality, student-centered instructional programs.

**Interpretation**--A type of learning at the comprehension level (Bloom, 1956) in which students develop and understand relationships among the various aspects of a communication and are able to perform such activities as making inferences, generalizing, and summarizing.

**Introduction**--Major section of a lesson designed to establish a common ground between the instructor and students, to capture and hold attention, to outline the lesson and relate it to the overall course, to point out benefits to the students, and to lead the students into to the body of the lesson; usually contains attention, motivation, and overview steps.

**Knowledge**--The lowest level of the cognitive domain (Bloom, 1956) in which student have the ability to recall or recognize material in essentially the same form as it was taught.

**Knowledge-Level Summary**--A reiteration of key points of content in a knowledge-level lesson designed to help students remember facts.

**Leadoff Question**--An instructor-initiated question at the beginning of a lesson or main point that is designed to generate discussion.

**Learning**--A change in student behavior resulting from experience or insight. The behavior can be overt or covert and physical, intellectual or attitudinal.

**Learning Center**--A learning environment which has been specifically developed to foster individualized instruction and which emphasizes employment of instructional media to augment textbooks, manuals, and teacher presentations.

**Lecture**--See **Teaching Lecture**, **Formal Lecture**, and **Informal Lecture**.

**Lesson Plan**--A teaching-learning plan which includes student-centered instructional objectives, detailed content outline, and significant details describing the instructional elements such as media, teaching method, and length of period.

**Level-Of-Learning**--The degree to which a student is expected to internalize (master) a mental subject, values, or ability to perform psychomotor skills.

**Level-Of-Learning Objective**--A student-centered instructional objective which states the intended subject matter for a planned program of learning activities and assigns a carefully defined taxonomy level or proficiency level to that subject matter to indicate the desired level of mastery.

**Main Points**--The primary, logical break out of subject matter to support an instructional objective.

**Mastery Learning**--An approach to learning in which students progress from learning experience to learning experience based upon achievement of instructional objectives prescribed in the curriculum design rather than other factors such as age, effort, or time of year.

**Measurement**--The act of acquiring data in the educational environment without making value judgments regarding the relative or absolute merits of those data.

**Method Of Instruction**--A planned program of instruction with characteristics sufficiently different from other alternatives to be identified as a major vehicle for teaching subject matter.

**Motivation Step**--The segment of a lesson introduction in which an instructor provides specific reasons why students need to learn whatever they are about to learn.

**Non-Examples (in concept teaching)**--People, objects, events, ideas, or actions which lack one or more critical attributes of a particular concept and which should not be called by that concept name.

**Norm-Referenced Test**--Any test designed to obtain data for rank ordering or comparing relative student performance.

**Objective**--See **Student-Centered Instructional Objective**.

**Objectivity**--A characteristic of evaluation which requires that measurement in an educational environment be correct and factual and be free from instructor bias.

**Organization**--Level of the affective domain (Krathwohl, 1956) in which students compare, relate, and synthesize new values into their own value systems.

**Overhead Question**--An instructor-initiated question to which the instructor expects an answer, directed to an entire group rather than to a specific student.

**Overview**--Segment of a lesson introduction in which the instructor provides a clear and concise explanation of
the lesson objective, the subject matter, rationale, and
an indication of the teaching method to be employed.

Patterns (lesson plan organization)--The logical ways of
organizing main or sub-points of a lesson; includes
time space, problem-solution, pro-con, cause-effect, or
topical.

Performance--Part of a criterion objective which
describes the observable student behavior (or the
product of that behavior) which is acceptable to the
instructor as proof that learning has occurred.

Performance-Supervision Phase--A phase of the
demonstration-performance teaching method during
which students, under the supervision of the
instructor, practice the skill they are learning.

Posttest--A test given to a student upon completion of a
learning experience to measure achievement.

Pretest--A test given to students prior to entry into a
learning environment to determine entry skills or
knowledge; can be used to identify portions of the
instruction the student can bypass.

Principle--A statement of casual relationship (as opposed
to a descriptive relationship or one of identify)
between two or more concepts; a rule, axiom, theorem,
or algorithm.

Proof Support--A type of instructional material used
during the body of a lesson which provides hard data
or expert testimony in support of an assertion.

Psychomotor Domain--A major area of learning which
deals with acquiring the ability to perform discrete
physical skills requiring dexterity, coordination, and
muscular activity.

Rating Scales--Any of a number of instruments upon
which instructors record their assessments of student
performance through a process of observation or
measurement and judgment.

Receiving--Lowest level of affective domain (Krathwohl,
1956) in which students become aware of and pay
attention to someone or something.

Relay Question--The teacher’s response to a student-
initiated question whereby the instructor redirects it to
another student to answer.

Reliability--A characteristic of evaluation which requires
that testing instruments yield consistent results. See
Consistency.

Remotivation Step--Segment of a lesson conclusion
during which the instructor reminds students why the
information presented is important to them and
challenges the students to use what they have learned.

Responding--A level of affective domain (Krathwohl,
1956) in which principle students act or comply with
the instructor’s expectations by performing an act and
obtain satisfaction from it.

Reverse Question--A teacher’s response to a student-
initiated question whereby the instructor redirects the
question to the student who asked it.

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Rhetorical Question--An instructor-initiated overhead
question directed to a group but expecting no answer.

Samples Of Behavior--A statement of student behavior
that, if performed correctly, indicates to the teacher
that the students have probably or more likely than
not attained the lesson objective. A description
behaviors from which the teacher can draw to write
test questions. See Affective Sample Of Behavior.

Self-Concept--A relatively stable framework of beliefs
about ourselves that helps us act in a consistent
manner.

Specific-To-General Presentations--The process or
pattern of outlining lesson main and subpoints so as to
start by examining elements of the original subject
then drawing a conclusion about the original subject
of the objective.

Spontaneous Question--An unplanned instructor-
initiated question used to seek clarification, probe for
understanding, or to control the direction of the
discussion; may be either direct or overhead question.

Standards Statement--Part of a criterion objective which
describes the qualitative and quantitative criteria
against which student performance or the product of
that performance will be measured to determine
successful learning.

Strategies (lesson plan organization)--The detailed plan
which explains one’s overall lesson objective and the
steps one intends to take in achieving that objective
most efficiently and effectively.

Student-Centered Instructional Objective--A statement
of the student’s learning goal, identifying the level-of-
learning and subject of the lesson; the description of
the components of a domain of learning (See Domain
Of Learning). This manual focuses on three that
describe the cognitive, affective, and psychomotor
domains respectively and that are hierarchical in
nature (See Hierarchy).

Summary--Segment of a lesson conclusion during which
the instructor reiterates key points of lesson content
(knowledge level) or reviews and expands on key
material and develops relationships which lead to
generalizations (comprehension level).

Summative Evaluation--An evaluation of student
achievement of instructional objectives at the end of
the learning experience which is used to measure and
report the student’s class standing or success in
achieving the objective(s).

Support--A type of instructional material used during
the body of a lesson to clarify, characterize, or prove an
assertion, claim or idea. See Clarification Support
And Proof Support.

Synthesis--Level of cognitive domain (Bloom, 1956) in
which students are able to put parts together to form
new patterns or structures.
Task Steps--The sequential, component steps in a larger task; represented by achievement of a criterion objective.

Taxonomy Of Educational Objectives--A systematic classification scheme for sorting learning outcomes into three broad categories (cognitive, affective, and psychomotor) and rank ordering these outcomes in a developmental hierarchy from least complex to most complex.

Teaching Interview--A learning experience in which an instructor questions a visiting expert and follows a highly structured plan which leads to achieving educational objectives.

Teaching Lecture--A formal or informal presentation of information, concepts, or principles by the teacher(s).

Transition--Statements used by the instructor to move from the introduction of a lesson to the body, between main points, between sub-points within each main point, and from the body to the conclusion of the lesson. These statements show a logical relationship between the lesson segments they connect.

Translation--A type of learning (Bloom, 1956) at the comprehension level in which students demonstrate sufficient learning to grasp the meaning of a concept, principle, or other communication.

Validity--A characteristic of evaluation which requires that testing instruments measure exactly what they were intended to measure.

Valuing--Level of affective domain (Krathwohl, 1956) in which students accept, prefer, or commit themselves to an object or behavior because of its perceived worth or value; to appreciate.

Variable Attributes--Characteristics shared by some, but not all, members of a class of people, objects, events, ideas, or actions which are grouped together on the basis of shared critical attributes and called by the same concept name.
SAMPLE LESSON PLAN FOR HIGHER-LEVEL COGNITIVE LESSONS

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART I
COVER SHEET

STUDENT NAME: [Blank]
HOME/SCATTER SEMINAR ADVISORS: Kline Johnson
LESSON TITLE: The Crisis at 1630
METHOD:

PART IA

COGNITIVE OBJECTIVE: TOOTLIFEST (A) crisis situations to determine violations of time management principles.

COGNITIVE SAMPLES OF BEHAVIOR:
1. Discriminates between the relevant and irrelevant management activities within crises of time management.
2. Illustrates the relationships among contributing factors and the results of these interrelationships in time management scenarios.
3. Separates the controllable from the uncontrollable contributing elements in crises of time management.

AFFECTIVE OBJECTIVE: TOOTLIFEST (V) the benefits of adhering to time management principles in crisis situations.

AFFECTIVE SAMPLES OF BEHAVIORS:
1. Habitually follows the time management principles when confronted with crises of time management.
2. Willingly and persistently shares with others benefits derived from following time management principles during crises of time management.
3. Sincerely and persuasively justifies the inclusion of time management principles in professional military training and professional continuing education curricula.
PART IB

ORGANIZATIONAL PATTERN: Cause-Effect

STRATEGY: The four class periods devoted to this exercise will be divided equally between individual and group work. I will assume a relatively equal knowledge of time management principles on the part of all students in the course since this topic was explained earlier. Therefore, the first hour will be an informal lecture in which I will briefly review the principles of time management. More time, however, will be spent on developing a deeper understanding of the elements that point to the cause-effect relationships. The reason for this is to develop a deeper appreciation for one's ability to break the cycle of management problems by being able to identify and eliminate the causes. For the review, I will basically follow the previous lesson plan. After this, I will introduce the exercise. During the second hour, students will work through the exercise as a group up to approximately item #17 because this point represents a natural break in the focus of analyzing the contributing factors. I will, primarily, only monitor the student activity to allow them maximum opportunity to analyze the group choices and decisions on their own. However, I will interject, as needed, hints and suggestions to keep the students working at the analysis level. During the third hour, the students will complete the exercise and I will critique their analysis of the scenario they have worked through. This should not take up the entire hour. Therefore, I will make appointments for private consultations with students to give them an experiential analysis of the crisis situation and the use of the time management principles in a logical and efficient order. Here, I will allow interaction from the students as I progress through the scenario in order to reinforce the learning that is occurring.

* Fictitious exercise and not included as part of this plan.
ACADEMIC INSTRUCTOR SCHOOL  
Maxwell Air Force Base, Alabama

PART II  
TEACHING PLAN

Period 1 (50 minutes)
Review **basic time management principles presented and discussed earlier in course.**  
**NOTE:** Emphasize interrelationships between time management problems and their effects.  Note synergistic effect of multiple causes.
Explain “Crisis at 1630” exercise.  Introduce ground rules for in-basket exercises.  Discuss purpose of exercise.  TO PRACTICE ANALYZING CRISIS SITUATION FOR SPECIFIC OR GENERAL TIME MANAGEMENT PROBLEMS.  
Distribute materials.  Check each packet to ensure that all 23 items are included.  Explain role of supplementary reading list.  Emphasize need for independent work, thought, and action until 4th period.  Explain importance of written analyses required for 4th period.
Begin exercise.  Check EACH student to make sure that start up is correct and directions have been understood.

Period 2 (50 minutes)
Reorient group.  Answer questions aloud that have value to group.  Point out that each student should be completing analysis of item #17 by the end of this period.  Announce availability to meet with individuals in private on individual problems related to the exercise.

Period 3 (50 minutes)
Reorient group.  Make personal check of each individual’s progress.  Note any common errors observed during period 2.  Remind group of requirement to bring written analyses of exercise to next period.  Schedule voluntary sessions with interested individuals.

Period 4 (100 minutes)
Review purpose of exercise.  Comment on common mechanical and analytical errors observed in periods 2 and 3.  
Have three volunteers outline their analyses on chalkboard.  Analyze similarities and differences.  To the maximum extent possible, let other students carry discussion.  
**NOTE:** Make sure that contributing and noncontributing factors emerge clearly.  Reemphasize basic principles on each point of disagreement.  
Summarize:  Use chalkboard input from the three students to close the discussion.  Emphasize agreement on principles and place disagreements in perspective.
Collect papers and announce schedule of individual appointments (20 minutes each) to discuss critique of paper.
PU -- THROW THIS PAGE OUT
SAMPLE LESSON PLAN FOR WRITING AND MEASURING AFFECTIVE OBJECTIVES

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART I
COVER SHEET

STUDENT NAME: Major Peter L. Conklin
HOME/SCATTER SEMINAR ADVISORS: Major Jim Sutton
LESSON TITLE: A Sound Code of Ethics
METHOD:
REFERENCES: “Are Integrity and Professionalism Only a Myth?” ACSC Readings and Seminars, Volume 3
AIDS/HANDOUTS: Handout of Code of Ethics definition and flipcharts

PART IA

COGNITIVE OBJECTIVE: TOOTLIFEST (C) that a sound code of ethics is vital to a military professional.

COGNITIVE SAMPLES OF BEHAVIOR:
1. In your own words, write an acceptable explanation of why a sound code of ethics is vital to a military professional.
2. Given a series of situations, select the one that best predicts for a military professional the consequences of no sound code of ethics.
3. From a given series of alternatives, select the one that best summarizes the importance of a sound code of ethics for a military professional.

AFFECTIVE OBJECTIVE: TOOTLIFEST (V) an ethical frame of reference is an essential element of military professionalism.

AFFECTIVE SAMPLES OF BEHAVIOR:
1. Honestly relate compelling personal examples depicting how an ethical frame of reference proved to be an essential element of military professionalism.
2. Animatedly rebut the challenges posed by others in class to the claim that an ethical frame of reference is an essential element of military professionalism.
3. Sincerely attempt to convince others, in and outside of class, that an ethical frame of reference is an essential element of military professionalism.
PART IB

ORGANIZATIONAL PATTERN: Topical

STRATEGY: I will start with specific principles and elements of honor and ethical character in the military to lead the students to draw the general conclusion stated in the objective. Because I want to start with these characteristics, it would be most logical to proceed topically in the discussion rather than to use problem-solution or cause-effect. But before starting with these principles, I will set the foundation by use of a five-minute minilecture to define key terms and lay out situations wherein ethics might play a role. Here, I will also encourage students to discard the mistaken belief that the decisions one makes are morally neutral. Without their accepting this principle, this discussion cannot proceed. After the minilecture and the discussion of the importance of the principles of ethics that I intend to consider (without telling the students what these principles signify), I will ask key questions that will lead them to the conclusion that, without these principles, our military could not stand up for the ideals we profess. Therefore, they must accept the fact that, if these principles (taken together) reflect ethics and morality, they are important for affirming military professionalism. Since I am relatively certain that the students are already at the responding level, as evidenced by prior lessons related to this subject, I hope the discussion will draw them to personalize their positive opinions about ethics to elicit expressions of value.

LESSON OUTLINE

Objective—Main Point—Subpoints
1. (C) A clearly defined sense of priorities provides a frame of reference for decision making.
   (V) The ability to order tasks on the basis of value judgments removes some of the confusion from decision making.
   a. Descriptions of what a “sense of priorities” means.
   b. Discuss situations that require a sense of priorities.
   c. Discuss effects of a confused sense of priorities on decision making.
   d. Discuss effects of a “no fault” philosophy on decision making.
2. (C) Practicing principles we preach enhances mission accomplishment.
   (V) Willingness to live by the values we feel are important presents to our subordinates a consistent model that is easier to follow.
   a. Discuss principles usually espoused by leaders and supervisors.
   b. Discuss some more common examples of unethical behavior.
   c. Discuss possible effects of a “double standard” on subordinates.
   d. Discuss positive effects of ethical behavior on mission accomplishment.
3. (C) A sound code of ethics is vital to a military professional.
   (V) An ethical frame of reference is an essential element of military professionalism.
   a. A sound code of ethics establishes a clearly defined sense of priorities
   b. Practicing principles we preach enhances mission effectiveness.
   c. A sound code of ethics therefore is important for a military professional.
   d. Provide additional support for objective.
ATTENTION: General Flynn, former Inspector General of the Air Force remarked: “You must oppose what is wrong and support what is right even if it costs you your life or your career.”

All of us should display a selfless commitment to integrity and its determination of what is right and what is wrong. Yet, many of us have compromised our integrity because of misplaced loyalty, fear of reprisal or censure, or even personal dishonesty. How often have we seen the “pencil whipping” of status reports, flying documents, training records, etc, to fill a square?

How many of us have learned to use the double standard in the real world of the Air Force? In a recent commanders’ conference, 35 members remarked that they did not get to the top telling it “like it is.” A recent survey by the Leadership and Management Development Center found some more startling remarks among Air Force people. Some common findings were:

1. The requirement to document unaccomplished training because of the lack of time to properly do it.
2. The requirement to report 100 percent mission accomplishment.
3. Flying unsafe aircraft to meet scheduled sortie rates.
4. Awards and decorations given as “end-of-tour prizes.”
5. Undercover warning systems for impending “no notice inspections.”
6. Greater concern over appearance rather than problems.
7. Greater concern with loyalty than with honest reporting.

