



DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
3000 MARINE CORPS PENTAGON
WASHINGTON, D.C. 20350-3000

NAVMC 1553.1
C 469
27 OCT 2010

NAVMC 1553.1

From: Commandant of the Marine Corps
To: Distribution List

Subj: SYSTEMS APPROACH TO TRAINING USER'S GUIDE, (SHORT TITLE: SAT USERS GUIDE)

Ref: (a) MCO 1553.2B
(b) MCO 1553.3A

1. Purpose. Per references (a) and (b), this user's guide establishes the procedures and business rules for the application of the SAT process to formal school curriculum development and unit training management for the operating forces. The SAT User's Guide has been prepared as an extension of Marine Corps Training and Readiness Manuals. Developed in support of instructional theory and the Department of Defense MIL-STD-1379D (Military Training Programs), the SAT is the primary source of information for instructional program development and management for Marine Corps Formal Learning Centers (FLC) and formal courses of instruction collocated at other military service schools. It is also useful in assisting in the development of unit training programs in the Operating Forces.

2. Scope. The Systems Approach to Training, based on Instructional Systems Development (ISD), was established to manage the process of analyzing, designing, developing, implementing, and evaluating instructional programs. To illustrate the process of instructional program development from start to finish, the five phases of SAT are presented sequentially in this Guide. In actuality these phases overlap and are interrelated, and some procedures of each phase may be performed at various times throughout the life of an instructional program. The SAT is a dynamic flexible system that, when applied, provides for effective and efficient instruction.

3. Changes. As a result of the 2009 Formal School Management Symposium, this edition of the SAT has been significantly reduced in scope. Chapters on Adult Education, Formal School Administration, and Appendixes have moved to different documents. Adult Education will be captured in a higher level doctrinal publication and school administration and the appendixes will be located in reference (a). Recommendations for further improvements to this publication are always encouraged from commands; recommendations should be submitted to the Training Management and Evaluation Branch, Ground Training Division, TECOM.

4. Information. CG, TECOM will update the SAT as necessary to provide current and relevant procedures to commanders, and to ensure current best practices are available for use by Marine Corps FLCs. All questions pertaining to the Marine Corps Ground T&R Program, SAT process, and Unit Training Management should be directed to: Commanding General, TECOM (Ground Training Division, C 469), 1019 Elliot Road, Quantico, VA 22134.

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5. Command. This Directive is applicable to the Marine Corps Total Force.
6. Certification. Reviewed and approved this date.



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SAT USERS GUIDE

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SAT USERS GUIDE

CHAPTER 1

OVERVIEW

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SAT USERS GUIDE

CHAPTER 1

OVERVIEW

1000. INTRODUCTION. The mission of any instructional system is to determine instructional needs and priorities, develop effective and efficient solutions to meet these needs, implement these solutions in a competent manner, and assess the degree to which the outcomes of the system meet the specified needs. To achieve this in the most effective way possible, a systems approach to the process and procedures of instruction was developed. The resulting model, ISD, was later adopted by the Marine Corps as the Systems Approach to Training (SAT). Continued operations in Iraq and Afghanistan have caused all military services to advance their institutional approaches to training and education to better prepare Marines for the complex environment they find themselves operating in. In the future, the manual will be modified to be more inclusive of procedures that accommodate, and encourage, the cognitive and affective development of Marines, particularly as addressed in leader courses. The model, whether it is referred to as ISD, or SAT is a recognized standard governing the instructional process in the private sector and within the Department of Defense (DoD) and other government agencies.

1001. GOAL OF INSTRUCTION

a. The goal of Marine Corps instruction is to develop performance-based, criterion-referenced instruction that promotes student transfer of learning from the instructional setting to the job. For a learning objective to be achieved, instruction must be both effective and efficient. Instruction is effective when it teaches learning objectives based on job performance requirements and efficient when it makes the best use of resources.

b. SAT is a comprehensive yet flexible process that identifies what is performed on the job, what should be instructed, and how this instruction should be developed, implemented, and evaluated. This systematic approach ensures that what is being instructed are those tasks that are most critical to successful job performance. It also ensures that the instructional approach chosen is the most time and cost efficient. The SAT process further identifies standards of performance and learning objectives. This ensures that students are evaluated on their ability to meet these objectives and that instructional courses are evaluated based on whether or not they allow student mastery of these objectives. Finally, the SAT identifies needed revisions to instruction and allows these revisions to be made to improve instructional program effectiveness and efficiency.

1002. INTENT OF SAT

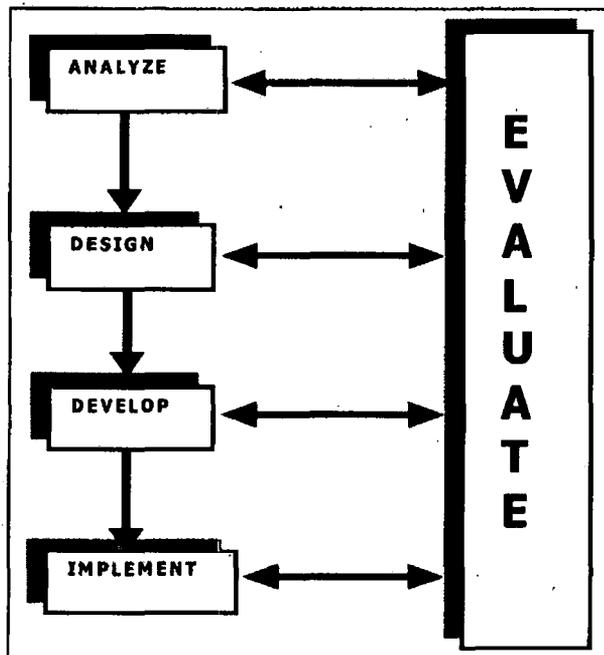
a. The SAT was created to manage the instructional process for analyzing, designing, developing, implementing, and evaluating instruction. The SAT serves as a blueprint for organizing or structuring the instructional

process. The SAT is a set of comprehensive processes, guidelines, tools, and techniques needed to close the gap between current and desired job performance through instructional intervention.

b. The Marine Corps originally targeted the SAT for initial job training in FLCs, but the comprehensive system can be applied to Managed On-the-Job Training in the operating forces and supporting establishment. SAT although slightly modified, is also used to manage Unit Training Management Programs. Refer to MCRP 3-0A, Unit Training Management (UTM) Guide for specific guidance on applying SAT to UTM.

1003. BENEFIT OF SAT

a. The Systems Approach to Training is a dynamic, flexible system for developing and implementing effective and efficient instruction to meet current and projected needs. The SAT process is flexible in that it accounts for individual differences in ability, rate of learning, motivation, and achievement to capitalize on the opportunity for increasing the effectiveness and efficiency of instruction. The SAT process reduces the number of school management decisions that have to be made subjectively and, instead, allows decisions to be made based on reasonable conclusions which are based on carefully collected and analyzed data. More than one solution to an instructional problem may be identified through the SAT; however, the selection of the best solution is the goal.



b. The SAT model allows any one of the five phases, and their associated processes, to occur at any time. In addition, each phase within SAT further builds upon the previous phase, providing a system of checks and balances to

ensure all instructional data is accounted for and that revisions to instructional materials are identified and made.

c. It is not the intent of the SAT process to create an excessive amount of paperwork, forms, and reporting requirements that must be generated by each FLC conducting instruction. This would serve only to detract from the instructional program. The SAT process does not provide a specific procedure for every instructional situation that can be encountered. Instead, it presents a generalized approach that can be adapted to any instructional situation.

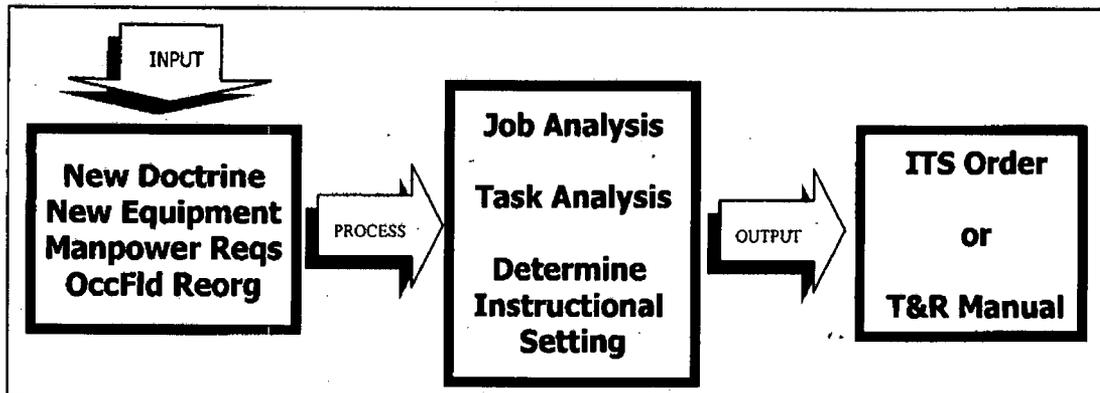
(1) SAT Phases. The SAT model simplifies and standardizes the instructional process into manageable subsets. The SAT process is made up of five distinct phases, each serving a specific purpose. The five phases are Analyze, Design, Develop, Implement, and Evaluate. Each of these phases involves inputs, processes, and outputs. The successive phases of the SAT build upon the outputs of the previous phase(s).

(a) Analyze. During the Analyze Phase of SAT, a particular job or Occupational Field/Military Occupational Specialty (OccFld/MOS) is analyzed by CG, TECOM (C46) to determine what job holders perform on the job, the order in which they perform it, and the standard of performance necessary to adequately perform the job. The result, or output, of the Analysis Phase is Individual Training Events (ITEs) as part of a Training and Readiness (T&R) Manual. Training events are behavior statements that define job performance in the Marine Corps and serve as the basis for all Marine Corps instruction. The three main processes of the Analysis Phase are:

1. Job Analysis. Job or occupational analysis is performed to determine what the job holder must know or do on the job. Job analysis results in a verified list of all duties and tasks performed on the job.

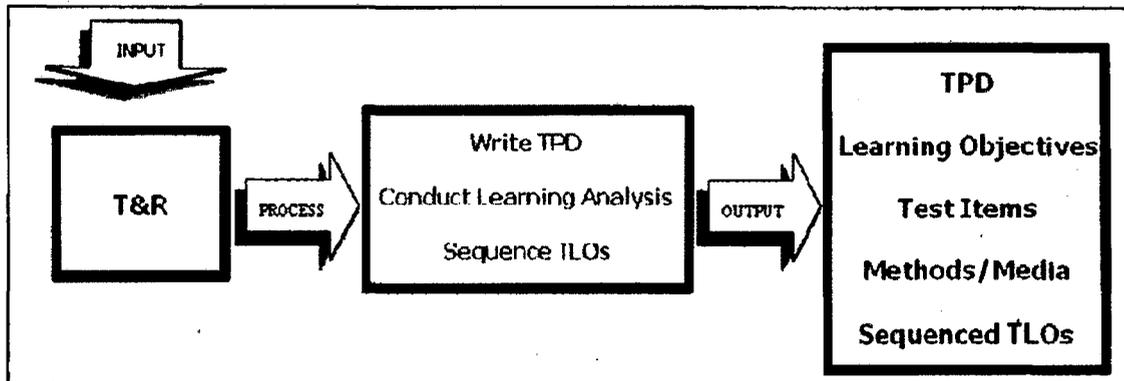
2. Task Analysis. Task analysis (sometimes called Training Analysis) is performed to determine the job performance requirements requisite of each task performed on the job. Job performance requirements include a task statement, conditions, standard, performance steps, administrative instructions, and references. Job performance requirements in the Marine Corps are defined by ITEs. ITEs define the measures of performance that are to be used in diagnosing individual performance and evaluation of instruction.

3. Determine Instructional Setting. The third process in the Analysis Phase involves determining the instructional setting for each individual training standard task behavior. Instructional setting is important because it defines who is responsible for instructing the task and the level of proficiency the student must achieve when performing the task in an instructional environment. TECOM (C 469) is responsible for determining the organization responsible for conducting the instruction and the level of instruction assigned to each task. This is done after ITEs/T&R are developed. When determining instructional setting, two guiding factors must be used - effectiveness and efficiency. Seek the best program within acceptable costs while meeting the learning requirement.



(b) Design. During the Design Phase of SAT, FLC instructional developers equate task performance under job conditions to task performance within the instructional setting. The goal of this phase is to simulate as closely as possible the real-world job conditions within the instructional environment. The closer the instructional conditions are to the real world, the more likely it is that the student will transfer the learning to the job. The Design Phase is made up of three separate processes, each of which has a specific purpose:

1. Write a Target Population Description (TPD). The TPD defines the student population entering a course.
2. Conduct Learning Analysis. The learning analysis is conducted to develop the learning objectives, test items, and methods/media. The learning analysis describes what the students will do during instruction, what they will be tested on, and what methods and media are appropriate to maximize student learning and transfer of knowledge and skills to the job setting.
3. Sequence Learning Objectives. Learning objectives are sequenced to allow students to make logical transitions from one subject to the next. Sequenced learning objectives provide efficient instruction and serve as a draft course structure.



(c) Develop. The Develop Phase of SAT builds on the outcomes of the Analyze and Design Phases. The Analyze Phase identifies those tasks to be instructed and the desired standard to which those tasks must be performed. The Design Phase outlines how to reach the instructional goals determined in the Analyze Phase by converting job tasks to tasks taught in the instructional environment, and further builds the foundation for instruction. During the Develop Phase, instructional developers from the FLC produce Course Descriptive Data (CDD), the Program of Instruction (POI) and the Master Lesson File (MLF). The processes of the Develop Phase are:

1. Develop a Course Structure. The course structure is a detailed chronological document identifying the implementation plan for a course.

2. Develop Concept Cards. Academic and administrative concept cards are created to assign resources within the formal FLC to lessons, evaluation, and events.

3. Conduct an Operational Risk Assessment (ORA). An ORA will be conducted on each lesson/event within a POI. The associated ORA tools will be incorporated into the Master Lesson File (MLF).

4. Develop Lesson Material. Lesson plans, student materials supplemental student materials, (optional), media, the Instructor Preparation Guide (IPG), are all lesson materials to be used during the Implement Phase.

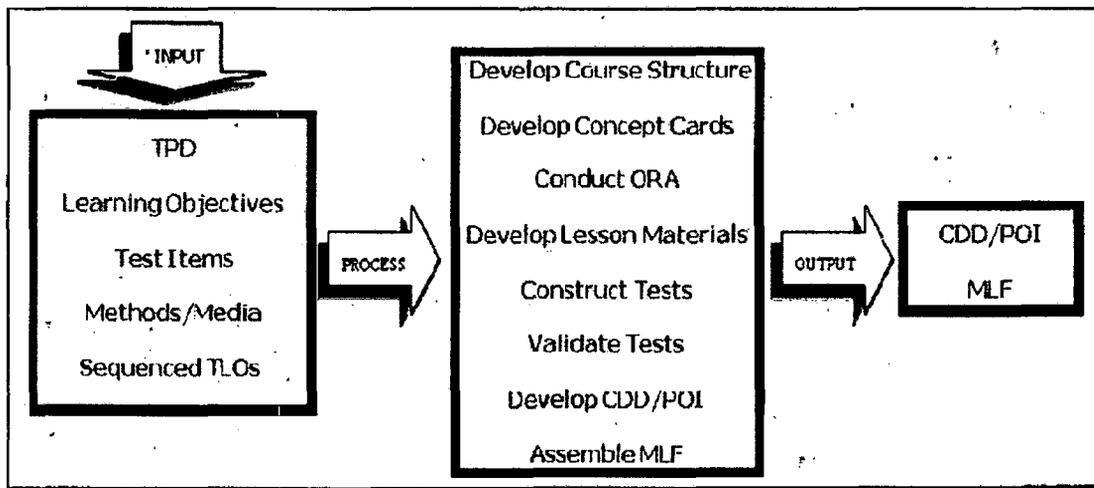
5. Construct Tests. Constructing a test involves selecting and placing the test items from the Learning Objective Worksheet (LOW) on the appropriate test. It also involves providing ample instructions to the student, instructions to the evaluation, and developing the grading criteria for each test given in the course.

6. Validate Instruction. The goal of validation is to determine the effectiveness of instructional material prior to implementation.

7. Develop Program of Instruction (POI). The CDD as section I of the POI provides an estimate of the resources required to administer a

course, and the remainder of the POI provides a detailed description of the course. This document records the FLC's plan for satisfying the training requirements listed in the T&R Manual.

8. Assemble A Master Lesson File. One Master Lesson File (MLF) is compiled for EVERY class taught at the FLC in order to provide continuity of instruction.



(d) Implement. During the Implement Phase of SAT, instructors within the FLC prepare the class and deliver the instruction, test, and conduct after-lesson management. The purpose of the Implement Phase is the effective and efficient delivery of instruction to promote student understanding of material and to ensure the transfer of student knowledge and skills from the instructional setting to the job. The processes of the Implement Phase are:

1. Review Lesson Materials. Reviewing lesson material involves all those activities that instructors must perform before preparing and conducting instruction. Instructors must have a clear understanding of all aspects of the lesson. This is accomplished by reviewing the course/training schedule, the MLF, and tests. By reviewing these items the instructor can identify any conflicts, questions, or potential problems before the rehearsals begin. More importantly, the instructor can make required adjustments prior to delivering the instruction to the students. The instructor must ensure the lesson plan, student materials, and media all have the same information.

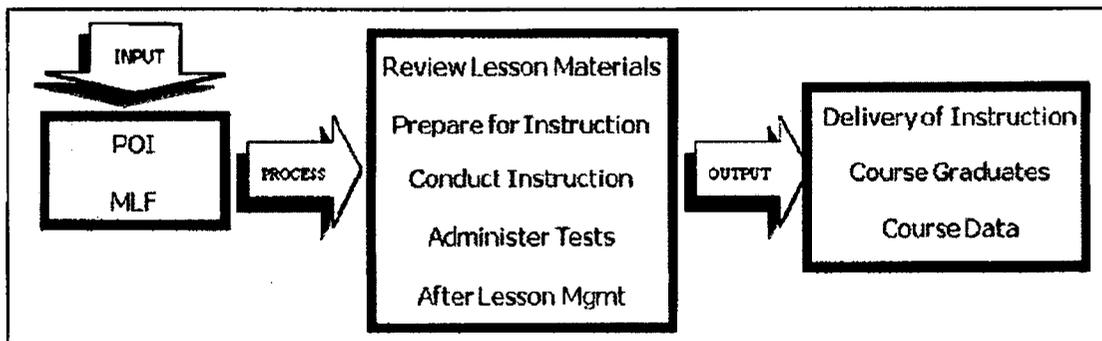
2. Prepare for Instruction. The preparation portion of the Implement Phase involves all those activities that instructors and support personnel must perform to get ready for delivering the instruction. To maximize the transfer of knowledge and the development of skills by the learner, instructors must rehearse the lesson, prepare instructional materials, and prepare the instructional environment.

3. Conduct Instruction. The effective and efficient delivery of instruction is a key point in the SAT process. Although the

curriculum developer may have designed and developed the material so that it would maximize the transfer of learning, it is crucial that the instructor present the lesson in a manner that ensures comprehension and on-the-job application. While comprehensive planning and preparation early in the Implement Phase is necessary, it does not guarantee success. The instructor must communicate effectively, conduct the lesson, and manage the classroom during and after the presentation.

4. Administer Tests. The primary purpose for administering tests is to determine if the learning objectives have been met, improve instruction, and thereby increase student learning. This is accomplished by having a well thought out evaluation process.

5. After-Lesson Management. The primary purpose for employing after-lesson management is to ensure the effective and efficient use of school resources. By ensuring the instructional environment is well maintained, the instructor is saving the school valuable resources. The secondary purpose is to capture specific lesson-related data for future use in the school's evaluation program.



(e) Evaluate. The Evaluate Phase of SAT measures instructional program effectiveness and efficiency. Evaluation and revision drive the SAT model. Evaluation consists of formative and summative evaluation and management of data. Formative evaluation involves validating instruction before it is implemented and revising instruction to improve the instructional program prior to its implementation. Formative evaluation is ongoing at all times both within and between each phase of the SAT model. Summative evaluation is conducted after a course of instruction has been implemented. Summative evaluation assesses the effectiveness of student performance, course materials, instructor performance, and/or the instructional environment. There are five main processes in the evaluation phase:

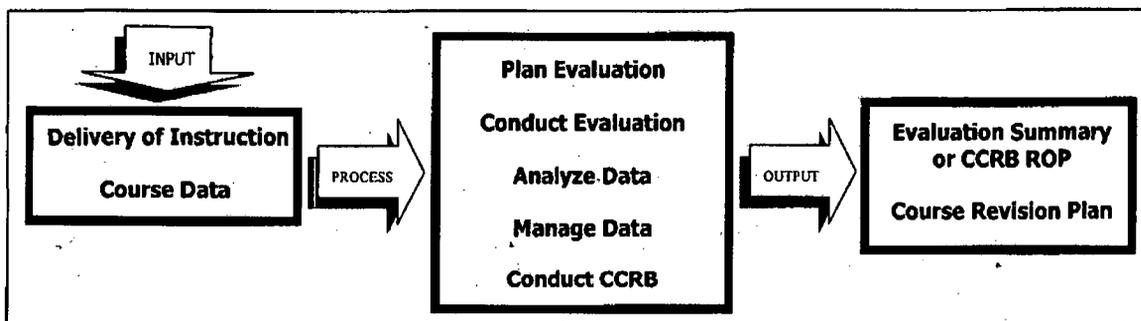
1. Plan Evaluation. Thorough and systematic planning is key to a successful evaluation. For an evaluation to provide the information required for making decisions concerning an instructional program, the evaluation must identify the critical evaluation issues and topics influencing the program. These topics will define the focus of the evaluation. Potential evaluation questions, criteria, and issues need to be identified and specific evaluation topics selected.

2. Conduct Evaluation. This section provides how evaluation takes place within each phase of the SAT to provide checks and balances. This section allows the user of this manual to address specific ways to conduct evaluation for each phase of the SAT process.

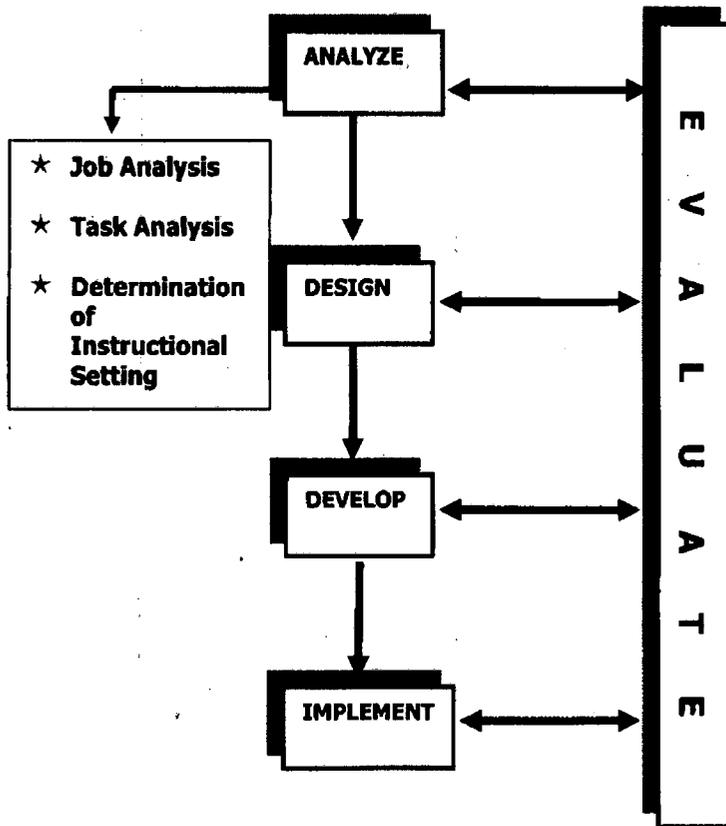
3. Analyze Data. This section takes the evaluator through the steps of organizing, quantifying, interpreting, and summarizing data so that information supporting changes can be presented in a Course Content Review Board (CCRB).

4. Manage Data. The next step in the evaluation process is to manage the documentation of evaluation results and recommendations for revising or refining an instructional program. These documents and reports are prepared to serve as a historical record of the evaluation, provide an audit trail for the continuing development and improvement of instruction, and direct the activities for implementing changes to the instructional program. Efficient data management therefore requires that the information presented in these documents be clear, concise, and accurate. This chapter provides guidance concerning the documentation of evaluation results.

5. Conduct CCRB. A CCRB functions to record information and make recommendations to improve the effectiveness and efficiency of an instructional program. The Record of Proceedings (ROP) must provide justification and recommended courses of action for implementing any revisions to the instructional program.



ANALYZE PHASE



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Chapter 2

2000. INTRODUCTION

The Analyze Phase is a crucial phase in the Systems Approach to Training (SAT) process. During this phase, job performance data is collected, analyzed, and reported. The analysis is conducted through a process called Front End Analysis (FEA). The results of the FEA is a comprehensive list of tasks and performance requirements. In the Marine Corps, job performance requirements are defined by Individual and Collective Training Events (ITE/CTE) in Training and Readiness (T&R) Manuals. The Analyze Phase consists of three main processes: job analysis, task analysis, and determining instructional setting.

This chapter has four separate sections. The first three cover the three Analyze Phase processes and the fourth provides the administrative responsibilities.

1. **Job Analysis:** "What are the job requirements?"
2. **Task Analysis:** "What are the tasks required to perform the job?"
3. **Determine Instructional Setting:** "Will the Marine receive job training in a Formal Learning Center (FLC), or through MOJT?"
4. **Requirements and Responsibilities in the Analyze Phase:** "What are the roles and responsibilities of each element in the training establishment?"

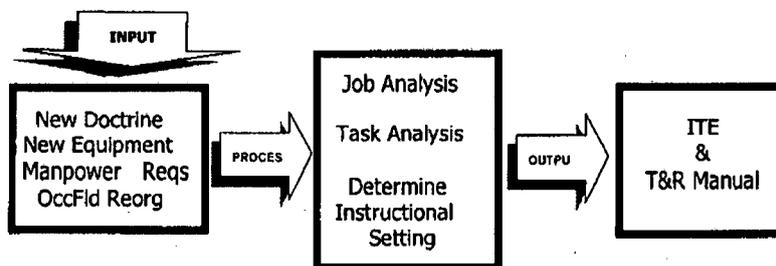


Figure 1-1

2001. PURPOSE

Section 1

The purpose of the Analyze Phase is to accurately determine what the Marine must know and do on-the-job. Job Analysis is done through a systematic research process called the Front-End Analysis (FEA) to collect, collate, and report job performance data. Task analysis is accomplished by convening a Subject Matter Expert (SME) conference. This conference, attended by representatives from the Operating Forces, FLCs, and Marine Corps Center for Lessons Learned (MCCLL), along with the occupational field sponsor and TECOM Task Analysts, review the results of the FEA (and MCCLLs material) and produce a draft T&R Manual to describe training events. The draft T&R is then staffed and, when final changes are made, it is published in the NAVMC 3500 series.

The FLCs are responsible for reviewing the signed T&R to identify those events that they are responsible for teaching. The curriculum developers then enter the relevant tasks into MCTIMS Curriculum Management Module and begin the development of the Program of Instruction (POI). To accelerate the design and development phases of the SAT process, schools can begin the process of entering the tasks into MCTIMS from the draft T&R that is published immediately following the T&R conference. There is a risk however that if the T&R draft is ultimately rejected or changed during the CG level staffing that the developed curriculum will become obsolete.

As part of instruction, FLCs, develop, implement, and evaluate their curricula based on existing T&R events. The development of T&R events within the Analyze Phase is unique to TECOM, and is normally performed under the guidance of Ground Training Division (GTD) or Aviation Training Division (ATD). FLCs, within the Marine Corps, should not develop T&R events independently without prior approval of TECOM (GTD/ATD).

The results of this phase form the basis for the entire instructional process by clearly defining the target population, what Marines are actually performing on the job, what they will need to learn in the FLC, and what will be learned through managed on-the-job training (MOJT). The Analyze Phase is concerned with generating an inventory of job tasks, selecting tasks for instruction, developing performance requirements, and analyzing tasks to determine instructional setting.

Section 2002. JOB ANALYSIS

2

Job analysis involves finding out exactly what the Marine does on the job rather than what the Marine must know to perform the job.

The first step in the Analyze Phase is the completion of a Job Analysis that is conducted through the FEA process. TECOM (GTD) collects, examines, and synthesizes data regarding each Occupational Field/Military Occupational Specialty (OccFld/MOS). This data may include time in grade and MOS, career progression, tasks performed on the job, instructional location, level of instruction, etc. Job analysis is the collection and organization of data that results in a clearly defined description of duties, tasks, and indicative behaviors that define that job. Job analysis involves finding out exactly what the Marine does on the job rather than what the Marine must know to perform the job. The product of job analysis is a verified list of all duties and tasks performed on the job and the identification of those tasks that must be taught in the FLCs. Once the Job Analysis is complete, an FEA Report is produced and serves as a key input to the T&R conference held to define the training events and determine instructional setting.

Job Analysis Requirements

Job analysis begins once a requirement for training has been identified and validated. Job analysis requirements are typically generated by:

- ⇒ The introduction of new or better weapons/support systems.
- ⇒ Organizational changes such as changes in MOS structure and career field realignments.
- ⇒ Doctrinal changes required by new laws, Department of Defense (DoD) requirements, and Marine Corps needs.
- ⇒ Evaluations/Marine Corps Center for Lessons Learned indicating that a change in job requirements is required.
- ⇒ Direction from higher headquarters.
- ⇒ FEAs are also conducted on a cyclical basis for most OccFlds.

Task Criteria

A task is a behavior performed on the job. A task is defined by specific criteria and must:

- ⇒ Be a logical and necessary unit of work.
- ⇒ Be observable and measurable or produce an observable and measurable result.
- ⇒ Have one action verb and one object.
- ⇒ Be a specific act done for its own sake.
- ⇒ Be independent of other actions.
- ⇒ Have a specific beginning and ending.
- ⇒ Occur over a short period of time.

Functional Areas

To facilitate survey of job incumbents and correlation of survey data, closely related tasks within a task list are grouped by functional area for the purposes of job analysis. A functional area is an organizer of data consisting of one or more tasks performed. Functional areas are generally very broad categories. One or more functional areas make up a job. A functional area may be defined by:

1. a system (e.g., Small Arms Weapons, Mines and Demolitions, Communication Equipment).
2. a function (e.g., Administrative Functions, Patrolling Functions).
3. a level of responsibility (e.g., Train Logistics Personnel, Supervise Intelligence Personnel).

Initial Task List Development

Develop an initial task.

The first step in Job Analysis is the development of an initial task list and is conducted by TECOM (GTD) and OccFld sponsor. This process can include the initial identification of functional areas in which the tasks will be organized. An initial task list is developed by a combination of the following means:

1. Reviewing technical documentation and references pertaining to the job. This documentation might also be obtained from various sources outside the Marine Corps. These sources may address similar jobs and tasks and have generated materials that may be applicable for task list development. These sources include:
 - ☐ Other Service Schools. These include Navy, Army, Air Force, or Coast Guard FLCs, such as U.S. Army Engineer School at Ft. Leonard Wood, MO, U.S. Army Signal School at Ft. Gordon, GA, and Air Force Communications Technical School at Lowry Air Force Base, CO.
 - ☐ Trade Organizations/Associations. Civilian or industry trade organization/associations, such as Society for Applied Learning Technology (SALT) or Association of Naval Aviation can provide additional resources and technical support.
 - ☐ Defense Technical Information Center (DTIC). DTIC offers training studies, analyses, evaluations, technical articles and publications.
2. Convening a board of subject matter experts (SME) who can detail the requirements of a specific job.
3. Conducting interviews with SMEs.
4. Reviewing Marine Corps Center for Lessons Learned to identify timeless (environment, enemy, and conflict non-specific) changes to job and task requirements.
5. Soliciting input from Marine Corps FLCs, and Centers of Excellence (COE).

Task List Verification

Verify the task list for accuracy and completeness.

The next step in Job Analysis involves verifying the task list in terms of accuracy and completeness. Verification ensures that the tasks on the list are actually those performed by members of the OccFld or MOS. Task list verification is normally conducted by TECOM (GTD) during the FEA by one or more of the following methods:

- Administering survey questionnaires to job incumbents.
- Conducting interviews with SMEs.
- Observing actual job performance of tasks at the job site.
- Convening a board of SMEs to review the task list.

Refining the Task List

Refine and Consolidate the task list.

After the data in the previous two steps have been collected, the task list is refined and consolidated. A final review of the task list should be made to ensure all tasks meet the criteria for a task discussed previously in this Section.

Identifying Tasks for Instruction

Task recommendations are accomplished through administration of a survey questionnaire sent to job incumbents and SMEs. The data collected represent the judgments of a statistically-valid sample of job incumbents and SMEs who are familiar with the job. The responses to the survey are analyzed using statistical analysis procedures. The following criteria may be considered when selecting tasks for instruction and are included in the survey questionnaire administered by TECOM (GTD).

<input type="checkbox"/> Percent of job holders performing the task.
<input type="checkbox"/> Percentage of time spent performing the task.
<input type="checkbox"/> Task difficulty.
<input type="checkbox"/> Amount of training required to perform the task

Survey responses to each of these criteria are then analyzed and a Front End Analysis Report (FEAR) is produced that will assist the task analyst in creation/revision of the T&R Manual

2003. TASK ANALYSIS

SECTION 3

The second step in the Analyze Phase is to conduct a Task Analysis that sequences and describes observable, measurable behaviors involved in the performance of a task or job. Task analysis is conducted by a T&R conference. It involves the systematic process of identifying specific tasks to be trained, and a detailed analysis of each of those tasks in terms of frequency, difficulty, and importance.

The purpose of task analysis is to:

⇒ Refine the task list based on SME input.
⇒ Develop T&R events that identify the conditions, standards, and performance steps necessary for the successful completion of a task.
⇒ Determine where the tasks will be instructed (FLC or via MOJT at the unit level).
⇒ Produce a target population description that will guide the FLC or unit in the preparation of instruction/training.

Below are questions to ask when performing a Task Analysis:

- How difficult or complex is the task?
- What behaviors are used in the performance of the job?
- How frequently is the task performed?
- How critical is the task to the performance of the job?
- To what degree is the task performed individually, or to what degree is the task part of a set of collective tasks?
- If a subset of a set of collective tasks, what is the relationship between the various tasks?
- What is the consequence if the task is performed incorrectly or is not performed at all?
- To what extent can the task be trained on the job?
- What level of task proficiency is expected following training?
- How critical is the task?
- What information is needed to perform the task? What is the source of information?
- What are the performance requirements?
- Does execution of the task require coordination between other personnel or with other tasks?
- Are the demands (perceptual, cognitive, psychomotor or physical) imposed by the task excessive?
- How often is the task performed during a specified time-frame (i.e., daily, weekly, monthly, yearly)?
- How much time is needed to perform this task?
- What prerequisite skills, knowledge, and abilities are required to perform the task?
- What are the current criteria for acceptable performance?
- What are the desired criteria?
- What behaviors distinguish good performers from poor performers?
- What behaviors are critical to the performance of the task?

Development of T&R Events

Once tasks are verified and the task lists are refined, T&R events are developed. Refer to MCO P3500.72_ (Ground Training and Readiness Program) for conduct of a T&R conference. Often, many elements of the ITE (e.g., performance steps, conditions, standards) are collected while the task list is being refined. This enables a better understanding of the task and can serve as a check to ensure the tasks are actually performed on the job. A working group conference composed of subject matter experts (SME) is particularly effective for examining how a task is to be completed by identifying the performance steps and the sequence of those performance steps, conditions, and standards necessary to successfully accomplish the task. \

Components of a T&R Event

A T&R event contains the following basic components. Refer to MCO P3500.72A (Ground Training and Readiness Program) for all components available for use in the MCTIMS T&R Development Module:

- a. **Event Code.** The event code is a 4-4-4 character set. The first four characters indicate the MOS or community (e.g., 0321, 1812, MWT). The second four characters indicate the functional area (e.g., DEF, FSPT, MVMT). The third four characters indicate the level and sequence (1000 through 8000).
 - (1) **Functional Area Grouping.** Categorizing events with the use of a recognizable up to four-letter functional code makes the type of skill or capability being referenced easily identifiable. Examples include DEF (defensive tactics), MAN (maneuver), CBRN (chemical, biological, radiological, and nuclear, etc.).
 - (2) **Sequencing.** A four digit numerical sequence is assigned to each training event. The higher the first number, the more advanced the capability or skill being evaluated. For example, PAT-4001 (patrolling) is a designator for patrolling conducted at the squad level, PAT-5001 is a designator for patrolling at the platoon-level, and PAT-7001 is a designator patrolling at the battalion level. Each event should be given a unique four digit sequence number. Depending on the arrangement of the functional areas within the T&R Manual (alphabetical, logical sequencing) the numbering should proceed by "ones" starting with the number 1 until all events within a functional area are numbered. At that point, numbering should resume by adding one or two to the "tens" digit and again starting with "one." Numbering in this fashion will allow for new events to be added to the functional area, without having to number them out of sequence. For example, if the last event in the AAAA functional area is numbered 0300-AAAA-1007, then the next event will be 0300-BBBB-1011.

d. **Sustainment Interval.** This is the period, expressed in number of months, between evaluation or retraining requirements. Skills and capabilities acquired through the accomplishment of training events are refreshed at pre-determined intervals. It is essential that these intervals are adhered to in order to ensure Marines maintain proficiency.

e. **Event Description.** A discretionary field that provides a description of the event purpose, objectives, goals, and requirements. It is used when the event title needs to be enhanced to describe specific tasks within the event.

f. **Billet.** Individual training events may contain a list of billets within the community that are responsible for performing that event. This ensures that the billet's expected tasks are clearly articulated and a Marine's readiness to perform in that billet is measured.

g. **Grade.** Each individual training event will list the rank(s) at which Marines are required to learn and sustain the training event.

h. **Initial Training Setting.** For Individual T&R events only, this specifies the location for initial instruction of the training event in one of three categories (formal school, managed on the job training (MOJT), distance learning). Regardless of the specified Initial Training Setting, any T&R event may be introduced and evaluated during MOJT.

f. **Condition.** Describes the condition(s), under which tasks are performed. Conditions are based on a "Real World" operational environment. The conditions also indicate what is provided (equipment, materials, manuals, aids; etc.), environmental constraints, conditions under which the task is performed, and any specific cues or indicators to which the performer must respond. When resources or safety requirements limit the conditions, a downgraded justification must be submitted.

c. **E-Coded.** This is a "yes/no" category to indicate whether or not the E-Coded event contributes toward the Combat Readiness Percentage (CRP) of the associated Mission Essential Task (MET).

g. **Standard.** The standard indicates the basis for judging effectiveness of the performance. It consists of a carefully worded statement that identifies the proficiency level expected when the task is performed. The standard provides the minimum acceptable performance parameters and is strictly adhered to. "In accordance with the reference" will **NOT** be used as a stand-alone standard.

f. **Performance Steps.** Performance steps specify the actions required to accomplish a task. Performance steps follow a logical progression, and should be followed sequentially, unless otherwise stated. Normally, performance steps are listed only for 100-level individual T&R events (those that are taught in the entry-level MOS school), but may be included in upper-level events when appropriate.

h. **Prerequisite(s).** Prerequisites are the listing of academic training and/or T&R events that must be completed prior to attempting completion of the event.

i. **Reference(s).** References are the listing of doctrinal or reference publications that may assist the trainees in satisfying the performance standards and the trainer in evaluating the performance of the event.

b. **Event Title.** The task behavior is used as the event title.

k. **Ordnance.** Each event will contain a listing of ordnance types and quantities required to complete the event.

l. **External Support Requirements.** Each event will contain a listing of the external support requirements needed for event completion (e.g., range, support aircraft, targets, training devices, other personnel, and non-organic equipment).

m. **Combat Readiness Percentage (CRP).** The CRP is a numerical value used in calculating training readiness for collective events. Only E-Coded events listed in the appropriate T&R manual are used to determine a units CRP.

T&R Staffing

Draft T&R staffing involves soliciting comments from affected individuals or organizations throughout the Marine Corps, and then integrating those comments into the T&R document. The Operating Forces, FLCs, and OccFld sponsors (and designated SMEs under special circumstances) will be included on the T&R staffing distribution list. TECOM (GTD/ATD) will coordinate final review, and will consolidate and reconcile all recommendations.

Upon completion of this process, necessary changes will be incorporated into the final T&R draft manual for signature. T&R Manuals are forwarded to CG, TECOM for approval and signature.

Once final approval and signature has been received, the training events are published as a T&R Manual in the NAVMC 3500-series and can then be distributed throughout the Marine Corps.

2004. INSTRUCTIONAL SETTING

SECTION 4

The third process in the Analyze Phase involves determining the instructional setting for each individual training event (ITE) task behavior. Instructional setting is important because it defines who is responsible for instructing the task and the level of proficiency the student must achieve when performing the task in an instructional environment. TECOM is responsible for determining the organization responsible for conducting the instruction and the level of instruction assigned to each task. This is done during the T&R Conference while T&R events are being developed. When determining instructional setting, two guiding factors must be used -- effectiveness and efficiency. The Marine Corps seeks the best training possible within acceptable, affordable costs while meeting the learning requirement.

Responsibility for Instruction

Once the job is defined and the T&R events are developed, the job structure can be broken down into organizations that will assume responsibility for instruction. The tasks must be divided into four groups:

1. Those that are to be included in a formal learning center (level 1000).
2. Those that are to be included in a Managed On-the-Job-Training (OJT) program (level 2000+).
3. Those that can be covered via computer-based instruction or via simulation.
4. Those for which no formal or OJT is needed (i.e., can be learned by using job performance aids or self study packets).

Instructional Setting

The purpose of entry-level FLC instruction is twofold: to teach the minimum skills necessary to make the Marine productive immediately upon arrival at his first duty station; and to provide the Marine with the necessary prerequisites to continue instruction in an MOJT program. Instructional setting refers to the extent of instruction assigned to each Individual Training Event (ITE) task behavior. Instructional setting is generally determined by convening a board of job incumbents and SMEs to discuss the extent of instruction required to adequately perform the task. This can be accomplished at a T&R Development/Review Conference or Operational Advisory Group (OAG) Conference. Instructional settings are published in the T&R Manual. Instructional settings in T&R Manuals are designated for 1000/2000-level events in the T&R Development Module

The Determination of the Instructional Setting is the final process in the Analyze Phase. The output of this phase is:

- Training and Readiness (T&R) Manual.**

This output becomes the input to the Develop Phase. The first step of

the Design Phase will be to write a Target Population Description (TPD) for the course to be developed from the events identified during the Analyze Phase.

SECTION 5 2005. REQUIREMENTS AND RESPONSIBILITIES IN THE ANALYZE PHASE

Training and Education Command [TECOM (GTD/ATD)] Responsibilities

A systematic approach to the design of instruction requires an identification of the tasks performed on the job. Job performance in the Marine Corps is defined and supported by training standards. Training standards published as individual events in T&R Manuals are the primary source for the development of all Marine Corps instruction. TECOM (GTDGTD/ATDATD) is responsible for coordinating all the steps in the Analyze Phase and for managing the FEA process. TECOM will coordinate the development of T&R Manuals for military occupational fields (OccFld) and military occupational specialties (MOS). The culmination of the Analyze Phase is an approved set of training standards for an OccFld or MOS, published as a NAVMC 3500 series T&R Manual.

1. **Job Analysis.** As part of the FEA process, TECOM (GTD) is responsible for conducting job analyses. Additionally, TECOM (GTD) will collect supporting information that will assist in the identification and selection of tasks for instruction. TECOM (GTD) publishes the analysis results in a Front-End Analysis Report (FEAR). The process of conducting a FEA is directed by MCO 1200.13.
2. **Task Analysis.** TECOM (GTD/ATD) is responsible for convening the T&R conference. The conference conducts formal task analysis and produces the refined task list which TECOM publishes as a draft T&R.
3. **Determination of Instructional Setting.** The T&R conference also determines where the tasks should be taught, either at the FLC (for level 1000 entry-level), or in the Operating Forces/Supporting Establishment as MOJT. The TECOM task analyst conducting the T&R conference will publish the instructional setting in the T&R Manual.

Formal Learning Center Responsibilities

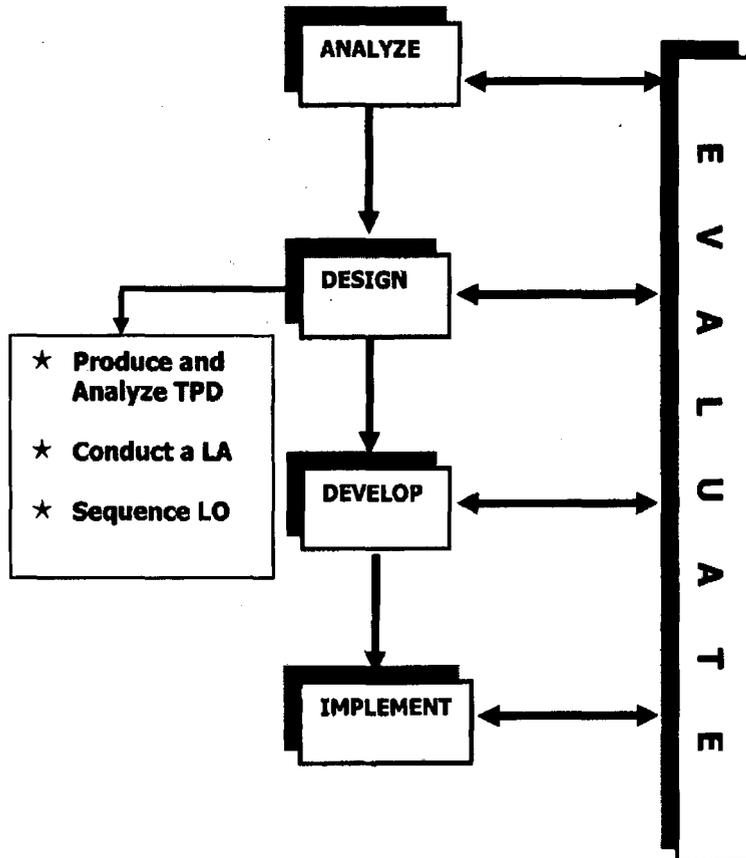
The FLCs play a supporting role during the Analyze Phase.

1. **Task Analysis.** Since task analysis involves determining the condition, standard, performance steps, etc., having the resident experts from the FLC participate in this process is beneficial. FLCs, will provide SMEs to aid in the development of the condition, standard, performance steps, and support requirements for T&R events.

NAVMC 1553.1
27 Oct 2010

Train the Trainer School, TRNGCMD will provide instruction on Individual Training Event Development as part of the Curriculum Development Course and Formal School Management Course.

DESIGN PHASE



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3002 LEARNING ANALYSIS (LA)	3-5
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Chapter 3

3000. INTRODUCTION

The output of the Analysis Phase which is the T&R Manual, becomes the input to the Design Phase.

The Design Phase consists of three processes:

1. **Write the Target Population Description (TPD):** "Who is coming for instruction and what knowledge, skills, and attitudes (KSAs) must/will they bring with them?"
 2. **Conduct a Learning Analysis:** "What do I have to teach with?" and "What will be taught, evaluated, and how?"
 3. **Sequence TLOs/ELOs:** "In what order will the instruction be taught to maximize both resources and the transfer of learning?"
-

3001. WRITE THE TARGET POPULATION DESCRIPTION

SECTION 1

INTRODUCTION. The first process of the Design Phase is to write the **Target Population Description (TPD)**. A TPD is a description of the knowledge, skills, and attitudes (KSAs) students are expected to bring to a course of instruction. It provides a general description of an average student and establishes the minimum administrative, physical, and academic prerequisites each student must possess prior to attending a course. During the Design Phase, the TPD will provide guidance for developing objectives and selecting instructional strategies that will meet the needs of the students.

KSA - Knowledge, skills, and attitudes.

ROLE OF TPD IN INSTRUCTION

The TPD provides the focus for designing instruction. For instruction to be effective and efficient, it must build upon what students already know. Considering the TPD allows the curriculum developer to focus on those specific knowledge and skills a student must develop. For example, if knowing the nomenclature of the service rifle is required for the job, and the students entering the course already possess this knowledge, then teaching this specific information is not required. Conversely, if students entering a course do not know the service rifle nomenclature, then they need instruction. The TPD also allows the curriculum developer to select appropriate methods of instruction, media, and evaluation methods. For example, experienced students can often learn with group projects or case studies and self-evaluation. Entry-level students generally need instructor-led training and formal evaluation. *In summary, the TPD describes the average student in general terms, establishes prerequisites, serves as the source document for developing course description and content, and is used to design instruction.*

TPD - Target Population Description

STEPS IN WRITING THE TPD

Obtain Sources of Data

To clearly define the target population, gather data from the appropriate sources listed below. These references outline job performance by detailing what tasks must be performed on the job and the specific requirements of that particular job.

- ⇒ MCO P1200.7, Military Occupational Specialty (MOS) Manual.
- ⇒ NAVMC 3500 Series, Training and Readiness (T&R).

Additionally, information can be obtained from the OccFld Sponsor and TECOM Task Analysts (Ground Training Division (GTD)/Aviation Training Division (ATD)) by means of phone conversation and/or electronic message.

STEP 1

Gather and Review Student Background Information

While considering the adult learning characteristics identified in Chapter 6 and the resources identified above, review pertinent student background information. In order to ensure the course prerequisites are correct and that the training program is developed to meet the attributes of the TPD, organize this information into the following categories:



1. **Administrative**
2. **Physical**
3. **Academic**

- a. **Administrative.** Certain prerequisites may be necessary due to administrative requirements of the school or the course material. These prerequisites include the student's rank, MOS, security clearance, time remaining in service, or police record (which may mean exclusion from certain types of instruction).
- b. **Physical.** Physical information includes specific skills and general fitness which may include age, height, color perception, vision acuity, physical limitations, etc.
- c. **Academic.** Academic information represents an inventory of the knowledge and skills the student must or will possess prior to the start of instruction. These prerequisites may include specific basic courses already completed, reading level, test scores, training experience and GCT/ASVAB scores.

Write the TPD

Capture information that describes the general characteristics of the average student attending the course. Summarize the data into a concise paragraph describing the target population. Organize the general information describing the average student so that it is grouped together and so that any prerequisites are grouped together.



**Figure 3-2.
Sample Target
Population Description
(TPD)**

TPD FOR CURRICULUM DEVELOPER COURSE

This course is for the staff non-commissioned officer through company grade officer, as well as civilian and contracted employees involved in the design, development, and evaluation process of the SAT. Attendees must possess a working Common Access Card (CAC) and be proficient in Microsoft Word and PowerPoint.

Prerequisites:

1. Students must possess a CAC with current certificates
2. Assignment as a curriculum developer or administrator at a Marine Corps FLC
3. Proficient in Microsoft Word
4. Proficient in Microsoft PowerPoint

3002. CONDUCT A LEARNING ANALYSIS

This second process of the Design Phase is to conduct a Learning Analysis to define what will be taught. The purpose of the Learning Analysis is to examine the real world behavior that the Marine performs in the Operating Forces and transform it into the instructional environment. A Learning Analysis produces three primary products essential to any Program of Instruction (POI): learning objectives, test items, and methods/media. This process allows for adjustments to be made to accommodate for resource constraints at the FLC. A Learning Analysis must be performed for every task covered in new courses. Learning Analyses must be validated with every POI submission. Additionally, each new task added to the Training and Readiness (T&R) Manual, and taught at the FLC, requires a Learning Analysis.

POI- Program of Instruction.

3 primary products of a Learning Analysis:

1. Learning Objectives
2. Test items
3. Method/Media

STEPS TO CONDUCT A LEARNING ANALYSIS

Gather Materials

The first step in conducting a learning analysis is to gather materials. Once the scope of the course that the curriculum developer is designing is determined (by reading guidance from TECOM or the School Commander), obtain the:

1. T&R manual – to determine what tasks the jobholder performs.
2. Publications – like orders, directives, manuals, job aids, etc. that will help analyze the tasks to be taught.
3. Subject Matter Experts – to fill in details that the publications will not. SMEs will conduct the brainstorming session along with the Curriculum Developer.
4. Learning Analysis Worksheet (LAW) - Use the LAW found in the MCO 1553.2_ and or enter the data into MCTIMS. LAWs must be included as a component of the Master Lesson File (MLF).
5. Previously developed LAWs and LOWs for established courses under review.

STEP 1

Determine Training Requirements

Review the T&R manual to determine what tasks must be taught at the FLC. Tasks with "Initial Training Setting" or "Formal" are taught at the appropriate school. Communication with TECOM Task Analysts is essential. The T&R Manual is the foundation for curriculum development. In some cases, topics that need to be taught at a FLC will not have corresponding events in a T&R Manual. Examples are a course overview or an introduction to a series of tasks being instructed. These lessons are not derived from learning objectives and are designated "Lesson Purpose." Although Lesson Purpose should be minimized since those lessons can not be linked to T&R Events, the overall importance to the effectiveness of the POI must be considered in determining the amount of Lesson Purpose required. Coordination with the Task Analyst is essential in determining if T&R Events need to be added, or if the Lesson Purpose classes are the appropriate solution. See MCO 1553.2_ Ch 1, par. 3.f (3) for guidance on use of Lesson Purpose time.

STEP 2

STEP 3

Analyze the Target Population Description

Before the knowledge, skills, and attitudes (KSAs) are determined, the target population must be analyzed. The TPD is analyzed so that the curriculum developer can make a determination of the KSAs the students will bring into the instructional environment. Instruction must capitalize on students' strengths and focus on those KSAs the students must develop or possess to perform satisfactorily on the job. The goal is for the learning analysis to reveal the instructional needs of the target population so that selected methods and media are appropriate for the student audience.

Record Task Data

Record the data found in the T&R manual. The LAW in Annex O-2 of the MCO 1553.2_ serves as a guide for what information to record. Record the T&R Event including the task, and the conditions and standards associated with the task. Then record each performance step.

STEP 4

Generate Knowledge, Skills, and Attitudes for each Performance Step

When generating knowledge, skills, and attitudes (KSA), analyze each performance step and break it down into a list of KSAs required for each student to perform that performance step. Consideration of the level of detail needed, transfer of learning, target population, and school resources is essential. The method used to identify KSAs is commonly called "brainstorming." Brainstorming is the process used by SMEs and curriculum developers to work together to ensure that KSAs are generated for each task. In order to do this, the differences between knowledge, skill, and attitude must be identified:

STEP 5

KSA – Knowledge, Skill, Attitude.

- a. **Knowledge** is information required to effectively accomplish a step, task, or job. Knowledge involves storing and recalling information and refers to the learning of names, facts, processes, and principles. Examples include "know rifle nomenclature", or "know the format of the operations order".
- b. **Skill** is the ability to perform an activity that contributes to the accomplishment of the step, task, event, or job. Examples include "disassemble a rifle", "organize inventory", etc.
- c. **Attitude** is the feeling or emotion in regard to a fact or state. Since the majority of these cannot be observed or measured within the confines of the instructional setting, they are generally not recorded during the Learning Analysis. The exception is when analyzing the lower levels of Receiving and Responding within the Affective domain.

Knowledge and skills are generated from references for the subject or task, such as an operator's manual, SOP, or user's guide. Also, consider the knowledge and skills that the target population possesses upon entering the course. This will ensure that resources are not wasted on instruction of knowledge and skills that the target population already possesses.

KSAs are brainstormed and recorded with one object and one verb, the words "or" and "and" cannot be used as they would introduce a second object or verb. See Enclosure (1) for a non-exclusive list of action verbs and definitions.

A KSA must be recorded for each performance step to indicate that the step has been analyzed and not overlooked. If no KSA can be generated for the performance step, then record the performance step as the KSA. *These KSAs are an essential part of lesson plan development, as they will become the information contained in the lesson plan.*

Group KSAs

Review all the knowledge and skills generated for the entire event, regardless of the performance step under which they were initially brainstormed. Circle and/or color-code the ones that are duplicative, very similar, or common to one or more performance steps. For each group, answer the question: "What behavior would confirm that the student possesses these skills and knowledge?" Complementary knowledge and skills are grouped to reduce the number of Enabling Learning Objectives (ELO). ***Therefore the number of performance steps usually does not equate to the number of ELOs.*** Record behaviors on a working copy/scratch paper and retain since these behaviors are the basis for developing the ELOs. Also, use the scratch paper for notes and other considerations or decisions that are made.

Specifically, grouped knowledge and/or skills that are beyond the scope of instruction (for more experienced personnel) or are possibly taught elsewhere (in the course or school), still need to be grouped and recorded as the Learning Analysis progresses. For example, if any grouped KSAs identified during the Learning Analysis directly relate to the TPD of the course, they would be designated as "TPD." Additionally, if a grouped KSA is taught in an earlier portion of the course, then it would not need to be re-taught but merely recalled. These grouped KSAs will be designated as delete "del" since they will not be taught in follow-on lessons. However, since these KSAs were identified during the Learning Analysis, they must be recorded for every task. This is critical to ensure that when future modifications to the course are made, key KSA groupings are not lost or dropped from the instruction.

Sequence Groupings

Review the behavior for each individual event and all the groupings of knowledge, skills and/or attitudes. The question to be answered during this step is, "Which grouping(s) of knowledge, skills, and/or attitudes should be taught first?" There are several methods curriculum developers use to sequence and present course material. The developer will use one, or a combination of two or more, of the methods listed below to sequence the groupings.

KSAs are brainstormed and recorded with one object and one verb.



ELO - Enabling Learning Objective.

The number of performance steps does not necessarily equate to the number of ELOs.

TLO- The TLO is verbatim from the T&R Event



Methods used to sequence and present material.

- a. **Whole to Part.** Present the result or product first, and then present the process or each step.
 - b. **Part to Whole.** Present the process or steps first, then teach the final result or product.
 - c. **Simple-to-Complex.** Present concepts that students may be familiar with or that are less complicated, then build on these concepts by presenting newer or more difficult ones.
 - d. **Complex-to-Simple.** Actions are sequenced in terms of decreasing complexity; each associated with the larger complex structure of which it is a part.
 - e. **Chronological.** Present concepts or ideas in the order they occur over time, such as with historical events.
 - f. **Sequential.** Present procedures or steps in the order they are performed on the job.
 - g. **Cause and Effect order.** Actions are sequenced to demonstrate cause and affect relationships. This technique is appropriate for relationships that personnel must commit to long-term memory and for which training environment performance failures can be tolerated.
 - h. **Critical Order.** Actions are sequenced in the order of relative importance, whether from the least important to the most or vice versa, depending on the situation. Tasks favoring this technique are those that require an important action such as "Clear the weapon before starting disassembly."
-
- i. **Known-to-Unknown Order.** Familiar topics are considered before unfamiliar ones. This technique is appropriate in situations where the target audience has some familiarity with the type of action, but the specific action is generally unknown to them. For example, maintenance of military commercial vehicles would precede maintenance of lesser-known military specific vehicles.

Assign a lower case alpha designator to each grouping of KSAs, based on the order that they will be taught.

Under each performance step, assign a lower case alpha designator to each grouping of KSAs, based on the order that they will be taught. For the first group the lower case "a" would be assigned, "b" for the next and so on. If the groupings exceed a to z, continue with aa, ab, ac, etc...

Record Learning Analysis in MCTIMS

MCTIMS is the designated database that the Marine Corps uses for managing instruction. For documentation of the Learning Analysis process, all elements must be recorded into MCTIMS. A Learning Analysis Worksheet (LAW) must be produced for inclusion in the Master Lesson File (MLF). The required components of an MLF are discussed in MCO 1553.2_ Ch 1, par. 6(a). See Annex O-2 of MCO 1553.2_ for the paper-based LAW and Annex O-3 for the Learning Analysis checklist.



DEVELOP LEARNING OBJECTIVES

The learning objective is the first of three primary products of the Learning Analysis. A learning objective is defined as the precise behavior that the student will accomplish under a specified condition, and to a prescribed standard. It is a "contract" between the instructor and the student.

The purpose of a learning objective can be broken down into five areas. All areas should be considered of equal importance. The learning objective should:

-
- ⊙ Tells student what he/she will be able to perform. (Behavior)
 - ⊙ Describes the conditions under which the performance will occur. (Condition)
 - ⊙ Tells how well someone will perform. (Standard)
 - ⊙ Establishes the basis for measurement of the performance.
 - ⊙ Provides a focus for the instructor and the student.
-

What a Learning Objective should do!

COMPONENTS OF A LEARNING OBJECTIVE

Prior to writing a learning objective, it is important to have an understanding of each component: behavior, condition, and standard.

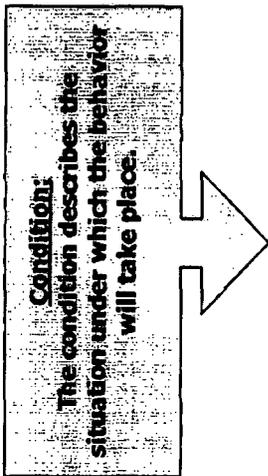
Behavior

The behavior is the action the student is expected to perform after instruction. The behavior must:

- ☑ **Contain one action verb and one object.** To avoid confusion by both the student and the instructor, the behavior needs to state a single action and a single object. For example, "type an electronic mail message." In this example "type" is the action verb, and "message" is the object.
- ☑ **Be free of ambiguity.** When a behavior is observable, measurable, and uses qualifiers when necessary, the behavior will mean the same thing to all students. An action verb must be observable in order to be measurable. It should paint a picture in the student's mind of what must be accomplished. This is true whether it is knowledge or a skill. Some verbs require further explanation. For instance, the verb "describe" requires a qualifier, either "in writing" or "orally." This will eliminate any confusion on the part of the student as to how he will be required to demonstrate the behavior. Examples of other verbs that require qualifiers are "explain," "select," and "list." By qualifying the action statement, the action or the product of that action is made observable. Some verbs are not useful even when qualified. These verbs are impossible to directly observe. For example, a person cannot see someone "know." A person cannot see someone "understand." These words are intangibles. (See figure 3-7 for a comprehensive domain/verb listing)

What must a Behavior Statement do?

- Be stated in student terms.** Instructors must understand that they may already possess knowledge that the student does not. Do not use acronyms or technical terms that could create confusion. Keep it simple, clear, and condse.
- Be a realistic performance of the behavior in the instructional environment.** The behavior must reflect what the student will do within the confines of the instructional environment and should as closely as possible replicate what the student will do on the job.



Condition

The condition describes the situation under which the behavior will take place. Conditions specify the resources provided to the student and the environment in which the student must perform the behavior. Conditions can be broken down into three areas: aiding/limiting, environmental, and implied.

Aiding/Limiting Conditions. A description of what a student will or will not have available to him/her when performing the task. These include references, tools, equipment, job aids, facts, formulas, specific situations, special instructions, and cues. *If the task must be simulated because performance could be hazardous or impracticable to reproduce, then the conditions must reflect this simulation. For example, "in a simulated contaminated environment."*

- Aiding Conditions.** Any information or resource that is available to the student is considered an aiding condition. Some examples are listed below:

Given tools and equipment, tune an engine

Given an observation scenario..., complete a "SALUTE" report

- Limiting Conditions.** Any information or resource that is not available to the student is considered a limiting condition. Some examples are listed below:

Without the aid of references, perform immediate action

While blindfolded, assemble an M16 rifle

Environmental Conditions. Environmental conditions describe the environment in which the student will be performing the behavior. These conditions can be physical or social.

- Physical.** Physical conditions deal with the time of day, weather, location, and facilities. A few examples are listed on the next page.