MOTIVATION: Each of us wears the uniform of our country. We are military leaders who have a responsibility to ourselves, our country and most importantly, to each other. Neither the Air Force nor our armed forces can endure without a rigid code of ethics and personal integrity. Each of us must assume the position that “I will not compromise my integrity,” regardless of the consequences or the difficulty of the situation. If we individually adopt the higher professional ethic of acting to serve nation and mission before self, the chances of judgment errors and breaches of integrity will be minimized.

OVERVIEW: In order to understand that a sound code of ethics is important for a military professional, we are going to examine two aspects of the issue:

1. We will see how a clearly defined sense of priorities provides a frame of reference for decision making.
2. We will see how practicing the principles we preach avoids hypocrisy and poor morale among our people and enhances mission accomplishment.

First, I would like to refer you to the handout I have provided. It defines a sound code of ethics as I intend to use it during this discussion.

“A sound code of ethics is a clearly defined sense of priorities or values or qualities of an individual that enable him to distinguish right from wrong and willingly accept full accountability for his actions.”

I realize you may have differing opinions and suggest this definition only as a reference point. Support for our discussion must come from you. Personal experiences are a valuable source of support and are welcome.

TRANSITION: Keeping these things in mind, I would like to begin our discussion with a question related to what is meant by a “sense of priorities.”

Body

1. A clearly defined sense of priorities provides a frame of reference for decision making. (13-Minutes)
INSTRUCTOR ACTIVITY
a. Leadoff Question: How would you define a “sense of priorities?”

b. Follow-up Question: What situations in daily life require a sense of priority?

c. Follow-up Question: How does a clearly defined sense of priorities provide a frame of reference for decisionmaking?

d. Follow-up Question: What happens when someone adopts a “no fault” attitude toward decisionmaking?

ANTICIPATED RESPONSE
* likes and dislikes
* values: God, country, family, self, job
* laws
* country vs jobs
* family vs country
* job vs family
* important issues will come first
* self-interest less a problem
* less deliberation necessary
* failure to accept responsibility
* shifting responsibility
* poor decisions

INTERIM SUMMARY:

a. Summarize student ideas that support the first main point using the terms of the students.
b. State first main point “A clearly defined sense of priorities provides a frame of reference for decisionmaking.”

TRANSITION: We have seen how a code of ethics includes a sense of priorities which provide a framework for decision making. Let’s see how practicing the principles we preach is also related to a code of ethics.

INSTRUCTOR ACTIVITY
a. Leadoff Question: What are some of the thoughts about the job supervisors preach to our peers and subordinates but do not follow themselves?

b. Follow-up Question: What are some examples of unethical behavior on the job?

c. Follow-up Question: How does a double standard on the job affect subordinates?

d. Follow-up Question: How does practicing what we preach positively affect mission accomplishment?

ANTICIPATED RESPONSE
* do your job
* know your job
* report honesty
* be on time
* take care of your people
* falsifying reports
* inflating ERs
* image only behavior
* travel voucher “additions”
* double standard
* hypocrisy develops
* resentment
* loss of respect
* poor morale
* poor discipline
* self-serving unit
* loyalty
* hard work
* mission goals are desired
* unit success

TRANSITION: We have examined how practicing the principles we preach avoids certain problems and enhances mission accomplishment. What conclusions can we draw from our discussion?

Conclusion

FINAL SUMMARY:
3. A sound code of ethics is vital to a military professional.
   Summarize student inputs to MP 2. Add anticipated responses if necessary.
   Restate MP 2—“Practicing principles we preach enhances mission accomplishment.”
   Summarize student inputs to MP 1. Add anticipated responses if necessary.
   Restate MP 1—“A clearly defined sense of priorities provides a frame of reference for decision making.”
We have seen that a code of ethics includes a clearly defined sense of priorities that provides a frame of reference for decisionmaking. Additionally, we say that practicing the principles we preach enhances mission accomplishment by avoiding hypocrisy and poor morale among our people. As General Flynn stated, we must oppose what is wrong and support what is right even if it costs us our lives and our careers.

It follows once again, as our lesson objective stated: A sound code of ethics is vital to a military professional.

**REMTIVATION**: Each of us has seen several aspects of what a code of ethics means and why it is important. Perhaps the best motivation I can suggest is the comment of a preacher at a National Prayer Breakfast:

“Lord, I want a better world…
Let it begin with me.”

Ethics is important for the military. It must begin with us.

**CLOSURE**: In closing I would like to read you the following quote from Lt Col Ernest Webb, USA:

“There are no gray areas where we may deviate from the absolute requirements of the ethic. The reason is starkly obvious, yet it must be constantly iterated lest we forget: In some distant time and place we may be called upon to lead the sons of America to battle, and to death; ours is an awesome responsibility.”
ITEM 1

LESSON OBJECTIVE: The objective of this lesson is for each student to comprehend that a sound code of ethics is important for a military professional.

SAMPLE OF BEHAVIOR: Given a series of situations, select the one that BEST predicts the consequences of no sound code of ethics for a military professional.

QUESTION: Select the one situation below that BEST predicts behavior resulting from a lack of a sound code of ethics.

a. A commander’s career suffers because he very loudly voices his opposition to the Combined Federal Campaign and does not give his fair share.
b. The First Sergeant advocates supporting your people and appears as a favorable witness at a court-martial for an airman who has clearly violated the UCMJ.
c. Major Smedley is overheard telling an NCO to take unit discrepancy reports home “for review” during next week’s Management Effectiveness Inspection (MEI).

KEY: c

ITEM 2

LESSON OBJECTIVE: The objective of this lesson is for each student to comprehend that a sound code of ethics is important for a military professional.

SAMPLE OF BEHAVIOR: From a series of alternatives, select the one that BEST summarizes the importance of a sound code of ethics for a military professional.

QUESTION: From the following alternatives, select the one that BEST summarizes the importance of a sound code of ethics for a military professional:

a. A sound code of ethics includes a sense of priorities that provides a framework for decision making.
b. Providing the example to illustrate the principles we preach enhances the willingness of subordinates to accomplish the mission.
c. Ethics is a fundamental part of the United States Constitution and the Uniform Code of Military Justice (UCMJ).
d. a and b.
e. a, b, and c.

KEY: d

ITEM 3

LESSON OBJECTIVE: The objective of this lesson is for each student to comprehend that a sound code of ethics is important for a military professional.

SAMPLE OF BEHAVIOR: In your own words, write an acceptable explanation of why a sound code of ethics is important for a military professional.

CRITERION OBJECTIVE: Given reference to the importance of a code of ethics, write an acceptable explanation of why a sound code of ethics is important for a military professional.

QUESTION: In 100 words or less, explain why a sound code of ethics is important for a military professional.
INSTRUCTIONS TO STUDENTS: This question is worth 40 points and credit will be given for partial answers. Thirty (30) of the points will be on content. Ten (10) points will be based on organization, grammar, spelling, and legibility. You may use examples from class discussion.

KEY: Students should support the following general relationships:
Ethics provide a frame of reference for decision making. (15 pts).
Practicing the principles we preach enhances mission accomplishment by avoiding poor morale and hypocrisy. (15 pts).

ITEM 4

AFFECTION LESSON OBJECTIVE: Value that an ethical frame of reference is an essential element of military professionalism.

SAMPLE OF BEHAVIOR: Given a series of evaluative (good-bad) bipolar scales, respond more positively on a posttest than on a pretest to the concept, professional military ethics.

QUESTION: The purpose of this instrument is to determine your feelings about certain concepts related to professional military ethics. This will be accomplished by having you judge the concepts against a series of descriptive scales. In responding to this sort of item, please make your judgments on the basis of “your” feelings about the concepts. Place your mark to indicate how closely you feel that concept is related to the adjectives on either end of the scale. Of course, if you feel the concept to be neutral on the scale, both sides of the scale equally associated with the concept, or if the scale is completely irrelevant, then you should place your check mark on the middle space.

NOTE: Please place your marks in the middle of the spaces (not on the boundaries).

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ITEM 5

LESSON OBJECTIVE: The objective of this lesson is for each student to comprehend that a sound code of ethics is important for a military professional.

SAMPLE OF BEHAVIOR: Given a Likert-type scale calling for graded responses, show significant pretest-to-posttest gain in positive responses to principles about ethics.

QUESTION: The purpose of this instrument is to determine your feelings about certain principles related to professional military ethics. This will be accomplished by having you judge each principle on a graduated scale. Please indicate your level of agreement or disagreement with each principle by marking the appropriate space on the answer sheet. If you feel neutral on an issue, mark the space titled “no opinion.”

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E  Strongly Disagree

_____ 1. A clearly defined sense of priorities provides a frame of reference for decision making.
____  2. Practicing the principles we preach enhances mission accomplishment by avoiding hypocrisy and poor morale among our people.
____  3. A sound code of ethics is not especially important to a military professional.
SAMPLE LESSON PLAN FOR TEACHING LECTURE METHOD

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART I
COVER SHEET

STUDENT NAME: Capt Tice
HOME/SCATTER SECTION ADVISORS: Lt Col Barnes/Ms Wallace
LESSON TITLE: Early Developments in Military Aviation
METHOD: Formal Lecture

AIDS/HANDOUTS: Overview chart, overhead projector

PART IA

COGNITIVE OBJECTIVE: TOOTLIFEST know the significant developments in military aviation (1) prior to World War I, (2) during World War I, and (3) between World War I and World War II.

COGNITIVE SAMPLES OF BEHAVIOR:

1a. Describe the origins of military aviation.
   b. Identify uses of military aircraft prior to World War I.
   c. List accomplishments of selected military aviators prior to World War I.

2a. Select from a list military air functions in World War I.
   b. State the extent of US military air contributions in World War I.
   c. Identify significant accomplishments of aviators during World War I.

3a. Name General Mitchell as Commander of Aeronautical Branch after World War I.
   b. Outline the major accomplishments of General Mitchell prior to his court-martial.
   c. State the primary mission of the Army Air Corps Tactical School between World War I and II.

AFFECTIVE OBJECTIVE: TOOTLIFEST willingly receive the lecture on the significant developments in military aviation prior to, during, and just after World War I.

AFFECTIVE SAMPLES OF BEHAVIOR:

1. Voluntarily takes notes during the lesson on significant developments in military aviation.
2. Asks questions of the lecturer on the significant developments in military aviation.
3. Encourages others to listen attentively during the lecture on significant developments in military aviation.
PART IB

ORGANIZATIONAL PATTERN: Chronological

STRATEGY: Since these students are just beginning to study military history, I will present these developments chronologically rather than topically because the chronological pattern will give them a better sense of the relative speed of these developments and how they built on each other. I’ve divided the lecture into three periods that reflect very significant escalations and deescalations of exigencies brought on by external forces. This will show how need breeds more rapid developments than the natural progress of discovery through ongoing experimentation. I will proceed from the earlier period to the later period after the war. I have chosen the formal lecture because of the anticipated size of the audience and the amount of new material I recently incorporated into the presentation that is not yet recounted in a single, easily accessible reading for the students.

LESSON OUTLINE

MP 1. Significant developments in military aviation prior to World War I.
   a. First flight of heavier-than-air craft
   b. Military Aeronautical Division in Signal Corps
   c. First US military aircraft
   d. First US aviation combat operations
   e. US entry into World War I

MP 2. Significant developments in military aviation during World War I.
   a. European development
   b. US entry into the war
   c. US accomplishments and personalities
   d. St. Mihiel and Meuse-Argonne
   e. Public recognition of air battles

MP 3. Significant developments in military aviation between World War I and World War II.
   a. General Billy Mitchell
   b. Air Corps Tactical School
   c. Moves toward a separate air service
   d. Advances in equipment and technology
PART II
TEACHING PLAN

Introduction

ATTENTION: (Rhetorical Questions) Who was the first Airman to be awarded the Medal of Honor? Did you know that Captain Barry Goldwater flew in the first flight of single engine fighters to cross the Atlantic? Did you know that Lieutenant Frank Luke had 18 kills in 18 days during World War I?

MOTIVATION: As ROTC cadets, each of you is considering a commitment to the Air Force. Knowing the history of our service, and particularly of US military aviation, can help you strengthen that commitment and develop an appreciation for the professional heritage we share.

OVERVIEW: (Flip chart) We will review selected events and personalities of early military aviation during three broad periods:
1. Prior to World War I (1907-1917)
2. During World War I (1917-1918)
3. Between the World Wars (1919-1939)

TRANSITION: Today in military aviation we have sophisticated aircraft with complex weapons systems. The situation was quite different in the earliest periods of military aviation.

Body

MP 1. Significant developments in military aviation prior to World War I.
   a. First flight of heavier-than-air craft
      (1) Wright brothers-1903
      (2) Discontinued activities due to patent problems-1905-8
   b. Military Aeronautical Division in Signal Corps
      (1) Prompted by inquiry from President Roosevelt
      (2) Included one officer, two enlisted personnel
      (3) Operations confidential
   c. First US military aircraft
      (1) Specifications developed-1907: 40 mph, 1 hour flying time, 2 passengers, able to land without damage, “dismountable.”
      (2) Three contracts awarded initially—two forfeited
      (3) Acceptance flight flown-1909
         (a) Pilot—Orville Wright
         (b) Army observer—Lt Frank P. Lahm
      (4) No operational mission defined—planes used
         (a) For reconnaissance
         (b) As directed by commander
   d. First US aviation combat operations
      (1) General Pershing in Mexico-1916
      (2) Reconnaissance and communications dispatch
      (3) Eight aircraft taken—six destroyed and two returned but destroyed as unsafe
      (4) Need for more and better equipment
   e. US entry into World War I-1917
      (1) 35 flying officers-1,000 enlisted men

TRANSITION: Military aviation prior to World War I was characterized by indecision and confusion. No clear mission beyond reconnaissance was established. World War I brought with it the need for military aviation in various roles, and both the mission and the force expanded greatly.
MP 2. Significant developments in military aviation during World War I.
   a. European development
      (1) More rapid than US
      (2) Extensive early reconnaissance and artillery direction
      (3) Efforts to disrupt reconnaissance led to aerial combat and pursuit
      (4) Development of air superiority strategies and tactics
   b. US entry into the war—late in 1917
      (1) No aviation involvement until spring 1918
      (2) European equipment and tactics used
      (3) Primary roles were reconnaissance and pursuit
   c. US accomplishments and personalities
      (1) Lt Field Kindley
         (a) 148 Aero Squadron
         (b) First American credited with aircraft kill-13 July 1918
      (2) Lt Frank Luke
         (a) Flew combat mid August to 29 September 1919
         (b) Characterized by Bill Luke as headstrong, undisciplined
         (c) Once landed beside burning balloon he had shot down to get confirming signature from ground witnesses
         (d) 18 September 1918-five kills in ten minutes (two balloons, 3 aircraft)
         (e) 29 September 1918-three kills in last mission (18 in 18 days)
         (f) Killed in action—first American to win Medal of Honor
      (3) Capt Eddie Rickenbacker—leading American ace of World War I
   d. St. Mihiel & Meuse-Argonne
      (1) Control point for almost 1500 aircraft—one-third American
      (2) Commanded by Gen Billy Mitchell
      (3) New concept of air supremacy under central control
   e. Public recognition of air battles
      (1) Exciting and colorful
      (2) Contrast to ground actions

TRANSITION: World War I gave US military aviation its first combat test and a clear mission. Acknowledgment of its full value, however, would have to be achieved during the years between the World Wars.

MP 3. Significant developments in military aviation between World War I and World War II.
   a. Gen Billy Mitchell
      (1) Director of Military Aeronautics-1919
      (2) Early believer in offensive air doctrine and equal status with Army and Navy
      (3) Air Service-1920-combatant branch of Army
      (4) Demonstration of bombing effectiveness-1921
         (a) German battleship sunk
         (b) Navy interest in aviation followed
         (c) Proved defensive & offensive use of bombing
      (5) Courts-Martial-1925
         (a) Charges preferred by President Coolidge
         (b) Used as a forum by political and military enemies
         (c) Given five year suspension—chose to resign
   b. Air Corps Tactical School
      (1) 1920-Langley 1931-Maxwell
      (2) Little experience on which to base teaching—concerned with developing air doctrine
         (a) Strategic bombing doctrine developed—led to B-17
         (b) Pursuit doctrine neglected—fighter equipment and tactics not developed until 1943
      (3) Responsible for almost all military aviation strategy and tactics between World Wars—training ground for World War II leadership
   c. Moves toward a separate air service
      (1) Gen Billy Mitchell was early leader
(2) No major changes made by Army & Navy in defining separate role for military aviation
(3) No clear decision by Army & Navy for responsibility of coastal defense
d. Advances in equipment and technology
   (1) Lindbergh’s cross-Atlantic flight (1927) gave impetus to military aviation—no limit to flying capabilities
   (2) Early refueling efforts
   (3) Instrument flight capability
   (4) First all-metal aircraft—Martin B-10 bomber
   (5) B-17 in 1937—higher and faster than pursuit aircraft—carried up to 5,000-lb bomb load

TRANSITION: Military aviation showed tremendous advancement from 1903 to the beginning of World War II. We have discussed only a few highlights of that advancement, but there are some events and individuals which are especially important to remember.