Aiding Conditions Example

Limiting Conditions Example

During the hours of darkness, navigate from point A to point B...

In mountainous terrain, drive a HMMWV

In a mess galley, bake a cake

**Physical Environmental
Condition Examples**

- Social.** Most learning objectives talk to the student as an individual but they may also identify the student as a member of a team. For example, "*as a member of a machinegun team...*" This is an important aspect of the social environment since the person performing the behavior could be affected by what the other team members do or fail to do.

Implied conditions. Quite often the verb or object in a learning objective will have an implied condition in it. The learning objective, "Without references, drive an LAV over rough, hilly terrain in accordance with the Rough Terrain Checklist," has an implied condition. It implies that the driver will have an LAV, and anything else required to operate it over rough, hilly terrain. For tasks that require the Marine to be equipped with individual equipment, all efforts need to be made to simplify the condition statement with regard to these items. Instead of listing each piece of gear that the Marine would wear, a generic statement such as, "while wearing a combat load" should be used. Clarification of those components that make up a combat load is provided during the lesson or in a reference.

Standard

The standard describes the level of proficiency to which the behavior must be performed. Standards state the quantity and/or quality of acceptable behavior. There are four criteria for a good standard:

- Completeness.** A standard specifies the level of task completion that indicates acceptable performance of the task behavior. For instance, a standard may specify the precise nature of the output, the number of features that the output must contain, the number of steps, points, pieces, etc., that must be covered or produced, or any quantitative statement that indicates an acceptable portion of the total.

For example:

...list 3 of the 5 performance steps.

...tune an engine so that it idles between 900 and 1100 RPMs.

- Accuracy.** A standard indicates what is considered an accurate performance of a task behavior. Standards specify how well the behavior must be performed and are normally contained in references such as Marine Corps Orders, Technical Manuals, and Field Manuals. Only those references that describe in detail an acceptable standard of performance may be cited. If parts of the standard are contained in more than one reference, all references must be cited.

For example:

...solve a mathematical problem to within two decimal points.

...fire the rifle with a minimum score of 25.

- Time.** If the task is time critical, then the minimum time requirement must be specified in terms of days, hours, minutes, or seconds.

For example:

...don the field protective mask within 9 seconds.

...type a letter at a minimum speed of 40 words per minute.

...generate a 5-paragraph order in less than 2 hours.

- Realistic.** The standard must be realistic in order to expect the student to perform the behavior based on the instruction provided. A standard is deemed realistic when the time, accuracy, and completeness criteria allow for successful completion.

To be a standard, these four criteria must be met:
Completeness, Accuracy, Time, and Realistic

RECORD LEARNING OBJECTIVES

The Learning Objective Worksheet (LOW) is a required element of the Master Lesson File (MLF). Refer to MCO 1553.2, Ch 1, par. 6(a) for more information on the required MLF components. The LOW contains the TLO behavior/ELO and, if necessary, a rationale for downgrading. The LOW also contains test/evaluation items for learning objectives and selected methods and media. See MCO 1553.2, Anex O-4 for the LOW and Annex O-5 for the LOW Checklist.

WRITING TERMINAL LEARNING OBJECTIVES

The T&R Manual describes the real-world task the Marine performs in the Operating Forces. Each task in the T&R Manual designated to be taught at the FLC has a corresponding TLO.

It may be determined that modifications to the condition and/or standard may be needed to reflect the actual conditions of the instructional setting and/or the standard by which mastery is measured. In this case, the TLO must be downgraded. Provide downgrade justification and the revised condition and/or standard as required.

Compare Formal learning Center Resources Against the Task List

If the school does not possess the resources to teach the task/event to standard, there are two possible courses of action. The first is to downgrade the behavior and the second is to request additional resources.

If the school is going to downgrade the behavior, then the TLO is modified to accommodate the constraints of the instructional setting. Once the behavior is changed, a downgrade justification must be provided in the Program of Instruction (POI).

Figure 3-6, TLO Construction Flowchart, provides a guide for this decision making process.

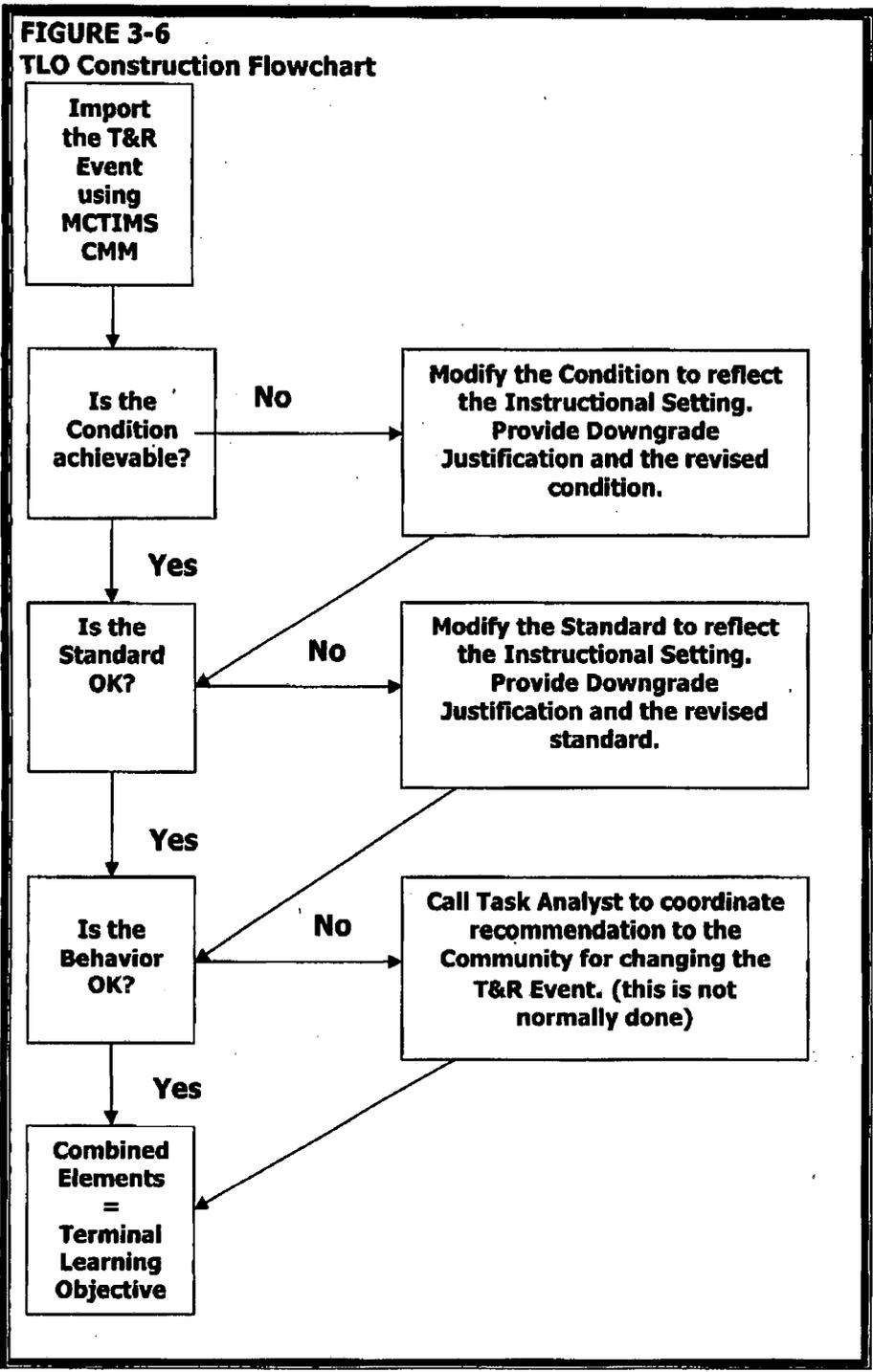
Resources include but are not limited to:

- Time**
- Manpower**
- Facilities**
- Equipment**
- Budget**
- Safety** (The ability to perform the task in an instructional environment safely)

The availability of these will impact how instruction is designed throughout the course.

Determine Evaluation Methods

If the task is performance-based, then performance evaluation of the process, the product, or both needs to occur. If the behavior is knowledge-based, then the evaluation will be written or oral. Since resources are often limited, performance-based evaluation and remediation are not always possible (remediation is not counted as academic time). However, every attempt must be made to secure required resources from TECOM to ensure that training and evaluation replicate actual job conditions and standards.



WRITING ENABLING LEARNING OBJECTIVES

ELOs are written to emphasize teaching points and evaluate student understanding/performance.

ELOs are subordinate to the TLO and are statements of behavior, condition, and standard to achieve the TLO. ELOs are derived from the identified knowledge and skills that are not identified as "TPD" or "DEL" needed by the students to perform the steps identified in the T&R Event. Remember, the number of ELOs is usually not equal to the number of T&R performance steps. There may be more ELOs or less depending on how KSAs were grouped. ELOs are written to emphasize teaching points and to evaluate student understanding/performance. For each grouping of KSAs not labeled as "TPD" or "DEL" an ELO is generated. This supports the building block approach of the SAT, which is the Marine Corps official instructional systems design.

ELOs are determined in the Learning Analysis when a list of required knowledge and skills are generated. One behavior is developed for each grouping of common, similar, or duplicative knowledge and skills that are assigned an "alpha" designator. This behavior is derived by keeping the evaluation method in mind and answering the following question: **"What one behavior will the students perform that confirms they possess the grouped knowledge/skills?"**

As a general rule, since every task performed has a definitive beginning and end, all TLOs should have a minimum of two ELOs. As discussed during the SAT Review Conference there may be specialized cases where a TLO can stand on its own. In these cases specific justification will be required if there are no associated ELOs with a TLO. This is not blanket authorization to submit POIs with TLOs and no associated ELOs. 2000 level career progression courses where the TPD has MOS experience is an example of a course that may have some TLOs with no ELOs. ELOs support the TLO. ELOs provide the level of detail necessary to describe knowledge and skills needed to master the task. TLOs will not be repeated as ELOs since this is contrary to logical learning analysis.

STEP 1

Below is a list of steps for writing ELOs. Figure 3-7 Enabling Learning Objective Construction Flowchart provides a flowchart of these steps.

STEP 2

Document the Behavior

When writing an ELO, the first step is to document the behavior that was identified by each grouping of KSAs. The behavior identified may need to be modified so that it follows the rules of a well-written behavior. Refer to Section 2203 for more information on writing the behavior.

STEP 3

Determine the Condition and Standard

When writing ELOs, modifications to the condition and/or standard may be needed (i.e., the TLO is a performance based objective, however there needs to be a knowledge based ELO in order to master the TLO).

Record Completed Enabling Learning Objective

The final step in writing the ELO is to record it. Like the TLO, the ELO must also be written in the form of a complete sentence. For example: While blindfolded, disassemble the M16 service rifle in four minutes or less. It is critical to ensure that all the Performance Steps of a given T&R Event are covered by the developed ELOs. The best way to accomplish this is to compare the ELOs to the groupings of

KSAs.

DEVELOP TEST ITEMS

The purpose of any test is to find out whether the objectives have been achieved. Test items are designed to determine if the learner has acquired the KSAs to perform an objective or task. Each TLO/ELO must be evaluated. TLOs and ELOs may be evaluated more than once (this is not common practice and must serve a purpose). Evaluation is also critical to maintaining or improving the effectiveness of instruction.

Analyze the TLO/ELO

Learning objectives tell the student what he is expected to know or be able to perform following instruction. Test items are written to assess the student's level of mastery of the learning objective. Prior to writing test items, the Curriculum Developer must analyze the behavior, condition, and standard.



STEP 1

- ☑ **Behavior.** The test item must be written to evaluate whether the student has acquired the knowledge, skills, and/or developed the appropriate attitude required by the learning objective. The verb used in the behavior will either require knowledge or performance. The behavior tells the curriculum developer whether the test will be knowledge-based or performance-based.
- ☑ **Condition.** The condition provides directions to the student on what will be available and under what conditions he/she will be tested. For example, "given a scenario" as a condition statement means to the test developer that a scenario will need to be a part of the test item.
- ☑ **Standard.** The standard establishes the criteria of how well the event is to be performed. The standard, as it is expressed in the learning objective, may need to be reiterated verbatim in the test item or in the test instructions.

The test item is written so that the student will perform the behavior stated in the learning objective, under the conditions specified, and to the established standard.

Determine Type of Test Item

Performance-based and knowledge-based are the two common types of test items used to measure student mastery of learning objectives.

STEP 2

Performance Test Items. Performance test items are used to measure the knowledge of a subject as well as the ability to perform the skills.

A performance test item can evaluate a process, a product, or both. The type of test item that evaluates a process is valuable for tasks where, if the process is not fully evaluated, much could be lost in the evaluation of the final product. For instance, if a student makes a mistake in the process, but the end result is correct, evaluators using this method are aware that a mistake was made. A performance examination that evaluates a product must use specific criteria to measure how well the student meets the desired objective. This type of test item is useful for evaluating tasks that can be performed in a number of different ways and still achieve the desired outcome. It is possible to have a test item that evaluates both the process and product.

PERFORMANCE BASED TEST ITEMS	
Advantages	<ol style="list-style-type: none">1. Can evaluate complex learning objectives that cannot be evaluated with traditional paper-and-pencil test.2. Provides a more natural, direct, and complete evaluation of some types of reasoning, oral, and physical skills.3. Provides greater motivation for students by clarifying goals and making learning more meaningful.4. Encourages the application of learning to "real life" situations.
Limitations	<ol style="list-style-type: none">1. Requires considerable time and effort to use.2. Judgment and scoring performance can be subjective and burdensome, if the evaluator is not knowledgeable in the assessment of the student's performance.3. Evaluation must frequently be done individually, rather than in groups. If evaluation is done in groups, careful allocation of task mastery must be adhered to so that performers are not penalized for non-performers.

Assessment of Student Achievement. By Norman E. Gronlund. p. 137.

Knowledge Test Items:

- True/False
- Multiple Choice
- Matching
- Listing
- Fill-in-the-Blank
- Short Answer
- Labeling
- Essay

Figure 3-8

Knowledge (Cognitive) Test Items. Time, cost, safety, and resource constraints do not always permit performance-based instruction and evaluation. If learning objective behaviors must be adapted and cannot duplicate the behavior, conditions, and standards of the job, the test item still must mirror the learning objective. Once the actual behavior is adapted, a knowledge-based learning objective and written test item are developed. Written test items can still provide realistic scenarios and circumstances, but must measure the stated learning objective. For example, if resource constraints prevent the FLCs from having the students "climb a mountain," an adapted learning objective and corresponding written test item would be to "describe the steps to climb a mountain." Some new information must simply be measured through cognitive evaluation.

Figure 3-8 is a list of the types of knowledge test items. The following paragraphs describe and outline the advantages and disadvantages of each.

- **True/False Test Items.** This type of test item is rarely effective for testing higher-level cognitive skills. It deals mostly with simple factual information and recall. Alone, this test item should not be used for evaluation because a true/false test item always runs a fifty percent chance of being guessed. Therefore, it is not as reliable as other test items. It would not be a good idea to send a graduate from the school out on the job based on evaluations supported solely by true/false test items. The students could have guessed their way to graduation. Another drawback to this item is that it is also extremely difficult to write one correctly. Most true/false items are poorly written. However, when used in conjunction with a short answer test item requiring the student to justify responses, this helps solidify the student's comprehension of the topic/task.

True/False test items are the least preferred method of testing. However, when used in conjunction with a short answer test item, T/F items can help solidify the student's comprehension of the topic/task.

TRUE/FALSE CHOICE ITEMS	
Advantages	
<ol style="list-style-type: none">1. The item is useful for outcomes where there are only two possible alternatives (e.g., fact or opinion, valid or invalid).2. Less demand is placed on reading ability than in multiple-choice items.3. A relatively large number of items can be answered in a typical testing period.4. Complex objectives can be measured when used with interpretive exercises.5. Scoring is easy, objective, and reliable.	
Limitations	
<ol style="list-style-type: none">1. It is difficult to write items beyond the knowledge level that are free from ambiguity.2. Making an item false provides no evidence that the student knows what is correct.3. No diagnostic information is provided by the incorrect answers.4. Scores are more influenced by guessing than with any other item type.	

Assessment of Student Achievement. By Norman E. Gronlund. p. 79.

Multiple-Choice Test Item. This type of test item is versatile and flexible. It is also the most common, and probably the most abused, of all test items. This item can measure a wide range of cognitive abilities ranging from simple recall of information to understanding of complex concepts. It is a quick and easy item to score whether using computerized grading or a paper-based answer key. This is one of the primary reasons this type of test item is seen so much in Formal Schools that process large groups of students. It is time efficient as well as fairly simple to construct if a few rules are followed.

MULTIPLE CHOICE ITEMS	
Advantages	
<ol style="list-style-type: none">1. Learning objectives from simple to complex can be measured.2. Highly structured and clear tasks are provided.3. A broad sample of achievement can be measured.4. Incorrect alternatives provide diagnostic information.5. Scores are less influenced by guessing than true-false items.6. Scoring is easy, objective, and reliable.	
Limitations	
<ol style="list-style-type: none">1. Constructing good items is time consuming.2. It is frequently difficult to find plausible distracters.3. This item is ineffective for measuring some types of problem solving and the ability to organize and express ideas.4. Score can be influenced by reading ability.	

Assessment of Student Achievement. By Norman E. Gronlund. p. 60.

- **Matching Test Item.** A matching test item is used to measure a student's ability to recognize facts and discriminate among related or similar items. Matching test items normally use two columns of related items, and students are required to match a series of items listed in one column with related items in the other column. It provides a way to test various knowledge factors simultaneously.

Always have more responses than premises. This keeps the student from ascertaining correct responses by process of elimination.

MATCHING ITEMS	
Advantages	
<ol style="list-style-type: none">1. A compact and efficient form is provided where the same set of responses fit a series of item stem (i.e., premises).2. Reading and response time is short.3. This item type is easily constructed if converted from multiple-choice items having a common set of alternatives.4. Scoring is easy, objective, and reliable.	
Limitations	
<ol style="list-style-type: none">1. This item type is largely restricted to simple knowledge objectives based on association.2. It is difficult to construct items that contain a sufficient number of responses that are of similar kind or nature.3. Susceptibility to irrelevant clues is greater than in other item types.	

Assessment of Student Achievement. By Norman E. Gronlund. p. 85.

Listing Test Item. A listing test item measures the student's knowledge of information presented during instruction. This item requires the student to list a specified number of items in response to a question. Listing test items should not be used if the student's grammar skills are not at the appropriate level (refer to TPD).

LISTING ITEMS	
Advantages	
<ol style="list-style-type: none">1. Easy to write.2. Guessing is less likely than in selection-type items.3. Preparation time is less than that for selection-type items.	
Limitations	
<ol style="list-style-type: none">1. It is difficult to phrase statements so that only one answer is correct.2. Scoring is contaminated by spelling ability.3. Scoring is tedious and time-consuming.	

- **Fill-in-the-Blank Test Items.** This type of item tests the student's knowledge and/or comprehension of information presented during instruction. A fill-in-the-blank test item requires the student to write a short answer in the blanks provided within the statement/question. The maximum number of blanks should be limited to two within a question or statement. Fill-in-the-blank test items are written as statements and do not require an action verb. Fill-in-the-blank test items do not test the student's ability to organize thoughts and ideas, and are not useful for problem solving.

- **Short Answer Test Items.** A short answer test item is used to evaluate the student when recall is important. Short answer is referring to a one word, number, or very short phrase type of response. The student creates the answer. Short answer test items are good to use, as they do not have a list to select from or something to help jog the student's memory. This type of item is unsuitable for complex learning.

FILL IN THE BLANK/SHORT ANSWER ITEMS	
Advantages	
<ol style="list-style-type: none">1. Easy to write.2. Guessing is less likely than in selection-type items.3. Well suited to computational problems and other learning outcomes where supplying the answer is important.4. A broad range of knowledge outcomes can be measured.	
Limitations	
<ol style="list-style-type: none">1. It is difficult to phrase statements so that only one answer is correct.2. Scoring is contaminated by student's spelling ability.3. Scoring is tedious and time-consuming.4. Not very adaptable to measuring complex learning objectives.	

Labeling Test Items. Labeling or identification test items are used to measure a student's ability to recall facts and label parts in pictures, schematics, diagrams, or drawings. This form of test is most often used to measure recognition of equipment components or other concrete objects. It has wide application when teaching complex processes, especially via Interactive Multimedia Instruction (IMI).

LABELING ITEMS
Advantages
<ol style="list-style-type: none">1. Tests student's visual recognition of equipment components or other concrete objects.2. Guessing is unlikely.3. Scoring is easy.
Limitations
<ol style="list-style-type: none">1. Must have a good diagram, sketch or illustration to be effective.2. Scoring is contaminated by student's spelling ability.

Essay Test Items. The essay test item is fairly simple to produce by the instructor and requires complex thought by the student. It differs from the test items covered so far in that it generally requires the student to communicate the response to the evaluator in his or her own words. The nature of the test item makes it one of the most difficult for a student to complete and also, by far, the most difficult to evaluate. The evaluator is also often required to make a subjective assessment on whether the student has communicated the correct response. It is critical that the student clearly understand the requirements of the learning objective, and that the instructor replicate the learning objective in the essay test item. Essay test items are usually used for learning objectives that are not readily measurable such as certain mental skills like judging, problem solving, evaluating, and analyzing to name just a few.

ESSAY ITEMS
Advantages
<ol style="list-style-type: none">1. The highest level learning outcomes (analysis, synthesis, evaluation) can be measured.2. Preparation time is less than that for selection-type items.3. The integration and application of ideas is emphasized.
Limitations
<ol style="list-style-type: none">1. Each question is time intensive for measuring or achieving each learning objective.2. It is difficult to relate to intended learning outcomes because of freedom to select, organize, and express ideas.3. Scores are raised by writing skill and bluffing and lowered by poor handwriting, misspelling, and grammatical errors.4. Scoring is time consuming, subjective, and tends to be unreliable.

Assessment of Student Achievement. By Norman E. Gronlund. p. 103.

STEP 3

Write Test Items

Once the decision has been made on the type of test most appropriate to use for an objective, the Curriculum Developer must write the test item(s). During this step, the Curriculum Developer is writing test items to be recorded on the LOW. Grading criteria and the construction of the test occurs in the Develop Phase. Refer to Section 3500 for information on Constructing Tests. Each type of test item has different sets of guidelines to follow. Following these guidelines will assist the Curriculum Developer to write valid test items.

Writing Performance-Based Test Items. This involves stating the performance objective, creating the checklist (if applicable), instructions to the evaluator, and instructions to the student.

For an example of a performance-based test item see Figure 3-9.

When developing performance test items, use the following steps:

- 1. State the performance objective as a brief description of what the student must accomplish for successful completion of the performance test.**
 - 2. List steps/activities/behaviors (process) or characteristics (product).**
 - 3. Note common errors that are made when using the checklist.**
 - 4. Arrange the activities or steps and characteristics in correct order.**
 - 5. Review the checklist for accuracy and completeness.**
-

Checklist. Performance test items, which require the student to perform a task, usually have the format of a checklist. The checklist is developed to correspond to the steps or activities of the task being performed and the underlying knowledge and skill elements. Checklists need to be detailed. This may help identify precisely what occurred during performance. The checklist should identify elements that have been taught and measure the behavior. Ensure that **all** the criteria are included so that the evaluator will be able to tell how well the student meets the objective. A checklist can be either a YES/NO (Mastery/Non-mastery) checklist or a scaled credit checklist with points for each specific action that the student performs. The FLC will identify which of these will be used in the overall evaluation of the student (See scoring and grading in Test Construction, Section 3504). Additionally, a determination of whether the student should have the checklist when being evaluated must be made.

➤ **Process Checklist.** When a performance test requires the steps or activities to be rated, a process checklist is used. The process checklist should contain all of the essential steps or activities required for successful performance. Process checklist construction guidelines are as follows:

1. Use when the performance of steps or activities of a task is to be evaluated.
2. The steps or activities must be observable.
3. Define all of the steps or activities of the task being performed.
4. Sequence steps or activities in order of performance.
5. Provide space for "checking" the performance of each step or activity.
6. Provide space for recording and describing errors.

Instructions to the Evaluator

- The instructions specify all the information required by the evaluator to include the planning and set-up of the exam, ensuring required student materials are at hand, matching the conditions stated in the learning objective to perform the behavior.
- The instructions cover what the evaluator needs to evaluate the student, such as checklists, tools, etc.
- The instructions additionally state any start/stop signals, safety considerations, time limits that the instructor should emphasize to the student. Administrative information such as disposition of the completed evaluation needs to appear in the instructions, if necessary.
- The instructions must be detailed enough to cover everything the evaluator needs to know or do to make the evaluation happen.

Instructions to the Student. Instructions include student directions, specifically any start/stop directions, any safety considerations, time limits, and how the performance will be evaluated. The instructions to the student must be clear to ensure that every student is evaluated on the ability to perform the behavior stated in the learning objective.

The instructions to the student must be clear to ensure that every student is evaluated on the ability to perform the behavior stated in the learning objective.

**FIGURE 3-9.
Sample Performance
Checklist**

Enabling Learning Objective: Without reference, given an M16 rifle, disassemble the rifle in 30 seconds in accordance with the procedures listed on pages 2-29 to 2-32 of FMFM 0-8.

Test Item:

1. **Instructions to the Evaluator:** Ensure you have an adequate training facility to conduct testing. Also, ensure the student has an M16 rifle. Inform the students that they have 30 seconds to disassemble the rifle. Inform students that if the time limit is not adhered to or he/she misses a step, the student will be given remedial training and retested. If the student fails a second time, he/she will be recommended for an academic review board. Ask the students if they have any questions. Tell the students to begin and evaluate the students by using the checklist provided. Once the test is completed, let the students know if they passed, send them to their next test station (if applicable), and turn completed checklist into Academics Chief.

2. **Instructions to the Student:** When the instructor says begin, disassemble the rifle. You have 30 seconds. You will be evaluated using a performance checklist detailing the disassembly procedures of an M16 rifle in accordance with FMFM 0-8. If you fail to complete this task in the time given you will receive remedial training. If you miss a step in the process you will receive remedial training. After completion of remedial training, you will be retested. If you fail to pass the second attempt, you will be recommended for an academic review board. Do you have any questions? You may begin.

3. Performance Checklist	YES	NO
a. Cleared the rifle.	___	___
b. Removed the sling.	___	___
c. Removed the handguards.	___	___
d. Separated rifle into two main groups.	___	___
e. Removed the charging handle.	___	___
f. Disassembled bolt carrier group.	___	___
1) Removed firing pin retaining pin.	___	___
2) Removed the firing pin.	___	___
3) Removed cam pin.	___	___
g. Disassembled the weapon in 30 seconds or less.	___	___

Writing Knowledge-Based Test Items

Writing True/False Test Items. True/False items are comprised of statements rather than questions. The item must be directly related to a learning objective. True/False items are designed to test knowledge, which means that they should be related to "knowledge" (Know-How-To or Know) from the learning analysis. Guidelines for writing true/false test items are as follows:

1. Include only one idea in each statement.
2. Place the crucial element at or near the end of the statement.
3. Avoid using negatives such as "no" or "not." They tend to confuse students.
4. Do not use absolutes such as "all," "every," "none," and "never."
5. Do not use statements containing "some," "any," and "generally."

Below is a checklist that can be used to evaluate true/false test items.

TRUE/FALSE ITEMS CHECKLIST		
	YES	NO
1. Is this type of item appropriate for measuring the learning objective?		
2. Does each statement contain one central idea?		
3. Can each statement be undisputedly judged true or false?		
4. Are the statements brief and stated in simple, clear language?		
5. Are negative statements used sparingly and double negatives avoided?		
6. Are statements of opinion attributed to some source?		
7. Is there approximately an even number of true and false statements?		
8. When arranged in the test, are the true and false items put in random order?		

Assessment of Student Achievement. By Norman E. Gronlund. p. 85.

Enabling Learning Objective:	
Without the aid of the reference, given a M16 service rifle, associated equipment and ammunition, identify "make safe" procedures in accordance with the FMFM 0-8.	
Test Item: When given the command to "make safe," the shooter will place the M16 service rifle in Condition 3.	True False _____

Figure 3-10 Sample True False Test Item

Incomplete Stem:

_____ is the first step in disassembling the M16.

Complete Stem: When disassembling the M16, what is the first step?

Correct response:

c. Clear the weapon.

Distracters:

a. Take out the buffer.

b. Take off the hand guards.

c.

d. Take off the Lower receiver.

Components of a Multiple Choice Test Items. Before getting into the rules for writing this type of test item, the various components of a multiple-choice test item need to be discussed. There are three basic components to this test item: the stem, the responses, and the distracters.

- a. **Stem.** The stem is a statement of the problem and should be worded in simple and understandable terms. Wording should be appropriate to the subject matter and to the group being tested. The solution to the problem should not depend upon the student's ability to translate complex sentence structure contained in the stem. Basically, there are two types of stems: the incomplete statement or the complete statement (usually in the form of a question).
- b. **Responses.** Apart from the stem, the test item also consists of several possible answers or responses; only one of which is to be accepted as the correct response. There are only two types of responses, the correct response and alternative responses. Alternative responses are also known as distracters.
- c. **Distracters.** Distracters are incorrect alternative responses to the question, however, all distracters are worded to be believable. Using commonly mistaken ideas and common misconceptions concerning the subject matter can best compose distracters. Care should be taken in forming the distracters. Distracters should not be designed to deceive students; rather, they are designed so that a student who does know the material will clearly know that the distracter is an incorrect answer. The student who does know the material should be able to select the correct response. Do not fall into the trap of presenting the student with a choice between several "correct" responses.

Writing Multiple Choice Test Items. Multiple choice test items are used to test facts and application of rules and procedures. They may also be used to test discriminations and problem solving. Guidelines for writing multiple choice test items are as follows:

1. Do not use the articles "a" and "an" at the end of the stem; this tends to indicate the correct answer.
2. All responses should follow grammatically from the stem.
3. All responses should be of approximately the same length.
4. All responses should have a similar grammatical structure.
5. All responses should use similar terminology.
6. Provide as many responses as necessary but normally four.
7. Position the correct response randomly throughout the test.
8. Ensure that there is only one correct answer.
9. Distracters should be plausible (believable) but incorrect.
10. Logically order all responses. Examples are smallest to largest, chronological order, or whatever makes sense.
11. Underline or CAPITALIZE all negatives and "in sequence" words. It is best if negatives are not used in the stem.
12. Ensure that all items are independent from other items. No hints at the answer to other test items should be in any item.
13. Avoid "all of the above," "none of the above," or "A and B only" in responses. This kind of response reduces the validity and reliability of test items.
14. Avoid the use of absolutes such as "never" or "always" since they tend to assess the student's attention to detail rather than the subject.
15. Never use double-negatives or double-talk, such as "What response is never true?"

Enabling Learning Objective: Without the aid of reference, select in sequence the basic steps for performing preventive maintenance on the M16 service rifle in accordance with FMFM 0-8.

Test Item: IN SEQUENCE, select the basic steps for performing preventive maintenance on the M16 service rifle.

- a. Disassemble, clean, lubricate, inspect, reassemble, clear, perform functions check.
- b. Clear, disassemble, clean, inspect, lubricate, reassemble, perform functions check.
- c. Disassemble, clean, reassemble, lubricate, perform function check, clear, inspect.
- d. Clear, disassemble, clean, inspect, reassemble, lubricate, perform functions check.

Figure 3-11. Sample Multiple Choice Test Item

MULTIPLE-CHOICE ITEMS CHECKLIST		
	YES	NO
1. Is this type of item appropriate for measuring the intended learning objective?		
2. Does the item task match the learning task to be measured?		
3. Does the stem of the item present a single, clearly formulated problem?		
4. Is the stem stated in simple, clear language?		
5. Is the stem worded so that there is no repetition of material in the alternatives?		
6. Is the stem stated in positive form wherever possible?		
7. If negative wording is used in the stem, is it emphasized (by underlining or caps)?		
8. Is the intended answer correct or clearly best?		
9. Are all alternatives grammatically consistent with the stem and parallel in form?		
10. Are the alternatives free from verbal clues to the correct answer?		
11. Are the distracters believable (plausible) and attractive to the uninformed?		
12. To eliminate length as a clue, is the relative length of the correct answer similar to that of the distracters?		
13. Has the alternative "all of the above" been avoided and "none of the above" used only when appropriate?		
14. Is the position of the correct answer varied so that there is no detectable pattern?		
15. Does the item format and grammar usage provide for efficient test taking?		

Assessment of Student Achievement. By Norman E. Gronlund, p.75.

Writing Matching Test Items. A matching test items contains a list of premises (items that require responses), a list of responses (possible answers), and a brief explanation of how the premises and response are related. Guidelines for writing matching items are as follows:

1. Provide, clear, concise directions on how to match the items in the two columns.
2. Indicate whether the responses may be used more than once.
3. Limit test items to a single area of choices to a single subject category.
4. Arrange the responses in the same logical order.
5. The responses and premises should have parallel grammatical construction.
6. Keep each list of premises and responses as brief as possible. It is recommended to have no more than ten items.
7. Always have more responses than premises.
8. The entire matching test item should be kept on the same page.

Enabling Learning Objective: Without the aid of reference, identify the individual components of the three main groups in a M16 service rifle per TM 05538C-10/1.

Test Item: Column A contains the three main groups of the M16 service rifle and column B contains a list of individual rifle components. Match the components to its main group.

A	B
___ Upper receiver	a. Hand guards, rear sight, ejection port.
___ Lower receiver	b. Bolt, firing pin, cam pin.
___ Bolt carrier group	c. Slide, half cock notch, ejector.
	d. Selector switch, magazine release, trigger.

Figure 3-12. Sample Matching Test Item

MATCHING ITEMS CHECKLIST		
	YES	NO
1. Is this type of item appropriate for measuring the intended learning objective?		
2. Does the item task match the learning task to be measured?		
3. Does each matching item contain only similar material?		
4. Are the lists of items short with the brief responses on the right?		
5. Is an uneven match provided by making the list of responses longer or shorter than the list of premises?		
6. Are the responses in alphabetical or numerical order?		
7. Do the directions clearly state the basis for matching and that each response can be used once, more than once, or not at all?		
8. Does the complete matching item appear on the same page?		

Assessment of Student Achievement. By Norman E. Gronlund. p. 87.

Writing Listing Test Items. A listing test item requires the student to list a specified number of items in response to a question. For example, a student may be asked to list the seven basic steps for performing preventative maintenance on the M16. Listed below are a few guidelines to keep in mind when writing a listing test item.

1. The student should always be told the number of items to be listed.
2. A listing test item can cover a complete procedure; such as, the steps in the process of disassembling the M16.
3. If the sequence of the process is important for the student to know, then "in sequence" should be highlighted or printed in bold text. For instance, if a Marine was being tested on failure to fire procedures before going to the rifle range, then "in sequence" would be very important.
4. Provide blanks of the same length at a length long enough for the student's answers.

Learning Objective: Without the aid of reference, list in sequence the five phases of the SAT process in accordance with the SAT.

Test Item: List IN SEQUENCE the five phases of the SAT process.

Figure 3-13. Sample Listing Test Item

Writing Fill in the Blank Test Items. A fill in the blank test item requires the student to recall facts and supply one or more key words that have been omitted from the statement. When placed in the appropriate blanks, the word(s) make the statement complete, meaningful, and true. Listed below are a few guidelines to keep in mind when writing a listing test item.

1. Leave blanks for key words only.
2. Keep items brief.
3. Make all blanks approximately the same size.
4. Grammatical cues to the correct answer, such as the articles "a" and "an" just before the blank, should be avoided.
5. Ensure that only one correct answer is possible for each blank.
6. Ensure that the sentence has enough context to cue the correct response.

Enabling Learning Objective: Without the aid of the reference, describe in writing the performance characteristics of the M16 service rifle in accordance with TM 05538C-10/1.

Test Item: The maximum effective range of the M16 service rifle is _____ meters at individual/point targets and _____ meters at area targets.

Figure 3-14. Sample Fill In The Blank Test Item

Short Answer Test Items. Listed below are a few guidelines to keep in mind when writing a short answer test item.

1. Phrase the item so that the required response is concise.
2. May use a question or a statement.
3. Provide space for student to answer.
4. Provide same amount of space for each answer.

Enabling Learning Objective: Without the aid of reference, describe in writing the performance characteristics of the M16 service rifle in accordance with TM 05538C-10/1.

Test Item: State the cyclic rate of fire for the M16 service rifle.

Figure 3-15. Sample Short Answer Test Item

SHORT ANSWER/FILL IN THE BLANK ITEMS CHECKLIST		
	YES	NO
1. Is this type of item appropriate for measuring the intended learning outcome?		
2. Does the item task match the learning task to be measured?		
3. Does the item call for a single, brief answer?		
4. Has the item been written as a direct question or a well-stated incomplete sentence?		
5. Does the desired response relate to the main point of the item?		
6. Have clues to the answer been avoided (e.g., "a" or "an," length of the blanks)?		
7. Are the units and degree of precision indicated for numerical answers?		

Assessment of Student Achievement. By Norman E. Gronlund. p.99.

Labeling Test Items. Listed below are a few guidelines to keep in mind when writing a labeling test item.

1. Make all sketches, drawings or illustrations clear and of sufficient size. If possible, use the actual parts of a unit.
2. Provide sufficient information to indicate what the equipment is and which part is to be labeled.
3. The parts to be labeled or identified should be clearly pointed out by using lines or arrows.
4. Ensure that only one definite answer is possible.

Recording Test Items

Test items are recorded on the Learning Objective Worksheet (LOW), which is a required document of the Master Lesson File (MLF). Refer to MCO 1553.2 Chap 1 para 6 on the required MLF components. See MCO 1553.2_ Appendix O-4 for the LOW and Appendix O-5 for the LOW Checklist. Entering test items into MCTIMS will facilitate the automated grading/scoring of tests, tracking of GPAs (if applicable), and test item analysis (discussed in Section 5300 of this manual).

SELECT INSTRUCTIONAL METHODS

An instructional method is the approach used to present instruction. The method selected will have a direct impact on both the quality of the training system and its cost effectiveness. Any given lesson will probably incorporate two or more methods to serve different purposes at different points in the progression of the lesson.



STEP 1

Consider the Advantages and Limitations of Methods

In order to evaluate instructional methods, consideration of the advantages and limitations inherent to each is required. Twelve major types of instructional methods are characterized below. Lecture, demonstration and practical application are three of the most common methods. They are easily remembered as "tell, show, do."

INSTRUCTIONAL METHODS	ADVANTAGES	LIMITATIONS
<p><u>Lecture (Formal, Informal, Briefing, Guest).</u> Formal lecture involves one-way communication used for reaching large audience in a classroom setting. Informal lecture involves considerable interaction between the instructor and student in both the form question and discussion.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Ideal for presenting many ideas in a short time. <input checked="" type="checkbox"/> Suitable for introducing a topic. <input checked="" type="checkbox"/> Convenient for instructing large groups. <input checked="" type="checkbox"/> Supplementing material from other sources. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Does not provide an avenue for the instructor to estimate student progress. <input checked="" type="checkbox"/> No active participation by students. <input checked="" type="checkbox"/> Dependent on the instructor's speaking skills. <input checked="" type="checkbox"/> Not responsive to individual needs of students. (Informal lectures however, accommodate these concerns)
<p><u>Indirect Discourse (Panel Discussion, Dialogue, Teaching Interview).</u> Involves verbal interaction among two or more persons, which is seen and heard by students. Some example include, dialogue, a teaching interview, a panel discussion (debate), skits, playettes, and other dramatizations.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Can effectively be used for extremely large groups. <input checked="" type="checkbox"/> Facilitates higher level cognitive skills. <input checked="" type="checkbox"/> Class size is not an issue with this method. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Does not permit students' needs to be satisfied. <input checked="" type="checkbox"/> Instructors cannot gauge if learning has transferred. <input checked="" type="checkbox"/> Requires a high level of instructor expertise to be effective. <input checked="" type="checkbox"/> Recommended method to reach high levels of learning. <input checked="" type="checkbox"/> Evaluation is not inherent in method. <input checked="" type="checkbox"/> Not responsive to individual needs of students.
<p><u>Demonstration.</u> This instructional method is used to allow students to observe instructors perform a sequence of events. It is designed to teach a procedure, technique, or operation.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Enables performance standards to be demonstrated. <input checked="" type="checkbox"/> Provides immediate feedback. <input checked="" type="checkbox"/> Method may be tailored during instruction. <input checked="" type="checkbox"/> Responsive to individual needs. <input checked="" type="checkbox"/> Extremely effective when used in conjunction with lecture or prior to practical application. <input checked="" type="checkbox"/> Evaluation is inherent in method. <input checked="" type="checkbox"/> Instructors can tell if learning has transferred. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Time consuming to develop and requires a great deal of preparation. <input checked="" type="checkbox"/> Requires a high level of expertise. <input checked="" type="checkbox"/> Instructor must be able to anticipate student error. <input checked="" type="checkbox"/> Best conducted in small groups. <input checked="" type="checkbox"/> Success is dependent on demonstrator skills.
<p><u>Reading (Books, Reference Publications, Web-based Material, Manuals, Handouts).</u> The assignment to a student or printed materials including books, periodicals, microfilms, manuals and regulations, and handouts.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Most effective and time efficient means of presenting material. <input checked="" type="checkbox"/> Students progress at own pace. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Not responsive to individual needs. <input checked="" type="checkbox"/> Dependent on availability of resources. <input checked="" type="checkbox"/> Evaluation is not inherent in method. (Should be used as a supplement with formal Marine Corps curricula. In cases of entry-level should be used sparingly.)

INSTRUCTIONAL METHODS	ADVANTAGES	LIMITATIONS
<p><u>Self-Paced (Programmed, Modular, Computer Assisted, Mediated).</u> 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 include, programmed instruction (paper and computer), modular instruction (prepackaged units of instruction containing clear statement of objectives, computer-assisted instruction (computer used as vehicle for interaction), and mediated instruction (slides, film, tapes, and cassettes).</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Accommodates learning rates. <input checked="" type="checkbox"/> Provides immediate feedback. <input checked="" type="checkbox"/> Responsive to individual needs. <input checked="" type="checkbox"/> Evaluation is inherent the method. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Has rigid rules and requires considerable development time. <input checked="" type="checkbox"/> Instructor experience must be high to utilize this method effectively. <input checked="" type="checkbox"/> Directed towards individual learning.
<p><u>Questioning (Socratic Method, Student Query).</u> Questioning as a method is used to emphasize a point, stimulate thinking, keep students alert, check understanding, review material, and seek clarification. Examples of this method are the Socratic method (instruction by asking students questions), and student query (students asking questions).</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Reaches higher levels of learning. Stimulates higher order thinking. <input checked="" type="checkbox"/> Effective at developing mental skills. <input checked="" type="checkbox"/> Evaluation is inherent this method. <input checked="" type="checkbox"/> Responsive to individual needs and differences. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Will not work if students are unfamiliar with the topic. <input checked="" type="checkbox"/> Requires a high level of instructor expertise to be used effectively. <input checked="" type="checkbox"/> Lends itself best to one-on-one or groups of 8-12 for instruction.
<p><u>Discussion-Non Directed (Peer Controlled Seminar Free Discussion).</u> Non-directed discussion is an individual/group interactive process in which task or objective-related information and experiences are evoked from a student or the group. This method places the responsibility for learning on the students through their participation.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Works best if students have experience with lesson topic. <input checked="" type="checkbox"/> Responsive to the individual needs of students. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Danger the seminar method will pool ignorance. <input checked="" type="checkbox"/> Natural leaders of the class may dominate discussion. <input checked="" type="checkbox"/> Instructors play a limited/passive role. <input checked="" type="checkbox"/> Recommended for both lower and higher level cognitive skills. <input checked="" type="checkbox"/> Most effective for small groups of 8-12 students. <input checked="" type="checkbox"/> Evaluation not inherent in method.

INSTRUCTIONAL METHODS	ADVANTAGES	LIMITATIONS
<p>Guided Discussion. Guided discussion provides interaction among students and instructors. This instructional method develops concepts and principles through a group process and the unobtrusive guidance of the instructor.</p>	<ul style="list-style-type: none"> ☑ Involves interaction by all. ☑ Allows students to exchange ideas, values, and attitudes. ☑ Responsive to the individual needs of students. ☑ Effectively used for teaching in the Affective Domain. 	<ul style="list-style-type: none"> ☑ Not recommended for simple recall of information. ☑ Effective utilization of this method requires a high level of instructor expertise. ☑ Instructors must be able to judge value of student responses. ☑ 8-12 students is the optimum size to conduct a guided discussion. ☑ Evaluation is not inherent with this method.
<p>Practical Application. Individual Projects. Students interact with things, data, or persons as necessary to develop the skills to master the learning objectives.</p>	<ul style="list-style-type: none"> ☑ Provides student's maximum flexibility to practice and demonstrate acquired skills in a controlled setting. ☑ Method combines well with other methods. ☑ Evaluation is inherent this method. ☑ Responsive to student's special weaknesses, interests, and needs. 	<ul style="list-style-type: none"> ☑ Time consuming. ☑ Require supervision and informal evaluation by the instructor. ☑ Can take place outside the classroom. ☑ Students need to acquire mastery for this method to be effective. ☑ One of the best methods for ensuring learning at higher levels of application, analysis, and evaluation. ☑ High level of instructor expertise ☑ Designed for individual instruction.
<p>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 objectives. Typically used for affective purposes rather than for measurable cognitive development.</p>	<ul style="list-style-type: none"> ☑ Students encounter real settings appealing to all senses. ☑ Method is highly recommended for reaching the affective domain. 	<ul style="list-style-type: none"> ☑ May require extensive logistical considerations. ☑ Instructor must be at the comprehension level. ☑ Not typically used as much for cognitive development. ☑ Evaluation not inherent in the method ☑ Not responsive to individual needs.

INSTRUCTIONAL METHODS	ADVANTAGES	LIMITATIONS
<p>Simulations (Role-playing Games). Simulations are low risk, educational experiences, which substitute for some real life situation. It may involve groups or whole units. Some kinds of simulations are role playing, in-basket exercises (used in random order to simulate a series of matters or decisions which a leader might actually encounter), organizational or management games- students manipulate an organization or some component part to produce certain outcomes, hardware simulations (students use trainers that resemble, to some degree, the equipment that is to be used on the job; e.g. flight simulator and virtual reality).</p>	<ul style="list-style-type: none"> ☑ Low risk and effective as capstone methods following a block of instruction. ☑ Students can operate at the highest cognitive level in a low-risk environment. ☑ Student weaknesses and strengths can be quickly identified and worked with. ☑ Recommend few students per instructor ☑ Evaluation is inherent in the method. ☑ Responsive to students needs. 	<ul style="list-style-type: none"> ☑ Not usually recommended for imparting knowledge to students. ☑ Knowledge is presumed to be prerequisite for this method. ☑ Elaborate versions may require special equipment. ☑ Few students per instruction during simulation itself. ☑ Simulation areas are of various sizes and configurations. ☑ Requires trained staff to conduct.
<p>Case Study. A learning experience in which students encounter a real-life situation in order to achieve some education objective.</p>	<ul style="list-style-type: none"> ☑ Students develop new insights into the solution of specific on-the-job problems. ☑ No follow-up evaluation is necessary ☑ Responsive to student's needs, differences, and creativity. ☑ Evaluation is inherent in the method. 	<ul style="list-style-type: none"> ☑ Can be time consuming. ☑ One of the best methods for reaching higher levels in the cognitive domain ☑ Students must have thorough understanding at the comprehension level prior to starting. ☑ Level of instructor expertise is high. ☑ Size of class is normally small, but may accommodate larger groups.
<p>Coaching. A learning experience where face-to face interaction occurs between the instructor and the student in order to meld individuals with diversified backgrounds, talents, experience and interests; encouraging them to accept responsibility and seek continued improvement and achievement.</p>	<ul style="list-style-type: none"> ☑ Enhances learning and enables performance standards to be demonstrated. ☑ Provides immediate feedback. ☑ Responsive to individual needs. ☑ Extremely effective when used in conjunction with lecture or prior to practical application. ☑ Evaluation is inherent in the method. 	<ul style="list-style-type: none"> ☑ Time consuming to develop. ☑ Requires a great deal of preparation. ☑ Requires a high level of expertise. ☑ Instructor must be able to anticipate student error. ☑ Best conducted in small groups or individually. ☑ Accommodates evaluation and instructors can tell if learning had transferred.

Review Method Considerations

In addition to considering the advantages and limitations of each method, the Curriculum Developer must review the following: learning objectives, TPD, adult learning principles, and resource constraints.



Learning Objectives. The method choice must complement the kind of learning to be undertaken by the students (e.g. cognitive, affective, psychomotor). Based upon the domain and the level required by the learning objective, methods of instruction are chosen that will enable students to perform at the specified level. A combination of methods work best.

For example: If the terminal learning objective required learners to assemble a piece of equipment, then the informal lecture method alone is inadequate to teach that particular skill. Since the objective is a motor skill, students would benefit by adding demonstration and practical application.

Target Population Description (TPD). Consider the level of motivation, background, knowledge, and skill level of the target population.

For example: Since the case study method requires the learners to analyze and evaluate the subject matter, then case study method would not be the appropriate method for students with no prior knowledge.

Consider Adult Learning Principles. Typically, adults are self-directed learners and bring their own experiences to the classroom. Research has shown that they learn best:

- through problem-based learning.
- in small groups.
- when challenged.

NOTE: The TPD must also be considered along with these principles.

For example: If the course is entry level, the students may not bring a lot of experience to the classroom and problem-based learning may not be appropriate. Also, courses for entry-level students are generally large in size, which may not allow for certain interactive methods.

Resource Constraints. Although resource constraints should not be the primary factor in determining instructional methods, availability of resources must be considered. This can include minimum level of instructor experience, class size, evaluation potential, and the ability to meet the individual needs of students.

For example: If the Curriculum Developer wanted to use the demonstration method to show students how to field strip various weapons, experience level of the instructors would need to be considered. In this particular case, instructor experience must be high in order for the demonstration to be successful.

STEP 3

Select Method

Select the appropriate method after reviewing method considerations.

STEP 4

Record Instructional Methods

The instructional method chosen is recorded in MCTIMS for printing on the Learning Objective Worksheet (LOW) and the Concept Card.

STEP 1

SELECT INSTRUCTIONAL MEDIA

In any instructional situation there is a message to be communicated. Video, television, diagrams, multimedia, computers, and printed material are examples of media used to communicate the message. Appropriate media ensures that information is presented to students by the most effective and cost-efficient means possible.

The Curriculum Developer should select a media mix that is best suited for the TPD. Selection of media types should also take into consideration theories of adult learning.

Consider the Advantages and Limitations of Media

Media have various characteristics that make them either suitable or unsuitable for particular training situations. Consider the characteristics listed in Figure 3-18 carefully to ensure that the appropriate media are selected for the instructional system.

See Media Figure 3-18 on the next page.

MEDIA CHARACTERISTICS	ADVANTAGES	LIMITATIONS
<p>Printed Materials. Printed material must be kept simple, yet meaningful; displaying only small amounts of information.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Easily constructed. <input checked="" type="checkbox"/> Easily duplicated. <input checked="" type="checkbox"/> Effective for indoor use. <input checked="" type="checkbox"/> May be enlarged, displayed, or distributed to students as a handout. <input checked="" type="checkbox"/> Low cost. <input checked="" type="checkbox"/> Readily available. <input checked="" type="checkbox"/> Computer-generated graphics and charts can be easily revised. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Can not be tailored to needs of students during instruction. <input checked="" type="checkbox"/> Can only be used outdoors if weather permits. <input checked="" type="checkbox"/> Time consuming if images are illustrations or photographs, or digital images. <input checked="" type="checkbox"/> Flat pictures cannot be revised.
<p>Chalkboards and Dry Erase boards. Common presentation media tools that are familiar to instructors and students alike.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Easy to prepare and use. <input checked="" type="checkbox"/> May be used to show development or buildup of an event or display. <input checked="" type="checkbox"/> Allow information to be tailored during instruction. <input checked="" type="checkbox"/> Effective when instruction calls for great deal of writing. <input checked="" type="checkbox"/> Portable (in some instances). <input checked="" type="checkbox"/> Low in cost. <input checked="" type="checkbox"/> Readily available. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Displays are not effective if lettering is not large enough to be seen by all.
<p>Turn Chart. Simple and familiar in design, specifically in small interactive classes.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Easy to prepare and use. <input checked="" type="checkbox"/> May be used to show development or buildup of an event or display. <input checked="" type="checkbox"/> Allow information to be tailored during instruction. <input checked="" type="checkbox"/> Effective when instruction calls for great deal of writing <input checked="" type="checkbox"/> Allows for interaction between instructor and students. <input checked="" type="checkbox"/> Portable. <input checked="" type="checkbox"/> Low in cost. <input checked="" type="checkbox"/> Readily available. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Displays are not effective if lettering is not large enough to be seen by all. <input checked="" type="checkbox"/> Can only be used outdoors if weather permits, unless lamination is applied (cost factor).

Figure 3-18 Media Characteristics (continued)

MEDIA CHARACTERISTICS	ADVANTAGES	LIMITATIONS
<p>Models/Mock-Ups. Models/Mock-Ups is representations of actual equipment, structures or devices. Models/Mock-Ups seeks to represent actual items when items are too large, to difficult, or too dangerous to be brought into the classroom.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Appeals to students' sense of touch. <input checked="" type="checkbox"/> Realistic <input checked="" type="checkbox"/> Shows details. <input checked="" type="checkbox"/> Useful in demonstrations and hands-on experiences 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Time consuming to develop. <input checked="" type="checkbox"/> May require specialized personnel. <input checked="" type="checkbox"/> May require assistant instructors. <input checked="" type="checkbox"/> Class size limited to the size of the model/mock-up. <input checked="" type="checkbox"/> May be costly. <input checked="" type="checkbox"/> May not be readily available. <input checked="" type="checkbox"/> Cannot be revised (only minor modifications can be made).
<p>Actual Item/Object. AIOs are the equipment or devices that are actually utilized in the performance of the task or job. AIOs may be too difficult, or too dangerous to be brought into an indoor classroom and therefore outdoor facilities may need to be utilized. Actual Item/Object. AIOs are the equipment or devices that are actually utilized in the performance of the task or job. AIOs may be too difficult, or too dangerous to be brought into an indoor classroom and therefore outdoor facilities may need to be utilized.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Appeals to students' sense of touch. <input checked="" type="checkbox"/> Realistic <input checked="" type="checkbox"/> Shows details. <input checked="" type="checkbox"/> Useful in demonstrations and hands-on experiences 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Time consuming to develop. <input checked="" type="checkbox"/> May require specialized personnel. <input checked="" type="checkbox"/> May require assistant instructors. <input checked="" type="checkbox"/> Class size limited to the size of the model/mock-up. <input checked="" type="checkbox"/> May be costly. <input checked="" type="checkbox"/> May not be readily available. <input checked="" type="checkbox"/> Can not be revised (Only replaced)
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 3-18 Media Characteristics (continued)

MEDIA CHARACTERISTICS	ADVANTAGES	LIMITATIONS
<p>Slides. Slides are presented using a slide carousel and projector that projects images on a large screen or wall.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Effective for presenting still images of text, photographs, and graphics to large audiences. <input checked="" type="checkbox"/> Ideal for enlarging images. <input checked="" type="checkbox"/> Easy to develop if computer generated. <input checked="" type="checkbox"/> Can be combined in any sequence. <input checked="" type="checkbox"/> Instructor can maintain eye contact with students. <input checked="" type="checkbox"/> Slide projectors are easy to use <input checked="" type="checkbox"/> Easy to update, move, or rearrange. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Slides can only be used where there is source of electricity. <input checked="" type="checkbox"/> Requires a large screen. <input checked="" type="checkbox"/> Projector must be monitored for overheating. <input checked="" type="checkbox"/> Requires additional equipment (e.g., slide carousel, extra bulb). <input checked="" type="checkbox"/> Can be costly to develop if photos are developed into slides.
<p>Audio. Audio is generally used in conjunction with other media (e.g. supplementing a slide presentation).</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Effective for self-paced instruction. <input checked="" type="checkbox"/> Easy to use. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lengthy to develop. <input checked="" type="checkbox"/> Costly to develop. <input checked="" type="checkbox"/> Cannot be tailored during instruction. <input checked="" type="checkbox"/> Requires a source of electricity and additional equipment (e.g. Audio Deck). <input checked="" type="checkbox"/> Cannot be revised.
<p>Video. Video recreates or shows footage of actual sites, events, procedures, equipment that is difficult or dangerous to observe in class (e.g. volcanic eruption).</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Effective for recreating actual events. <input checked="" type="checkbox"/> Presenting correct method for performing a set of procedures. <input checked="" type="checkbox"/> Reproduced at a low cost. <input checked="" type="checkbox"/> Readily available from commercial sources. <input checked="" type="checkbox"/> Easy to use. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Generally requires a great deal of planning. <input checked="" type="checkbox"/> They can not be tailored during instruction. <input checked="" type="checkbox"/> Requires a source of electricity. <input checked="" type="checkbox"/> Normally requires additional equipment (e.g. TV). <input checked="" type="checkbox"/> Has a high initial development cost. <input checked="" type="checkbox"/> Cannot be revised (copyright).

Figure 3-18 Media Characteristics (continued)

MEDIA CHARACTERISTICS	ADVANTAGES	LIMITATIONS
<p>Computer Based Training (CBT). Computer based training utilizes the computer as an instructional device.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Allows students varying levels of control over the rate and sequence of their learning. <input checked="" type="checkbox"/> Provides immediate feedback. <input checked="" type="checkbox"/> Provides reinforcement. <input checked="" type="checkbox"/> Tracks student progress. <input checked="" type="checkbox"/> Provides diverse learning experiences 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Educators and students have unrealistic expectations. <input checked="" type="checkbox"/> Teaches only a limited range of interaction. <input checked="" type="checkbox"/> Human interaction is reduced or completely eliminated. <input checked="" type="checkbox"/> Start-up cost for both hardware and software can be very expensive. <input checked="" type="checkbox"/> Software cannot be revised.
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MEDIA CHARACTERISTICS	ADVANTAGES	LIMITATIONS
<p>Computer Mediated Conferencing, Video Teleconference, Virtual Conferencing, Interactive Television, and Desktop Video Conferencing. All of these methods describe learning via telecommunications. These types of media formats permit cost-effective training to large numbers of people who may be disturbed across numerous sites.</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Real-time interactivity to large audiences in a cost efficient way. <input checked="" type="checkbox"/> All television/computer systems allow the transmission. <input checked="" type="checkbox"/> OD motion images and sound over a distance. <input checked="" type="checkbox"/> Learners can communicate with the instructor and with each other via telephone or two-way video. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> The classroom used must be dedicated for two-way communications <input checked="" type="checkbox"/> Can not generally be used for other purposes. <input checked="" type="checkbox"/> Learners may feel isolated. <input checked="" type="checkbox"/> Technical problems any interrupt instruction. <input checked="" type="checkbox"/> Instructors may not feel comfortable using these mediums. <input checked="" type="checkbox"/> Students may be reluctant to assume greater responsibility in this type of setting. <input checked="" type="checkbox"/> Start up cost may be expensive depending on requirements. <input checked="" type="checkbox"/> May not be available due to space constraints.
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Figure 3-18 Media Characteristics

REVIEW MEDIA CONSIDERATIONS

STEP 2

The type(s) of media selected should enhance the presentation of information and compliment the method of instruction, be available, and be able to be developed prior to the onset of the course. Curriculum developers weigh these factors and select the media for the course of instruction being taught. The following factors are considered and analyzed prior to selecting instructional media:

Factors that must be considered.

-
- a. **Target Population Description:** Consider the abilities, education level, and learning preferences of the learner to select media that meets their learning preferences and abilities.
 - b. **Learning Objective:** Identify the learning domain addressed in the learning objective as either, Cognitive, Psychomotor, or Affective.
 - c. **Class size:** Ensure the type of media selected compliments the size of the class. For the Marine Corps, in most situations: 1-9 students is considered a small class, 10 -20 students is a medium class, and over 20 students is a large class.
 - d. **Resources:** Money, time, scheduling, facilities, personnel, and equipment availability must also be considered to assess whether certain types of media are available, cost effective, and/or feasible to use.
 - e. **Learning Styles:** Consider that students will have different learning styles. Instruction is best when it accomodates visual, auditory, and kinesthetic learners.
-

Select Media

After considering the target population description, learning objective, class size, resources and learning styles, select the media that best accommodates these factors.

STEP 3

Record Instructional Media

The instructional media chosen is recorded on the Learning Objective Worksheet (LOW). The selected media is then recorded in MCTIMS for inclusion on the LOW and Concpet Card.

STEP 4

3003. SEQUENCE LEARNING OBJECTIVES (LO)

SECTION 4

Sequencing LOs is the final process of the design phase and provides a foundation for developing course structure. Once this is completed, instruction is developed. The purpose of sequencing LOs is to ensure the instruction promotes learning by the optimum placement of learning objectives. Sequencing LOs provides the following benefits:

-
- a. **Efficiency.** Sequencing LOs allows for an efficient system of instruction while avoiding duplication.
 - b. **Transition.** Properly sequenced LOs allow the student to make a logical transition from one skill or knowledge to the next while avoiding confusion. This ensures that supporting knowledge and skills are acquired before dependent subject matter is introduced.
 - c. **Structured Learning.** Sequenced LOs serve as a rough course structure and outline the strategy for instruction. This is important as it facilitates learning, particularly when introducing new concepts or material. This transfer of learning is maximized when closely related learning objectives are kept together.
-

RELATIONSHIPS BETWEEN LOS

To sequence LOs, they are organized into broad categories. The relationships between them are determined and they are sequenced in the order implied by their relationship. Learning objectives do not necessarily have to be taught in the sequence they are listed. For instance, facilities and equipment may not be available for this. The organization provides the optimum sequence for learning, but it may not always be possible to instruct the course in this order.

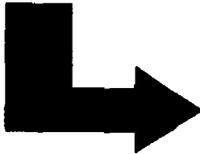
1. **Grouping LOs.** Before LOs are sequenced, they should be grouped. LOs that deal with the same subject have a shared element relationship and may be grouped together. The shared element may be that of an object (e.g., ammunition, supply procedures, M16 rifle) or a condition (e.g., a desert environment, using a specific piece of equipment, nighttime).
 - a. **Same Object.** LOs with the same object may be grouped together (e.g., all TLOs pertaining to the M16 rifle or all LOs pertaining to a communications annex). Same object LOs can often be determined by reviewing the T&R Events, because all tasks are grouped by duty areas that define similarities among them. LOs may be grouped by these same areas also. Grouping LOs this way maximizes the mastery of LOs, because closely related LOs are kept together.

b. **Same Condition.** The environment and the resources within a school should be considered when grouping LOs. LOs may be grouped by like resources (e.g., all instruction requiring the use of a radio or all instruction that takes place on the firing range). Grouping learning objectives with the same condition maximizes instructional time (e.g., instructional time is not lost due to traveling from one location to another or due to obtaining the same equipment at different times throughout the course) allowing an efficient system of instruction.

2. **Relationships in sequencing.** To logically sequence LOs, the curriculum developer must determine the relationship among them. The four most important relationships in sequencing LOs are dependent, supportive, independent, and conflicting. They are described in detail below:

a. **Dependent Relationships.** Dependent relationships exist between LOs that are a prerequisite to other LOs. Personnel must master the dependent LO before they can master the others. Examples of actions having a dependent relationship are:

Examples of actions having a dependent relationship are:

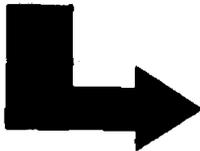


For a sniper to engage a target, he must first learn to apply the principles of marksmanship.