Conclusion

SUMMARY:

1. Significant developments in military aviation prior to World War I.
   a. Wright Brothers-1903
   b. Problems in Mexico-1906
   c. Military Air in the Signal Corps-1907
2. Significant developments in military aviation during World War I.
   a. Europeans ahead of US in equipment and tactics
   b. Primary mission was reconnaissance and patrol/pursuit
   c. Secondary mission was bombing, interdiction and communications
   d. Public recognition was large and positive
3. Significant developments in military aviation between World War I and World War II.
   a. Gen Mitchell was early true believer—frustrations and court martial.
   b. Army Air Corps Tactical School
      (1) Developed strategic bombing doctrine
      (2) Training ground for World War II leadership
      (3) Responsible for development of B-17
   c. No successful moves toward separate air service
   d. Progress in technology crowned by B-17

REMTIVATATION: Today we have looked at some highlights of military aviation in its early days. Many more fascinating events and individuals are included in this time frame. I encourage you to read and learn as much as you can about them. Knowledge of and appreciation for our professional heritage can help to make each of us more informed, dedicated, and effective as Air Force professionals.

CLOSURE: Study of history can prevent us from having to “reinvent the wheel” with each generation, each job, or each change in personnel.
ITEM 1

LESSON OBJECTIVE: TOOTLIFEST know significant developments in military aviation during World War I.

SAMPLE OF BEHAVIOR: Select from a list military air functions in World War I.

CRITERION OBJECTIVE: Given a multiple choice question listing the military air functions during World War I, select those consistent with the lecture material.

QUESTION: The two primary military air functions in World War I were patrol/pursuit and
   a. Courier.
   b. Interdiction.
   c. Reconnaissance.

RATIONALE: (c) Consistent with lecture content. (a) and (b) are incorrect because those functions were not attributable to the years associated with World War I.

ITEM 2

LESSON OBJECTIVE: TOOTLIFEST know significant developments in military aviation during World War I.

SAMPLE OF BEHAVIOR: Identify significant accomplishments of selected aviators during World War I.

CRITERION OBJECTIVE: Given a list of accomplishments in aviation and a list of prominent aviators from WWI, match the two lists with all answers being historically correct.

QUESTION: Column A lists accomplishments in aviation. Column B lists World War I aviators. In the space to the left of each accomplishment, place the letter which matches the aviator responsible for that accomplishment. Each item in Column B may be used once or more than once.

<table>
<thead>
<tr>
<th>Column A—Accomplishments</th>
<th>Column B—Aviators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. First American credited with aircraft kill</td>
<td>a. Lt Field Kindley</td>
</tr>
<tr>
<td>2. First American to win Medal of Honor</td>
<td>b. Lt Frank Luke</td>
</tr>
<tr>
<td>3. Five kills in ten minutes</td>
<td>c. Capt Eddie Rickenbacker</td>
</tr>
<tr>
<td>4. Leading American ace of World War I</td>
<td></td>
</tr>
</tbody>
</table>

KEY:
1. a
2. b
3. b
4. c
PART I
COVER SHEET

STUDENT NAME:  Ssgt Smith
HOME/SCATTER SEMINAR ADVISORS:  Major Blank/Capt Sure
LESSON TITLE:  Time Management
METHOD:  Informal Lecture
REFERENCES:
1.  How to Find the Time You Need Through Better Time Management, Robert C. Dorney
2.  How to Manage Your Time More Effectively With a Day-Timer, Charles R. Hobbs
3.  How to Get Control of Your Time, Alan Laiken

PART IA

COGNITIVE OBJECTIVE:  TOOTLIFEST comprehend the concept of time management.

COGNITIVE SAMPLES OF BEHAVIOR:
1.  Define time management in one’s own words.
2.  Identify missing critical attributes in non-examples of time management.
3.  Identify new examples/non-examples of time management.
4.  Explain why a given attribute is critical to the concept of time management.

AFFECTIVE OBJECTIVE:  TOOTLIFEST respond with interest to the concept of time management.

AFFECTIVE SAMPLES OF BEHAVIOR:
1.  Openly participates in class discussion on the concept of time management.
2.  Assists others in understanding time management.
3.  Volunteers information from personal background to support the comprehension of time management.
4.  Displays positive non-verbal communications during lesson on time management.
ORGANIZATIONAL PATTERN: Topical

STRATEGY: I will begin this informal lecture with a definition of “time management” from the references I’ve cited above and combining these to formulate a working definition. This will provide a common ground from which to start. From the definition, I will explain the critical attributes of analyzing time, identifying tasks, deadlines, and goals, and performing tasks. By breaking down these attributes and using support from the students they will fully understand what each attribute is and why each one of them must be present to make up the concept of time management. After explaining and discussing these attributes with the students, I will evaluate their comprehension by presenting a series of scenarios and asking the students to describe how each attribute is or is not included in each scenario, thus an example or non-example of time management.

LESSON OUTLINE:

MP 1. Definition of time management.

MP 2. Critical attributes.
   (a) Analysis
   (b) Adjustment
   (c) Performance
   (d) Goals

MP 3. Examples and non-examples (scenarios)
   (a) Bob, example
   (b) Bill, non-example
   (c) Doyle, example
PART II
TEACHING PLAN

Introduction

ATTENTION: Role play scenario of a person just tasked to do more projects because he is so efficient (videotape sequence ahead of time). After scenario, ask rhetorical question, “Have you ever said to yourself, ‘If only I had more time…!’ or ‘There just aren’t enough hours in the day!!?’”

MOTIVATION: Recall that Robert C. Dorney, the Vice President of a time management company said that time is a fixed commodity which can’t be manufactured or stored. Also, recount that Peter Drucker, author and one of our country’s foremost experts on the business scene has said, “Time is our scarcest resource and unless it is managed, nothing else can be managed.” Explain the importance of our roles in protecting national resources and even life, at times. And stress the importance of continually doing the best in the time we have available. Personalize this importance to the individuals in the class according to their career fields showing how time management can help them finish PME on time or early, how they can stand out as the experts simply by competently doing what needs to be done when it needs to be done.

OVERVIEW: Before we can manage time properly, we must first understand exactly what time management is, and that’s exactly what we are going to do today. We are going to first define time management. From that definition we will see that there are four critical attributes that must be present in order for time management to exist. Then, just to ensure we fully understand this concept of time management I will present some situations to you where you will need to determine if those situations are examples of time management or not.

TRANSITION: We have already touched on the importance of time management so let’s see why it’s important by showing what it is.

Body

MP 1: Definition:

Having researched extensively on the topic of time management, I found several excellent works but two in particular seem to relate to our military environment more easily than others:


However, even with these excellent books, I discovered that neither one had the perfect definition for our purpose. What I did find was that by combining the thoughts and words of these two individuals we could create a working definition that clearly applies to our environment.

Time management is:

“Continually analyzing time and tasks, and adjusting task requirements to most efficiently and effectively accomplish goals that have been established and prioritized.”

TRANSITION: Having created our own working definition that accurately tells us what time management is, we need to break that definition down to see just why this represents time management.

MP 2: Critical Attributes: (Reference Definition) Looking at our definition.

“Continually analyzing time and tasks” we will refer to as analysis (mag card).

“Adjusting task requirements” which means we must react to our analysis, we’ll refer to as adjustment (mag card).
The purpose of adjusting would be to “most efficiently and effectively accomplish our goals” or **performance** (mag card).

But these goals don’t just fall out of the sky, so we must be working with “goals that have been established and prioritized” **goals** (mag card).

If we have all four of these critical attributes present in a given situation, we have time management. But it takes more time than this to really comprehend this idea, so let’s analyze each of these attributes further.

**A. Goals**

I don’t mean to confuse you, but we need to start here at the bottom with goals. Why do you think we should address the idea of establishing goals before any of these other items?

**AR:** Must have direction/objective.
Provides focus.
Don’t know what task must be done with out them.
Communication—if the team doesn’t know what the goal is they may be working against each other.

A goal is the result or achievement toward which effort is directed. Establishing a goal then is making a conscious decision or having knowledge of the desired outcome.

What are some of your current personal/professional goals?

**AR:** Particular work project/tasking.
School.
Study for promotion.

So you all have established goals, whether they are personal or have been established for you by someone else. But, as we all know there are only so many hours in a day, a week, a month, etc. So, we have to make choices. We have to prioritize or have priorities made for us. There must be an establishment of precedence, what is needed first, second, third, etc.…

Although it appears at the end of our definition, if we are going to have effective time management it must start with establishing and prioritizing our goals.

**B. Analysis**

Once we have this solid list of prioritized goals we must continually analyze both the time and tasks involved with reaching those goals.

How do you analyze a task?

**AR:** Break it down to see;
What is required by the end user?
What resources are needed?
Who is qualified to perform the task?

So, you must know what the expected outcome is and how you will be able to accomplish that task. On rare occasions the task has an unlimited time requirement, but usually time is a critical factor. Therefore, time management inherently requires you to also analyze your time. How much time will it take to accomplish task X, Y, Z? How much time do I have to work with? What other constraints from tasks or duties do I have to deal with?

It’s one thing to analyze your tasks and another to analyze your time, but putting those two critical factors together is where it starts getting tricky.
What are some situations that you’ve been in where you had to analyze both your tasks and time?

AR: Job and school.
    Job and family/house.
    2, 3, and 4 tasks on the job that all needed to be done “now.”

C. Adjustment

Let’s assume that we have established and prioritized our goals, and analyzed the time and tasks elements. That sounds good, however, you can have the best analysis in town, but unless you react and adjust to those elements you have not managed your time. The reason you need to continually analyze your time and tasks is that they are usually very fluid and dynamic. They are always changing. Priority #3 just became priority #1, task #1 needs a part that will not arrive for two more days, priority #4 was just modified and only requires a quick 30 minute fix, General X just walked in to check on his “baby” which until that minute was your priority #51, etc….

You cannot change the number of hours in a day, but effective time management requires you to adjust your tasks based on your continual analysis of both the time and the tasks. Adjustment, it’s a pro-active response not a reactive reaction.

Why do all of this? If priority #3 just became priority #1, so what, I only had a day’s worth of work left on it to finish—why not just finish it? If task #1 needs a part that will not arrive for two more days—why not just sit down and wait for it to show up?

D. Performance

Although we often get frustrated by changing priorities the fact is that things change, situations (needed parts) change. To meet our goals we/our customers need quality products/service in a timely manner—quality, quantity, efficiency and effectiveness. We must perform our duties, get our job done by completing the form/report, by getting the aircraft launched ensuring safe parameters.

I would wager that all of us at one time or another has had a true “want and need for more time.” Time management, something most of us do quite well but probably wish we could do even better. To do it better is to first truly understand “what” time management is.

INTERIM SUMMARY: If we fail at time management one of the most likely reasons stems from the first critical attribute we spoke of, goals. Our goals must be established and prioritized, both the long-range goals and the short term goals.

We must continually analyze both the time and tasks involved in reaching those goals.

But, it does no good to analyze unless you actually react and adjust the task requirements based on your analysis. Keeping in mind however, that no action/adjustment is sometimes the correct action/adjustment.

The purpose of course brings it full circle, in that the accomplishment of our goals can be performed in the most efficient and effective manner.

TRANSITION: Having managed our time here effectively, we have just enough time to see whether you can now distinguish time management from time mismanagement.

MP 3: Examples/Non-examples
Handout scenarios and have students discuss why each one is or is not an example of time management. (See attached)

Answers to scenarios:

Scenario #1, Bob: This is an example. Although he got off to a slow start Maj Bob did establish and prioritize goals, he now seems to be continually analyzing both the time and tasks involved and making appropriate adjustments to more efficiently and effectively accomplish those goals.
Scenario #2, Bill: This is a non-example. Although he acknowledged his shortcomings and took the class and analyzed his overall situation, Capt Bill did not establish goals. If he does not establish goals he cannot possibly prioritize those goals. Without those established and prioritized goals all the analysis of time and tasks will serve no purpose because without an established and prioritized goals, he would have no foundation therefore eroding what efficiency and effectiveness may or may not have been there.

Scenario #3, Doyle: This is an example. Mr. Doyle establishes and prioritizes goals along with his managers. Mr. Doyle continually reviews and re-suspends (reacts) based upon his analysis of time and tasks. Company results indicate that things are running in an efficient and effective manner.

TRANSITION: Since you were able to distinguish examples of Time Management from non-examples, you have learned what Time Management is. Let’s review what we’ve talked about today and come to a conclusion about this subject.

Conclusion

SUMMARY: We have managed our time extremely well. We started this hour with a definition of time management, saying that it is “Continually analyzing time and tasks, and adjusting task requirements to most efficiently and effectively accomplish goals that have been established and prioritized.” From that definition we determined that for time management to exist we needed to continually analyze our time and tasks, to react to our analysis by adjusting for the purpose performing efficiently and effectively those goals that have been established (our critical attributes). With that understanding you were able to identify examples and non-examples of time management. We saw that both Maj Bob and Mr Doyle were managing their time, while Capt Bill attempted to manage his time he had never established his goals which are critical to our concept of “time management.”

REMOTIVATION: Now that you have a tool to be more efficient and effective, you have an obligation to use it on a daily basis. It can only result in career success for you, your unit and the Air Force.

CLOSURE: Even though time cannot be created or recovered, it can be lived to the fullest here and now by our using it correctly day-by-day, hour-by-hour.
SCENARIO 1:

Bob is a Major with 15 years in the Air Force. He is in charge of the Information Systems Division in his squadron and has four people working directly for him. He is also married and the father of three children, ages 12, 18, and 8. Bob notices that things are pretty hectic at work. He feels overburdened and notices a streak of rebellion in his children over the last two months. Bob has decided he is stretched to the limit and has no time for anything. He decides to take a time management class. After the class, he begins to take action. He establishes and prioritizes his top 3 long-range and top 3 short-term goals. He takes a survey of his time for two weeks. A pattern emerges. He discovers there are many things that can and should be delegated to his subordinates. There are many things that his division is doing that shouldn’t be done and he decides to tactfully return the responsibility for those things to the division who should have responsibility. Bob discovers he has more free time to begin working on reports that were due two months ago. He then takes his survey and breaks it down into three classifications: daily goals, career and company goals, and personal goals. Breaking the items on his list into: A - vital, B - important, C - some value, and D - complete waste, he finds that his daily company and career goals are coming into order. In the area of personal goals, he realizes that he is not spending quality time with his children. He then reviews his goals in this area and prioritizes them. Bob decides that his usual Wednesday night poker game with the boys is time better spent with his children. In two months he notices the streak of rebellion that was so evident in his children is now gone.

QUESTION: Why is this an example/non-example of time management?

SCENARIO 2:

Bill is a Captain with 12 years in the Air Force. He is in charge of the Disaster Preparedness Division for the wing. He has a master sergeant and a technical sergeant working directly for him. They are very sharp and Bill has things pretty easy because of these two talented co-workers. His boss knows this and decides to task him with the base Voter Registration Drive and also the Combined Federal Campaign. Overnight, Bill has deadlines and reports that are due for these projects. He has also just found out his section will be assuming the disaster preparedness duties for another nearby base because of budget cutbacks. Bill reads in the base newspaper about a time management class being offered. He decides to take it. After taking the class, Bill decides to put what he has learned into practice. He starts by analyzing his time to find out where it is going. He then prioritizes each area. Bill decides after all this work he deserves a vacation. Things are coming together.

QUESTION: Why is this an example/non-example of time management?

SCENARIO 3:

Doyle is a happy-go-lucky fellow on the fast track at his company. He runs the budget division and has succeeded in cutting expenditures by seven percent over the past year. He attributes this success to his semiannual meetings with managers at which he reviews the company goals, division goals, and his goals. After this meeting, supervisors meet with him and with their own workers so that bosses can review individual goals with their subordinates. Doyle also sends out memos reviewing all divisional suspenses and prioritizing them for this level but encouraging the supervisors to reprioritize those that pertain directly to themselves. As Christmas gifts, he gave each supervisor a Day-Timer for the office with training on how to record appointments, to-do lists, and suspenses. An independent consultant came in and confirmed that these Day-Timers are being used effectively by 80 percent of the supervisors and that 65 percent of the subordinate budget analysts also started using them. Doyle intends to reward the success of his division by giving all staff members some time off.

QUESTION: Why is this an example/non-example of time management?
ITEM 1:

LESSON OBJECTIVE: TOOTLIFEST comprehend the concept of time management.

SAMPLE OF BEHAVIOR: Identify new examples/non-examples of time management.

CRITERION OBJECTIVE: Given a situation, identify it as an example/non-example of time management.

QUESTION:

As the result of the drawdown, Capt Smidly finds himself in a situation where he has picked up a fellow officers primary and additional duties in the same maintenance squadron. Initially, Capt Smidly panics knowing he will not be able to accomplish all required tasks. As the initial shock begins to wear off, Capt Smidly coordinates with the NCOs in both areas noting the goals of each. He explains to his commander what his priorities will be for the first month or so but realizes things can change.

Is this an example of effective time management?

A. Yes. Capt Smidly has done everything he can do in this situation. He should succeed in providing efficient and effective products/services based on his willingness to work with the NCOs from both areas. The commander will be pleased.

B. No. Capt Smidly approached the situation incorrectly as he should have analyzed the current time and tasks of each area and then combined the efforts of both shops to most efficiently and effectively produce products/services based on the priorities he established.

C. No. Although Capt Smidly had the right idea, and seems to acknowledge that priorities may change, he has not made provisions for continually analyzing the tasks/goals. He will not be able to produce efficient/effective products/services after an initial period of time.

RATIONALE: (C) is correct. He has set the stage and is off to an excellent start, however, without continually reassessing the goals/priorities and the tasks that go along with them he will soon be well behind the power curve and will have to start to simply react to immediate taskings levied upon him. (A) is incorrect. Capt Smidly did establish goals and priorities but he failed to take into account just what it would take and how to best go about reaching those goals. Even if he had accomplished that, there was no indication that his plan would be more than a one time good deal. (B) is incorrect. Although the basic answer of the situation being a non-example is correct the explanation lacked justification primarily because the explanation does not address the establishment or prioritization of goals.

ITEM 2:

LESSON OBJECTIVE: TOOTLIFEST comprehend the concept of time management.