To send a message in Morse code, one must first learn to identify the Morse code symbols for each letter and number.

b. **Supportive Relationships.** In supportive relationships, skills and knowledge in one LO have some relationship to those in another LO. The learning involved in mastery of one LO transfers to the other, making learning involved in the mastery of the other easier. In a supportive relationship, LOs are sequenced so that a logical transition can be made from one skill or knowledge to the next. This type of sequencing is largely dependent upon the Curriculum Developers expertise in the subject matter and subjective judgment of what makes the learning of a task easier. For example, "maintain a checkbook ledger" has a supportive relationship to "balance a checkbook." You could learn how to balance a checkbook without first learning to maintain a checkbook ledger. However, learning to maintain a ledger first will make balancing a checkbook much easier.

Examples of actions having a supportive relationship are:



Other examples are:

"Disassemble the M16 service rifle." Disassembling the M16 service rifle has a supportive relationship to the "assembly of the M16 service rifle."

"Drive a 1/4 ton truck." Driving a 1/4 ton truck has a supportive relationship to "drive a 5 ton truck."

"Write learning objectives." Writing learning objectives has a supportive relationship to "given learning objectives, write a lesson plan."

- c. **Independent Relationships.** In an independent relationship, skills and knowledge in one learning objective are unrelated to those in another LO. For example, "balance a checkbook" has nothing to do with "selecting investments." Arrange LOs with independent relationships in any reasonable sequence. However, they should not be placed between LOs having dependent or supportive relationships. Examples of actions having an independent relationship are:

"Balance a checkbook" is independent of "select investments."

"Solve mathematical equations (general math, geometry, calculus)" is independent of "solve scientific equations (chemistry, physics)."

"Disassemble the M16" is independent of "disassemble the 9mm pistol."

- d. **Conflicting relationships.** Conflicting relationships exist between LOs that involve opposite responses to the same cue in a different context. These responses must be clearly related to the situation in which the cue is received. The two actions should be taught together and the reason for the opposite response to the same cue explained and reinforced. The conflicting element that causes two very similarly stated LO(s) to be conflicting usually involves a visual or auditory cue within the learning objective(s).
- e. Remember to sequence the LO(s) with conflicting relationships as close to one another as possible so that the conflicting issues/concerns can be addressed. Examples of conflicting elements presented in similarly stated actions are:

In the TLO "As a member of a platoon and on the command fall in, fall in platoon formation per the NAVMC 2691W/CH 1." This command could mean two distinctive different movements, depending on whether the platoon has weapons or not. You may want to teach these movements close to each other to show the major differences and make it clear to the platoon.

In the TLO "As a member of a platoon and on the command right face, execute a right face per the NAVMC 2691 W/CH 1," the same holds true depending on whether the platoon is armed. If the platoon is not armed, on the command of execution, "Face," the individuals in the platoon simply execute a right face. On the other hand, if armed, the individuals in the platoon have to execute trail arms, right face, and then order arms.

- f. **Relationship Table.** Not all actions fit neatly into one of the above categories. Some may seem to be both dependent and supportive. Other combinations may seem to be just as possible. The table in Figure 3-19 summarizes the relationships between TLOs.

DEPENDENT	CONFLICTING	SUPPORTIVE	INDEPENDENT
Knowledge and skills in one LO are closely Related to those in the other LO.	Knowledge and skills in one LO conflict in some respect with those in another LO.	Knowledge and skills in one LO have some relationship to those in the other LO.	Knowledge and skills in one LO are unrelated to those in the other LO.
To master one of the LOs it is first necessary to master the other.	Mastering one LO may cause difficulty in mastering the other LO.	Mastering one LO transfers to other, making learning Involved in the mastery of the other easier.	Mastering one LO does not simplify mastering the other.
LOs must be arranged in the sequence indicated by the knowledge and skills hierarchy.	LOs must be taught closely together, directly addressing the conflicting elements between the two LOs.	LOs should be placed close together in the sequence to permit optimum transfer of learning from one LO to the other.	In general, the LOs can be arranged in any sequence without loss of learning efficiency.

Figure 3-19 Relationship Table

STEPS FOR SEQUENCING LEARNING OBJECTIVES

The following are steps for sequencing LOs:

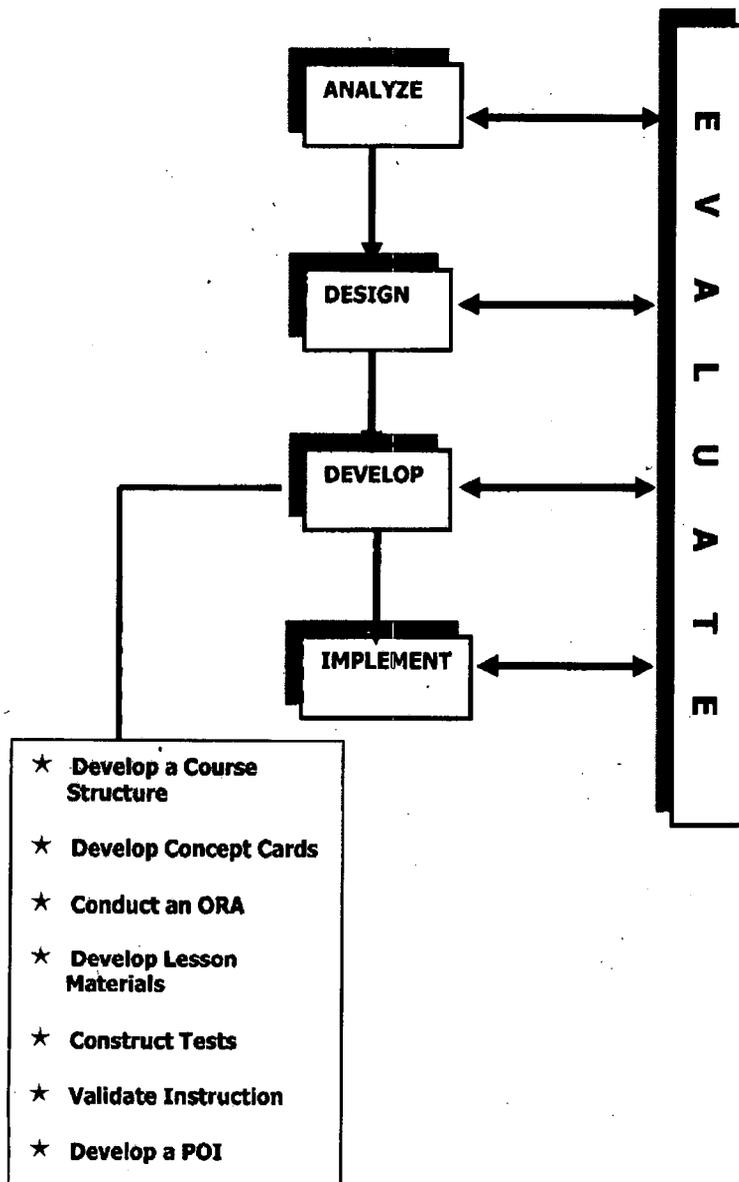
1. Group the LOs based on shared elements.
2. Determine if the relationship between the LOs is dependent, supportive, independent, or conflicting.
3. Arrange LOs based upon their relationship.
 - Sequence the LOs with **dependent relationships** in a hierarchical arrangement.
 - Sequence LOs with **supportive relationships** in an order that permits the optimum transfer of learning from one learning objective to another.
 - Sequence the LOs with **independent relationships** in any logical order. Since the LOs are independent of one another, the sequence in which they are presented will not affect learning. Remember that these LOs stand-alone and should not be placed between dependent or supportive LOs as this would disrupt the transfer of learning.

Summary of the Design Phase: The outputs of this phase are:

- TPD**
- Learning Objectives**
- Test Items**
- Method and Media**
- Sequenced LOs**

These outputs become the inputs to the Develop Phase that begins with developing course structure.

DEVELOP PHASE



In Chapter 4:

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⊕ Steps for Developing a Course Structure	4-3
4002 DEVELOP CONCEPT CARDS	4-6
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4004 DEVELOP LESSON MATERIALS	4-10
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Chapter 4

4000. INTRODUCTION

The Develop Phase of the Systems Approach to Training (SAT) process builds on the outputs of the Design Phase to produce a Program of Instruction (POI) and the Master Lesson File (MLF).

This chapter is broken down into the following eight sections:

1. **Develop A Course Structure.** The course structure is a detailed chronological document identifying the implementation plan for a course.
2. **Develop Concept Cards.** Academic and administrative concept cards are created to assign resources within the FLC to lessons, evaluation, and events.
3. **Conduct an Operational Risk Assessment (ORA).** An ORA will be conducted on each lesson/event within a Program of Instruction (POI). The associated ORA tools will be incorporated into the Master Lesson File (MLF).
4. **Develop Lesson Materials.** Lesson plans, student materials, supplemental student materials (optional), media, the Instructor Preparation Guide (IPG), are all lesson materials to be used during the Implement Phase.
5. **Construct Tests.** Constructing a test involves selecting and placing the test items from the Learning Objective Worksheet (LOW) on the appropriate test. It also involves providing ample instructions to the student, instructions to the evaluator, and developing the grading criteria for each test given in the course.
6. **Validate Instruction.** The goal of validation is to determine the effectiveness of instructional material prior to implementation.
7. **Develop a Program of Instruction (POI).** POI provides a detailed description of the course and is the FLC Commanders communication to TECOM of how the course is being conducted. These documents record the Formal School's plan for satisfying the training requirements listed in the Training and Readiness (T&R) order. The CDD (Section I of the POI) provides a summary of the resources required to administer a course and the task list.
8. **Assemble A Master Lesson File.** One Master Lesson File (MLF) is compiled for **EVERY** class taught at the FLC in order to provide continuity of instruction.

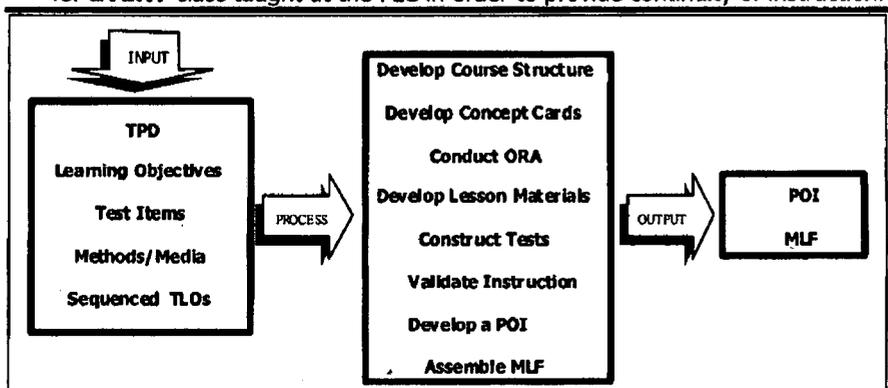


Figure 3-1

4001. DEVELOP COURSE STRUCTURE

SECTION 1

The purpose of developing course structure is to determine how much content is appropriate for a single lesson or a single exam and arrange the lessons and exams in a logical sequence. The course structure provides an outline of how the lessons in the course will flow from start to finish. Course structure is not a course schedule. However, the course structure provides a guideline for developing the course schedule. A course structure contains lesson titles, methods, academic hours, and lesson designators.

STEPS FOR DEVELOPING COURSE STRUCTURE

The four steps for developing course structure are: review source materials, determine lesson/exam content, estimate instructional hours, and assign lesson/exam titles and designators.

Review Source Material

The **first step** in developing course structure is to review the following items:

- a. **The Learning Objective Worksheets (LOW) for the course that contains the Terminal Learning Objectives (TLO) and their associated Enabling Learning Objectives (ELO), the delivery system, and test items.**
- b. **Directives from higher headquarters that may influence the length of the course.**
- c. **School Standing Operating Procedures (SOP) for any additional school academic requirements that may affect the course.**

STEP 1

Determine Lessons/Exam Content

The **second step** in developing course structure is to decide how many objectives are appropriate for a single lesson or exam. There is a process used to determine lessons/exams.

**See the Process of Determining Lesson/Exam Content
on the next page:**

STEP 2

**Process of Determining
Lesson/Exam Content**

Review Objectives. When reviewing the objectives, consider the following:

1. **The complexity of an objective.** If it is lengthy or technical, the lesson may need to be divided into several lessons.
2. **The domain of the objective.** In general, objectives in the cognitive domain require fewer resources to teach. Several cognitive objectives may be reached during one lesson. However, an objective in the psychomotor domain can require more methods and more resources. Therefore, it may require more than one lesson.
3. **Select closely related objectives.** If multiple objectives are chosen for one lesson, select those objectives that are closely related. When combined, they must make a logical, self-contained group suitable for an individual lesson.
 - Learning objectives are organized so that the group has a natural beginning and ending point.
 - Look for "natural breaks" in the sequenced learning objectives that indicate major changes in subject matter (e.g., changing from one system to another or going from knowledge-based instruction to performance-based instruction.)

Consider Target Population Description (TPD). The level of experience the average student will bring into the classroom must be considered. Due to their lack of experience, entry-level students may not be able to comprehend multiple objectives in a single lesson. Remember that the students are seeing it for the first time.

Assign Lesson/Exam Titles. All lessons and exams are assigned titles (i.e., Perform Preventive Maintenance on the M16A2 Rifle). The titles must be meaningful and relate to the lesson or exam content.

Estimate Instructional Hours

Estimate Hours. An estimate of the hours required for each lesson is necessary to ensure that the proposed curriculum does not exceed the maximum training days authorized for the course. Academic time includes all hours devoted to instruction, review, evaluation, re-testing of the TLOs/ELOs, and organized physical training that requires instructor supervision. Some other non-academic events, such as course overview, end of course critiques, or training aid maintenance, should be included in this estimate. All other events not directly related to the structure of the course are administrative in nature and not considered when building course structure. If the estimate exceeds the maximum authorized training days, the FLC must contact CG, TECOM (GTD/ATD) for guidance. When estimating instructional time, consult and review the following:

STEP 3

**See How to Estimate Instructional Hours
on the next page:**

Steps for Estimating Instructional Hours

- 1) Time requirements for similar lessons in other approved courses. This will give you an estimate of how long it may take to teach your lesson.
- 2) The number and complexity of learning objectives within each lesson. A learning objective's complexity is based upon whether its behavior is knowledge-based or performance-based, what conditions must be present, and how the behavior is evaluated.
- 3) The amount of time spent performing the task on the job. Normally, teaching a task takes longer than performing it on the job.
- 4) Review the instructional method selected for each learning objective. For instance, performance-based instruction with practical application will take longer to conduct than a lecture.
- 5) Total the number of hours and divide by 8 (the minimum number of training hours per day under peacetime training conditions). This will provide the estimated number of training days for the course.
- 6) Then review approved POI or CG, TECOM development directive. The POI or directive will state the training days authorized for the course.

Assign Lesson/Exam Titles and Designators

Assign Lesson/Exam Designators. These codes are a quick way to identify a lesson or exam. Designators must be purposeful, relate to the lessons, and numbered sequentially. They can be written in any format, provided they are meaningful (e.g., TBS.1 for Lesson 1 of The Basic School Course; BIC.10 for Lesson 10 of the Basic Infantryman Course). School SOP will provide guidance for the assignment of designators. Figure 3-2 Below is a sample course structure.

STEP 4

<u>SAMPLE COURSE STRUCTURE</u>			
<u>TD-1 Lesson</u>	<u>Method</u>	<u>DESIG</u>	<u>Est Hours</u>
SAT Overview	L	IT-00	1.5
Effective Comm	L/D/PA/G	IT-01	2.5
Effective Comm Exam	X (W)	IT-04	1
Conduct a Lesson	L/D/PA/G	IT-04	2
Conduct a Lesson Exam	X (P)	IT-08	1

Figure 3-2

4002. DEVELOP CONCEPT CARDS

SECTION 2

A concept card is a document that gives the reader a snapshot of one entire lesson, exam, or administrative event during a program of instruction. It identifies all of the learning objectives, instructional methods and media, and the resources required to conduct the entire lesson, exam, or event. Concept cards have both a primary and a secondary purpose. The primary purpose is to provide the school with a way to manage its resources. The secondary purpose of a concept card is to document the FLCs plan for implementing the ITEs within the instructional setting. Concept cards make up the bulk of Section IV of the Program of Instruction (POI) and are produced in MCTIMS. A concept card must be produced for each lesson, exam, and administrative event for inclusion in the Master Lesson File (MLF).

A Concept Card must be produced for inclusion in the Master Lesson File (MLF)

CATEGORIES OF CONCEPT CARDS

There are two categories of concept cards: **Academic and Administrative.**

Academic Concept Card. There are three specific types of academic concept cards: Lesson Purpose, Task Oriented, and Exam.

1. **Lesson Purpose.** Lesson purpose concept cards are created when the instructional content is not specifically related to an ITE for the course and does not address any TLOs/ELOs. The lesson purpose concept card will have a clearly defined lesson purpose statement reflecting the rationale for presenting the lesson (i.e., orientation or overview). Although Lesson Purpose should be minimized since it uses school resources and time without evaluation, the overall importance to the effectiveness of the POI must be considered when determining the amount of Lesson Purpose time. Coordination with the GTD Task Analyst is essential in determining if T&R events need to be added or if Lesson Purpose classes are the appropriate solution.
2. **Task Oriented.** Task oriented concept cards identify the instructional content as it relates to at least one task within the task list for the course. They address one or more TLO(s) and the associated ELOs being taught.
3. **Exam.** Exam concept cards capture the resources required for the evaluation of at least one task within the task list (ITE/T&R Event) for the course. One exam concept card is created for each initial exam administered over the course of instruction. Retesting is a remedial action available to school commanders but must be accomplished with resources provided for the course. These hours do not go toward the 40 hour training week. Exceptions to this policy may be authorized by CG TECOM.

Three specific types of academic concept cards

Every task oriented/exam concept card will have the TLO and associated ELOs that the lesson/exam supports.

Administrative. Administrative concept cards capture all of the non-instructional information required to conduct the course. An example would be the graduation ceremony upon completion of a course. Administrative concept cards are found in Annex Z of the POI.

CONCEPT CARD ELEMENTS

MCTIMS is the program used by the Marine Corps to record all elements of the concept card. See MCO 1553.2_ Appendix O-11 for a sample paper-based Concept Card. The elements of a concept card are:

MCTIMS will indicate the date printed in the upper right hand corner.

Annexes A through Y are reserved for academic concept cards (task oriented, lesson purpose or exam).

Heading. The information in the heading will include the name of the course, letter of the annex, and the title of the annex .

Annex. Annexes are established with an alpha designator to represent subject areas into which concept cards are grouped. They may be established according to the functional areas by which ITEs/T&R events are organized or according to some other logical grouping. Annexes A through Y are reserved for academic concept cards (task-oriented, lesson purpose or exam). Exam concept cards may be assigned to the same annex in which the related task oriented cards appear or may be assigned a separate annex of their own. Annex Z is reserved exclusively for administrative concept cards.

Lesson, Exam, Event ID. The lesson, exam, or event ID is assigned during the development of the course schedule and is recorded here.

Lesson, Exam, Event Title. The lesson, exam, or event title is assigned during the development of the course schedule and is recorded here.

Hours (Total). The total amount of time required to conduct a lesson, event, or exam is reflected here. This is automatically calculated within MCTIMS based on the total of hours allocated to individual methods. See hours (per method) below.

Method. Instructional methods selected during the design phase and recorded on the LOW are assigned to the concept card. This is done not only for quality control, but also as a quick reference. The method is recorded as a code or abbreviation.

Hours (per method). The overall time for the lesson is broken down to reflect how much time is allotted for each of the selected methods.

Student Instructor (S:I) Ratio. The student instructor ratio is determined so that it complements the selected method. For example, a ratio of 30:1 (students :instructor) would be appropriate for a lecture. During practical application where additional instructors are required for closer supervision of the students, a 30:5 ratio might be necessary. The difference in these two ratios is determined by how the practical application exercise is actually conducted. Are the students and instructors working in a small group, or are additional instructors merely added to the classroom for additional control? Mathematically, MCTIMS will treat the ratios the same for the Instructor Computation Worksheet (Lockstep). Curriculum developers must remember the concept card provides a "snapshot" of what is actually transpiring in the classroom.

Media. Media that were selected during the design phase and recorded on the LOW are assigned to the concept card. This is done not only for quality control, but also as a quick reference. The media are recorded as a code or abbreviation.

Learning Objectives. On task oriented or exam concept cards, the learning objectives included in the lesson for that task are recorded. A TLO should only appear on a Concept Card for a lesson or exam during which students will actually perform the TLO.

Lesson Purpose. A detailed lesson purpose statement will replace the learning objectives on a Lesson Purpose Concept Card.

Ammo Requirements. Those learning objectives requiring ammunition for instruction and evaluation must have the Department of Defense Identification Code (DODIC) and nomenclature for each ammunition type used. This information can be found in MCO P8011.4_ Marine Corps Table of Allowance for class V (w) material (peacetime). The DODICs are broken down by the number of rounds per student, expended and unexpended, during the execution of the lesson. The number of support rounds, expended and unexpended, are also recorded by DODIC. Ammo allocations for a lesson must reflect the relationship between TLOs and the ITEs they are developed from. ITEs establish the ammo requirement and those DODICs and amounts must be transferred to the lesson by TLO. There must be parity between the ammo requirements in the T&R and POI.

**(DODIC) - Department of
Defense Identification Code**

Notes. This section can be used to provide a word picture describing the execution of the class, exam, or event. It can be used to capture, in detail, any information that clarifies additional instructional and resource requirements such as:

**Any logistical requirements
identified on task oriented
concept cards will be
transposed to the
Instructor Preparation
Worksheet.**

- ✓ Safety (e.g., Highest initial and residual Risk Assessment Codes [RAC])
- ✓ Justification of exam method
- ✓ Instructor ratios (e.g., justification of additional instructors for different methods and safety)
- ✓ Logistical requirements (e.g., requests for transportation, ammunition, or ranges, etc...)
- ✓ External personnel support (e.g., corpsman, RSO, contractors, guest lecturers)
- ✓ External facilities (e.g., pool, laboratories)
- ✓ External equipment support (e.g., helicopters, computers, radios, tanks etc...)

References. References are source documents that include doctrinal publications, technical manuals, field manuals, and Marine Corps Orders. These references provide guidance for performing the task in accordance with the given conditions and standards.

Signature Blocks. MCTIMS allows names or titles of up to five officials to be entered on the concept card for the purpose of routing/approval. Routing and approval procedures are normally found in the FLC SOP.

Optional Items. Phase and group designators are optional elements that can be entered to identify certain timeframes or instructional teams responsible for specific instruction during implementation of the POI. For example, Recruit training has Forming, 1st, 2nd and 3rd Phase. During 2nd phase Weapons and Field Training Battalion (WFTB) is responsible for the instruction of marksmanship skills.

SECTION 3

4003. CONDUCT AN OPERATIONAL RISK ASSESSMENT (ORA)

The FLC conducts an Operational Risk Assessment (ORA) on all events, lessons and exams. The concept of Risk Management formalizes the process of training safely and efficiently. Rather than relying solely on individual experience to achieve the best results, risk management provides careful analysis and control of hazards in each lesson. Refer to MCO 1553.2_ for ORM and High Risk Training (HRT) procedures and requirements.

SECTION 4

4004. DEVELOP LESSON MATERIALS

The purpose of developing instruction is to generate the lesson plans, student outlines, supplemental student material, media, and an Instructor Preparation Guide (IPG) to support the training. Curriculum developers must create materials that support student learning and compliment instruction. Real world relevance is the key in the development of lesson materials to maximize the transfer of learning from the instructional setting to the job. Relevance dramatically increases the student's motivation to learn and retain those skills that will help in the performance of the job. The steps in developing lesson materials include securing resources, writing the lesson plan and student materials, developing the media, and creating an Instructor Preparation Guide.

SECURE RESOURCES

LOW – Learning Objective Worksheet.

The development of instructional materials begins with acquiring all the resources necessary for instruction. A final review of the concept card for the lesson needs to be made to ensure that required resources are available. The concept card will provide the methods to use, how much time is allowed for each method, the type of media, instructor/student ratio, and other notes regarding the lesson. In addition to the concept card, the Learning Analysis Worksheet(s) (LAWs), Learning Objective Worksheet(s) (LOWs), and all applicable references are reviewed to provide the background and thought process from the Design phase. This information will assist the curriculum developer in ensuring that the written lesson meets the intended lesson goals.

LAW – Learning Analysis Worksheet

WRITE A LESSON PLAN

The lesson plan is a comprehensive document that details the strategy to be used in teaching the learning objectives. Before learning the mechanics of writing a lesson plan, it is important to understand the function and components of the lesson plan.

The lesson plan is a comprehensive document that details the strategy to be used in teaching the learning objectives.

Function of a Lesson Plan.

The lesson plan has three functions:

- a. First, it provides the instructor, regardless of individual level of expertise, with a detailed script establishing all the information concerning preparation and delivery of the lesson content.
- b. Second, it establishes continuity and standardization of instruction so that the same information is taught every time.
- c. Third, it provides a historical document of what has been taught at the FLC.

Components of a Lesson Plan

The title page, introduction, body, and summary are the primary components found in a lesson plan. Refer to MCO 1553.2_ Appendix O-16 for a sample of the format to use when writing the lesson plan.

Title Page. The title page is the cover sheet for the lesson plan.

Introduction. The introduction is written to gain the attention of the student at the beginning of the lesson and provide an overview of what the student can expect in relation to the lesson. There are seven parts to an introduction. They are the gain attention, overview, learning objectives, method and media, evaluation, Safety/Cease Training brief (per the ORAW) and the transition into the body. These parts will be discussed in more detail later in this section.

Body. The body of a lesson plan is a detailed script of the content to be presented. It is written to cover all of the information necessary to master the learning objectives for the lesson. It includes the main ideas, lesson content, transitions, instructor notes, and cues for the instructor.

Summary. The summary provides a review of the main ideas, reinforces the importance of the content, and includes administrative instructions for the students.

Refer to MCO 1553.2_ Appendix O-16 for a sample of the format to use when writing the lesson plan.

How to Write a Lesson Plan

Writing the lesson plan involves producing a detailed script that establishes what needs to be said and done during the lesson so that the students are able to meet the learning objectives. The lesson plan is written in the following sequence:

-
- Title Page.**
 - Body.**
 - Introduction.**
 - Insert Transitions, Instructor Notes, and Cues.**
 - Summary.**
-

The title page is produced first. Next, the body is outlined and written so that a conceptual framework is established. This conceptual framework establishes the main ideas and the sequence in which they will be introduced. Since the introduction provides an overview of the conceptual framework, it is written after the body is developed. Once the introduction is completed, transitions, instructor notes, and cues are inserted into the lesson. Last, the summary is written to bring closure to the lesson.

The following steps detail how to write each component:



Title Page. The title page contains the school's name and address centered at the top. Centered in the middle of the page are the lesson title, lesson designator, course title, course identification number, and the date the lesson was developed or revised. At the bottom of the page is the signature block and date of approval. (See MCO 1553.2_ Appendix O-16 for a sample lesson plan.)

Writing the Body. When writing the body the curriculum developer establishes and sequences the main ideas, inserts content, provides examples, determines and inserts methods. This is done in a manner so that the material flows and aids the transfer of learning.

Steps in writing the body are as follows:

-
- Establish Main Ideas.**
 - Sequence Main Ideas.**
 - Insert Content.**
 - Provide Examples.**
 - Determine Placement of Methods.**
 - Insert Methods.**
-

1. **Establish Main Ideas.** Within the body, main ideas are numbered 1, 2, 3, and so on. As a general rule, the main ideas correspond with the learning objectives. However, there are times when an ELO is complex and must be broken into more than one main idea. The main ideas need to be bold, underlined, and uppercase so that they can be easily distinguished from the rest of the lesson content by the instructor. The grouped and sequenced knowledge and skills that were produced during the learning analysis can be used to break the main ideas into specific subheadings detailing the outline. Such knowledge and skills provide the curriculum developer with more comprehensive information to cover within the lesson.

The format for the body is as follows:

1. **MAIN IDEA #1.**

a. **Paragraph Heading.**

(1) **Paragraph Heading.**

(a) **Paragraph Heading.**

1. **Paragraph Heading.**

a. **Paragraph Heading.**

2. **Sequence Main Ideas.** The main ideas are normally presented in the same order as the learning objectives. The initial sequence of the learning objectives was determined during the Design Phase. However, the curriculum developer may have to re-sequence the main ideas to ensure that the lesson plan flows logically, student retention is maximized, and logistical constraints are met.

3. **Insert Content.** Content is now inserted to explain, in detail, the main ideas and subheadings. The information is compiled from the references noted on the concept card (e.g., technical manuals, Orders, and reference publications). It is the curriculum developer's responsibility to ensure that the information is explained in such a way that the instructor can easily understand the content.
4. **Provide Examples.** In addition to the teaching points, real world examples and experiences are placed in the outline to aid the learning process and provide realism for students. The material must be structured to present a variety of examples to explain a topic. The use of multiple examples helps students with varying experience and comprehension levels better understand the material. Examples also emphasize how to do or how not to do something and why.
5. **Determine Placement of Methods.** The methods that were determined during the Design Phase are listed on the concept card. However, the placement of the method in the lesson plan is determined at the time that the lesson plan is being developed. For performance-based learning, the placement of lecture, demonstration, and practical application methods in the lesson plan is important to the learning process and level of retention.
 - a. **Lecture (Formal/Informal).** Lecture is assumed as the method for presenting the content of the lesson unless another method is noted. All other methods will have an associated instructor note and specific directions for employing that method. Lecture is generally used to provide the foundational knowledge required for the development of skills or attitudes. For instance, lecture is generally used before demonstration and practical application so that the students are familiar with the process or procedures before seeing and performing them.
 - b. **Demonstration.** Demonstrations usually take place during or following the lecture. When using demonstration, the instructor explains the process or procedure while performing it for students. Demonstrations can be placed anywhere in the lesson, but are normally placed immediately prior to the practical application.
 - c. **Practical Application.** Whenever students are learning a new skill or acquiring knowledge, they should be given the opportunity to practice what was taught. The more practice students are given during instruction, the more likely students are to retain the information and apply it to the job. When a practical application is involved, decisions must be made on the placement and frequency of the practice session(s) (massed versus distributed). Additionally, it must be determined whether the task(s) need to be taught as a whole or broken into parts (whole versus part practice sessions). More detail on these type of practice sessions are discussed below along with a chart to aid in this decision making process.

① **Massed Versus Distributed Practice Sessions**
① **Whole Versus Part Practice Sessions**

- **Massed Versus Distributed Practice Sessions.** In *massed* practice, the learner engages in one or a few intensive, extended periods of practice with little or no rest between. The alternate form of practice is called *distributed*, in which the learner participates in many relatively short practice sessions spaced over time.

Based on the time constraints of the course, the curriculum developer must decide whether to divide practice periods into segments of **distributed practice** or plan one continuous session of massed practice. For instance, **distributed practice** interspersed with rest periods permits more efficient learning of psychomotor skills than does massed practice. The reason for this is that rest periods allow students to overcome the fatigue that builds up when performing the same procedures continuously. The greater the length or difficulty of the task, the more appropriate distributed practice is relative to massed practice.

	Shorter & More Frequent	Longer and Less Frequent
If the Task	<ul style="list-style-type: none"> Is simple, repetitive, or boring Demands intense concentration Is fatiguing Demands close attention to detail 	<ul style="list-style-type: none"> Is complex Has many elements Requires warm-up Is a new one for the performer
If the Learner	<ul style="list-style-type: none"> Is young or immature (unable to sustain activity) Has short attention span Has poor concentration skills Fatigues easily 	<ul style="list-style-type: none"> Is older or more mature Is able to concentrate for long periods of time Has good ability to focus attention Tires less easily

Smith and Ragan (1999), *Instructional Design*, 2nd Edition.