SAMPLE OF BEHAVIOR: Identify the missing critical attribute in a non-example of time management.

CRITERION OBJECTIVE: Given a multiple choice test item, select the best alternative that identifies the critical attribute missing from a scenario of a non-example of the concept of time management.
QUESTION:

Capt Martin, OIC of the munitions branch, received a report of a recent evaluation that reflected poorly on his office management. Capt Martin decided to manage his office better using the information he learned in his time management course. He began by establishing goals. He identified priorities for these goals and his entire office agreed with these goals. Capt Martin then decided how much time was needed to reach his goals as well as the requirements to reach these goals. He was satisfied with the analysis and decided to post his prioritized goals on the office wall. Within 12 months, his office had accomplished all of the goals. Which critical attribute of time management did Capt Martin miss from this non-example of time management?

A. Identifying goals.
B. Analysis of elements.
C. Adjustment of goals.
D. Differentiation of duties.

RATIONALE: (C) is the correct response. Capt Martin never reevaluated his goals in relation to prioritization. (A) is incorrect because Capt Martin established goals. (B) is incorrect because Capt Martin analyzed time requirements and the elements required for each goal. (D) is not an attribute of time management.
SAMPLE LESSON PLAN FOR GUIDED DISCUSSION METHOD

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART I
COVER SHEET

STUDENT NAME:  Tsgt Racer
HOME/SCATTER SEMINAR ADVISORS:  Major Doyle/Capt Helms
LESSON TITLE:  Total Fitness Promotes Readiness
METHOD:  Guided Discussion
REFERENCES:
  1. AFP 50-45, Wellness Lifestyle Guide for Personal Readiness
  2. Price, Joan, The Honest Truth About Losing Weight and Keeping It Off
  3. The National Exercise for Life Institute, The New Fitness Formula for the 90’s

AUDIO/VISUAL AIDS:  Overhead projector and overhead transparencies

PART IA

COGNITIVE OBJECTIVE:  TOOTLIFEST comprehend that total fitness promotes readiness.

COGNITIVE SAMPLES OF BEHAVIOR:
1. Describe how total fitness promotes readiness.
2. Given a scenario, predict how total fitness promoted readiness.
3. Defend the idea that total fitness promotes readiness.
4. Give examples of how total fitness promotes readiness.

AFFECTIVE OBJECTIVES:  TOOTLIFEST respond with interest to the principle that total fitness promotes readiness.

AFFECTIVE SAMPLES OF BEHAVIOR
1. Voluntarily participates in the discussion of how total fitness promotes readiness.
2. Gives meaningful examples from personal experience of how total fitness promotes readiness.
3. Assists others in comprehending how total fitness promotes readiness.
PART 1B

ORGANIZATIONAL PATTERN: Topical

STRATEGY: This discussion will be conducted in deductive approach and will begin with an overview of the concept of readiness, as this concept is well known by all military personnel. I will then define the concept of total fitness as this term is not as well known by the group and, most probably, they think of fitness as physical fitness only. The first aspect of total fitness, physical fitness will be related to readiness through discussion of how strength training, aerobic training and nutrition promote fitness. This point will be discussed first because physical fitness is more concrete than the second area which is mental fitness. In addition, students usually find it easier to talk about physical fitness than mental fitness. The group will be encouraged to share personal examples of how physical fitness promotes their readiness. We will then discuss the impact mental fitness has on readiness by looking at alertness, stress management, and intellectual growth. More effort in the area of questioning might be required here because mental fitness is somewhat abstract and it usually isn’t a common discussion topic. Additional support will be introduced in the final comprehension-level summary to aid in reaching the generalization in the objective, that total fitness promotes readiness.

LESSON OUTLINE:

MP 1. Physical fitness promotes readiness.
   a. Strength training promotes readiness
   b. Aerobic training promotes readiness.
   c. Appropriate nutrition promotes readiness.

MP 2. Mental fitness promotes readiness.
   a. The ability to remain alert promotes readiness.
   b. Stress management promotes readiness.
   c. Intellectual growth promotes readiness.
ATTENTION: “Lean, mean, fighting machines”—that’s a description we’ve all heard to describe a soldier, or in today’s jargon, a warrior. Does that description paint a picture of you?

MOTIVATION: When we’re asked what our purpose as Air Force members is, one of our responses is that we are preparing for war. As warriors, we need to do all that we can to be ready: we need to study the profession; we need to practice as we will fight; and we need to be fit to fight. Today we’re going to take a look at one of these components. We’re going to discuss how total fitness promotes readiness. As warriors with about 14-15 years experience, you should all be able to participate in a discussion about how total fitness promotes your personal readiness. Also, if you aren’t doing all that you can do personally to be physically and mentally fit, perhaps this discussion will encourage you to do more.

OVERVIEW: We’re going to discuss how total fitness promotes readiness (or our ability to go to war at a moment’s notice) by looking at how each component of total fitness promotes readiness.

First we’ll look at physical fitness promotes readiness, probably the one component we know the most about. We’ll talk about how strength training, aerobic training, and good nutrition all promote readiness. Second, we’ll discuss how mental fitness promotes readiness. This discussion will cover such areas as the ability to remain alert, stress management, and intellectual growth, and how they all promote readiness. I used the word discuss and that exactly what I want to happen here today. This is a time for you to express your opinions and ideas about this subject. But, as we discuss, remember to respect the other individuals in the group. So as we participate in this discussion we will be exercising our mental fitness to promote a healthy exchange of ideas.

TERMS: I’m sure we can all agree that readiness is our ability to go to war at a moment’s notice. But because total fitness may not mean the same thing to all of us, let’s look at a definition.

“The ability to carry out daily tasks with vigor and alertness without undue fatigue and with ample energy to engage in leisure time pursuits and to meet the above average stress encountered in emergencies.”

Total fitness has many dimensions—it’s a positive state of total health and well being, involving the mental, social, and spiritual aspects of life as well as the physical.

Body

TRANSITION: Because when we talk and think about “fitness” we usually focus on physical fitness, lets first look at this aspect of total fitness.

MP 1: Physical fitness promotes readiness.
QUESTION:
Lead-off question (LOQ): How does physical fitness promote individual readiness?

ANTICIPATED RESPONSE (AR)
* Lifting weights helps pull G’s
* Can physically carry out mission
* Can keep going, running, long periods of standing
* Not to heavy, so can tolerate activity without getting ill

Follow-up question (FUQ): Strength training seems to be an important aspect of physical training: what does strength training do to promote readiness?

FUQ: How does aerobic training promote readiness?

* Protect body against injury
* Control blood pressure
* Reduces body fat, less load to move
* Improves self-confidence
* Strengthens heart so it doesn’t have to work so hard to keep body going
* Improves oxygenation to keep muscles going
* Increases feeling of well being
* Keeps weight down
* Increases stamina

TRANSITION: We talked about how aerobic and strength training really promote readiness by increasing endurance, strength, self-confidence, etc. But none of this works very well without good nutrition.

FUQ: How does appropriate nutrition promote readiness?

* Feeds cells
* Keeps body working
* Keeps us alert
* Keeps weight down
* Allows us to rest and rejuvenate

INTERIM SUMMARY:
1. Include students’ ideas that support main point.
2. Add new information if necessary.
3. Relate to and state conclusion of main point, that “physical fitness promotes readiness.”

TRANSITION: We’ve talked a lot about the physical side of promoting readiness. We’ve said that having strength, aerobic conditioning, and good nutrition feeds our body and keeps us going, to carry out the mission. But what about the mental side

MP 2: Mental fitness promotes readiness.

LOQ: How does mental fitness promote readiness?

* Increases your ability to stay alert
* Keeps stress levels low
* Make smarter and safer decisions and actions
* Body will not function if you’re not mentally prepared
* Where there is a will—there is a way

FUQ: How does the ability to remain alert promote readiness?

* Able to listen to plans, directives
* Operate equipment safely
* Fly long missions
* Critical thinking remains intact (problem solving)

TRANSITION: We said in our definition that total fitness included our ability to meet the above average stress encountered in emergencies. We all have stress in our lives, stresses from many things.
FUQ: How does management of that stress promote readiness?

- Plan ahead to prevent or decrease stress
  - Wills, finances, child care
- Keeps us healthy
- Makes us a reliable resource
- We’re mentally “all there”
- Not having our mind elsewhere away from mission
- Positive mental attitude
- Gives confidence

FUQ: How can intellectual growth promote readiness?

- Keeps us sharp
- Know when to question
- Gives confidence
- Promotes problem solving

TRANSITION: We’ve pretty well developed the notion that mental fitness plays just as important a role in promoting readiness as physical fitness does.

Conclusion

SUMMARY:

1. Review MP2 (student input), show relationship between ideas, restate MP2.
2. Review MP1 (student input), show relationship between ideas, restate MP1.
3. Provide additional support that spiritual fitness and self-responsibility promotes readiness.
4. Draw conclusion/generalizations about MPs which lead to the lesson objective.

REMOIVATION: As warriors, we are always preparing for war, we study the profession, we practice our skills as we will fight with those skills and we must be fit to fight. This is not something that I told you, you have all told that to each other. You have provided examples that demonstrated how physical fitness promotes readiness and you have provided examples of how mental fitness promotes readiness—you said it all yourselves.

CLOSURE: If you aren’t as physically fit as you should be—now is the time to get started. But, in addition to your physical ability it takes positive mental fitness to maintain a good physical fitness plan, just as it takes both physical and mental fitness to be “ready.”
LESSON OBJECTIVE: TOOTLIFEST comprehend that total fitness promotes readiness.

SAMPLES OF BEHAVIOR: Describe how total fitness promotes readiness.

CRITERION OBJECTIVE: Given a stem for a multiple-choice test item requiring students to describe how total fitness promotes readiness, and three seemingly correct explanations (one correct in accordance with class discussion), select the answer that best describes how total fitness promotes readiness.

QUESTION: Which of the following BEST describes how total fitness promotes readiness?

Total fitness promotes readiness by

a. providing the physical and psychological energy necessary to maintain a vigorous and alert lifestyle.
b. providing health, strength, and stamina in quantities necessary to participate in a full, vigorous, and alert lifestyle.
c. enabling us to lead a vigorous and alert lifestyle with enough energy to meet above average pressures such as in emergencies.

RATIONALE: (c) This is the only answer that relates all aspects of total fitness to responding to an emergency. (b) describes physical fitness only, and doesn’t mention the relationship to readiness. (a) describes nothing about readiness (emergencies).
ACADEMIC INSTRUCTOR SCHOOL  
Maxwell Air Force Base, Alabama

PART I  
COVER SHEET

STUDENT NAME: Capt West  
HOME/SCATTER SEMINAR ADVISORS: Maj Matthews/Ms Jenkins  
LESSON TITLE: Use of Positive Humor Enhances Student Learning  
METHOD: Guided Discussion  
REFERENCES:  

AUDIO/VISUAL AIDS: Flipchart and overhead transparencies

PART I A

COGNITIVE OBJECTIVE: TOOTLIFEST comprehend that the instructor’s use of positive humor enhances student learning.

COGNITIVE SAMPLES OF BEHAVIOR:  
1. Justify why an instructor’s use of positive humor enhances student learning.  
2. Defend the statement that an instructor’s use of positive humor enhances student learning.  
3. Predict the outcome on student learning when an instructor uses positive humor.  
4. Explain why an instructor should use positive humor rather than negative humor to enhance student learning.  

AFFECTIVE OBJECTIVES: TOOTLIFEST respond positively to how instructor’s use of positive humor enhances student learning.

AFFECTIVE SAMPLES OF BEHAVIOR:  
1. Voluntarily participates in class discussion on how an instructor’s use of positive humor enhances student learning.  
2. Shares personal examples on how instructor’s use of positive humor enhances student learning.  
3. Displays positive non-verbal communications during lesson on how an instructor’s use of humor enhances student learning.
PART 1B

ORGANIZATIONAL PATTERN: Problem/Solution

STRATEGY: The lesson starts with an example of inappropriate humor which is designed to get a few laughs. Point out that the humor was incorrectly used because it stereotyped a particular group. Humor shouldn’t be used at the expense of others. It should be used to relax students and help them retain information. Before the students can discuss the topic it’s necessary to define the terms that will be used. After these terms have been defined, I’ll introduce the problem and solution approach to this topic. Main point one represents the problem which is that improper use of humor detracts from student learning and main point two represents the solution which is the instructor’s use of positive humor enhances student learning. We will look at both of these ideas in a deductive manner. This approach is being used because of the many problems associated with the use of humor. The negative and bad experiences have resulted in some teachers not using humor. On the other hand, because some teachers have gotten some laughs, they continue to use humor incorrectly. From the guided discussion, the students will know that getting a laugh isn’t everything. To discuss this improper use of humor we will look at overuse of and offensive humor along with using a student as the target of a joke detracts from learning. Then we’ll turn the focus to a solution which is that correct use of humor enhances learning. Questions in this area will deal with supporting the lesson objectives, timing, directing the humor toward yourself, and being familiar with your humorous material. These could be classified as techniques in using humor. These techniques enable the teacher to use humor correctly. Two summaries will be provided. The first is done to ensure that a clear understanding of the problem has been identified and discussed. The second and final summary will come at the end of main point two which is the solution. The problem statement will be restated but the focus here will be the solution. The solution is emphasized because it’s what will enable teachers to effectively use humor and that’s the end goal. The lesson will come to a conclusion by challenging the students to use humor and using a quote from The Laughing Place. With the use of the LOQs and FUQs throughout the lesson, students will be able to use their past experiences to discuss both problems and solutions to arrive at the proper use of humor to enhance learning. As we move through the discussion, the students will see that using humor is serious business that requires skill.

LESSON OUTLINE:

MP 1. Improper use of humor detracts from student learning.
   a. Overuse of humor detracts from student learning.
   b. Offensive (ethnic, sexist, and/or racial) humor detracts from learning.
   c. Using a student as the target of a joke detracts from learning.

MP 2. The instructor’s use of positive humor enhances student learning.
   a. Humor that supports a lesson objective enhances student learning.
   b. Correctly timing the use of humor enhances student learning.
   c. Directing the humor toward yourself enhances learning.
   d. Knowing your story enhances student learning.
ATTENTION: An English lady, while visiting Switzerland, was looking for a room and asked a local schoolmaster if he could recommend one. He took her to several rooms, and when everything was settled, she returned home to make final arrangements for moving. When she arrived home, the thought occurred to her that she had not seen a W.C. (water closet or bathroom) around the place. She immediately wrote to the schoolmaster asking him where the W.C. was. The schoolmaster didn’t know the meaning of “W.C.” so with a priest’s assistance he came to the conclusion that it meant Wayside Chapel (a small building beside the road where travelers could rest or pray). He sent a letter back to the English lady, which read as follows:

Dear Madam:

I take great pleasure in informing you that the nearest W.C. is situated only nine miles from the house in a beautiful grove of trees. It is capable of holding 32 people. It is open only on Mondays and Tuesdays.

There are a great number of people expected during the summer months, so I would suggest that you come early, although there is usually plenty of standing room. This is an unfortunate situation, especially if you are in the habit of going regularly.

You will, no doubt, be glad to hear that a number of people bring their lunch and make a day of it, while others who can’t afford it, arrive just in time. I would recommend Thursday because, on that day, there is an organ accompanist. The acoustics are excellent and even the slightest sound can be hear anywhere.

It may interest you to know that my daughter met her husband in the W.C., and they were married there. I can still vividly remember the rush for seats. Seven people crowded into seats for four. It was wonderful to see the expressions on their faces.

Unfortunately, my wife is rather delicate, so she has not attended in over a year. Naturally, it pains her very much—not to be able to go more often. I shall be delighted to reserve a seat for you if you wish, where you can be seen by all. Hoping to be of assistance, I am, Sincerely Yours, (A Laughing Place, pp 46-47)

MOTIVATION: Being humorous/funny is serious business because it’s tough to do. Nevertheless, it’s well worth the effort.

WHY:
• Help students to retain information. “A smile is a curve that sets many things straight.” Dr Richard Lester, CPD Educational Advisor
• Reduces stress and anxiety for both teachers and students
• Since most teachers use humor, they need to know more about it
• Laughter like music is an international language. “The only weapon more powerful than humor is a gun.” Dr Lester
• “It’s the most powerful ammunition you can carry.” Bob Hope, Oct 11, 1983, Foreword, How To Hold Your Audience With Humor by F. Perret.

The example that I read is the incorrect use of humor. Although it’s funny, it doesn’t relate specifically to the subject that I’m addressing today.

TRANSITION: The example of humor that I just read was funny but it was an incorrect use of humor because it only partially related to the lesson objective.

OVERVIEW: In today’s lesson we are going to discuss how the instructor’s use of humor affects student learning.
First, we will discuss the relationship between the improper use of humor and student learning which creates a problem. After we’ve discussed this problem, we’ll turn to a possible solution which is the use of positive humor to enhance student learning.

Definition of terms:

- **Learning**—we discussed the concept of learning last week and generally can describe it as a change of behavior through experience.
- **Improper use of humor**—comical situations or occurrences/intended comical situations that result in negative consequences/hurt feelings. It results in laughing at someone rather than with them; it’s laughter at someone else’s expense.
- **Positive humor**—It results in learning being more enjoyable and lasting by using amusing and/or comical situations to emphasize the lesson objective.
- **Students and learners** are used interchangeably.

This is not necessarily a time for you to be funny but it is a time for you to express your opinions and ideas about this subject. But, as we share, remember to respect the person speaking. Because you have experience with this subject, you can share your experiences both positive and negative. You have a wealth of knowledge and I especially want you to share it today.