- **Whole Versus Part Practice Sessions.** The curriculum developer must decide if it is more efficient to teach an entire task at each practice session (*whole*) or to teach individual subtasks initially (*part*) and begin combining them as the student masters each subtask. For tasks that have highly interrelated subtasks (e.g., preparation of an operations order), the whole method is more efficient than the part method. When tasks do not have highly interrelated subtasks (e.g., preventive maintenance of the M16 rifle), the part method is superior to the whole method.

	Emphasize Whole	Emphasize Parts
If the Task	<ul style="list-style-type: none"> Has highly dependent (integrated) parts Is simple Is not meaningful in parts Is made up of simultaneously performed parts 	<ul style="list-style-type: none"> Has highly individual parts Is very complex Is made up of individual skills Requires limited work on parts or different segments
If the Learner	<ul style="list-style-type: none"> Is able to remember long sequences Has a long attention span Is highly skilled 	<ul style="list-style-type: none"> Has a limited memory span Is not able to concentrate for a long period of time Is having difficulty with a particular part Cannot succeed with the whole method

Smith and Ragan (1999), *Instructional Design*, 2nd Edition.

- a. **Other Methods.** During the Design phase, the appropriate method(s) for each learning objective was determined and placed on the Learning Objective Worksheet (LOW). The placement of method(s) in the lesson plan is determined by where the content for each learning objective is being taught. However, there are methods that can cover multiple learning objectives. One such method is the case study that is placed at the end of the lesson for reinforcement. Before making decisions concerning the placement of alternate methods, consider the following:
- The amount of knowledge and/or skill that the student needs as prerequisite for the method to enhance the learning process.
 - The amount of knowledge and/or skill that the student brings into the lesson.
6. **Insert Methods.** Whenever there is a method, other than lecture, inserted in a lesson plan, specific instructions must be provided to the instructor. This provides the instructor with the details so that he/she is able to implement instruction as intended. When practical-application is inserted into the outline, practice and provide help headings are indicated to offer detail to the instructor. All other methods will have student role and instructor role headings. These headings are described in detail below.
- a. **Practical Application.** There are three headings used when inserting practical application. An example of the format follows.
- Practical Application Heading.** This heading is uppercase, bold, and underlined. Beside practical application, general information is provided to include group size, if applicable, and setup (handouts, turn charts, actual items to distribute, etc.) for the practical application. The purpose of the practical application and the desired outcome should be explained.
 - Practice Heading.** This heading is uppercase and bold. Beside practice, the curriculum developer describes in detail step-by-step instructions for what the student's role in the practical application will be.
 - Provide-Help Heading.** This heading is also uppercase and bold. Underneath the provide help heading are three subheadings describing the instructor's role before, during, and after the practical application. The subheadings include the safety brief, supervision and guidance, and debrief.

PRACTICAL APPLICATION. Provide general information to include group size, if applicable, and setup (handouts, turn charts, actual items to distribute, etc.).

Provide the purpose of the practical application.

PRACTICE: Describe in detail step-by-step instructions for what the student's role in the practical application will be.

PROVIDE-HELP: Describe the Instructor's role.

1. Safety Brief: (per the ORAW) This is a brief to the students on safety precautions and what to do if there is a mishap.

2. Supervision and Guidance: Describe what the instructor is doing during the PA, i.e., moving about the room, assisting students, answering questions.

3. Debrief: (If applicable) Allow participants opportunity to comment on what they experienced and/or observed. Provide overall feedback, guidance on any misconceptions, and review the learning points of the practical application.

**Example of format for
Practical Application**

- b. **Other Methods.** There are also three headings used when inserting other methods. An example of the format is on the next page.
- ☑ **Method Heading.** The method heading identifies the method being used. This heading is uppercase, bold, and underlined. Beside the method, general information is provided to include group size, if applicable, and setup (handouts, turn charts, actual items to distribute, etc.). The purpose and desired outcome should also be explained here.
 - ☑ **Student Role Heading.** This heading is uppercase and bold. Beside student role, the curriculum developer describes in detail step-by-step instructions for what the student's role is during the method.
 - ☑ **Instructor Role Heading.** This heading is also uppercase and bold. Beside instructor role are three subheadings describing the instructor's role before, during, and after method implementation. The subheadings include the safety brief, supervision and guidance, and debrief.

Example of format used for methods other than practical application.

DEMONSTRATION: Provide general information to include group size, if applicable, and setup (handouts, turn charts, actual items to distribute, etc.).

STUDENT ROLE: Describe in detail step-by-step instructions for what the student's role during the demonstration will be.

INSTRUCTOR ROLE: Describe Instructor's role.

1. Safety Brief: (per the ORAW) This is a brief to students on safety precautions and what to do if there is a mishap.

2. Supervision and Guidance: Describe a detailed script of exactly what the instructor is doing during the demonstration.

3. Debrief: (If applicable) Allow students the opportunity to comment on what they experienced and/or observed. Provide overall feedback, guidance on any misconceptions, and review the learning points of the demonstration.

Write the Introduction. There are seven parts to an introduction. They are the gain attention, overview, learning objectives, method (and media), evaluation, Safety/Cease Training brief, and the transition into the body.

Gain Attention. The gain attention is developed to capture the students' interest. It must relate to the lesson content and inform the students why the information is important. The gain attention needs to provide the student with why he/she needs to learn the information. This is often referred to as the WIIFM ("What's in it for me?"). According to adult learning principles, adults are motivated to learn to the extent that they perceive what they learn is applicable to what they do. By providing the relevance and intent of the lesson, the attention of the students is gained. The curriculum developer needs to provide in the lesson plan a completed gain attention, along with a few other possible ideas. Extra lines are placed below the gain attention so that the instructor can personalize the completed gain attention or use one of his/her own ideas. Any changes within the lesson plan need to be approved by the appropriate personnel in accordance with the FLC Standing Operating Procedures (SOP).

STEP 3

The following items can be used for gain attentions:

- Video clip.**
 - Skit.**
 - Historical/actual event.**
 - Rhetorical question.**
 - Unexpected/surprising statement.**
-

**Types of gain attentions
that can be used.**

Regardless of the type of gain attention used, its elapsed time should be in proportion to the overall length of the lesson. For example, a gain attention for a one-hour class should be no more than 3-5 minutes.

1. **Overview.** In the overview, the instructors can first introduce themselves along with their qualifications or experience. The overview then describes the intended outcome of the instruction and the conceptual framework of the lesson. A conceptual framework informs students of the learning agenda for the lesson by stating the main ideas that will be covered to achieve the desired outcome. By providing the conceptual framework, student anxiety is decreased. Adult learners prefer to be oriented to what will be covered. The overview may also state the lesson's relationship to other lessons within the course, if applicable.
2. **Learning Objectives.** Learning objectives are presented early in the lesson to inform students what knowledge or skill is required for successful completion. It is critical for students to understand at the outset of a lesson what is expected of them. A lesson presents at least one (or more) Terminal Learning Objective(s) (TLOs) and the Enabling Learning Objective(s) (ELOs) associated with the listed TLOs. Listing the TLOs provides focus for both the student and instructor. The TLOs are the desired goal(s) within the lesson plan and the ELOs are the main ideas that support the TLOs. The TLOs and ELOs are transferred to the lesson plan verbatim and in the same sequence as they appear on the concept card. For lesson purpose classes, a statement is placed in this section to state "there are no formal learning objectives."
3. **Method/Media.** The method/media section describes the delivery system that was selected in the learning analysis. This information is found on both the concept card and Learning Objective Worksheet (LOW). In addition, the method/media section of the introduction is the natural area to place administrative instructions that affect the delivery of the lesson. An instructor note must be inserted immediately following this section to ensure these instructions are delivered to the students.

An example of the format for the note explaining Instructional Rating Forms (IRF) is below:

<p>INSTRUCTOR NOTE Explain Instructional Rating Forms.</p>

**Insert instructor note to
explain IRFs between the
Method/Media and the
Evaluation portion of the
Introduction.**

When developing the Safety/Cease Training brief, refer directly to the ORA worksheet.

5. **Evaluation.** Most learners want to know how, when, and where they will be tested on a lesson's content. In order to reduce student anxiety, the evaluation section of the introduction describes the type of evaluation, time, and location (i.e., "in accordance with the training schedule") of where the students' knowledge or skills will be evaluated. This information can be obtained from the training schedule and the exam concept card. For lesson purpose classes, there are no formal evaluations.
6. **Safety/Cease Training (CT) Brief.** Lessons that involve risk of injury, or damage to equipment must include a safety brief. Explaining to the students that hazards have been identified and controls implemented to minimize the risks will reduce anxiety about the training. Identified controls and hazards are provided from the ORAW completed on the lesson. This also serves to make the students safety conscious before the first main idea is introduced. Additionally, the CT will be briefed if all students are required to know and initiate a stoppage of training. Regardless of the student's role, the instructor is responsible for reviewing and executing the CT policy for the lesson spelled out on the Operational Risk Assessment Worksheet located in the Master Lesson File (MLF).
7. **Transition.** A transition is placed between the introduction and the first main idea. This transition is where the instructor ensures all students have an understanding of what is going to be taught, how it is going to be taught, how they will be evaluated, and Safety/Cease Training procedures. The transition then introduces the first main idea. The curriculum developer must provide the transition, along with blank lines, so that the instructor can personalize.

An example of a transition into the body of a lesson.

TRANSITION: Are there any questions about what will be covered, how it will be covered, or how you will be evaluated? Do you have any questions about the safety or Cease Training procedures? Now let's talk about (first main idea).

Insert Transitions, Instructor Notes, and Cues. Now that the body is outlined and the introduction is developed, the next step is to insert transitions, instructor notes, and cues (time, media, and break) into the lesson.



1. **Types of Transitions to Insert.** Transitions tie together the different components, methods, and main ideas within the lesson by smoothly summarizing one main idea and introducing the next idea. The transition should reinforce the conceptual framework, allowing the instructor to probe and gather feedback from the students.
 - a. **Transition.** A transition is placed between the introduction and the first main idea, between each main idea in the lesson, and between the last main idea and the summary. A transition contains three elements:
 - Review.** The review is done by smoothly summarizing the main idea that was just taught. The students are then asked if they have any questions about the information covered so far.

↳ **Probe:** The probe allows the instructor to confirm student comprehension by asking questions and accepting feedback. At least one question should be asked during a transition that relates to the last main idea covered. The curriculum developer writes the question to be posed and its intended answer directly in the lesson plan. Questions need to be challenging and cover the critical point of the last main idea. Unless a direct question actually appears in the transition, inexperienced instructors may not ask a probing question. However, blank lines are left at the end of each transition so that the instructor has room to personalize each transition. If the instructor personalizes the transition, he/she must be sure to review, probe, and introduce the next main idea. The transition should not be the only place where questions are posed. (Refer to Section 4301 for more on questioning.)

A transition contains three elements: review, probe, and introduce.

↳ **Introduce next main idea.** The introduction of the next main idea takes the instructor smoothly into the content to be covered next.

To sum it up, after a review of the main idea, an overhead question appears to allow students an opportunity to ask any question on the material (i.e., "Are there any questions on ___?"). This is followed by at least one direct question that will be asked during the transition. It comes from the last main idea taught (i.e., Q: "What is the... A:"). Then the next main idea is introduced.

An example of a transition is in the shaded box below:

TRANSITION: Now that we've talked about why the SAT is important, are there any questions? **QUESTION:** Why does the Marine Corps use the Systems Approach to Training? **ANSWER:** The process reduces subjectivity in how formal school decisions are made regarding curriculum and instruction. Now, let's talk about how the SAT is used in the FLC environment.

- b. **Interim Transitions.** Interim transitions are used when a method (e.g., practical application, demonstration, etc.) or break is inserted within the main idea. These transitions are placed before the new method to provide the instructor with guidelines of how to transition from the lecture to the next method or break. Once the method or break is complete, another transition must be placed to close out the method and transition back to lecture. An interim transition is different from other transitions because it does not require a probing question. If a new main idea is to be introduced following the method or break, then a transition should be written to review, probe, and introduce the next main idea.

Interim Transitions contain Elements:

- 1. Review**
 - 2. Introduce method or next heading**
-

An example of an interim transition is in the shaded box below:

INTERIM TRANSITION: Thus far, we have discussed the techniques used for effective questioning. Does anyone have any questions about questioning techniques? At this point, we're going to do a practical application where you will use the different questioning techniques.

2. **Insert Instructor Notes.** Instructor notes include information pertinent to the conduct of the lesson and can appear throughout the lesson. These notes are normally short and concise. Instructor notes are especially valuable to alternate instructors. As with cues, instructor notes should stand out from the normal text as illustrated below with a text box.

An example of the format for an instructor note is below:

INSTRUCTOR NOTE Have the students refer to TM 9-2350-264-10-1 for preparing the driver's station on the M1A1 tank.
--

3. **Insert Cues.** There are three types of cues contained in the lesson to assist the instructor with the presentation of the material. All cues must stand out from the regular text of the lesson. The three types of cues are:

- Time Cues.** Time cues are approximations for the amount of time required by the instructor to present each lesson component.

- Main Headings.** Time cues for main headings (Introduction, Body, and Summary) are placed right justified of the heading. The cue is bold, capitalized, and in parenthesis (**30 MIN**). The main heading time cues (Introduction, Body, and Summary) add up to equal the total lesson time.

- Main Ideas.** Time cues for the main Ideas within the Body are placed two spaces after the main idea. The main idea cue is bold, natural-cased text, and in parenthesis (**30 min**). All main idea time cues add up to the Body time cue. The sum of all the main heading time cues [and, at times, method time cues (see below)] in a lesson plan equals the total time for the lesson reflected on the concept card.

- Methods.** The time allotted for a particular method (demonstration, practical application, case study, etc.) is explained within the method instructions, with the **exception** of one case. If a method is not within a main idea, then it has its own time cue. For example, if three main ideas are covered and a practical application is inserted at the end to practice material covered in all of the main ideas (mass practice), then that practical application is given its own time cue since the method is not associated with any **one** main idea.

- Media Cues.** Media cues are placed throughout the lesson to tell the instructor what media to use and when to present it during the lesson. An alpha/numeric designator is used to identify specific medium at a specific point in the lesson. For example, (**ON SLIDE #1**) indicates to the instructor to employ slide #1 of the presentation.

- Breaks Cues.** Students are more likely to retain information if breaks are built into the course. It is generally recommended to allow a ten-minute break after every 50 minutes of instruction. Remember, it is important for the instructor to summarize information via a transition from day-to-day, lesson-to-lesson, and before and after breaks so the flow of instruction is not disrupted. A related activity can also be inserted to regain the students' attention to the subject material after the break.

3 Types of Cues

1. Time Cues
 2. Media Cues
 3. Break Cues
-

One exception within time cues for methods

NOTE: A break cue is not counted as a separate time cue when it is within a main idea. However, if the break cue falls between main ideas, then it becomes a time cue. In a case where a break cue becomes a time cue, the main idea time cues and the break cue are added together to equal the Body time cue.

An example of the format for a break cue is below:

(BREAK - 10 Min)

STEP 5

Review Lesson Plan and ORA. Compare the lesson plan with the ORA worksheet to ensure that all hazards have been identified and that the controls have been integrated into the lesson plan.

Write the Summary. The summary is a short paragraph which restates the main ideas (conceptual framework) discussed during the lesson. The summary is not used to re-teach material nor introduce new material; it is concise. No questions are asked or answered during the summary of a lesson. All questions should have been answered in the body and in the transitions. The summary needs to provide closure, a "mini-WIIFM," quote, or similar item, which will confirm why it is important for the student to remember what was taught. The final element of the summary given to the student is closing instructions, i.e. "Fill out IRFs and take a ten-minute break."

STEP 6

IRF – Instructional Rating Form.

STUDENT MATERIALS

Student materials serve as a guide to what is being presented in the course. These materials can provide class participants with additional facts and information. These materials also serve as a study guide that should be referred to during the course and/or as a job aid that students can take back to their unit following the completion of the course. When developing student materials, the appeal and ease of their use needs to be considered. These materials are supplied to aid the student in his/her learning. There are two types of student materials, student outlines, and supplemental student materials. Each is designed for a specific purpose that will aid the student during the course.

When developing student materials, the appeal and ease of their use needs to be considered.

Student Outline

The student outline provides the student with a general structure to follow during the class and a conceptual framework that highlights the main ideas of the class. It contains the learning objectives, lesson outline, and any references used to build the lesson. It also includes any additional notes or information, such as graphics (charts, graphs, clip art, photos, diagrams) deemed necessary. When developing the student outline, it does not have to be in Naval Format or in outline form. It should be developed in a way that the student is able to easily follow and use. Regardless of the format, all pertinent information from the lesson plan should be included, as described above. Appendix B provides examples of some different formats for student outlines and MCO 1553.2. Appendix O-25 provides a checklist to follow when creating a student outline. Student outlines can be written using one or a combination of the following styles:

- ↳ **Completed.** This style provides students with a "cut-and-paste" of the body from the instructor's lesson plan that excludes the administrative information, introduction, any cues, instructor notes, and/or the summary. This style is desirable when students are expected to read the entire outline during class, are unable to take notes or follow along during class, or when instruction takes place outdoors. It is very useful as a study guide or a job aid.
- ↳ **Fill in the blank.** This style uses an abridged form of the completed style with key terms or phrases omitted and replaced with blank lines. It is developed as a skeleton outline of the lesson plan. It is the student's responsibility to follow the lecture and fill in the missing information. When students complete the missing key terms or phrases, they are more likely to remember the material as they heard, saw, and wrote it. Presentation of the lesson must be structured to allow students time to fill in the blanks. This style of outline is not recommended for subjects of a technical nature.
- ↳ **Bullet.** This style incorporates short, informational statements presented in the same sequence as in the lesson plan. The student must take detailed notes to complete the information. Curriculum developers must take this into consideration and leave sufficient "empty space" for student's notes in the outline. The bulleted style is not recommended for those students with little or no knowledge of the subject.

Supplemental Student Materials

Supplemental student materials include handouts, other than the student outline, given to the class in support of the instruction. Supplemental student materials may include advance handouts to prepare the student for class. Additionally, supplemental student materials may include answer keys to quizzes, additional articles for reading, and reference materials such as technical manuals, graphs, charts, formulas, figures, and maps. The use and number of supplemental student materials is optional and they can be presented in any format. The distinction needs to be made between supplemental student materials and classroom instructional aids. The distinction is made based on ownership. Supplemental student materials will be items that students are able

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to take with them following the class. Instructional aids belong to the instructor for use in the classroom. Although the students use them during the class, they do not retain them at the end of the lesson. All supplemental student materials should support the learning objectives being taught.

INSTRUCTOR PREPARATION GUIDE

The Instructor Preparation Guide is a required element of the Master Lesson File (MLF). This guide is created to provide the instructor with information that is critical to the preparation for implementing the lesson. Detailed information is given so that the instructor understands what resources are necessary for the lesson. Much of the information provided under administrative information is copied from the concept card. Though this guide is a MLF item, instructors can make a copy so that they can check off items when preparing for the lesson. An example of the Instructor Preparation Guide can be found in MCO 1553.2_ Appendix O-26, 27. The minimum components for the Instructor Preparation Guide are listed below. This checklist can be added to as needed.

An example of the Instructor Preparation Guide can be found in MCO 1553.2_ Appendix O-26,27.

Lesson Title and Lesson Designator. The lesson title and lesson designator are provided to identify the lesson. Both can be found on the concept card.

Total Lesson Time. Refer to the concept card for the total lesson time. This provides the instructor with the amount of time that he/she has to teach the lesson.

References. List all of the references from the concept card.

Location of Test. The location of the test is provided so that the instructor will know where to go to gather the test materials.

Personnel Required. List all personnel that will be required to implement the lesson (e.g., instructors, support personnel, Corpsman). Check the student to instructor ratio and notes on the concept card for this information.

Facilities. The facilities required for the lesson need to be listed (e.g., classrooms, labs, ranges, etc.). Some facilities may require prior coordination to ensure availability.

The above components are listed as follows:

LESSON TITLE:	Assemble a Master Lesson File
LESSON DESIGNATOR:	CD0209
TOTAL LESSON TIME:	30 Minutes
REFERENCES:	MCO 1553.2, SAT Manual, MCTIMS User's Manual
LOCATION OF TEST:	See Course Chief
PERSONNEL REQUIRED:	1 Instructor
FACILITIES:	30 seat classroom

Top portion of the Instructor Preparation Guide.

Review Course Materials. This checkbox is necessary so that the instructor will review the course materials to identify any potential problems prior to instruction.

REVIEW COURSE MATERIALS:

- Review the course/training schedule, administrative requirements, student background information, lesson plans, student materials, media, and evaluations (tests).

Personalization. This checkbox is necessary so that the instructor adds personalization to the lesson plan.

PERSONALIZATION:

- Personalize the lesson plan by adding subject matter detail, relating personal experiences, providing examples, and/or interactive techniques.

Materials/Equipment. All materials and equipment needed to conduct the lesson are listed here with check boxes so that the instructor can gather materials well in advance of the lesson. Materials may include models, mockups, audiovisual equipment, handouts, etc.

MATERIALS/EQUIPMENT:

- Video clip for Gain Attention
- Computer and Projector
- 30 Brown Binders for Master Lesson Files
- 30 Master Lesson File Checklists

Exercise Setup and Planning. Each exercise (e.g., demonstration, practical application) is listed here. Underneath each, the setup and planning is described in sequence with check boxes to the side.

EXERCISE SETUP AND PLANNING:

Demonstration

- An MLF binder is ready to hand out to each student.
- The MLF checklists are ready to hand out to each student.
- Ensure that classroom is set up so that demonstration can be seen by all.

Safety. The ORA worksheet is a required element of the MLF and must be reviewed by the instructor. This checklist also requires that the instructor reassess the environment for changes (e.g., weather or worn equipment) and report findings on the AIR.

SAFETY:

- Review ORA worksheet in Master Lesson File
- Reassess the environment for changes that affect the original ORA. Document any additional considerations/controls on the After Instruction Report (AIR) for future reference.

Other Possible Items. Additional items can be added to the checklist if deemed necessary by the FLC.

Approving Signature and Date. A space is provided for the designated approving authority's signature and date. The Formal School's SOP will dictate who approves the Instructor Preparation Guide.

4005. CONSTRUCT TESTS

SECTION 5

Tests are designed to evaluate if the learner has the knowledge and skills required to master the objective or task. Back in the Design Phase, test items were developed for each learning objective. Now, based upon the course structure and when specific learning objectives are to be tested, the test is constructed. Before going into the steps for constructing a test, there must be an understanding of the methods of tests, purposes of tests, and the types of tests.

METHODS OF TESTS

Knowledge-Based Test

As was discussed in Chapter 2, Section 2207 of the Design Phase, knowledge-based testing can be done through oral or written tests. This method of testing does not evaluate the student's ability to perform the required job skills; however, it does determine if the student knows how to perform the required job skills. Two advantages of this method are its high degree of objectivity in scoring (the capability of measuring a large numbers of facts, ideas, or principles in a relatively short time) and the convenience in the development of statistical analysis. There are a number of factors that force schools to administer knowledge tests: time, cost, safety, and resource constraints that do not always permit performance-based testing.

Performance-Based Test

This evaluation deals with the assessment of technical skills, usually physical/motor skills. It usually deals with physical performance that follows a procedure or sequence of steps, which is called a process, or the end result, which is called a product. A test item that requires the student to replicate a task that is performed on the job is considered performance-based. A performance-based test will usually have a checklist that clearly defines the steps or procedures that must be completed to master the objective. In some circumstances, a written test can be considered a performance-based test if the student actually performs that item on the job. For example, filling out a DD Form 214 is a valid performance test for a student who actually fills those out on the job. A performance test duplicates the actual behavior by using the same equipment, resources, setting, or circumstances that the student will encounter on the job.

MCTIMS Student Evaluation Module (SEV). The SEV module is part of MCTIMS and is a web-based application used to construct tests, record test data, track student scores/GPA's and generate reports. MCO 1553.2_ Ch. 5 par. 2a(5) directs the SEV will be used to the fullest extent possible.

CATEGORIES OF TESTS

There are different purposes for giving tests. Below are some categories of testing along with their purpose. Since criterion-referenced testing is the preferred method of evaluation for the Marine Corps, more focus has been given to it.

1. **Criterion-Referenced Test.** These tests are used to evaluate the student's accomplishment of the criterion objective and to determine the effectiveness of the instructional system. Criterion-referenced tests are composed of items based on specific learning objectives. Each individual's ability to demonstrate mastery of the learning objectives is measured. The learner's achievement is measured against the predetermined criterion established in the learning objectives.
2. **Diagnostic Test.** The purpose of diagnostic testing is to measure the achievement of the supporting skills and knowledge that contribute to the ability to perform the criterion objective.
3. **Survey Test.** These tests are designed to determine what prospective students already know and can do before receiving instruction. The test is administered while the instructional system is being developed and provides important design data.

TESTING INTERVALS

A student's knowledge and skill level can be tested at different intervals before, during, and after instruction. A pretest, progress test, and a posttest accomplish this.

1. **Pretest.** A pretest is designed to identify how much the student knows or is able to do prior to starting the course. This kind of testing is diagnostic in nature. It provides what level the student is at prior to the course.
2. **Progress Test.** A progress test is administered throughout a course to evaluate student progress and to determine the degree to which students are accomplishing the learning objectives.
3. **Posttest.** The purpose of posttests is to identify/evaluate the effectiveness of instruction and how well the student learned. It is also a certification process. The student's ability to graduate from the course is generally based on posttest results. Therefore, **certification** that the student is able to go out in the real world and perform the job is provided through graduation.

Different test intervals.

Before
During
After

STEPS FOR CONSTRUCTING TESTS

The test items have already been written. Now the challenge is to properly assign and arrange test items, determine the grading criteria, develop scoring method, and develop the testing instructions.

Determining Mastery

Mastery Learning. Criterion-referenced testing is the preferred method of testing for learning objectives taught in the FLC. The criteria for test mastery are established by the learning objectives. The student, when completing a test, receives either a master (pass) or non-master (fail) for each learning objective. The student may be assigned an overall score, but it does not remove the responsibility of mastering each learning objective. Students that non-master a learning objective may receive remedial instruction and retesting until they reach the standard for mastery. The FLC will establish the remediation policy based on school resources (i.e., time, equipment utilization, availability of instructors). Students who do not master the learning objective during the established number of retests could be recycled through the program or dropped from the course. See MCO 1553.2_ Ch. 1, Par. 3, f(5) for guidance on remediation policy.

Determination of Course Mastery. The term "mastery" can be misleading – mastery does not mean or require that students pass with 100%. Students graduating from a course must, however, master 100% of the learning objectives.

Determination of Learning Objective Mastery. A determination is made by the FLC as to what is the acceptable level of performance for mastery of each learning objective. It may easily be that, for some objectives, a score of 60% is indicative of mastery, while for others a score of 90% or higher would be required. The determination is based upon the criticality of the objective. Mastery of all ELOs does not necessarily result in the mastery of the TLO, just as receiving a minimum score on each individual event of the PFT does not necessarily mean that you receive an overall passing score on the PFT.

Assigning Written Test Items

When determining what test items to use, the idea is to measure **all** learning objectives. Formal evaluation of learning objectives is accomplished by testing **each** learning objective.

Informal evaluation of learning objectives is accomplished through class work, homework, quizzes, and practical application. This does not meet the requirement to test learning objectives in the FLC. There is no established formula for determining the most appropriate number of test items required for testing any given learning objective. However, the guidelines listed below are factors to consider:

Criticality of skill. This refers to how important the skill is in relation to its application to actual job performance.

1. **High:** Skill is used during job performance.
2. **Moderate:** Skill influences job performance.
3. **Low:** Skill has little influence on job performance.

Other Criticality Factors. Refers to a learning objective's/outcome's importance as related to the performance of a job task.

1. **Safety to personnel/equipment: Critical tasks are those which are considered high risk or dangerous.**
2. **Frequency of performance: The more often a task is performed, the more critical it becomes.**
3. **Learning objectives importance to on-the-job performance.**
4. **Learning objectives importance to the overall course mission.**

Criticality of the objective. When both most critical and least critical objectives are measured on the same test, the critical objective should have more items to ensure that the test reflects the critical aspects of the course.

Instructional time allotted to present the material. For example, if the majority of the material covers one objective, then the majority of the test items should cover that objective. This ensures the emphasis in the classroom.

Complexity of the material. The more complex the material is, then the more test items are required to ensure understanding.

Arranging Test Items

When making decisions on how to arrange test items, consider the following:

Test item placement. Test items should be placed on the page so each item stands out clearly from the others. For example, a true or false item that is two lines long would have single spacing with double-spacing between items. A space should separate the stem of multiple-choice items and the list of answers. The answers should be in a single column beneath the stem and should be indented beyond the paragraph margin.

Example of Multiple Choice Item:

1. What are the three Domains of Learning?
 - a. Auditory, Visual, Kinesthetic
 - b. Intellect, Value, Tactile
 - c. Knowledge, Skill, Attitude
 - d. Cognitive, Affective, Psychomotor

Arrangement of test items. Items of the same type (e.g., multiple choice, short answer, essay) are grouped together in a test. Individual test items should also be arranged in approximate order of difficulty, which allows the students to progress as far as they can without spending excessive time on difficult items at the first part of the test.

Design. A test is designed so that the majority of the students can complete it. When many students cannot complete a test, efficiency is lost and student morale suffers.

Layout/Format. Below are some guidelines to consider when formatting the test:

1. Space items for easy reading and responding.
2. Provide generous borders.
3. List alternative responses vertically beneath the stem (multiple choice).
4. Do not split an item onto two separate pages.
5. If an answer sheet is not being provided, allow space for student answers.
6. Number items consecutively throughout the text.
7. If separate answers are used, number them so a check can be made for complete sets of materials before and after test administration.
8. Select an arrangement of items that serve the purposes of the test.

EVALUATING THE ASSEMBLED TEST	
1. Relevance	Do the test items present relevant tasks?
2. Conciseness	Are the test tasks stated in simple, clear language?
3. Soundness	Are the items of proper difficulty, free of defects, and do they have answers that are defensible?
4. Independence	Are the items free from overlapping, so that one item does not aid in answering another?
5. Arrangement	<ul style="list-style-type: none"> ▪ Are items measuring the same objective grouped together? ▪ Are items of the same type grouped together? ▪ Are items in order of increasing difficulty?
6. Numbering	Are the items numbered in order throughout the test?
7. Directions	<ul style="list-style-type: none"> ▪ Are there directions for the whole test and each part? ▪ Are the directions concise and at the proper reading level? ▪ Do the directions include time limits and how to record answers?
8. Spacing	Does the spacing on the page contribute to ease of reading and responding?
9. Typing	Is the final copy free of typographical errors?

Assessment of Student Achievement. By Norman E. Gronlund. p. 122.

Developing Grading Criteria

Grading criteria describe the standards by which the student will be measured and factors that will be considered in determining the student's grade on an individual performance or knowledge test/test items.

Uses of criteria. Grading criteria enable the instructor to determine whether or not the student/group has met the objective. Additionally, it provides an unbiased and non-subjective evaluation of the student's ability with respect to a particular area of performance or knowledge. The primary concern of grading criteria should be that it describes what the student is expected to do and what happens if the requirements are not met.

Grading Criteria for Performance Evaluations. The creation of grading criteria may be the most critical step in performance evaluation test development because it ensures standardized grading. The scoring guide contains a description of each step or group of steps to be graded. A pass/fail checklist describes in detail what constitutes satisfactory and unsatisfactory performance. Grading criteria for the course is a factor if the course is graded Mastery or Non-mastery; a checklist may be the most appropriate to use. If the course is graded with a numerical grade, a rating scale may be the most appropriate to use. When defining the checklist steps and rating scale decisions, all behaviors have to be written in sufficient detail so that all tasks are as precise as possible. The more completely the behaviors are described, the more effective the Job Sheet Checklist/Rating Scale will be. This helps remove instructor subjectivity from the grading process. Performance and knowledge-based testing should not be combined. Multi-part tests can be constructed in MCTIMS to support situations where both forms of testing are needed.