**TRANSITION:** Let’s start with the BAD—the problem area, the relationship between learning and improper humor.

**Body**

**MP 1:** Improper use of humor detracts from students learning.

**INSTRUCTOR ACTIVITY**

| Leadoff question (LOQ): Why does improper use of humor detract from learning? | * Diverts students’ attention from subject  
* Creates biases about speaker  
* Not reinforcing learning  
* Laughing at the expense of student  
* Incorrect use of classroom time |
|---|---|
| Follow-up question (FUQ): Too much humor in the classroom is improper use of humor. Why would too much humor in the classroom detract from learning? | * Focus away from subject  
* Learning isn’t being reinforced  
* Chain reaction with everybody trying to be funny rather than learning |

**FUQ:** Ethnic, racial, and sexist jokes are all forms of negative humor. How do these forms of negative humor detract from learning?

* Create hostility toward instructor and students that are object of the joke  
* Students might fear they’re next  
* Instructor shows a lack of professionalism  
* Violates AF policy  
* Some students become defensive  
* Discourage student from participating

**Lead in to final FUQ:** Some students have funny names, facial features, etc. They are naturals for getting a few laughs. Where are some examples that you’ve seen where an instructor made a specific student the target of a joke?

* Any negative situations that students have observed.  
Could include size, shape, height, etc.

**FUQ:** What was the effect of this improper use of humor on learning?

* Other students reluctant to participate out of fear that they might be next  
* Fosters poor human relations  
* Disrupts communication on subject
* Other students might see as okay thing to do and target the student also
* Result in student isolation which makes it more difficult for students to learn

**TRANSITION:** From your discussion we can see that what’s considered a “good laugh” by some might actually be a “bad laugh” for the learning process. Let’s review what you said.

**INTERIM SUMMARY:**

- Summarize student ideas that support the first main point using the terms of the students.
- Add new information from anticipated responses if necessary.
- State the first main point; “Improper use of humor detracts from student learning.”

**TRANSITION:** The use of humor in the classroom isn’t all bad. I’m sure that you can identify numerous situations where the use of humor helped the learning process.

**MP 2:** The instructor’s use of positive humor enhances student learning.

**LOQ:** How does teacher’s appropriate use of humor enhance student learning?

- Keeps student attention focused on the subject
- Makes good use of classroom time to improve learning
- Shows students that the instructor is human
- Helps to clarify point
- Instructor models positive behavior

**FUQ:** How does using humor that supports the lesson objective help student learning?

- Reinforces the idea in a student-centered manner
- Student hears the idea more than once
- Enables students to use association to remember information
- Give the students an opportunity to digest material

**FUQ:** How does the effective timing of humor enhance student learning?

- Space throughout—keeps audience alert and eager to listen
- Helps keep the message from getting boring thus students continue to listen
- Timing of the right words and phrases helps to clarify the point being made
- Shakespeare, “Brevity is the soul of wit.” Keeping the humor short enables the instructor to keep on the point of the lesson

**FUQ:** How would learning be enhanced if the instructor directed the humor toward himself/herself?

- Shows teacher is human
- Establishes rapport with group
- Eliminates insulting class
- Easier to relate to teaching point

**FUQ:** The instructor should know the story/punchline well. Why is this essential to enhancing learning?

- Tell story only once—saves time
- Establishes credibility
- Ensures that it ties to lesson

### Conclusion

**FINAL SUMMARY:**

- Restate conclusion of MP 1 (Problem). The improper use of humor detracts from student learning.
- Summarize MP 2 (Lesson Objective/Solution) by recapping student comments and adding any new information.
- State conclusion—the instructor’s use of positive humor enhances student learning.

**REMOtIVATION:**
• Start using positive humor if you aren’t already doing so. Assess your classroom performance and determine how you could make more effective use of this classroom tool.
• You can be a more effective instructor if you learn to use positive humor.
• Start a humor file from various sources like the newspaper, educational literature, etc.
• Refuse to use improper/negative humor, or be a party to it and correct when necessary.
• Learn to laugh at yourself.

CLOSURE: Remember, “you are not the center of the universe, nor are you its director—that job is already taken and you’re not qualified.” (A Laughing Place by Christian Hageseth III, M.D.) Learning to laugh at yourself as the instructor will help to ensure that humor is used correctly in your classroom.
ITEM 1

OBJECTIVE: The objective of this lesson is for each student to comprehend that the instructor’s use of positive humor enhances student learning.

SAMPLE OF BEHAVIOR: Explain why an instructor should use positive humor rather than negative humor to enhance student learning.

CRITERION OBJECTIVE: Given a stem for a multiple-choice test question requiring students to explain why an instructor should use positive humor rather than negative humor to enhance student learning and three possibly correct explanations (one of which is correct in accordance with the class discussion) select the correct response.

QUESTION: An instructor should use positive humor rather than negative humor because

- a. Students can more easily digest the material and form associations to remember information.
- b. It allows students to focus on topics away from the subject so that student learning is enhanced.
- c. Humor directed toward the students is usually more effective than humor directed toward the teacher himself/herself.

RATIONALE: (a) is correct as it is the only answer that explains how positive humor enhances the learning process (b) & (c) are both incorrect because they are false statements; humor should be directed at the instructor not the students and humor should always make a connection to the subject of the lesson.

ITEM 2

OBJECTIVE: The objective of this lesson is for each student to comprehend that the instructor’s use of positive humor enhances student learning.

SAMPLE OF BEHAVIOR: Defend the statement that an instructor’s use of positive humor enhances student learning.

CRITERION OBJECTIVE: Given a requirement to defend the statement that an instructor’s use of positive humor enhances student learning and without the use of text or notes, write an acceptable defense consistent with the class text and discussion.

QUESTION: By looking at the pros and cons, in 400 words or less defend the statement that an instructor’s use of positive humor enhances student learning. This question will be scored on content only (35 points). Partial credit will be given.

KEY: The student should explain how the improper use of humor detracts from student learning and contrast that with the proper use of humor as it enhances student learning.

15 POINTS, 5 points for each point on how improper use of humor detracts from learning—overuse, offensive, and using a student as the target of a joke, detracts from learning.

20 POINTS, 5 points for each point on how positive humor enhances learning—supports the lesson objective, timing, directing humor towards yourself (instructor), and knowing your story.
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EXAMPLES OF CASE METHOD OBJECTIVES

Example 1

Objective: “…apply the ISD process to course development.”

Main Points:
1. Analysis.
2. Design.
3. Development.
4. Implementation.
5. Evaluation.
6. “…apply the ISD process to course development.”

Chalkboard Arrangement:

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Design</th>
<th>Development</th>
<th>Implementation</th>
<th>Evaluation</th>
</tr>
</thead>
</table>

Example 2

Objective: “…apply the Carkhuff counseling approach to given counseling situations.”

Main Points:
1. (A) Attending skills.
2. (A) Responding skills.
3. (A) Initiating skills.
4. “…apply the Carkhuff counseling approach to given counseling situations.”

Chalkboard Arrangement:

<table>
<thead>
<tr>
<th>Attending</th>
<th>Responding</th>
<th>Initiating</th>
</tr>
</thead>
</table>

Example 3

Objective: “…apply the concept of professional ethics in a leadership situation.”

Main Points:
1. (A) Analysis of cast of characters and their relationships with each other.
2. (A) Analysis of ethical considerations of each character.
3. (A) Analysis of the impact of professional ethics in a leadership situation.

Chalkboard Arrangement:

<table>
<thead>
<tr>
<th>Characters</th>
<th>Ethics</th>
<th>Impact</th>
</tr>
</thead>
</table>

Example 4

Objective: “…apply the principle of creativity to a survival situation.”
Main Points:

1. Develop criteria necessary to construct a priority list of survival items.
2. Generate uses for the list of survival items.
3. Apply the criteria to construct a priority list of survival items.
4. “…apply the principle of creativity to a survival situation.”

Chalkboard Arrangement:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Uses of Items</th>
<th>Priority of Items</th>
</tr>
</thead>
</table>

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SAMPLE LESSON PLAN FOR CASE STUDY METHOD

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART I
COVER SHEET

STUDENT NAME:  Sgt Sams
HOME/SCATTER SEMINAR ADVISORS: Captain Dunlap
LESSON TITLE:  Prosecutorial Discretion
METHOD:  Case Study

AIDS/HANDOUTS:  Case Study:  What's Up Doc? (Attached); chalkboard.

PART IA

COGNITIVE OBJECTIVE:  TOOTLIFEST comprehend that prosecutorial discretion provides commanders with viable alternatives for resolving disciplinary problems.

COGNITIVE SAMPLES OF BEHAVIOR:

1. Predict the effect of providing commanders with viable alternatives for resolving disciplinary problems through prosecutorial discretion.
2. Distinguish among prosecutorial discretion factors which provide commanders with viable alternatives for resolving disciplinary problems.
3. Justify the use of prosecutorial discretion in resolving disciplinary problems.
4. Explain how commanders can resolve disciplinary problems through the effective use of prosecutorial discretion.
5. Give original examples which illustrate prosecutorial discretion providing commanders with viable alternatives for resolving disciplinary problems.

AFFECTIVE OBJECTIVE:  TOOTLIFEST respond positively to the flexibility that prosecutorial discretion provides commanders for resolving disciplinary problems.

AFFECTIVE SAMPLES OF BEHAVIOR:

1. Actively participates in case study on how prosecutorial discretion in order to provide commanders viable alternatives for resolving disciplinary problems.
2. Animatedly defends the position that prosecutorial discretion provides commanders viable alternatives for resolving disciplinary problems.
3. Independently researches case study for class presentation showing how prosecutorial discretion provides commanders viable alternatives for resolving disciplinary problems.
PART IB

ORGANIZATIONAL PATTERN: Problem-Solution

STRATEGY: To develop an understanding of prosecutorial discretion, students must experience the concept in operation. The case study provides the vehicle for such an experience. In analyzing the case, three problem-solving activities are necessary. First, the students must first develop a list of relevant facts. Second, students will be given a list of viable options available to the commander as possible solutions to the problem. Each option will be explained in the depth necessary to ensure each student comprehends the options. Third, students will determine the feasibility of each option based upon relevant facts and the prosecutorial discretion factors involved. This sequence allows students to see each option and why each option might be used. Because each option could be used, depending on one’s view of the facts, the discretion notion is depicted. The three main points will be introduced and reinforced at various points in the lesson, including the final summary. Using support material from my summary of the case study, the generalization will be established that prosecutorial discretion provides commanders with viable alternatives for resolving disciplinary problems.

LESSON OUTLINE

MP 1. Facts relevant to the “Nature of the offense and offender” in the situation

MP 2. Options available to the Commander (instructor provided)

MP 3. Prosecutorial burden/discretion factors most relevant to each option
PART II
TEACHING PLAN

Introduction

ATTENTION: (Rhetorical questions) Have you ever wondered why one person gets prosecuted for a crime while another does not, or why one person is prosecuted as a felon while another who commits the same offense suffers only a misdemeanor prosecution? Why is one person given a court-martial by a commander while another is given an Article 15 for the same offense?

The prosecutor, be it a military commander or a civilian district attorney, is exercising a concept known as prosecutorial discretion (PD).

Describe prosecutorial discretion.

Outline and explain prosecutorial discretion factors.

1. Nature of the offense.
2. Nature of the offender.
3. Prosecutorial burden.

MOTIVATION: If you become a commander, PD gives you options for resolving disciplinary problems.

If you are not the commander, your commander may ask you to recommend a form of disciplinary action for one of your subordinates. An understanding of PD will allow you to make recommendations based upon reason instead of emotion.

If you are the victim in the civilian world, the district attorney may ask you if you want to prosecute the case. This is a PD factor that both you and he or she must consider.

OVERVIEW: Ensure all students have copies of the case and have read it. (See case study, "What's Up Doc?" in this chapter.)

Reveal the analysis procedure to be used (use chalkboard). The students will:

1. Determine what facts are relevant to the situation.
2. Examine options available to the commander.
3. Discuss prosecutorial discretion factors most relevant to each option in seeking a solution to the problem.

Encourage all students to participate actively and to draw upon their wide range of experience.

TRANSITION: Now that you have had a chance to see where we are going in today's case, let's go to the first step in the analysis process and identify the important facts.
CASE STUDY ACTIVITIES:

MP 1. Outline facts relevant to the situation.

QUESTIONS
Lead-off Question (LOQ): What facts are pertinent to the offense?

Follow-up Question (FUQ): What factors, if any, aggravated the offense?

FUQ: What mitigating factors are present?

FUQ: What are the relevant factors concerning Major Stun himself?

FUQ: What are the factors relating to the offense?

FUQ: What factors relate to the Air Force?

INTERIM SUMMARY: (From chalkboard) Review facts relevant to the situation, (offense and offender).

TRANSITION: To this point we have established a list of the relevant facts bearing on this offense/offender. We can now examine options available to us.

MP 2. Explain options available to the commander. Go into depth required based upon perception of student understanding of each.

a. No punishment.
b. Oral reprimand.
c. Written reprimand.
d. Article 15.
e. Court-martial.

MP 3. Identify prosecutorial/burden discretion factors most relevant to each option.

QUESTIONS
Lead-off Question (LOQ): What are the arguments, if any, for doing nothing in this situation?

Follow-up Question (FUQ): What are the arguments against doing nothing?

FUQ: What are the arguments for a reprimand, oral or written?

FUQ: What are counter-arguments?

ANTICIPATED RESPONSES
45 days AWOL
Disobeyed CC order
Etc.

Mission requirement
Conduct toward Airman Jones

Mother’s illness
Remorse (apology)

Doctor, highly qualified
Otherwise clean record

Increase in case load at clinic
Airman Jones’ friends know of offense
Junior enlisted normally court-martialed

Shortage of doctors

Good record
Doctor shortage

Fairness
Morale of the troops
Serious offense

Some punishment
No serious, long-term effect

Too little punishment
Hurts morale
**FUQ: What are the arguments for an Article 15?**  
Meaningful punishment without destroying career  
Court-martial too drastic

**FUQ: Arguements against an Article 15?**  
Will hurt career (personnel office statement)  
Too light—field grade officer should be held to higher  
standards

**FUQ: What are arguments for a court-martial?**  
Serious offense  
Appropriate  
Effect on mission

**FUQ: Arguments against a court-martial?**  
Would result in disproportionate punishment—recall  
basically good record  
Extenuating circumstances

**INTERIM SUMMARY:** Summarize arguments students have made for and against each of the options available.

**TRANSITION:** Now that we have examined various possible solutions to the problem presented in the case, let’s review what we have done.

**Conclusion**

**FINAL SUMMARY:**

**MAIN POINTS/OBJECTIVE:** (Develop using student/instructor support material)

1. Facts relevant to the “Nature of the offense and offender.”.
2. Options available.
3. Prosecutorial burden/discretion factors.
4. PD provides commanders with viable alternatives for resolving disciplinary problems.
   a. Explain how they employed the concept of PD.
   b. Explain how utilization of PD factors opens up previously unconsidered options for the commander.
   c. Restate the lesson objective.

**REMOΤIVATION:** Reemphasize the importance of looking at all the factors. Illustrate with stories from personal experience. Emphasize the importance of a systematic approach and tell students that PD will simplify complex and often emotional decisions for them.

**CLOSURE:** Leave students with the thought that when they hear of a case which is being handled very differently from a case involving the same basic offense, this is not necessarily bad, but rather might be a proper exercise of PD and, in fact, an application of real justice.
CASE STUDY

Capt Dunlap

“What’s Up Doc?”

Major Stun is a highly qualified psychiatrist assigned to an Air Force hospital. On 1 October he receives word that his mother is gravely ill with cancer. He requests (and is granted) a 30-day emergency leave. At the end of this period Maj Stun requests an additional 15 days leave as his mother is not expected to live. However his commander denies the request because the base has a serious backlog of cases and mission effectiveness has started to suffer. The commander tells Maj Stun that he is urgently needed at the base and orders him to return immediately. Maj Stun grudgingly agrees and hangs up.

After stewing about the situation for several hours, Maj Stun calls the orderly room back and speaks with Airman Jones, who is the only person present. Stun tells Jones that he is not coming back until the situation with his mother is resolved. Jones tries to tell Stun that the commander will be furious, but Stun cuts him off: “If he needs a shrink so badly, he can just find himself another.” Jones relates this incident to his buddies in the barracks and predicts that nothing will be done. Jones himself recently received an Article 15 for being frequently late for work.

Maj Stun’s mother recovers. Shortly before Christmas he returns to the base and apologizes to the commander. Moreover, he offers to work the entire holiday period so that the other physicians can have the time off. He explains to the commander that he was distraught over his mother’s illness and promises not to repeat his misconduct.

The commander asks you for a recommendation as to what disciplinary action, if any, he should take. He notes that, except for this incident, Maj Stun has an excellent record and that the Air Force is critically short of doctors. The staff judge advocate advises that junior enlisted personnel ordinarily receive a court-martial for this offense. The personnel officer says that even an Article 15 would be disastrous for this officer’s career. The options are (1) do nothing, (2) oral reprimand, (3) written reprimand and establishment of an Unfavorable Information File, (4) Article 15 (maximum: $2,000 forfeiture), and (5) court-martial (maximum: confinement at hard labor 1 yr, dismissal).
CASE STUDY

PROSECUTORIAL DISCRETION

TEACHING NOTE

**MP 1.** Facts relevant to the “Nature of the offense and offender” in the situation.

**LOQ:** What facts are pertinent to the offense?
- 45 days AWOL
- Disobeyed CC order
- Etc.

**FUQ:** What factors, if any, aggravated the offense?
- Mission requirement
- Conduct toward Airman Jones

**FUQ:** What mitigating factors are present?
- Mother’s illness
- Remorse (apology)

**FUQ:** What are the relevant factors concerning Major Stun himself?
- Doctor, highly qualified
- Otherwise clean record

**FUQ:** What are the factors relating to the offense?
- Increase in case load at clinic
- Airman Jones’ friends know of offense
- Junior enlisted normally court-martialed

**FUQ:** What factors relate to the Air Force?
- Shortage of doctors

**MP 2.** Options available to the Commander.

a. No punishment.
b. Oral reprimand.
c. Written reprimand.
d. Article 15.
e. Court-martial.
TEACHING NOTE

MP 3. Prosecutor/burden discretion factors most relevant to each option.

LOQ: What are the arguments, if any, for doing nothing in this situation?
- Good record
- Doctor shortage

FUQ: What are the arguments against doing nothing?
- Fairness
- Morale of the troops
- Serious offense

FUQ: What are the arguments for a reprimand, oral or written?
- Some punishment
- No serious, long-term effect

FUQ: What are counter-arguments?
- Too little punishment
- Hurts morale

FUQ: What are the arguments for an Article 15?
- Meaningful punishment without destroying career
- Court-martial too drastic

FUQ: Arguments against an Article 15?
- Will hurt career (personnel office statement)
- Too light—field grade officer should be held to higher standards

FUQ: What are arguments for a court-martial?
- Serious offense
- Appropriate
- Effect on mission

FUQ: Arguments against a court-martial?
- Would result in disproportionate punishment—recall basically good record
- Extenuating circumstances
ITEM 1

LESSON OBJECTIVE: Comprehend that PD provides commanders with viable alternatives for resolving disciplinary problems.

SAMPLE OF BEHAVIOR: Predict the effect of providing commanders with viable alternatives for resolving disciplinary problems through PD.

CRITERION OBJECTIVE: Without the use of reference materials and given three possible answers, select the answer that is most likely to occur based on classroom discussion and the text material.

QUESTION: The proper application of PD by a commander will MOST LIKELY cause the number of prosecutions to:

a. Increase
b. Decrease
c. remain the same

KEY: c

The number of prosecutions remains unchanged. The number of Articles 15 will probably decrease.

ITEM 2

LESSON OBJECTIVE: Comprehend that PD provides commanders with viable alternatives for resolving disciplinary problems.

SAMPLE OF BEHAVIOR: Distinguish among PD factors which provide commanders with viable alternatives for resolving disciplinary problems.

CRITERION OBJECTIVE: Given a scenario containing an offense that could require an Article 15, identify those factors that could be used by a commander who chooses to use PD. At least two factors should be identified for both (a) the nature of the offense and (b) the nature of the offender.

QUESTION: (Short Answer)

Airman James Jones is a 19-year-old computer programmer. He is caught smoking marijuana while on duty in the computer center. The base has a serious drug problem. Airman Jones has two dependents and this is his first offense.

You have learned three groups of PD factors. Using the scenario above, classify pertinent PD factors into the categories below. Then, in 100 words or less, tell why these two categories should be considered by commanders in resolving disciplinary problems.

a. Nature of the offense
b. Nature of the offender

KEY: Students should identify and distinguish the age/rank and prior clean record as factors relating to the “nature of the offender,” and the “on duty” status of the crime and the base-wide problem as factors relating to the “nature of the offense.”
“Nature of the offense” allows commanders to consider the overall impact of the individual’s offense. The “nature of the offender” allows commanders to give careful consideration to the person’s past record and current attitude.

ITEM 3

LESSON OBJECTIVE: Comprehend that PD provides commanders with viable alternatives for resolving disciplinary problems.

SAMPLE OF BEHAVIOR: Justify the use of PD in resolving disciplinary problems.

CRITERION OBJECTIVE: Given an essay question and without the use of reference materials, justify the use of PD by a commander. At least three key areas must be covered and they must be consistent with discussion during class.

QUESTION: (Essay)

In 400 words or less, justify the use of PD in resolving disciplinary problems. Partial credit will be given. One point will be deducted for each spelling error. The question is worth a total of 40 points.

KEY: Students should identify the three key areas of PD (nature of the offense, nature of the offender, and prosecutorial burden) and explain how a review of them and their subpoints will bring to light options not readily apparent in the disposition of cases.
STUDENT NAME: 
HOME/SCATTER SEMINAR ADVISORS: 
LESSON TITLE: Too Busy to Manage 
METHOD: Case Study 

AIDS/HANDOUTS: Case Study: Too Busy to Manage (attached), title chart, chalkboard, copies of case scenario 

PART IA 
COGNITIVE OBJECTIVE: TOOTLIFEST apply the concept of delegation of authority in management situations.

COGNITIVE SAMPLES OF BEHAVIOR: 
1. Given a problem situation involving mismanagement due to inadequate or improper “delegation of authority,” and several alternative management concepts, correctly identify that problem as one of mismanaging “delegation of authority.”
2. Given a problem situation involving inadequate or improper “delegation of authority,” propose a reasonable solution which is consistent with the facts and which is generally consistent with the concept of proper “delegation of authority.”
3. Given a real problem at HQ USAF (or at an experience level above that of the students), solve the problem through proper application of the concept “delegation of authority.”
4. Given a common management situation containing new elements as compared to the situation in which the concept was learned, demonstrate proper application of the concept “delegation of authority” in solving the problem.

AFFECTIVE OBJECTIVE: TOOTLIFEST value the benefits of “delegation of authority” in management situations.

AFFECTIVE SAMPLES OF BEHAVIOR: 
1. Habitually demonstrates, on the job, the appreciation for “delegation of authority” through its appropriate use.
2. Takes own time to counsel co-workers on how to properly delegate authority in management situations.
3. Independently initiates class discussions on the benefits of delegating authority in management situations.
PART IB

ORGANIZATIONAL PATTERN: Problem-Solution

STRATEGY: We’ll use the categories of “FACTS, ASSUMPTIONS, PROBLEMS, SOLUTIONS” to analyze the case, “Too Busy to Manage,” for this class of Air Command and Staff College (ACSC) students. However, any other logical arrangement of categories, e.g., “PROBLEMS, ALTERNATIVES, PRIORITIES, SELECTION,” can also be used with equally efficacious results. These students will have a wealth of experience in the problems of time management and will have studied this management initiative. Therefore, they will be at some end of the responding scale. The important thing for the instructor to keep in mind is that we want to present a workable framework for these students to improve their own management ability and to encourage them to help their subordinates work smarter when problems develop. Therefore, we want to convince them of the absolute benefit of taking time management seriously and encouraging others with whom they work to do the same. This can only be done if they see the intrinsic value of such a framework. In any systematic time management solution, the effect of Delegation of Authority will play a major role. And this is the theme we will develop most fully in the case. If students are to apply the principle of Delegation of Authority, they must first recognize the need for it. To uncover this insight, we will spend more time on identifying the problem(s) and resist jumping to hasty conclusions based on identifying symptoms. Therefore, I will ask some pointed questions and play the devil’s advocate to hone the students’ perspective by forcing them to justify their observations. From this point, identifying solutions, goals, options, or selections will be easy.

LESSON OUTLINE:

MP 1. Facts and Assumptions

MP 2. Problems

MP 3. Solutions
ATTENTION: Brief summary of management concepts covered during this block of instruction.

MOTIVATION: Cannot be applied universally without regard to the personnel, technology, or environment in which they are applied. However, the concepts can provide you with general guidelines for managing an organization. But it is one thing to have some understanding of the concepts and another to be able to apply them in realistic situations. Today we will practice applying one or more of these concepts in a realistic situation. You will have an opportunity to practice your management skills in the safety of the classroom environment as we examine the case “Too Busy to Manage.”

OVERVIEW: Ensure that all students have copies of today's case and have had time to read it. (Tell them they may write or mark on the handout.) Reveal the process that will be used to solve today's case. (Refer to chalkboard.) Encourage all students to participate actively and contribute to the best possible solution of the problem based upon their wide range of past experience. Assign role: You are the Director of Logistics, a colonel with 20 years in supply and maintenance, who is Major Beeman’s immediate supervisor. You just became aware of what’s happening in supply. What action will you take to correct the situation and retain Major Beeman as Chief of Supply (as stated in ROTC casebook)?

TRANSITION: Now that we see where we’re going in today’s case, let’s separate the facts from the assumptions as our first step in the process. (See case study “Too Busy To Manage” in this chapter.)

Body

MP 1. Ask questions to get class to separate the facts from the assumptions using past management training and experience.

Leadoff Questions and Follow-up Questions

1. What are some of the facts in this case?
2. What assumptions can we make about Major Beeman’s personality?
3. What assumptions can be made about the immediate future of the 927th Supply Squadron?
4. Why is it important to know Major Beeman’s career background?
5. What facts do we know about the other squadron personnel?
6. Is it a fact or an assumption that Major Beeman’s management techniques are ineffective? Why?

INTERIM SUMMARY: Instructor will summarize those facts and assumptions selected by the class and recorded on the chalkboard.

TRANSITION: Obviously we have been able to differentiate between facts and assumptions in the case; at this time, let’s go on to our second step and attempt to clearly define the problem(s) in this case.

MP 2. Ask questions to get class to define problems in the case by using group problem solving techniques.

1. Why is it important for you, as Director of Logistics, to define clearly the specific problem before taking any action?
2. What are some of the underlying problems involved in this particular situation?
3. Who is causing the biggest problem in this case? How?
4. Which problems are immediate and which are long-range?
5. Why is it important to work on the most pressing immediate problems first?

INTERIM SUMMARY: Instructor will summarize group’s discussion of immediate and long-range problems then read final problem definition as recorded on chalkboard.
TRANSITION: Now that we have determined the basic problem in the case, let’s decide on the best course of action to take in solving the problem(s). (We can redefine the problem if necessary.)

MP 3. Ask questions to get class to reach the best possible group solution to the problems by using individual creativity.

1. How can your past experiences aid you in solving this problem?
2. How can the 927th Supply Squadron be run more smoothly without replacing the squadron commander?
3. How might advanced management training effect Major Beeman’s management techniques?
4. What concepts of management does one see being violated in this case?
5. Which of these violations has the most serious consequences?
6. Why is it important to delegate authority within a unit?
7. How might Major Beeman’s self-concept play an important part in his management techniques?
8. Why is it important for intermediate level managers to feel needed?

(Instructor will read final solution(s) recorded on chalkboard.)

TRANSITION: Now that we have reached a viable solution in the “Too Busy to Manage” case, let’s go back and see how we pooled our past experience and decided that the principle of delegation of authority was being violated by Major Beeman.

Conclusion

FINAL SUMMARY:

Apply the concept of “delegation of authority” in management situations. Thank students for their participation in the case and put them back into their role as AIS students. Summarize the case with emphasis on how the concept of “delegation of authority” was violated. Show how the student inputs would apply to the concept of “delegation of authority.” Use some new examples of “delegation of authority” from ROTC management text and personal experience.

REMOtIVATION: Remotivate the students by showing them several applications of the concept of "delegation of authority" as an Air Force leader, classroom instructor, and as a parent.

SAMPLE CASE 3

Too Busy to Manage  Major John Beeman is 33 years old. He has been in the Air Force for the past twelve years. He is married and has three daughters.

The major was assigned to the 927th Supply Squadron, Minot AFB, in August of last year. His specific duty title was Chief of Supply. As the Chief of Supply he was responsible for the complete function of supply at his base. He had a fully manned organization with 7 officers and 68 enlisted men. There were no personnel problems in the squadron. All the airmen were trained or in training to their highest authorized level. The major had spent his entire career in the supply field, but this was his first assignment as Chief of Supply.

Upon arrival, Major Beeman quickly made it known that he was the boss. He said that he was accustomed to working very hard and that was the way he expected every man in his organization to work. No one thought too much about the major’s getting to work ahead of everyone, or that he often worked beyond the end of a normal duty day. Often, however, he would work through his lunch hour as well. Sometimes the lights were still on in the major’s office late at night. It was not unusual to find him working on weekends. At first everyone thought he was simply trying to learn his new job, but after a few months it became apparent that he worked so much because he did not trust anyone else. He felt he could do the job faster and better than his subordinates, and that is exactly what he was doing.

His staff meetings were generally conducted along the lines of an inquisition. He would ask questions from his officers that required more detail to answer than they were able to give on the spot. Often, he would ask questions, then answer his own question before anyone had a chance to respond. He seemed perturbed that he knew more about the detailed functioning of the organization than his officers did.

Problems began to arise. Some of the officers felt that if the major wanted to run the whole show by himself, then they were not needed. They began taking longer lunch hours, and leaving early to play golf.

Most of the enlisted men thought the major was some kind of genius because of his detailed, technical knowledge. Soon the ranking noncommissioned officers (NCOs) also felt they were not needed on the job either. The organization began to fall apart.
The following scenario will pertain to questions 1 and 2:

Scenario: Lieutenant Joe Blitzfield was assigned to the 5th FIS located at Williams AFB, Arizona, 6 months ago. This was his first base assignment after completing tech school. He had graduated with honors from a school which was oriented towards management skills. He was assigned to the 5th FIS Avionics Division. Lt Blitzfield performed well in his job and was a real go-getter. After only three months he proposed a plan to Capt Comstock, his supervisor. Since the 5th FIS had recently gained access to a computer located on the base, the Lieutenant proposed a way to use the computer to increase efficiency within his section. Capt Comstock gave the OK to the plan and it was initiated two weeks later.

At first things went great. The avionics section he was in charge of saw an improvement in aircraft turnaround statistics, which showed the plan had merit. But then things began to go downhill. Essentially the plan had eliminated most of the duties of MSgt Loney. MSgt Loney was NCOIC of Avionics and was not even aware of the computer plan being formulated before it was put into action. He had six months remaining before retirement and until recently had worked hard at his job. After the computer started doing most of his work for him, he developed a poor attitude saying all he wanted to do was get out. This attitude affected the other enlisted workers. They developed similar attitudes doing only the minimum amount of work.

**ITEM 1**

**LESSON OBJECTIVE:** Apply the principle of “delegation of authority” in management situations.

**SAMPLE OF BEHAVIOR/CRITERION OBJECTIVE:** Given a problem situation involving mismanagement due to inadequate or improper “delegation of authority” and several alternative management principles, correctly identify that problem as one of mismanaging “delegation of authority.”

**QUESTION:** Based on your understanding of management principles, which of the following principles most clearly appears to have been violated in the problem situation described above?

a. delegation of authority  
b. span of control  
c. unity of command  
d. another principle not listed above

**KEY:** a

**ITEM 2**

**LESSON OBJECTIVE:** Apply the principle of “delegation of authority” in management situations.

**SAMPLE OF BEHAVIOR/CRITERION OBJECTIVE:** Given a problem situation involving inadequate or improper “delegation of authority,” propose a reasonable solution which is consistent with the facts and which is generally consistent with the concept of “proper delegation of authority.”

**QUESTION:** In 300 words or less, propose a reasonable solution to the problem faced by Capt Comstock and Lt Blitzfield which is consistent with the facts and the proper application of management principles. Partial credit may be awarded. Two points will be deducted for each spelling error. The question is worth 20 points.
KEY: Delegation of authority means that a superior has a clear understanding with his subordinates, and that the subordinate has the power to make decisions and to act within explicit limits without checking with the superior. Proper application of the principle of delegation of authority would enable the superior, Lt Blitzfield, to share his responsibility with a trusted subordinate, MSgt Loney. Line authority is the backbone of hierarchy and must be respected. Lt Blitzfield must delegate authority to MSgt Loney commensurate with his position responsibilities as NCOIC of Avionics. With proper delegation of authority, MSgt Loney would assume definite responsibilities for the project and be accountable to Lt Blitzfield for his decisions and actions. These ideas must be developed and expanded upon for the 20 points.
SAMPLE LESSON PLAN FOR TEACHING INTERVIEW METHOD

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART I
COVER SHEET

STUDENT NAME: Sgt Robinson
HOME/SCATTER SEMINAR ADVISORS:
LESSON TITLE: Laws of Warfare
METHOD: Teaching Interview
REFERENCES: AFP 110-31

AIDS AND HANDOUTS: Overview Chart

PART IA

COGNITIVE OBJECTIVES: TOOTLIFEST comprehend that adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.

COGNITIVE SAMPLES OF BEHAVIOR:

1. Justify why adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.
2. Predict the effect on conflict if the US did not adhere to the laws of warfare.
3. Estimate the consequences on conflict if the enemy did not adhere to the laws of warfare.
4. Given a scenario, explain how adherence to laws of warfare could prevent the conflict from escalating to uncontrollable death and destruction.

AFFECTIVE OBJECTIVE: TOOTLIFEST respond positively to the principle that adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.

AFFECTIVE SAMPLES OF BEHAVIOR:

1. Unhesitatingly predicts the probable outcomes in war situations resulting from violations of the laws of war.
2. Openly explains the rationale and benefits of the laws of war using examples of actual past conflicts.
3. Actively tries to persuade others who mock the utility of the laws of war in preventing uncontrollable death and destruction.
ORGANIZATIONAL PATTERN: Topical

STRATEGY: My primary purpose is not to study the laws of war in depth but to sensitize the students to the very real and important benefits we derive from adhering to them. Consequently, we will simply look at a sample of the laws and talk about their past and potential benefits during wartime. I’ve decided to use the teaching interview to heighten the affective impact of the lesson. I’ve invited an interviewee who works intimately on questions related to the law of armed conflict (laws of war). First, the guest will talk about the requirements governing the status of combatants and noncombatants, and civilians and how these requirements protect human life during periods of conflict. Since this point deals with human life, it should be of great interest to the students and, consequently, draw students’ attention to the interview more forcefully. Our focus will then shift to objects. We’ll develop rules of aerial bombardment so students can see why rules, valid targets, unacceptable targets and location problems are such a concern in warfare. Once students understand how adherence to these requirements and rules prevents indiscriminate killing and bombing of targets, I will question the interviewee on how the laws as a whole prevent conflicts from escalating. The inductive approach was selected to more easily understand and this complicated subject. In looking at the laws as a whole we will address the reasons for following the laws, the consequences of non-adherence, the effect of bombing cities and disobeying orders and finally how will adherence to the laws keep even the smallest war from resulting in the end of civilization. I take this line of questioning so that the students can deduce the conclusion about the benefits of following the law for their own good as well as the good of others. Since I will be asking all the questions of the guest during the body of the class, I will allow students to ask questions at the end, but before the conclusion of the lesson. After student questioning is completed, I will do a final summary and conclusion based upon my questions during the body and their questions during the Q & A. This final step will enhance the likelihood of the students identifying with this lesson. I want to make sure that their concerns as well as mine are noted and emphasized.