Other important grading criteria factors should include:

1. Compliance with required safety precautions.
2. Correct operation of equipment after completed assembly.
3. Physical testing if the job is finished.
4. Time required completing the job.
5. Skill in using tools.
6. Care and use of the equipment.

Develop a Scoring Method

Manually graded. A key or template needs to be developed to eliminate any subjectivity in the scoring process. Ensure this item is safeguarded against compromise. The essay test requires different scoring criteria. A model answer is required that lists all essential data a knowledgeable student can be expected to provide. This model is used as the standard answer by which all other answers are scored and the worth of each item or part of an item is set.

Automated grading system. Some schools utilize bubble sheet scanning devices to do automated grading. Future upgrades to the Student Evaluation Module of MCTIMS will provide an interface between systems so grades can automatically be fed to Student Evaluation.

RULES FOR SCORING ESSAY ANSWERS

1. Evaluate answers to essay questions in terms of the learning objectives being measured.
2. Score restricted-response answers by the point method, using a model answer as a guide.
3. Grade extended-response answers by the rating method, using defined criteria as a guide (Rubric).
4. Evaluate all the students' answers to one question before proceeding to the next question.
5. Evaluate answers to essay questions without knowing the identity of the writer.
6. Whenever possible, have two or more persons grade each answer.

Test Instructions for the Student

Once the desired test items are prepared, focus on the required information identifying the test. A complete set of instructions, either written, oral and/or by visual aid, must be given to the student. For written tests, a sample test item is given so that students understand how they should answer the question (i.e., circle, write out, "X"). The student instructions should specify the following:

1. References and materials are to be utilized during the test (if any).
2. Any rules for the test (e.g., "No talking.")
3. Time allowed for each section or for the whole test.
4. How to proceed with the test (i.e., individually, from part to part, from page to page or whether to wait for a signal.)
5. Procedures to follow after completing the test.
6. School's policy on cheating.

Student evaluation instructions are covered in Chapter 4, Section 4400.

Test Instructions for the Test Administrator/Proctor

Specific instructions need to be written out to the test administrator/proctor so that there is uniformity in how the test is to be administered. The instructions should tell what is required for preparation in giving the test, how the test is to be administered, and how remediation is handled.

Instructions for Preparing to Give Test should specify:

1. What the testing materials are.
2. Where to gather the testing materials.
3. How many can be tested at a time if there's a limit.
4. Required testing environment (e.g. computer classroom, motor pool).
5. Seating arrangements (if applicable).
6. Prepare a "Testing" placard to be displayed outside the testing environment.

Instructions for Administering the Test should specify:

1. Whether the students can use references or other materials during the test.
2. Inform students of the cheating policy for the school.
3. Amount of time the students are given to complete the test.
4. Whether the test administrator/proctor is to answer questions during the test.

Remediation Instructions should specify:

1. Type of remediation that will be conducted.
2. Where the retest will be located.
3. Procedures for giving retest.

By preparing detailed instructions, the administration of the test is more likely to be standardized. The overall effect of the standardization is more reliable test results on student progress and level of mastery.

4006. CONDUCT VALIDATION

SECTION 6

Validation is a process of trying out instructional materials and course materials prior to implementation to ensure that mastery of the learning objectives is possible and reasonable. Validation involves examining the effectiveness of instructional materials by identifying strengths and weaknesses. The instructional material should be presented to members of the target population to determine its effectiveness. If the instruction does not enable students to reasonably achieve mastery, it is revised until it does.

METHODS OF VALIDATION

There are a variety of methods for validating instruction. Validation of instructional materials should involve as many methods as possible. If all methods are to be used, they should be conducted in the order in which they are presented below. Personnel other than the curriculum developer(s) should conduct the validation to enhance objectivity. The personnel conducting the validation are referred to as curriculum validators.

Subject Matter Expert (SME) Technical Data Review

SME technical data review involves reviewing course materials to ensure the technical accuracy of instructional material content. Although the instructional materials are not in final form at this stage, the content should still support the information provided in technical manuals and orders, job guides, and checklists. SME participation will help identify specific problem areas and provide additional technical data.

Curriculum Validation Teams (CVT)

The CVT is a method of validation in which a team comprised of an experienced jobholder, a novice; a supervisor, an instructor, and a curriculum developer meet to review the instructional materials. The curriculum validator will coordinate the meeting as a facilitator only. As with the SME technical data review, the instructional materials are not in final form yet. Each of the participants of the CVT will examine the material from their different perspectives ensuring that materials are technically accurate, instructionally sound, and the learning level is appropriate to the target audience. For instance, a novice can point out gaps in the content that may be unnoticeable to SMEs, or vice versa. If there are disagreements among participants, a technical data review concerning all participants may be assembled to resolve the issue.

Pilot Course

In this validation method, instructional in final form are presented to a target population group. This validation method is important because it takes into account individual student learning differences. Student samples should represent the entire range of the skill and knowledge level of the target population. Instructional materials should be presented under normal environmental conditions. For example, if the materials are intended for classroom use or field use that is the environment in which the trials should be materials conducted. The decision to use a pilot course as a validation method is based on the availability of the necessary members of the target population and time. A pilot course is used at the discretion of the school to validate a developing POI prior to submission to TECOM (within 120 day window of Proof of Concept CDD signature or Direction from TECOM to create a new course). This pilot course must be run with pre-existing school resources, a representative TPD, and not at the detriment of approved courses. Pilot courses are not meant to be run in multiple iterations but simply as a test bed on the validity of a POI prior to submission for approval.

-
- Small Group.** In a small group validation, the curriculum validator presents instructional materials to a small group (2-4 individuals) of the target population to determine if mastery can be attained.
 - Large Group.** During large group validation, the lesson plan is presented to a group of 5 or more people for validation. Presenting the lesson to a large group allows many people from different learning perspectives to receive the instruction. If time is a constraint, large group validation can be conducted concurrently with implementation.
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Validation at First Implementation

This type of validation involves presenting instructional materials, in their final form, to members of the target population at first implementation. In this case, validation and implementation are conducted concurrently for one presentation of a scheduled class. This is **NOT** the preferred method of validation, and is done only when there is not enough time to conduct validation of materials prior to implementation. Validation at first implementation should only be done as a last resort.

This is NOT the preferred method of validation

TYPES OF DATA

The following are types of data gathered during validations. Depending upon the type of validation, data may vary in quantity.

Data Collected from Students. Student data are collected to determine the attitude of students when they are presented with instruction, particularly anything that kept them from attaining mastery of the learning objectives. Additional student background information including age, time in service, past experience, past academic experience, current job assignment, etc., should also be collected. In the collection of data from students, students should provide their comments on the following:

<input checked="" type="checkbox"/> Length of instruction.
<input checked="" type="checkbox"/> Comprehension of instruction.
<input checked="" type="checkbox"/> Student interest/motivation level.
<input checked="" type="checkbox"/> Realism to the job.

Instructional Material Data. Information on the effectiveness of the instructional material should be gathered from instructors, SMEs, students, and curriculum developers. These data can include effectiveness of:

<input checked="" type="checkbox"/> Lesson plan.
<input checked="" type="checkbox"/> Student outline.
<input checked="" type="checkbox"/> Supplemental student materials.
<input checked="" type="checkbox"/> Media.
<input checked="" type="checkbox"/> Tests (see Chapter 5, section 5300, for procedures for analyzing test items).
<input checked="" type="checkbox"/> Practical applications.

Instructional Procedures Data. Data on the effectiveness of the delivery system (instructional methods and media) should be gathered from instructors, SMEs, students, and curriculum developers. These data may include effectiveness of:

<input checked="" type="checkbox"/> Method of instruction.
<input checked="" type="checkbox"/> Order of instruction (training schedule).
<input checked="" type="checkbox"/> Instructor presentation.
<input checked="" type="checkbox"/> Number of instructors.
<input checked="" type="checkbox"/> Instructional setting.

Test Item Data. During validation, test items should be analyzed to determine if they measure the knowledge or skills required of the learning objectives. Test items should also be analyzed for reliability to determine if they produce consistent results. This is done through a process called test item analysis. Test item analysis is a set of procedures for evaluating the effectiveness of test items. Item analysis will identify which test items need to be revised or rejected. It is critical to conduct item analysis during validation prior to course implementation to ensure that the test items are valid. Chapter 5, Section 5300 presents detailed procedures for conducting test item analysis.

STEPS FOR VALIDATING INSTRUCTION

Review Formal Learning Center (SOP) Standing Operating Procedures

STEP 1

The information needed to plan validation may be contained in the school validation plan located in the school's Academic SOP. This document may provide additional guidance on types of validation trials, data collection methods, and appropriate authority for approval.

Plan and Schedule Validation

STEP 2

Plan and schedule validation to allow enough time to incorporate any improvements into the lessons prior to the start of the course. This is a critical step that must be well thought out. Validation is planned so that all trials can be conducted, data analyzed, and revisions made prior to implementation of the course. During this step, the type of data to be gathered (see Section 3602) and the type of validation methods (see Section 3601) are determined.

Determine Data Collection Procedures

Once the validation method is selected, determine the system for collecting data. These data may be collected using surveys, questionnaires, interviews, group discussions, observations or other methods (see Chapter 5, Section 5603). Curriculum validators should ask open-ended questions so that participants can genuinely express their feelings, opinions, and perceptions of the effectiveness of the instruction. Curriculum validators must keep in mind that the purpose of validation is to obtain information that will improve instruction.



Implement Validation Plan

Using the validation methods planned in Step 2 and the data collection procedures identified in Step 3, conduct the validation.



- a. **SME Technical Data Review**. Provide SMEs with instructional materials or instructional material content. Directions should be provided as well as the objectives of the validation.
- b. **CVT**. The curriculum validator gathers members for the CVT and serves as the facilitator of the meeting. The curriculum validator should ensure the following:

-
- All participants contribute to the meeting.
 - Recommendations for revisions are understood by all participants and are recorded.
 - Any other feedback concerning the effectiveness of instruction is collected and recorded.
-

- c. **Pilot Course Trial**. A pilot trial is the most comprehensive and time-consuming validation to conduct. It involves conducting an actual class with a group of students within or similar to the target population group. To conduct a pilot trial, the curriculum validator will:

-
- Gather students from the target population to receive the instruction.
 - Arrange the instructional setting as it will be arranged for the actual implementation of the class.
 - Identify and brief instructors who will participate in the field trial.
 - Develop questionnaires to collect data from students and instructors concerning their attitudes toward the effectiveness of instruction.
 - Ensure the instruction is conducted as it will be implemented.
-

Interpret and Record Validation Results

STEP 5

Interpret and record data from the validation. Since there is no specific format for doing this, curriculum validators should record the results in a manner that meets their validation objectives. For example, data can be summarized in a brief paragraph annotating how many comments were made and the trends found detailing instructional strengths and deficiencies. If the data were collected using a scaled rating system, the answers should be averaged and presented as an average response for each question. This summation should also include recommendations for solutions to correct for instructional deficiencies. See Chapter 5, Section 5300 for detailed procedures concerning the analysis and interpretation of data.

Report Validation Results

STEP 6

Once validation data is collected and the results are summarized, make recommendations for correcting problems. The summarized results will indicate what materials, methods, or media need revision report the validation results to the validation authority for approval.

VALIDATION AUTHORITY

The responsibility for validation of instruction ultimately rests with the FLC commander. The method of validation is based on resources available. The commander provides guidance on conducting validations through a validation plan, usually found in the Standing Operation Procedures (SOP). The plan will identify who has validation authority. Decisions about how to validate are based on resources, as outlined in the table below.

For example, the following decisions concerning validation must be made by the FLC:

-
- **What personnel are available to conduct the validation (SMEs, instructors, curriculum developers, etc)?**
 - **How many methods of validation (see Section 3402) will be used in validating course material? What specific revisions to instructional materials can be undertaken and still meet the planned course schedule?**
 - **How do we obtain members of the target population for validation? If actual members of the target population are not available, then the school director should select individuals with backgrounds as similar as possible to those of the desired target population.**
 - **How much time is available? If your time to design and develop a course is limited, you will have to choose a validation method that fits within the time constraints.**
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4007. DEVELOP A PROGRAM OF INSTRUCTION (POI)

SECTION 7

Per MCO 1553.2_, every Marine Corps FLC must have an approved Program of Instruction (POI). This approved POI is the schools authorization to conduct a course. A POI documents a formal school's plan for instructing Individual Training Events (ITEs). Specifically, a POI describes a course in terms of structure, delivery methods and media, length, intended learning objectives, and evaluation procedures. It also serves as a historical record that reflects the continual evolution of the course. An important element of the POI is the Course Descriptive Data (CDD) which is section I of the POI. The CDD provides a summary of the course including instructional resources, class length, and curriculum breakdown.

COURSE DESCRIPTIVE DATA (CDD)

Description. An approved POI authorizes the FLC to develop a new course or it authorizes a change to an existing course. The CDD is an important component of the POI and does the following:

- ❖ Indicates the school's concept of how the course will meet the training needs as established in the T&R Manual.
- ❖ Identifies resource requirements needed to conduct the course from which decisions can be made.

**TECOM- Training &
Education Command**

- New Course of Instruction.** A FLC will submit a Proof of Concept CDD and a cover letter requesting approval to add a new course. The cover letter should address why the course is required, what deficiencies it will correct, and why it should be conducted in a Formal School setting. MCO 1553.2_ describes the requirements for Proof of Concept CDDs for new courses.
 - TECOM (FSTD) records the information contained in the CDD along with data collected from the Occupational Field (OccFld) sponsor at Manpower and Reserve Affairs into the Training Resource Requirement Management System (TRRMS) database. TRRMS processes this information and produces a Training Input Plan (TIP) reflecting the annual instructional requirements and a four-year instructional plan for each Formal School.
 - The CDD gives the details for assignment of students to formal courses of instruction. For each course listed on the TIP, TRRMS generates a Training Quota Memorandum (TQM), which is loaded to the MCTIMS Student Registrar module, an automated information system that enables order-writing commands to assign specific Marines to available course seats. These memoranda translate the annual TIP requirement into actual class seat quotas and form the basis for order writing.
3. **Elements of a CDD** (see MCO 1553.2_ Appendix A-1 for a sample CDD). Each element of a CDD, in order of presentation (appearing as items #1 through #24 in a CDD), is addressed below:

Course Title. The course title must appear as it is listed in MCO P1080.20_ (JUMPS/MMS Codes Manual) unless a change is required or the POI is for a new course.

Location. Record the complete address for each location the course is taught.

Marine Corps Service School Code (SSC). The SSC must correspond to the SSC listed in MCO P1080.20_ (JUMPS/MMS Codes Manual). If the course is new, record "To be determined."

Other Service Course Number. Use other pertinent service course numbers as provided by other branches of the military. If other service course numbers are not applicable, record "NA."

Military Assistance Program Articles and Service List Number. The military assistance program articles and service list number is a seven digit alphanumeric code used to identify a course intended for foreign military instruction. If this type of instruction is not applicable, record "NA."

Purpose. Include a concise statement about the goals of the instructional program.

Scope. Provide a list of the main subjects covered in the course. The list should be comprehensive to include all topic areas. A list of the T&R events covered by the POI must also be included with the CDD as the task list.

Length (Peacetime). Record the total number of instructional days required for the course. Per MCO 1553.2_ Ch. 1 Par. 6 the peacetime instructional week includes an average of 40 hours (8-hour day x 5 work days). Do not include holidays or weekends where instruction does not occur. TECOM FSTD will reconcile any exceptions, such as holidays, by comparing the number of instructional days to the TIP.

Curriculum Breakdown (Peacetime). Provide a breakdown of the curriculum in academic and administrative hours (see Section 3101). The Peacetime instructional week includes an average of 40 hours (8-hour day x 5 work days), 35 of which will be academic time (Administrative time exceeding five hours per week must be conducted after hours or justified in a waiver request). For detailed organizational and tracking purposes of instructional hours, academic hours should be further broken down into methods (e.g., practical application, lecture, demonstration, performance evaluation, written evaluation). Administrative hours should also be broken down into appropriate methods. See MCO 1553.2_ Ch. 1 pa. 3f

Length (Mobilization). Record the total number of instructional days required for the course during wartime mobilization. During mobilization, the instructional week averages 60 hours (10-hour day x 6 days). For courses on three shifts with equipment or facility constraints, the mobilization instructional week averages 48 hours (8-hour day x 6 days). This time includes both academic and administrative hours. If the course will discontinue upon mobilization, enter "NA." If the course length is the same during mobilization as in peacetime, click "Same as peacetime."

Curriculum Breakdown (Mobilization). Provide a breakdown of the curriculum in academic and administrative hours for mobilization. During mobilization, it is likely that academic hours will increase and administrative hours will decrease. If the course will discontinue upon mobilization, enter "NA." If the curriculum breakdown is the same during mobilization as in peacetime, click "Same as peacetime."

Maximum Class Capacity. Record the maximum number of students who can receive instruction using available resources. Resources include classrooms, messing, billeting, equipment, budget, and personnel available.

Optimum Class Capacity. Record the number of students per class that can take maximum advantage of all the resources (e.g., facilities, equipment, instructional capabilities) available to the school.

Minimum Class Capacity. Record the minimum number of students per class that will make the course cost effective.

Class Frequency. Record the number of classes required to support the TIP for the current year.

Student Prerequisites. List the prerequisites that personnel must meet to attend the course. This information can be found in the Target Population Description (TPD) developed in the Analysis Phase and filed at the school.

MOS Received. Record the Military Occupational Specialty (MOS) assigned to the student upon successful completion of the course. If the course does not result in an MOS assignment, record "None."

Quota Control. Record the name of the agency managing course quotas. The OccFld sponsor can provide this information if they are not the controlling agency.

Funding. Record the name of the agency that funds temporary additional duty incidental for students attending the course. In those instances where the using agency must also bear cost, an explanatory statement must be contained in this section. Courses are funded from a variety of sources, depending upon a number of factors such as student type, length of course, and career track. Basic guidelines for schools to determine the funding source are:

- a. Courses over 139 days or 20 weeks at one location are PCS and funded by MMOA/MMEA.
- b. Courses less than 139 days or 20 weeks may be unit-funded or TECOM-funded.
- c. Entry-level pipeline students – normally funded by MMOA or MMEA.
- d. Lateral Move students – may be unit-funded or TECOM-funded.
- e. Reserve students – normally funded by MARFORRES.

Reporting Instructions. Designate to whom the student will report when arriving for a course of instruction, to include information on transportation and directions (both during and after working hours). Contact phone numbers, fax numbers, organizational e-mail, and website addresses are elements that are to be included. Also include a statement indicating the availability of government billeting and messing. Provide telephone number and office contact information to obtain billeting reservations or confirm that government quarters are not available. If there is more than one school location, include a separate set of instructions for each location.

Instructor Staffing Requirements. Instructor staffing requirements are based on the academic course hours and computed in accordance with ITRO agreements, and are automatically computed by MCTIMS in the Instructor Computation Worksheet of the POI. Although instructor-staffing increases may be validated based on an approved POI, the POI itself will not generate a table of organization (T/O) change. A Table of Organization Change Request (TOCR) must be submitted with the POI to CG, TECOM G-1 requesting a T/O change.

This section of the CDD lists the school's T/O number and its date, and the instructor and instructor supervisor billets by line number, grade, billet name, MOS requirements, and number, indicating those line numbers not currently filled. The Instructor Computation Worksheet (ICW) used to compute requirements should be included as an appendix to the CDD with the POI. Additional comments as to whether the billet is filled or not, are required.

For FLCs located at another service's location, refer to MCO 1580.7 and compute instructor-staffing requirements using the Inter-service Training Review Organization (ITRO) manpower computation formula. The ITRO Manpower Analysis Subcommittee Procedures Manual detailing this formula may be obtained by contacting TECOM G-3.

PROGRAM OF INSTRUCTION (POI)

The POI serves as a FLC plan for implementing and evaluating a formal course of instruction. A POI is the management tool for conducting a course. At a minimum, a FLC must have a locally approved (by signature of FLC commander) POI for every course of instruction it delivers. For each school, the POI is used as an important element in the documentation and historical record that reflects the evolution of a course. Accordingly, a copy of the POI is maintained at the school to document this evolution.

POI Development Process. Using the information from the approved CDD, the FLC will develop the POI. MCO 1553.2_ details management of Marine Corps FLCs, contains POI submission and approval requirements and procedures. The curriculum module of the Marine Corps Training Information Management System (MCTIMS) is used to develop the POI.

POI Content Requirements. Development of the POI primarily involves the consolidation of materials produced during the Analysis and Design Phases. MCO 1553.2_ mandates minimum POI content requirements. Any additional items to the POI must be cleared for inclusion by TECOM (GTD/ATD) prior to submitting the POI.

POI requirements listed in order:

- (1) **Title Page.** The title page provides information necessary to identify the document. This includes the course title, SSIC, school name/address, and effective date. The effective date is left blank until the POI is approved, then the date approved is recorded. Each time a revised POI is approved, the new approval date is recorded.
- (2) **Certification Page.** The signed certification page signifies that the CG, TECOM has reviewed and approved the POI. The approved POI directs the school commander/director to implement the course of instruction. Local approval of POIs is not authorized.
- (3) **Record of Changes Page.** The record of changes page is a chronological log of all changes made to a POI. Each entry must indicate the change number, date of change, date received, date entered, and the signature of the individual entering the change.
- (4) **Table of Contents.** This table details the content of the POI and is arranged by section number and section title. The table of contents should include by section the following: CDD, Summary of Hours, Scope of Annexes, Concept Cards, Student Performance Data, and Distribution List.

- (5) **CDD.** Section I of the POI consists of the CDD with preface. The preface should include a brief purpose statement and the address where comments and recommendations concerning the POI may be sent. The 24 elements of the CDD provide a summary of the course.
- (6) **Summary of Hours.** Section II of the POI consists of a summary of the course. Included are two items: a breakdown of the academic and administrative hours, and revision data.

-
- All academic hours are organized by using annexes. Annexes organize the concept cards contained in the POI into chapters or topic areas. Annexes can duplicate the functional areas ITE/T&R are organized by or they may be some other organizational grouping determined by the developer of the POI. Annexes A-Y are for academic concept cards and annex Z is reserved for administrative concept cards. Due to MCTIMS' automatic calculations of academic and administrative hours from each concept card, the totals shown in this paragraph will match the instructional hours represented on the concept cards and the curriculum breakdown in the CDD (items #9 and #11).
- Revision data is listed by lesson designator, lesson title, and lesson time expressed in hours. The previous and current lesson designators and hours are listed (when applicable) and rationale is provided for each change to these items.
-

- (7) **Scope of Annexes.** The scope of annexes carries a subheading, academic subjects, and details a description of the scope of each annex contained in the POI. If there is a difference in the scope between the conduct of the course during peacetime and mobilization, it must be annotated here.
- (8) **Concept Cards.** Section IV of the POI is made up of the concept cards. Concept cards comprise the bulk of the POI and provide a snapshot of all lessons, examinations, and administrative events. An introduction is provided to explain the description of the contents of the concept cards, the location of learning objectives report, and summaries of instructional hours.
- (9) **Student Performance Evaluation.** Section V of the POI documents the scope of the evaluation, standards for successful performance, and evaluation procedures. Refer to the school SOP and for guidance on specific evaluation procedures. Student evaluation must be detailed and include, at a minimum, the evaluation philosophy (mastery/non-mastery/GPA), methods of evaluation (e.g., written, performance, remediation), Fitness Reports (if applicable), Pro/Con marks (if applicable), disposition of academic failures (recycle/MOS re-designation procedures).

**See section 3200
concerning concept
cards.**

Distribution List. This section details who receives the POI.

4008. ASSEMBLE A MASTER LESSON FILE

SECTION 8

A Master Lesson File (MLF) is a compilation of living documents that are kept in the school to provide everything needed to conduct a lesson. The MLF is kept at the FLC and serves as the central repository for all the instructional and supporting materials for a given lesson. A MLF must exist for each lesson taught. All copies of materials that are created for distribution must come from the MLF. Since the MLF is a living document, it can be altered to fit current doctrine or updated to provide better media, more complete handouts, new methodology, etc. The MLF is constantly being improved and is the most up-to-date file on what is occurring at the school for a particular lesson. Thus, it provides accountability, documents the use of school resources, and most importantly, **provides continuity**.

MINIMUM REQUIREMENTS

In an academic MLF, seven items must be present. For each of these items, there will also be a completed checklist. In a lesson purpose class, the first two items are omitted.

Learning Analysis Worksheet

The Learning Analysis Worksheet (LAW) is required in the MLF because it documents the transition between the T&R events and learning objectives.

Learning Objective Worksheet

We put the Learning Objective Worksheet (LOW) in the MLF because it describes the anticipated learning outcome, provides a test item for each Learning Objective (LO), and contains the selection of methods and media for that specific LO.

Concept Card

A concept card is placed in the MLF because it is a quality control document. The concept card is always located in the Program of Instruction (POI), but for quick reference will be placed in the MLF. The concept card provides a quick snapshot of the class (i.e. learning objective(s), method, media, instructor to student ratio, references).

Operational Risk Assessment Worksheet (ORAW)

The ORAW documents the school plan to conduct training in the safest manner possible. The ORAW documents the 5-step Operational Risk Management process as it relates to the lesson. Refer to and MCO 1553.2_ for further guidance on the preparation of the ORAW.

Instructor Preparation Guide

This document is used to guide the instructor in preparing for the lesson.

Lesson Plan

No MLF is complete without a lesson plan. The lesson cannot be conducted without a lesson plan. The lesson is written in such detail that an alternate instructor, with minimal preparation time, could effectively deliver the lesson.

Student Outline

The student outline will be contained in the MLF.

Supplemental Student Materials

Any other materials used to enhance instruction or student learning during the class should be maintained in the MLF. If the actual copies are not maintained in the MLF, a locator sheet is used to inform the instructor where to locate these materials.

Media

Media and/or a list of supporting papers are placed in the MLF. If the actual media are not contained in the MLF (e.g., films, tapes, wallcharts), supporting papers that list the media required and where they are located should be included. It may be possible to provide paper copies of slides, transparencies, or wallcharts in the MLF. Any copyright authorizations related to the media should also be filed here.

OPTIONAL COMPONENTS

Each FLC's SOP will dictate optional components that must be kept in a MLF.

Some examples of optional components are:

T&R Extract

An extract from the applicable Training & Readiness (T&R) Manual may be included as a foundation to the material being taught.

Approval Signature

Most schools require verification by a supervisor in an official capacity for any or all documents found in the MLF. This can be placed on a separate form that depicts whose signature is necessary for approval.

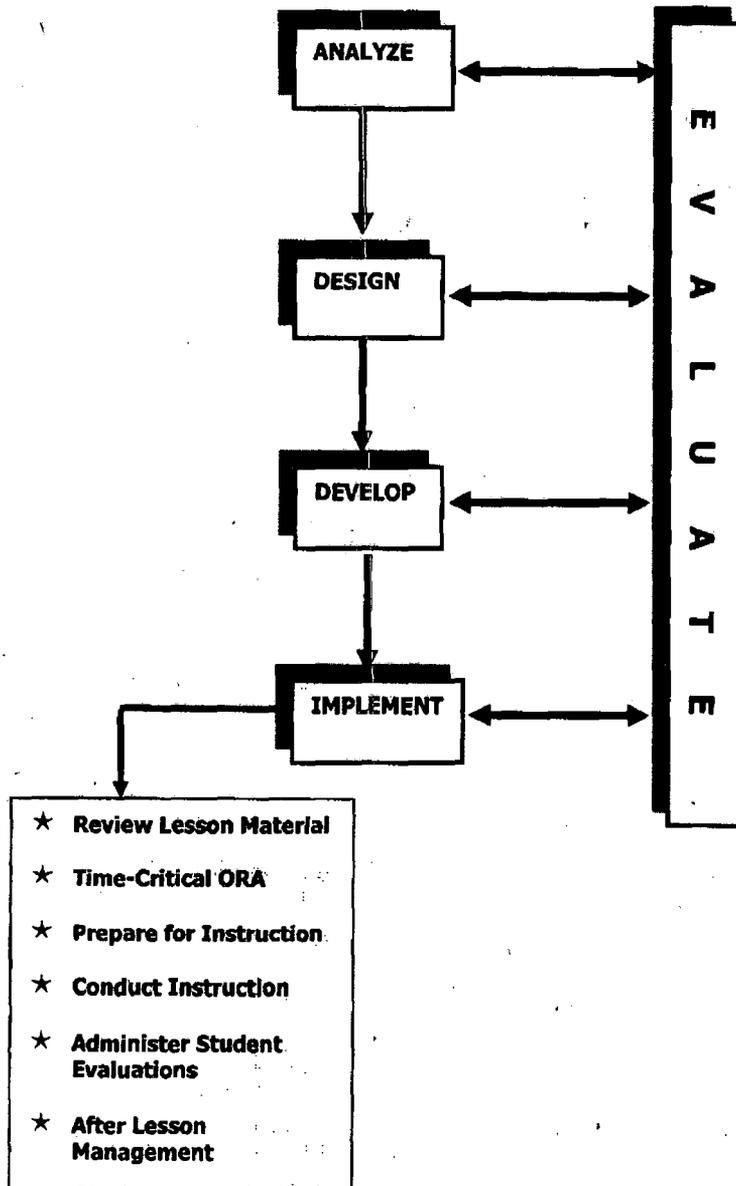
Other Course Related Materials

Any other item dictated by local SOP should be contained in the MLF. These items may include items such as test, training area requests, and other items applicable for use during the lesson that aid in the delivery or evaluation of that particular class.

STEPS FOR ASSEMBLING A MASTER LESSON FILE

STEP 1	<u>REVIEW MCO 1553.2 AND LOCAL SOP</u>
	Review the current copy of MCO 1553.2 (Marine Corps Formal Schools and Training Detachments) along with your school's SOP to determine the requirements of the MLF.
STEP 2	<u>GATHER DOCUMENTS AND CHECKLISTS</u>
	Gather all documents along with their blank checklists once you have determined your requirements.
STEP 3	<u>COMPLETE THE MLF CHECKLIST</u>
	Complete checklists for each component of the MLF. Sample checklists for each component may be found in APPENDIX O of the MCO 1553.2. Similar or additional checklists to be used for the optional MLF components may be mandated by local SOP.
STEP 4	<u>ARRANGE EACH DOCUMENT IN THE MLF</u>
	Arrange each document in accordance with your checklist in the MLF. Ensure each checklist is completed to ensure that all required items are included in the MLF.

IMPLEMENT PHASE



In Chapter 5:

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⊕ Review Course/Training Schedule	5-3
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Chapter 5

5000. INTRODUCTION

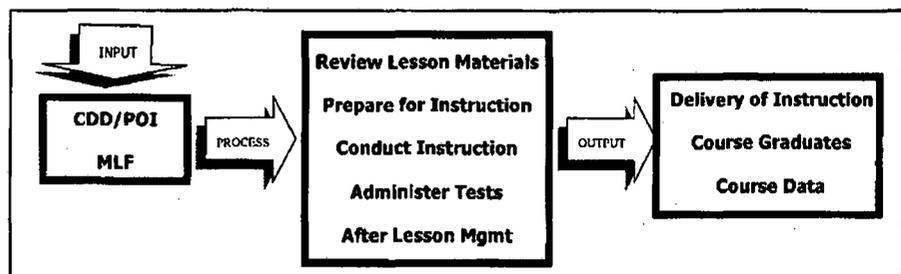
During the Implement Phase the following is accomplished: reviewing the lesson materials, preparing for instruction, conducting instruction, administering student tests, and performing after-lesson management. This includes the instructor reviewing the training schedule and, class materials (to include tests), preparing personnel and the training environment, and conducting rehearsals. Once the instruction has been delivered, the instructor must administer student evaluations to determine if the learning objective has been met. The instructor must conclude the instruction by completing an After Instruction Report (AIR) to document the course data for later use in the Evaluation Phase.