LESSON OUTLINE

MP 1. Adherence to requirements governing the status of parties prevents the indiscriminate killing of combatants, noncombatants, and civilians.
   a. Combatants
   b. Noncombatants
   c. Civilians

MP 2. Adherence to rules of aerial bombardment prevents the indiscriminate bombing of possible targets in an enemy nation.
   a. Rules dictate targets
   b. Valid targets
   c. Unacceptable targets
   d. Location problems

MP 3. Adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.
   a. Reasons for following laws of warfare
   b. Consequences of nonadherence
   c. Effect of bombing cities
   d. Disobeying orders
   e. Civilized warfare
ATTENTION: Some war criminals say that they believed it was their duty to kill everyone in their operational area, including women and children, because their superiors desired it.

The most common defense at Nuremburg was “I was following orders.”

North Vietnam threatened to kill captured pilots because they were not combatants in a declared war.

MOTIVATION: It is obvious that crew members would have an interest in the laws of warfare—their lives could depend upon it. It’s not so obvious for the rest of us support personnel. But I look at DESERT STORM, how many surprise deployments were there? Bottom line is that it’s too late to learn it all at the time. We all must be familiar with the basics in advance.

INTRODUCTION OF GUEST: Maj Nick Grebeldinger

Education: Juris Doctorate Degree, Duquesne University
LLM (Int. Law), George Washington University in D.C.
Graduate of Armed Forces Staff College

Background: 3 yrs on Air Staff in Int. Law Division of OTJAG
2 yrs in USAFE as member of Int. Law Directorate
2 yrs at JAG School
- Advised TAC, MAC, AFLC, and AU on laws of warfare training
- Lectured on laws of warfare at AWC, ACSC, and SOS

OVERVIEW:
1. Requirements governing the status of parties
2. Rules of aerial bombardment
3. Importance of following the laws of warfare

DEFINE TERMS

ANNOUNCE QUESTION-AND-ANSWER PERIOD

TRANSITION: Before entering the discussion, Maj Grebeldinger, why is it that you’ve channeled so much of your energies into this area of study?

Body

MP 1 Adherence to requirements governing the status of parties prevents the indiscriminate killing of combatants, noncombatants, and civilians.
**QUESTIONS**

**Lead-off Question (LOQ):** Why is it that a squad of soldiers operating behind the lines in civilian clothes can be shot as spies?

**Follow-up Question (FUQ):** What is the status of an escaping POW?

**FUQ:** How can a surrendering airman not resist when the enemy is approaching and the odds look better than when he surrendered?

**FUQ:** Do those in noncombatant status differ?

**FUQ:** In what conditions could civilians fight?

**INTERIM SUMMARY:** Summarize comments as they relate to how these requirements prevent indiscriminate killing.

**TRANSITION:** We have seen how adherence to requirements governing the status of parties prevents the indiscriminate killing of human beings. This action helps prevent conflicts from escalating. Now, let’s turn from people to objects as we examine target selection under the rules of aerial bombardment.

**MP 2.** Adherence to rules of aerial bombardment prevents the indiscriminate bombing of possible targets in an enemy nation.

**LUQ:** How do the rules of aerial bombardment affect the decision on targets?

**FUQ:** What would be the situation of targeting the capital of an enemy country with a nuclear weapon under the laws of warfare?

**FUQ:** Why is it that our enemies cannot target downtown Montgomery?

**FUQ:** What are some examples of targets that may be targeted and those that may not?
FUQ: How could we attack a factory if it’s next to a hospital?  
* Precision bombing or military necessity
* 
* 
*

INTERIM SUMMARY: Summarize comments as they relate to the prevention of indiscriminate bombing of targets.

TRANSITION: We have learned some basic rules and how they are applied to prevent the indiscriminate bombing of targets. Now let's find out what this means to us.

MP 3. Adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.

LOQ: Everyone knows the enemy doesn’t follow the laws of warfare—why should we?  
* Court marial
* War crime trial
* You as a POW
* 
* 
*

FUQ: How can adherence to laws of warfare preclude escalation to uncontrollable death and destruction?  
* Play game or get “nuked”
* 
* 
*

FUQ: Why would it not be a good idea to bomb their cities to “bring them to their knees?”  
* Sometimes unites enemy
* 
* 
*

FUQ: What if I am ordered to disobey the laws of warfare, such as attack a civilian target … what are my choices?  
* Refuse, but be right
* 
* 
*

FUQ: How will adherence to the laws of warfare keep even the smallest war from resulting in the end of civilization as we know it?  
* “Civilized” warfare
* 
* 
*

TRANSITION: In adhering to the laws of a good teaching interview, I would like to now offer an opportunity for you (the students) to ask Maj Grebeldinger any questions you may have.

QUESTION AND ANSWER SESSION:

Conclusion

FINAL SUMMARY:  
Summarize relevant material from Q & A session  
Summarize MP 3  
Review MP 2  
Review MP 1  
Restate lesson objective

REMTIVATION: In time of peace it is hard to get excited about the laws of warfare. However, now is the time for us to prepare. If war comes we will be too busy to take time. Our country cannot tolerate war criminals. You can't afford to be the next war criminal or have one work for you.
CLOSURE: Thank you, Maj Grebeldinger.
ITEM 1

LESSON OBJECTIVE: TOOTLIFEST comprehend that adherence to laws of warfare prevents conflicts from escalating to uncontrollable death, and destruction.

SAMPLE OF BEHAVIOR: Predict the effect on conflict if the US did not adhere to the laws of warfare.

CRITERION OBJECTIVE: Given several predictions resulting from the US not adhering to the laws of war and without the use of references, select the most likely response to such action consistent with the class text and seminar discussions.

QUESTION: If the US elected NOT to adhere to the laws of war, what would be the MOST LIKELY effect?

a. The US public would be behind us because “all is fair in love and war.”
b. There would be instant diplomatic, economic, and military reprisal by other nations.
c. Our overseas trade would suffer because such action is not consistent with the principles of capitalism.

KEY: b

RATIONALE: (b) is correct because this answer covers all of the areas of retribution open to other nations (consistent with text and discussion).

ITEM 2

LESSON OBJECTIVE: TOOTLIFEST comprehend that adherence to laws of warfare prevents conflicts from escalating to uncontrollable death, and destruction.

SAMPLE OF BEHAVIOR: Justify why adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.

CRITERION OBJECTIVE: Without the use of text or references, write a justification of the principle of adhering to the laws of warfare to prevent conflicts from escalating to uncontrollable death and destruction. A complete answer will include information on: (1) indiscriminate killing of noncombatants, (2) selection of military targets, (3) expectation theory, (4) escalation of the conflict.

QUESTION: In 250 words or less, justify why adherence to laws of warfare prevents conflicts from escalating to uncontrollable death and destruction. Question is worth 40 points, and partial credit will be given. One point will be deducted for each spelling error.

KEY: A complete answer must include:
10 Points—Adherence to requirements governing the status of parties prevents the indiscriminate killing of combatants, noncombatants, and civilians.
10 Points—Adherence to rules of aerial bombardment prevents the indiscriminate bombing of possible targets in an enemy nation.
10 Points—Students should include discussion on enforcement powers of the UCMJ (Court Marital), national and international law (war crime trials), and the expectation theory (what you would expect as a POW),
10 Points—How all of the above leads to the fact that adherence to the laws of warfare prevents conflicts from escalating to uncontrollable death and destruction.

Partial credit will be given with a maximum possible 40 points.
SAMPLE LESSON PLAN FOR DEMONSTRATION-PERFORMANCE METHOD

ACADEMIC INSTRUCTOR SCHOOL
Maxwell Air Force Base, Alabama

PART IA
COVER SHEET—DEMONSTRATION-PERFORMANCE
WITH PROBLEM SOLVING EVALUATION INSTRUMENT

STUDENT NAME: Capt Stall
HOME/SCATTER SEMINAR ADVISORS:
LESSON TITLE: Computing T-37 Landing Distance
METHOD: Demonstration-Performance
REFERENCES: T.O. IT-37B-1


ORGANIZATIONAL PATTERN: Sequential

STRATEGY: The lesson logically follows a sequential order and shows progression from one step to the next. The explanation and demonstration phases are combined because of the simplicity of the task. Start the lesson by defining landing distance, then explain the normal landing distance chart, its scale, interpolation factors and what data is needed. This will give the student a basic knowledge of the chart and the terms used for the procedure. Next using the task steps and overhead chart explain and demonstrate how to compute normal T-37 landing distance using temperature, pressure altitude, gross weight, and headwind/tailwind components. Ensure all students can see the chart and are able to follow along during the demonstration. Upon completion of the explanation/demonstration phase, begin the performance/supervision. During this phase the instructor will have the students perform the task steps while he/she reads the task steps to give the students hands-on practice under controlled conditions. After the students have completed the task steps with instructor assistance they will practice the task steps on their own at least one more time duplicating examination conditions. This will be done to give the students confidence in performing the procedure with the required accuracy within time constraints. For the evaluation phase the instructor will have the students compute the normal T-37 landing distance for four problems, ensuring that each student comprehends and can perform the procedure.

CRITERION-OBJECTIVE:

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<tr>
<th>PERFORMANCE/BEHAVIOR(S)</th>
<th>CONDITION(S)</th>
<th>STANDARD(S)</th>
</tr>
</thead>
</table>
| Compute T-37 landing distance | 1. Normal landing distance chart  
2. Four problems with each given  
   a. Temperature  
   b. Pressure altitude  
   c. Gross weight  
   d. Headwind/tailwind component | 1. Within +/- 200 feet  
2. Three out of four problems correct within 6 minutes |
PART IB

**AFFECTIVE OBJECTIVE:** TOOTLIFEST respond enthusiastically to the opportunity to compute T-37 landing distances.

**AFFECTIVE SAMPLES OF BEHAVIORS:**

1. Willingly computes T-37 landing distance.
2. Courageously defends the need to accurately compute T-37 landing distance.
3. Animatedly gives examples of the benefits derived from accurately computing T-37 landing distance.

**TASK STEPS** Enter normal landing distance chart with given data in the following order:

1. Temperature
2. Pressure altitude
3. Gross weight
4. Headwind/tailwind component
5. Read ground roll distance from graph
ACADEMIC INSTRUCTOR SCHOOL  
Maxwell Air Force Base, Alabama  

PART II  
TEACHING PLAN  

Introduction  

ATTENTION: Relate aircraft accident in which a C-141 ran off the end of the runway.  This could have been avoided by correctly computing the landing distance.  

MOTIVATION: Tell students how landing distance can affect them (any aircraft, plus future application).  

OVERVIEW: Explain what will be learned.  Explain how the lesson will proceed.  I’ll define landing distance and explain the normal landing distance chart.  Then I’ll demonstrate how to solve for landing distance.  The students will practice the procedure, at least once with my supervision and at least once with as little help as possible.  I’ll then evaluate the performance of each student IAW the standards.  I’ll end the lesson with a brief conclusion.  

TRANSITION: Now that we can see how today’s lesson on computing T-37 landing distances will proceed we’ll being by explaining some terms  

Body  

MP 1. EXPLANATION/Demonstration: Define landing distance.  Explain the normal (8 minutes) landing distance chart to include the scale and interpolation.  Ensure students can see demonstration and encourage questions.  Demonstrate the procedure using the task step (twice: 1st, \( \circ C \) and headwind; 2nd \( \circ F \) and tailwind): Enter normal landing distance chart with given data in the following order:  
1. Temperature  
2. pressure altitude  
3. gross weight  
4. headwind-tailwind component  
5. read ground roll distance from graph  

TRANSITION: Applying the data to the chart is easy, isn’t it?  Now it’s time for you to practice, first we’ll run through one together, then you’ll get to practice on your own.  

MP 2. PERFORMANCE-SUPERVISION (15 minutes): Review standards.  Hand out chart and practice problems.  Remind students to use a pencil, to make small tick marks, and to work as accurately as possible.  Explain that they should follow the procedure on the chart to work the practice problems.  Encourage students to ask questions.  Check progress of each student continually so they develop skill proficiency within acceptable standards.  Reteach any area(s) of difficulty to the class as they go along.  

TRANSITION:  I’ve explained and shown you how to compute landing distances, you’ve had a chance to practice a couple of times, now it’s time to check and see if you can do this without any help, to time and accuracy standards.  But before I give you the problems to solve, let’s run through the task steps and standards one more time.  

INTERIM SUMMARY: Review all task steps and standards.  Verify students are ready for evaluation.  

TRANSITION: Now that everyone understands the task steps and standards, let’s get on with the evaluation.  

MP 3. EVALUATION (6 minutes): Review procedure again from the chart.  Reemphasize standards of acceptable performance including time available.  Prepare area for evaluation by removing the task step chart and practice problem sheets, and by handing out the evaluation problems.  Ask students to work the three problems IAW conditions and standards specified.  Terminate evaluation after 6 minutes.  Evaluate each student’s performance and tactfully reveal results.  Record results for use in reteaching any area(s) of difficulty in the summary.
TRANSITION: I explained the task, showed you how to perform it, let you practice and finally evaluated you on the process. You all did well, let’s look at how it went.

Conclusion

SUMMARY: Review lessons with emphasis on any weak area(s).

REMOTIVATION: Remind them that landing distance will be an important consideration in any aircraft they fly.

CLOSURE: Remember what we have gone over today. We will use it as a starting point tomorrow to explore a couple of new areas. See you in class tomorrow.
### PART III
MULTI-STUDENT PROCESS-PRODUCT EVALUATION FOR PROBLEM SOLVING EVALUATION

<table>
<thead>
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<th>Standards</th>
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<tbody>
<tr>
<td>3 of 4 problems correct to +/- 200 feet</td>
</tr>
<tr>
<td>Problem #1</td>
</tr>
<tr>
<td>Problem #2</td>
</tr>
<tr>
<td>Problem #3</td>
</tr>
<tr>
<td>Problem #4</td>
</tr>
<tr>
<td>Within 6 minutes</td>
</tr>
</tbody>
</table>

**Evaluator:** ____________________

**Evaluator Comments** (weak areas, things to reteach, etc.):
STUDENT NAME: Capt Jensen
HOME/SCATTER SEMINAR ADVISORS:
LESSON TITLE: Lift latent fingerprints
METHOD: Demonstration-Performance


ORGANIZATIONAL PATTERN: Sequential

STRATEGY: I selected the sequential pattern because it is a logical flow for the lesson and helps the students to see the task as it should be performed. Begin by explaining what materials will be used for the process and run through the task steps involved enabling the students to see everything as you explain it. Next demonstrate the process of lifting latent fingerprints using the materials and task steps. Show them the samples of good and bad fingerprints and how to avoid lifting bad samples. Ensure that all students can see and have the opportunity to ask questions during this phase. This demonstration phase shows the students exactly how to perform the task. Allow the students to then practice the process at least three times while you supervise their performance using the materials and document protectors which contain fingerprints. Provide assistance and feedback on their progress as they practice. For the final practice you must simulate evaluation conditions, and ensure the students understand it as such. Review the task steps and standards one additional time. Finally pass out the new materials and evaluate each student on lifting latent fingerprints from the document protectors. Use a time measuring device and the product scale to compare each student’s result to the standard. This ensures that the students know how to perform the process and can in-fact produce a suitable set of fingerprints. Reveal the results of the evaluation in a positive manner to end the lesson on a high note.

<table>
<thead>
<tr>
<th>PERFORMANCE/BEHAVIOR(S)</th>
<th>CONDITION(S)</th>
<th>STANDARD(S)</th>
</tr>
</thead>
</table>
| Lift a latent fingerprint | 1. Document protector with latent prints  
2. Brush  
3. Hinge fingerprint lifter  
4. A smooth nonporous surface | 1. Lift must have at least 12 distinguishable ridges  
2. Must be accomplished in 4 minutes or less |
PART IB

AFFECTIVE OBJECTIVE: TOOTLIFEST respond seriously to learning the techniques for lifting latent fingerprints.

AFFECTIVE SAMPLES OF BEHAVIORS:

1. Willingly lifts latent fingerprints.
2. Practices lifting latent fingerprints on one’s own time.
3. Attentively listens to the explanations of how to lift latent fingerprints.

TASK STEPS:

1. Remove brush from tube and open powder container.
2. Dip brush into powder to obtain very small amount of powder on brush.
3. Brush surface of latent with gentle circular motion until fingerprint becomes clear and all excess powder is removed.
4. Pick up hinge lifter and hold in left hand so the words “hinge lifter” face you and are at the top.
5. Flip hinge up or open with right thumb and forefinger so the white paper is farthest away from you and the plastic is closest to you.
6. Peel back plastic protector at the top right side where the arrow is pointing toward.
7. Place tacky side of lifter over the powdered image very carefully with even motion from top to bottom.
8. Peel the lifter off the surface very carefully.
9. Close the lifter from the hinge outward by running thumb evenly down the length of the smooth plastic backing.
ATTENTION: Begin with story of people changing their appearance, and point out that one thing that cannot be changed is a fingerprint. Follow with a brief explanation of the meaning of fingerprints. Point out that every time we touch something we leave our fingerprints on the object we touched. Ask rhetorical question as to whether there is any value to fingerprints and latent fingerprints, and answer with appropriate examples.

MOTIVATION: Motivate by telling class that the skill of lifting latent fingerprints is basic to virtually every criminal investigation. It is a skill that they will be called upon to perform on a regular basis. They will not be able to discharge their duties effectively without this skill.

OVERVIEW: Explain that each student will learn how to develop and lift latent fingerprints utilizing the materials in front of them. The learning experience will occur as follows: The procedure will be explained by the instructor. The instructor will then demonstrate the procedure once. The students will then practice the procedure at least three times. Subsequent to this, an evaluation will be conducted wherein each student will develop and lift a latent fingerprint. The procedure must be accomplished within four minutes and will be judged for clearness and readability as set forth in the standard.

TRANSITION: Now that you can see where we’re going with this lesson, let’s start by looking at the materials we’ll need and what task steps you’ll use.

Body

MP 1. EXPLANATION: Describe the materials to be used emphasizing that the powder can be messy if used to excess. Explain procedure one time by going through the visual aid containing the task steps.

TRANSITION: I’ve told you how to lift fingerprints and showed you the materials, next I’ll show you how its done.

MP 2. DEMONSTRATION: Proceed with demonstration ensuring that all students can see the instructor. Encourage questions during the process. Go through the demonstration as set forth in the task steps. At the conclusion of the demonstration, show the product to class, and then place visual aid of good and bad fingerprint on the overhead projector. Carefully explain the visual standard of distinguishable ridges. Students must realize that acceptable prints will have ridges which appear clearly against the rest of the background and are not entirely black or smudged.

TRANSITION: I’ve lifted the fingerprints up to this point, now it’s your turn to try and I’ll help if you need me.

MP 3. PERFORMANCE-SUPERVISION: Place visual aid containing the task steps on the overhead projector; tell the students that they have the necessary materials, and that the document protector in front of them has a latent fingerprint within each square. Encourage questions and check student progress against the standard. After all students have practiced at least three times, terminate the practice and reteach any problem areas. Reinforce the standard of distinguishable ridges. Have students evaluate their work; then verify their judgments.

TRANSITION: We’re almost ready for you to lift some fingerprints for evaluation, but first let me review the standards and task steps.

INTERIM SUMMARY: Review task steps and standards. Verify that the students are ready for the evaluation.

TRANSITION: I can see you’re ready, so let’s see how you can do under evaluation.

MP 4. EVALUATION: Review procedure on task step aid and show aid with acceptable and unacceptable fingerprints. Remove all visual aids. Advise students they will have four minutes to complete the evaluation. Pass out new document
protector bearing latent fingerprint and tell students to begin. Terminate the evaluation after four minutes. Evaluate the result of each of the students and mark each result on the product scale. Provide each student with feedback.

TRANSITION: You all did a great job, and the reason you did so well is because you … (Summarize).

**Conclusion**

**SUMMARY:** Review task steps on the visual aid with emphasis on any weak areas.

**REMOVATION:** Remotivate by pointing out that the unique skill just learned should give each student a skill that will be used throughout their criminal investigation career.

**CLOSURE:** Close by saying that you hope none of them will ever have to give up a case because good fingerprints were unavailable.
### MULTI-STUDENT PROCESS-PRODUCT EVALUATION FOR FINAL PRODUCT EVALUATION

Evaluator: ____________________

<table>
<thead>
<tr>
<th>STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lift must have at least 12 distinguishable ridges.</td>
</tr>
<tr>
<td>2. Must be accomplished in 4 minutes or less.</td>
</tr>
</tbody>
</table>

### OVERALL GRADE

**EVALUATOR COMMENTS** (weak areas, things to reteach, etc.):
## CRITIQUE SHEET FOR SPEAKING SKILLS EXERCISE

<table>
<thead>
<tr>
<th>INTRODUCTION</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTENTION:</td>
<td>Omitted, unrelated to subject; offensive or vulgar</td>
<td>Appropriate; focused on subject</td>
<td>Stimulating; original, context clear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTIVATION:</td>
<td>Omitted; importance of subject not evident</td>
<td>Related to most listeners; established importance of subject (and expertise of speaker, if appropriate)</td>
<td>Compelling; appealed to needs of all</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVERVIEW:</td>
<td>Not Used. Confused, vague, or misleading; needed but not used.</td>
<td>Described organizational pattern and listeners’ roles; listed main points</td>
<td>Clear; prepared listeners fully.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BODY</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANIZATION:</td>
<td>Vague; hard to follow main ideas.</td>
<td>Main ideas related.</td>
<td>Enhanced meaning; logical progression.</td>
<td></td>
</tr>
<tr>
<td>SUPPORT:</td>
<td>Inadequate, insufficient, or extraneous; used out of context; source omitted or lacked credibility.</td>
<td>Credible facts and opinions.</td>
<td>Accurate, full exposition of ideas.</td>
<td></td>
</tr>
<tr>
<td>TRANSITIONS:</td>
<td>Omitted, vague abrupt; overuse of “okay” or other stock expressions.</td>
<td>Established continuity.</td>
<td>Easy, smooth, varied; related previous points to new points.</td>
<td></td>
</tr>
<tr>
<td>VISUAL AIDS</td>
<td>Not Used. Sloppy, unsupportive, busy; awkwardly used; misspelled words; needed but not used.</td>
<td>Supported or illustrated ideas.</td>
<td>Stimulating; well-timed; effectively translated verbal material into visual terms.</td>
<td></td>
</tr>
<tr>
<td>ACHIEVEMENT OF OBJECTIVE</td>
<td>Not met.</td>
<td>Partially met.</td>
<td>Fully met.</td>
<td></td>
</tr>
</tbody>
</table>

| CONCLUSION |  |  |  |  |
| SUMMARY:   | Omitted; incomplete; mechanical. | Reviewed essential ideas and relationships. | A synthesis; fostered retention of ideas and relationships. |  |
| REMOTIVATION: | Omitted; ineffective. | Reemphasized importance of subject to most listeners. | Challenging; capitalized on potential use of information for all. |  |
| CLOSURE:   | Omitted, inadequate, indefinite; abrupt. | Definite; appropriately tied to subject. | Positive impact; satisfying sense of completion. |  |
| COMMENTS:  |  |  |  |  |
FEEDBACK FOR STUDENT SPEAKING.

1. Make the speech feedback session as effective as possible by adjusting to the communication transaction. For example, when giving a student feedback, consider as wide a range of variables as possible—the type of speech, the maturity of the student, the setting for the session. What works in one situation may not work in another. Taking a transactional approach shows that you recognize the complexity of the feedback process. Specifically:
   a. Adapt feedback to the student. Human beings are sensitive to comments made about them, and the person is always more important than the performance. A word of praise or a word of disapproval will stay with the student for a long time. When reviewing a speech, try to separate the performance from the individual. Instead of saying “what you did wrong,” say “what you might have done to make the speech better,” or instead of “what you should have done,” say “the next time you speak you might…”
   b. Comment on both content and delivery. Often an instructor directs attention almost exclusively to delivery (focusing on such things as eye contact, movement, gestures, or voice) or on content alone (focusing on such things as subject, main points, or supporting material). To help the student develop totally as a speaker, be sure to consider both aspects.
   c. Encourage self-evaluation. Evaluation is often thought of as one-way communication where the instructor furnishes all of the ideas—a kind of self-action. The best feedback is more of an interaction or a transaction. Instead of saying “you did this” or “you didn’t seem to pay any attention to that,” a better approach might be to ask, “What do you think of your performance?” or “What could you do to improve?” In this way the student becomes involved with the instructor. If the student does not respond, the instructor might ask if there is any particular problem the student would like addressed. Remember the first goal is to help the student, not merely to give advice.
   d. Follow criticism with suggestions for improvement. It doesn’t help students to tell them their attention steps were ineffective or their organizations difficult to follow if a better approach is not suggested. Constructive feedback implies building, not tearing down.
   e. Mention as many favorable factors as you honestly can. Candid approval opens the recipient’s mind. Speaking is a terrifying experience for many people. Most speakers need affirmation for things they did well. If many negative factors and few positive ones are mentioned, the challenge to improve seems overwhelming.
   f. End comments on a note of praise. Repeat any outstanding item in the performance. If it is difficult to find items to praise, describe the progress the student is making. Undeserved praise makes the instructor less credible with the class and with the student being reviewed.

2. Make the speech feedback as effective as possible by avoiding these common traps:
   a. Avoid abstract general approval (or disapproval). Instructors who say only “That was a good speech” are not doing their job. Adjectives such as “wonderful” or “interesting” may make the student feel good for the moment, but they provide no motivation for growth or improvement. By the same reasoning, abstract expressions of disapproval such as “terrible” or “bad” also fall short of the objective as useful feedback.
   b. Avoid summarizing the speech. After a well-organized student has finished, the instructor may be tempted to enumerate the main points and summarize the support. While such comments may be interesting and show that the instructor was listening, the result is simply a short speech about a longer one. Summary is not feedback.
   c. Resist the impulse to extend the speaker’s subject. A student’s topic may be so arresting or controversial that you may want to take the floor yourself and present additional ideas. The student’s train of thought may legitimately stir up associated ideas, but free association is not feedback.
   d. Avoid calling attention to minor faults which will correct themselves automatically. Suggestions to the student for improvement should help make the speech better. Telling the student to speed up, move around more, quit playing with a paper clip, or to stop being so nervous have limited usefulness. Keep trivialities in proportion.
   e. Don’t criticize something that can’t be corrected. It does little good to criticize eye contact of a student who has crossed eyes or the accent of a person from another part of the country. If the problem is not correctable or the correction is not worth the effort and expense required, then don’t mention it.
# WRITING CRITIQUE SHEET
## CONTENT (What was written)

<table>
<thead>
<tr>
<th>STUDENT NAME ________________________________</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNMENT ......................................</td>
<td>GRADER</td>
</tr>
<tr>
<td><strong>INTRODUCTION</strong> (Preparing the Reader)</td>
<td></td>
</tr>
<tr>
<td>OPENING: Abrupt. Little or no attempt to provoke interest.</td>
<td>Related to reader’s common core of experience.</td>
</tr>
<tr>
<td><strong>BODY</strong> (Quality Thinking)</td>
<td></td>
</tr>
<tr>
<td>SUPPORT: Inadequate. Unrelated or irrelevant. Sketchy or repetitious. Excessive quotation or paraphrase to provide “filler.”.</td>
<td>Accurate, relevant, complete. No extraneous detail.</td>
</tr>
<tr>
<td><strong>CONCLUSION</strong> (Reinforcing the Discussion)</td>
<td></td>
</tr>
<tr>
<td>RESTATEMENT THESIS: Omitted or changed. Mechanical.</td>
<td>Restated so as to reinforce argument.</td>
</tr>
<tr>
<td>COMMENTS:</td>
<td></td>
</tr>
</tbody>
</table>
# STRUCTURE AND STYLE
## (How It Was Written)

### LOGICAL SEQUENCE (Getting the Point Across)

- **None evident.** Awkward for this topic. Ideas not in logical sequence.
- **Clear and appropriate.** Relationship between ideas precise and logical.
- **Arose naturally from topic and inseparable from it.** Strongly reinforced thesis.

### DEVELOPMENT

- **Vague or incomplete.** Imbalanced (some points developed, others not).
- **Clear, concise; facilitated the flow of argument.** All points supported.
- **Strategy amplified argument at every point.**

### USE OF SOURCES

- **Documentation omitted, partial or improper.** Evidence of plagiarism. Source used out of context or lacked credibility. Inaccurate or misleading. Wordy.
- **Credible and concise.** Appropriate quotation and paraphrase. Experts properly qualified.
- **Testimony strongly reinforced argument.** Ideal balance in types of proof or clarification support.

### TRANSITIONS

- **Missing, vague or abrupt.** Failed to show relation between points, paragraphs, or sentences. Mechanical.
- **Aided flow of argument.** Led reader smoothly through argument.
- **Unobtrusively controlled progress of argument.** Induced reader to accept conclusion as inevitable.

### READABLE WRITING (Using the Building Blocks Properly)

#### DICTION

- **Imprecise, vague, or unfamiliar.** Pretentious or trite. Deadheads, smothered verbs, non-words, gobbledygook. Overuse of jargon of acronyms. Impersonal or too abstract.
- **Clear, simple, concrete.** Personalized use of pronouns.
- **Refined use of precise diction at appropriate level of abstraction.** Effective use of plain talk.

#### SENTENCES

- **S-V-O pattern whenever possible.** Relaxed, informal style. Average length of 18 words. Consistent verb tense. Variety of length and pattern.
- **Direct, concise unpretentious.** Written to express, not to impress.

#### PARAGRAPHS

- **Poor focus.** No topic sentences or organizing idea. Too short/long. Topic sentences not related to thesis or did not advance argument. Unsupported.
- **Actively contributed to clarity and forcefulness of argument.** Effective alternation of level of abstraction. Average of four to six sentences.
- **Mature.** Ideal length and variety fully integrated into total argument.

### MECHANICS

<table>
<thead>
<tr>
<th>Format and Neatness</th>
<th>Poor</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proofreading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Documentation Style</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bibliography</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### COMMON ERRORS

- **Sentence Fragment (subject or predicate omitted)**
- **Run-on Sentence (two or more complete sentences joined by a comma or no punctuation)**
- **Mise of Semicolon or Colon**
- **Lack of Agreement between Subject and Verb**
- **Incorrect or Indefinite Pronoun Reference**
- **Possessives (no apostrophe) or Case Error**
- **Misspelled or Barbled Words**

**TOTAL ________**
FEEDBACK FOR STUDENT WRITING

1. Always keep in mind the purpose in giving feedback—to improve the student’s ability to write. No matter how much you would like to edit or rewrite the whole piece, don’t do it. There just isn’t time, and it is the student’s job to revise from your clear clues.

2. Strive for maximum objectivity. If you think something is wrong but you can’t put your finger on the exact problem, don’t bluff. Always try to be honest, fair, and unbiased.

3. Don’t arbitrarily impose your own personal style or preference on the student. The comment, “I like it better this way,” is not adequate justification for downgrading a student’s work. If you can follow this comment with a reason or a reference to the Guide for AF Writing, you are on much firmer ground. If what has been written communicates, but you wouldn’t have said it that way, let it be.

4. Judge the writing by its merit alone. You can’t measure the amount of effort or improvement.

5. Don’t give undue emphasis to mechanical details such as punctuation, capitalization, and grammar. They are important but less significant than the quality of the thought. Most mechanical details are not vital to the communication process; they merely assist in it. When usage is divided about mechanics or spelling, be flexible, but be sure the student has the same form throughout—encourage consistency.

6. Remember that good writing is hard work and that writers have a justifiable pride in their efforts. Don’t nitpick, wordsmith, or find fault just to be finding fault. Your feedback must be constructive to be acceptable. All writers have personal and social needs. If writing is loaded with errors, try to comment on the most important ones and deal with the others at a later time.

7. Approach the feedback job systematically.
   a. If you can physically separate the parts of the paper, do so. For ready reference, place the table of contents or overview on one side and the notes on another.
   b. Read the title or subject alone and see if you understand it. What expectation does the title arouse in the reader? Does the title give direction and a clue to content?
   c. On your first reading, attempt no corrections.
      (1) Instead, try to get a feel for the writer’s focus and direction, the organization of main points, and the quality of the support. See if the conclusions or recommendations are justified. In other words, see if the writing as a whole adds up before you worry too much about the mechanics. Every time you spot a mechanical error, however, make a check in the margin.

   (2) Before you read the paper the second time, jot down your impression of the paper’s overall quality apart from mechanical deficiencies. Does the writing communicate? If so, why? If not, what are the distractors?
   d. On the second reading, analyze why you made checkmarks and identify the errors in the margin. Rewrite one or two items, if necessary, to show what you mean by the corrections, but don’t get in the habit of a complete edit.

8. In grading writing, use your pencil as carefully as a surgeon’s scalpel.
   a. Don’t be sarcastic, cute, or cryptic. Don’t try to impress the student; try to improve the performance. When marking out words, be careful that you don’t cross out something necessary to the writer’s meaning.
   b. Make your marginal comments meaningful.
      (1) The comment “wordy” is not enough. Circle the unnecessary words and then add what is needed to complete the meaning.
      (2) The comment “awkward” is not helpful. Be specific. Tell the student, for example, that the sentence is awkward because of a dangling modifier or a misplaced adjective.

   (3) A question mark in the margin merely raises a question. If you find the sentence is confusing or ambiguous, point out where the confusion exists by asking a specific question or by suggesting a way to eliminate the confusion.

9. Don’t be so concerned with style that you ignore the quality of examples or support material. Make sure, for instance, that the writer has transitioned smoothly into each quotation, using phrases like the following: “As the Secretary of State wrote in Foreign Affairs in the spring of 1973,…”, “In 1942, a professor at Cornell summarized the problem as…”

10. Use the standard proofreader’s marks to avoid confusion.

| # | Shows a space between words. Used to close up. Deletes punctuation, a letters, or a word or phrase. |
| / | Transposes letters, phrases or words Adjusts paragraphing. |
| ^ | Downgrades a Capital to lower case. to raise lower case to a capital, use three underlines. |
|   | Use a ^ to insert material. |