PURPOSE

Using the curriculum produced during the Develop Phase, the instructor executes the instruction during this phase. The purpose of the Implement Phase is the effective and efficient delivery of instruction to promote student understanding of material, to achieve student mastery of learning objectives, and to ensure a transfer of student knowledge and skills from the instructional setting to the job. This is accomplished by effectively implementing the POI that was designed, developed, validated, and approved during the previous phases.

The Implement Phase is made up of five separate sections, each of which has a specific purpose.

1. **Review Lesson Materials.** This section provides guidance on reviewing lesson plans, student materials, media, Operational Risk Assessment Worksheet (ORAW), Instructional Preparation Guide (IPG), and tests when preparing to conduct a lesson.
2. **Time Critical Operational Risk Assessment.** The Time-Critical Operational Risk Assessment addresses preparing and reacting to changes in the instructional environment that affect safety.
3. **Prepare for Instruction.** This section addresses preparing the instructional environment, rehearsing, and preparing for instructor evaluations.
4. **Conduct Instruction.** This section addresses effective communication, steps in conducting a lesson, and how to employ instructional methods.
5. **Administer Student Tests.** A step-by-step process for administering student tests is provided in this section.
6. **After Lesson Management.** This section provides the responsibilities of an instructor after the lesson.



5001. REVIEW LESSON MATERIALS

SECTION

1

Reviewing lesson material involves all those activities that instructors must perform before preparing and conducting instruction. Instructors must have a clear understanding of all aspects of the lesson. This is accomplished by reviewing the course/training schedule, the MLF, and tests. By reviewing these items, the instructor can identify any conflicts, questions, or potential problems before the rehearsals begin. More importantly, the instructor can make required adjustments prior to delivering the instruction to the students. The instructor must ensure the lesson plan, student materials, and media all have the same information.

REVIEW COURSE/TRAINING SCHEDULE

The instructor should review the schedule as early as possible before instruction begins. This allows the instructor ample time to deal with any conflicts or problems. By reviewing the schedule early, the instructor has time to schedule resources (i.e., ranges, weapons, or transportation), rehearsals (i.e., a dress rehearsal in the instructional setting), and any administrative requirements (i.e., printing of student materials).

REVIEW LESSON PLAN

Detailed lesson plans ensure that the instructor has all the critical information needed to maximize student learning. The purpose of reviewing the lesson plan is to ensure it contains all of the required components; to match the learning objectives to the information in the lesson plan; and to personalize the lesson plan to the instructor's style of delivery. After reviewing the lesson plan, the instructor should fully understand lesson content and have confidence in the detailed script that allows for the smooth and effective delivery of instruction.

Lesson Plan Personalization. The instructor will be provided with the approved lesson plan for the block of instruction. The instructor personalizes the lesson plan, tailoring it to his or her style of teaching. Lesson plan personalization allows the instructor to make the class unique without deviating from the approved content. Personalization includes adding subject matter details, related personal experiences, and discussion topics which may be needed to cover the topic in greater depth. Personalization also includes the addition of notes to indicate when to stress a point, relate a personal experience, or use an example or analogy.

Subject Matter Detail. Use this type of information to provide technical data such as purposes, descriptions, facts, operations, and functions. Course reference materials provide this information.

Instructional Techniques. Use carefully written questions, well-planned media, or additional student/instructor activities to enhance the lesson.

Personal Experience. Relate personal on-the-job experiences to the lesson to increase student interest. Relating personal experiences has the positive effect of reinforcing the practical application of the material. It also serves to increase student interest and motivation.

Examples and Analogies. When possible, support main points of the lesson plan by examples and analogies to simplify the concepts or ideas being taught. Use them as a part of personalization for each lesson. For example, if the lesson is on the way sound waves travel through air, but the class has difficulty understanding that concept, then perhaps an analogy, such as "it is similar to the way waves travel through water after a stone is dropped," will help them understand.

REVIEW STUDENT MATERIALS

Student materials assist the instructor in the delivery of instruction by providing tools that stimulate the learner and reinforce key concepts. An instructor influences the transfer of learning by the way the content of the Master Lesson File (MLF) is used. There are two types of student materials; student outlines and supplemental student materials. All student materials must be reviewed to ensure they match and support the lesson. Using outdated and irrelevant material must be avoided at all cost. The students' performance and motivation will suffer when knowledge and skills are received that no longer pertain to the job.

Student Outlines. The student outline is the primary document that supports the instruction. This outline provides the student with a general structure to follow during the class and a conceptual framework that highlights the main ideas of the class. The primary purpose for reviewing the student outline is to ensure it is written in proper terms for the student, not the instructor, and to verify that it contains all required components.

Supplemental Student Materials. Supplemental student material is any material, in addition to the student outline, provided to the student prior to or during instruction. Supplemental student materials may include advance handouts to prepare the student for class (e.g., orientation material), answer keys to quizzes, additional articles for reading, and reference materials (e.g., technical manuals, graphs, charts, formulas, figures, and maps). The use and number of supplemental student material is optional, and can be presented in any format that will be easily understood by the student. The difference between supplemental student materials and classroom media is that students take ownership of the former, while the latter remains the property of the school. The primary purpose for reviewing supplemental student materials is to ensure the information does not contradict the information contained in the student outline and that it is an essential tool required to meet the learning objective.

REVIEW MEDIA

Instructional media can come in many forms. The primary purpose for reviewing media is to ensure that it matches the information in the lesson plan and will aid in the student's ability to master the LOs.

REVIEW OPERATIONAL RISK ASSESSMENT WORKSHEET (ORAW)

The purpose of the ORAW is to record the results of an Operational Risk Assessment. During the Develop phase of the SAT, an ORAW is developed and then maintained in the Master Lesson File (MLF). An ORAW is required for every lesson. However, some lessons may not have any hazards identified for the lesson, in which case the ORAW will state "No Identified Hazards." Through the ORAW, identifiable hazards are listed and assessed, risk decisions are made, controls are developed and placed in the lesson plan, and supervision of the controls is determined. Instructors must identify the ORAW and review it for safety issues pertaining to the lesson prior to the conduct of the lesson. The ORAW must also contain the Cease Training Criteria (CTC) for the lesson. These criteria detail the circumstances when training must be stopped. The CTC is specified in the safety brief of the introduction in the lesson plan. When there are CTC associated with a practical application or other method, it is reiterated prior to the practical application. For each safety control identified on the ORAW, a corresponding control must be in the lesson plan where applicable. It is absolutely imperative that this information is reviewed for accuracy to ensure the safety of the students during the lesson. Ensure that the ORAW is valid by looking at the approving signature and date. Any problems concerning the ORAW (such as acquiring resources necessary to implement controls, etc.) must immediately be brought to the attention of the appropriate authority. MCO 1553.2_ contains guidance on conduct of ORM.

REVIEW INSTRUCTOR PREPARATION GUIDE (IPG)

The Instructor Preparation Guide is a required element of the Master Lesson File (MLF). This checklist is created to provide the instructor with information that is critical to the preparation for implementing the lesson. Detailed information is given so that the instructor understands what resources are necessary for the lesson. Much of the information provided under administrative information is copied from the concept card. Though this checklist is an MLF item, instructors can make a copy so that they can check off items when preparing for the lesson.

REVIEW STUDENT TEST

The primary purpose for reviewing the student test is to ensure the instructor has a complete understanding of how the students will be evaluated. Every block of instruction begins with an introduction. One of the steps in the introduction is to explain how the students will be evaluated. By reviewing the test, the instructor will also determine if the test items are supported by the content of the lesson plan, instructional materials, and student materials. The instructor must never use this information to teach specific test items or questions.

SECTION 2

5002 TIME-CRITICAL OPERATIONAL RISK ASSESSMENT (ORA)

When instructing in the classroom, the need for Operational Risk Management (ORM) is paramount. Instructors are entrusted with the safety of the students. For this reason, ORM is needed in every aspect of training, whether the training is in the classroom or out on the machinegun range. Hazards still exist in the instructional environment. That is why the curriculum developer at the schoolhouse has done an in-depth Operational Risk Assessment (ORA) and placed a report of the assessment in the Master Lesson File (MLF). Though the in-depth ORA is already done, the instructor can have a significant impact on controlling risk by conducting a Time-Critical ORA prior to commencement of each instructional block.

IDENTIFY CHANGE(S)

Change has been called the "Mother" of all risk. Changes can occur during the preparation of the lesson, during the conduct of the lesson, and during the administration of tests. When talking about changes, what is really being discussed is what can happen in the instructional environment to change the hazards documented in the in-depth ORA that was completed by the curriculum developer. Remember, the instructor is in charge of the class and must ensure the safety of the students. There are several tools that can be used to aid the instructor in preparing for the lesson. Change Analysis and the What If Tool (WIT) will help identify changes or potential changes. Once a change has been identified, a determination can be made to whether the associated hazard is a high or low risk. If the risk is determined to be high, then training is ceased to ensure the safety of the students. If the risk is determined to be low, then the instructor applies a Time-Critical ORA to ensure the safety of students and continue with the training. If possible, enlist the aid of experienced instructors when using these tools. Their experience can shed light into areas an inexperienced instructor may not have thought about.

Change Analysis

Change Analysis is an excellent tool for use in time-critical applications where change has been introduced. It is very simple to use; simply look at a training event and ask, "What is different?" As the name implies, Change Analysis allows the identification and assessment of hazards resulting from planned or unplanned changes to a lesson. Case in point would involve an event that has been thoroughly planned and briefed, but something or somebody introduced some change and the whole plan fell apart. Examples of when to apply change analysis include when assessing the impact of:

- Resource cuts, to include time, dollars, people or other resources.
- Changes in weather or the environment.
- Changes to equipment or supplies, such as a HMMWV truck instead of a 7-ton truck.
- Changes to the location of a classroom or the number of students attending class.

What If Tool (WIT)

Asking the question, "What If?" may possibly identify additional hazards not even considered by the in-depth ORA. To use the WIT, assume that Murphy's Law applies. Murphy's Law states, "What can go wrong, will go wrong." Remember to consider possible mistakes or problems. Look at the worst-case scenario, even if it does not seem likely to happen. Also, consider the mistakes or problems that are much more likely to happen, but may not be as detrimental. "What-If" questions can be formulated around human errors, process upsets, and equipment failures. These errors and failures can be considered during normal operations and during training activities. The questions could address any of the following situations:

- Failure to follow procedures or procedures followed incorrectly
- Operator inattentive or operator not trained
- Equipment failure
- Instrumentation calibrated wrong
- External influences such as weather, fire
- Combination of events such as multiple equipment failures

Experienced personnel are knowledgeable of past failures and likely sources of errors. That experience should be used to generate "What-If" questions.

APPLY THE 5-STEP PROCESS

Time-Critical Risk Management will suffice only when the risk is low. It is used when there is no need to develop a written Risk Assessment for an evolution, such as would be required for a deliberate or in-depth level of ORM (refer to MCO 1553.2 Ch. 5 for more information on the In-depth ORA and the 5-step ORM process). It is also particularly helpful in choosing the appropriate course of action when an unplanned event occurs during the execution of a planned operation or training course.

Applying

The Time-Critical level of Operational Risk Assessments is employed by everyone responsible for a conducting a period of instruction to consider risk while making decisions in a time-compressed situation. In the steps of Risk Management, identify the hazard(s), make an assessment by examining probability and severity associated with the hazard, and use the Risk Matrix to determine a Risk Assessment Code (RAC). Next, the instructor must make a risk decision. This only refers to Instruction that is not of a high-risk nature, to which the instructor can apply the five-step process. If the risk is low and the decision is to continue training, then the instructor must implement some form of control and supervision to reduce the risk. This has already been done for the instructor in the In-Depth ORA worksheet. However, changes do occur and that is when the instructor needs to apply a Time-Critical ORA. Clearly, the assignments of risk are subjective; different people may assign different values. The point is to increase situational awareness so that a mishap or incident is more likely to be avoided.

SECTION 3

5003. PREPARE FOR INSTRUCTION

The preparation portion of the Implement Phase involves all those activities that instructors and support personnel must perform to get ready for delivering the instruction. To maximize the mastery of the LOs by the learner, instructors must rehearse the lesson, prepare instructional materials, and prepare the instructional environment. This is accomplished by organizing the instructional material and environment in a manner that promotes the smooth exchange of information between the instructor and the students. Prior to conducting instruction, instructors should think about how to influence the following; mastery of LOs, the instructional environment, delivery, facilitation techniques, use of media, and questioning techniques.

INSTRUCTIONAL ENVIRONMENT

Prior to delivering instruction, the instructor must prepare the instructional environment for an organized and smooth presentation to maximize the mastery of LOs. The instructional environment refers to the instructional setting (classroom), media/equipment, support personnel, student materials, and the administrative functions the instructor must perform.

Prepare Instructional Setting (Classroom)

The instructor must ensure that the instructional setting replicates the job setting as much as possible. This is achieved by organizing and placing required equipment or supplies as they would be in the job setting. The instructor must also ensure that the instructional setting is conducive to learning. This is accomplished by ensuring the following:

-
- ↳ **Lighting and ventilation are adequate, media equipment is accessible, and the climate control is functioning properly.**
 - ↳ **Chairs and desks are available for each student.**
 - ↳ **Unnecessary distractions are removed.**
 - ↳ **If an outdoor area is to be used, the instructor must survey the area to ensure it can be prepared per the specific lesson plan and local Standing Operating Procedure (SOP). An alternate site should be designated in the event the primary site cannot be used.**
 - ↳ **Ensure that all ORM and safety considerations have been addressed.**
-

Prepare Media/Equipment

The instructor must gather and set up all the instructional equipment and media required for the presentation of the lesson. Equipment can include items such as Digital Video Disc (DVD) players, Liquid Crystal Display (LCD) projectors, computers, etc. Media can include board media (chalkboards, dry erase boards, etc.), established media (actual item/object, printed materials, etc.), computer media (Computer-Based Tutorials [CBT]), Interactive Media Instruction [IMI], etc.), and multimedia (computer aided graphics, audio, video, etc.). Equipment and media preparation should include a review of the following requirements:

- ☞ **All the required equipment is operational. If the equipment cannot be repaired or replaced, an alternate media with equipment must be obtained.**
- ☞ **The media must be easily seen and heard from any part of the instructional area.**
- ☞ **The media are in good condition. The media are appropriate to the subject matter and target audience.**

Brief Support Personnel

Support personnel include assistant instructors, demonstrators, role players, Corpsmen (when applicable), and any other personnel who will be involved in the presentation or support of instruction. The instructor must brief support personnel so that each person's role is clearly understood. Additionally, the learning objectives of the lesson and any needed preparations for instruction must also be briefed.

- ☞ **The primary instructor is responsible for ensuring that all personnel are informed when to meet. Some personnel may need to be at the instructional area early to secure and set up equipment or to have student materials in place prior to the start of the class.**
- ☞ **Demonstrators should be briefed on their roles and, if time permits, a walk through of the demonstration should be conducted prior to instruction.**

Prepare Student Materials

The instructor must ensure that all materials required by the students are available, in good condition, and ready to be distributed. These may be student outlines (primary documents that supports the instruction) or supplemental student materials (something other than the student outline that is retained by the student after instruction).

Perform Administrative Functions

There are several administrative functions the instructor must address prior to implementation of instruction. The following is a list of some of these administrative actions:

-
- ↳ Verifying the time and location of the class.
 - ↳ Obtaining the class roster.
 - ↳ Making arrangements for monitor/visitor seating in accordance with local SOP.
 - ↳ Ensuring appropriate security or safety measures have been followed.
 - ↳ Preparing all administrative paperwork for presentation.
-

Personal Appearance

One of the last things to do before "stepping on the platform" is look in the mirror to check personal appearance. Whether military or civilian, an instructor must make sure that his/her attire is neat and professional. There is nothing worse than an instructor who appears before a class looking sloppy and unkempt, which in most situations distracts the learners' attention from the material.

REHEARSALS

Most people perform best when they are well prepared. The success of any presentation is a direct result of the amount of work that went into preparing it. Rehearsal is the process in which an instructor practices delivering his/her lesson. Rehearsing the lesson will reveal the most effective wording, enhance the instructor's knowledge of the subject matter, ensure a smoother flow of the presentation, and increase the chances for success. Rehearsal also provides the instructor a gauge of how his or her delivery fits the allocated time for the lesson.

Types of Rehearsals

The three types of rehearsals are: individual, small critical audience, and dress rehearsal. Each of these can stand alone; however, preparation is maximized when they are all conducted in sequence.

-
- ↳ **Individual.** The individual rehearsal requires the instructor to practice delivering the material alone. Individual rehearsals can take place anywhere, anytime, and at the convenience of the instructor. Some instructors rehearse on their way to work in their car, in the shower, or while watching television. It is strongly recommended to videotape individual rehearsals when possible.
 - ↳ **Small Critical Audience.** Upon completion of an individual rehearsal, the lesson should be presented to a small group of people. Emotional attitudes must be considered when selecting the audience. Ensure the people selected will provide constructive feedback. Peers make the best critical audience, but using family members at least provides an opportunity to rehearse in front of an audience. The instructor should be thick-skinned enough to accept feedback at face value. Tape this rehearsal if possible.
 - ↳ **Dress.** The dress rehearsal should be the final rehearsal and most important of all rehearsals. By this point, every effort should have been made to remove any discrepancies in the lesson. This rehearsal should be accomplished in the instructional setting that will be used when the actual lesson is conducted. Rehearse with all media and equipment that will be used on presentation day. Also, make certain any assistant instructors or support personnel are available to rehearse during the dress rehearsal. As with the other two types of rehearsals, tape this if possible.
-

How to Rehearse

There are several keys to remember when rehearsing.

Avoid Memorization. Never memorize the lesson because it will give the presentation a canned effect that causes the instructor to appear robotic. Know the outline (conceptual framework), sequence, and the points to be covered, but do not memorize the lesson verbatim (word for word) from the lesson plan.

Below are some recommendations that can help avoid memorization:

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- ↳ **Read the lesson plan at least twice and highlight words or key phrases that need to be emphasized. If anything is unclear, request guidance from other instructors.**
 - ↳ **Research the technical manuals and references to broaden knowledge of the subject.**

- ↳ **Review all supplemental material.**
 - ↳ **Print the media (3 slides per page) and write notes on the right hand side of the page. The notes can include key phrases from the lesson, examples, analogies, stories, or anything else that needs to be mentioned or accomplished when that particular slide is displayed. If using a turn chart or transparencies, write notes as well. Once the instructor is comfortable, rehearse without the notes.**
-

Rehearse by Parts. If there is any part of the lesson that feels uncomfortable or needs more practice, rehearse that part separately until you gain confidence with the material and delivery.

Rehearse for Criticism. After completing the previous step, rehearse the lesson for the sake of criticism in front of an audience. This audience should be instructor peers or curriculum developers responsible for the development of the curriculum.

Rehearse the Whole Lesson. After the instructor rehearses and is comfortable with the different parts, the lesson should be rehearsed from start to finish. An instructor can get a false sense of security when comfortable rehearsing only specific parts. This is essential to ensure that the lesson flows smoothly.

Evidence of Rehearsal

The following are indicators of effective rehearsal. It is important to note that a lack of rehearsal may cause students to form negative opinions regarding the lesson, the instructor's professionalism and abilities, and the course or instructional program. However, proper rehearsal will produce the following positive results.

Presentation Flows Smoothly. If the entire presentation flows smoothly, it is most likely due to instructor rehearsal. Conversely, if the presentation is choppy or disjointed, it can be presumed that the instructor did not rehearse appropriately.

Instructor Appears Knowledgeable. When an instructor appears knowledgeable about the subject matter, it is evidence of rehearsal.

Instructor Appears Comfortable. The next consideration is whether or not the instructor appears comfortable in the classroom. The instructor should know where all the equipment and media are located and the presentation should not be interrupted because the instructor could not operate the equipment or media. If the instructor appears relaxed while delivering the presentation, then he or she most likely spent enough time rehearsing.

Time Limit. Further evidence of rehearsal is the effective delivery of the instruction within the time allocated. If the instructor remains within the time limit, then it is most likely due to rehearsal.

INSTRUCTOR EVALUATION

Evaluation of instructors for the purpose of improving the quality of training is an ongoing process. All instructors should welcome the opportunity to be evaluated by others. Through this evaluation process, the instructor will receive feedback on strengths as well as those areas that need improvement.

Types. Two types of instructor evaluations are conducted: content and delivery. Content evaluations are normally conducted by occupational field subject matter experts to verify the content qualifications of the instructor. Seasoned instructors, who have completed training at Train the Trainer School (T3S), evaluate the instructor's ability to effectively deliver the training. Schools should contact the delivery experts at T3S for specific delivery evaluation support. Further, FLC commanders can request a Curriculum Assistance Visit (CAV) from CG, TECOM (Training Management and Evaluation Section). The CAV team provides expert consultation on all aspects of the curriculum and instruction.

Scheduled or Unscheduled. Evaluations may be conducted on a scheduled or unscheduled basis. Each method of evaluation has its advantages and disadvantages. A scheduled evaluation allows the instructor to prepare for the evaluation. It may also allow the instructor time to prepare a "show" that is not typical of usual performance. An unscheduled evaluation permits the evaluator to observe the instructor in a normal mode, which can result in a more realistic appraisal of the instructor. The drawback to an unscheduled evaluation is that an instructor may feel threatened and fail to perform at normal levels. Whether the evaluation is scheduled or unscheduled, the instructor should never switch from their usual performance for the benefit of the evaluator.

Preparing for Evaluation. Instructors need to always be prepared for an evaluation, because they are always being evaluated by their students. Instructors should always view the evaluation process as an opportunity to gather information that will help them become more effective as instructors. A preliminary meeting with the evaluator will aid the instructor in preparation for the evaluation. The evaluator should answer any question the instructor may have and should provide the instructor with a copy of the instrument(s) being used during the evaluation.

SECTION 4

5004. CONDUCT INSTRUCTION

The effective and efficient delivery of instruction is a key point in the SAT process. Although the curriculum developer may have designed and developed the material so that it would maximize the mastery of learning objectives, it is crucial that the instructor present the lesson in a manner that ensures comprehension and on-the-job application. While comprehensive planning and preparation early in the Implement Phase is necessary, it does not guarantee success. The instructor must communicate effectively, conduct the lesson, and manage the classroom during and after the presentation.

EFFECTIVE COMMUNICATION

How an instructor presents information can influence student understanding, retention, and ultimately, on-the-job performance. In conducting instruction, the instructor should adhere to the following effective communication guidelines to ensure the maximum transfer of knowledge and skills to the students.

Communication Process

Communication is the act of sending and receiving messages and providing feedback on those messages. The messages can be verbal, nonverbal, written, or physical. Even a lack of action can be a message. Communication is an on-going process; however it is incomplete if the person with the message does not have a person to receive the message. Therefore, communication is always an exchange between two or more people. In Figure 4-1, the communication model "freezes" the process so that what happens during communication can be examined.

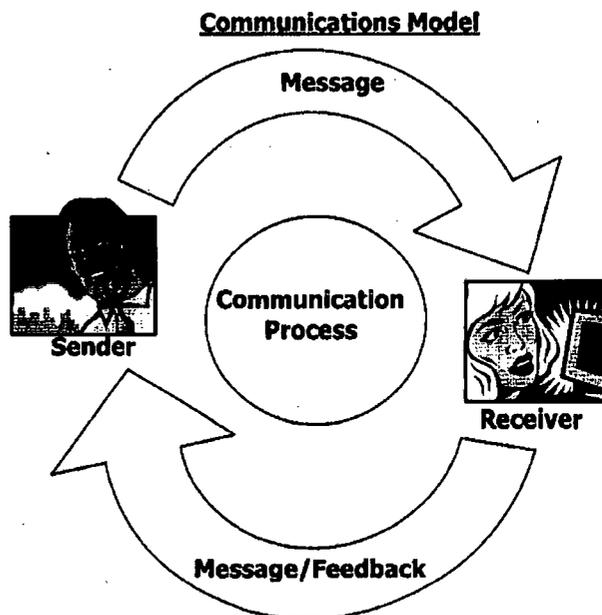


Figure 4-1 Communications Model

Communication Techniques

The communication techniques that instructors must skillfully employ in the classroom are: **verbal, nonverbal, listening, and questioning**. These techniques dramatically affect the students ability to master learning objectives and the instructor's ability to maintain student attention.

1. **Verbal**
2. **Nonverbal**
3. **Listening**
4. **Questioning**

1. **Verbal**. There are eight speech techniques that instructors must be cognizant of when speaking.

- ↳ **Volume**. Volume is the loudness or softness of a speaker's voice. Be sure to adjust your voice to the acoustics of the room, the size of the audience, and the level of background noise. If an instructor speaks too loud, he or she could be perceived as overbearing. If an instructor speaks too softly, students will have difficulty hearing the material and may perceive the instructor as timid or unsure of the content. Remember that the speaker's voice always sounds louder to the speaker than to a listener. If students look puzzled, are leaning forward in their seats, or are otherwise straining to hear, then the instructor needs to talk louder.
- ↳ **Rate**. Rate involves the speed at which a person speaks. The best rate of speech depends partly on the mood the speaker is trying to create. If a person wanted to communicate the experience of mastering the crucible or to express the excitement upon graduation from boot camp, then a faster-than-normal rate may be used. If speech is too slow, it may put students to sleep. If too fast, students may lose track of the ideas that the instructor is trying to convey. Change the rate of delivery to get students' attention and to hold their interest. The rate of speech should be governed by the complexity of the subject and the emotion to be expressed.
- ↳ **Dialect**. Most languages have dialects, each with a distinctive accent, grammar, and vocabulary. Dialects are usually based on regional or ethnic speech patterns. These dialects affect the way people talk in different parts of the country. For example, in the southern U.S., parents may tell their children to stop "squinting" their eyes while watching television and to go clean up their rooms "rat" now. There is no such thing as right or wrong dialect. However, it can be troublesome for the instructor when the audience does not share that dialect. In such a situation, this may cause listeners to make negative judgments about the speaker's personality, intelligence, and competence. Even worse, students may not be able to understand the material being taught.
- ↳ **Pronunciation**. Pronunciation is the accepted standard of sound and rhythm for words in a given language. Below are some of the most frequently mispronounced words in the English language:

Word	Common Error	Correct Pronunciation
genuine	gen-u-wine	gen-u-win
arctic	ar-tic	arc-tic
nuclear	nu-cu-lar	nu-cle-ar
February	Feb-u-ary	Feb-ru-ary

Every word leads a triple life; it is read, written, and spoken. Most people recognize and understand many more words in reading than they use in ordinary writing and about three times as many as occur in spontaneous speech. This is the reason for occasionally stumbling when speaking words that are part of reading or writing vocabularies. In other cases, commonplace words may be mispronounced out of habit. If there are any doubts about the proper pronunciation of certain words, check the dictionary or listen to someone say it properly.

- ↳ **Articulation:** Articulation is the delivery of particular speech sounds. Sloppy articulation is the failure to form particular speech sounds distinctly and carefully. Most of the time poor articulation is caused by laziness. Words are habitually chopped, slurred, and mumbled, rather than enunciating plainly. Though it is known that "let me" is not "lemme," "going to" is not "gonna," and "did you" is not "didja," yet we persist in articulating these words improperly. If sloppy articulation is used, work on identifying and eliminating common errors so that thoughts and ideas can be effectively expressed to students.
- ↳ **Force:** Use force by emphasizing the correct word or syllable. Placing emphasis on different words or syllables can change the meaning of a sentence. Practice placing emphasis on the underlined word in the following sentences: Why did you join the Marine Corps? Why did you join the Marine Corps?
- ↳ **Inflection:** Inflection refers to changes in the pitch or tone of a speaker's voice. It is the inflection of the voice that reveals whether a question is being asked or a statement is being made or whether a person is being sincere or sarcastic. Inflections can also make a person sound happy or sad, angry or pleased, dynamic or listless, tense or relaxed, interested or bored. If all sentences end on the same inflection (upward or downward), work on varying pitch patterns so they fit the meaning of the words. Inflection is one of the keys to expressing something emotional, persuasive, or convincing. Using inflection can make the difference between just saying words and making ideas meaningful.
- ↳ **Pause:** Learning how and when to pause is a major challenge for instructors. Even a moment of silence can seem like an eternity. As confidence is gained, however, it will be discovered how useful the pause can be. It can signal the end of a thought, give students a chance to absorb the material, give a speaker an opportunity to concentrate on the next point, and lend dramatic impact to a statement. Unfortunately, many times pet words are used in place of a pause, such as "um," "OK," "er," and "uh." These can become extremely annoying and distracting to students. To minimize the use of pet words, be familiar with the material, be well rehearsed, and make a conscious effort to use a natural pause in its place. Use of a Pause during questioning is crucial to allow the student to gather a thought before responding. Pauses in this situation of 5-10 seconds are normal.

2. **Nonverbal Communication (Platform Behavior).** Communication is not complete without the nonverbal signals that complement verbal communication. The factors of posture, movement, nervousness, gestures, facial expressions, and eye contact can contribute to, or hinder, the communication process.

- ↳ **Posture.** Posture is very important; it shows enthusiasm for the subject. Posture is referring to platform stance. It should be comfortable without being slouchy. Do not lean on the lectern. In fact, it is best to stay completely away from the lectern in classroom instruction. Remember to stand erect with confidence.
- ↳ **Movement.** Move with a purpose. Is movement excessive? Is there a reason for movement? Movement can attract the attention of the listener. Move to convey a thought or as an aid in transitions. The basic rule in use of movement is moderation. Avoid: moving constantly, staying anchored to the podium, standing in one spot, blocking media, dragging feet, swaying back and forth.
- ↳ **Nervousness.** Some nervousness or anxiety is natural and normal. Nervousness causes poor voice techniques and mannerisms.

Overcome nervousness by:

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- ★ **Focusing on student learning.**
 - ★ **Rehearsing the lesson.**
 - ★ **Having a positive mental attitude.**
 - ★ **Relaxing and enjoying teaching.**
 - ★ **Being organized.**
-

- ↳ **Gestures.** Gestures are the motions of instructor's hands or arms. The primary rule is this: The gestures made should not draw attention to the instructor or distract from the message. Gestures should appear natural and spontaneous, help to clarify or reinforce ideas, and be suited to the audience. Gestures tend to work themselves out as experience and confidence is acquired. Avoid: flailing arms about, rubbing hands, cracking knuckles, slapping legs, toying with rings, or any other distracting motions. Think about communicating with students and gestures will take care of themselves just as they do in conversation.
- ↳ **Facial Expressions.** Facial expressions can reinforce, modify, or even contradict the spoken word (showing an instructor's thoughts and feelings). Instructors that appear relaxed and express enthusiasm in the subject create a bond with their students and make them feel comfortable (e.g., a smile indicates pleasure). Expressionless instructors are usually unprepared or nervous, focusing too hard on their delivery vice students, uninterested in the subject, or not attempting to make learning fun.

↳ **Eye Contact.** The use of the eyes is probably the most meaningful channel of nonverbal communication available. An instructor's eyes convey thoughts and feelings and can open communication, prolong communication, or cut off communication. As eye contact is established, remember to:

- (a) **Be alert.** Be alert for student reactions. Can they hear? Do they understand? A stare used in conjunction with silence can be quite useful in gaining the attention of misbehaving or inattentive students.
- (b) **It isn't enough to just look at listeners.** How the instructor looks at students also counts. A blank or intimidating stare is almost as bad as no eye contact at all.
- (c) **Try to establish eye contact with the whole class.** Some common errors are darting the eyes around the room, looking at the floor or demonstrators vice the audience, or looking at one part of the audience while ignoring the rest. The rule of thumb is to hold the eye contact until communication occurs.

3. **Listening.** Look at Figure 4-2: notice that on an average day, 9% of our time is spent writing, 16% is spent reading, 30% is spent speaking, and the major portion, 45%, is spent listening. Listening takes in more information and is used more than reading and writing combined.

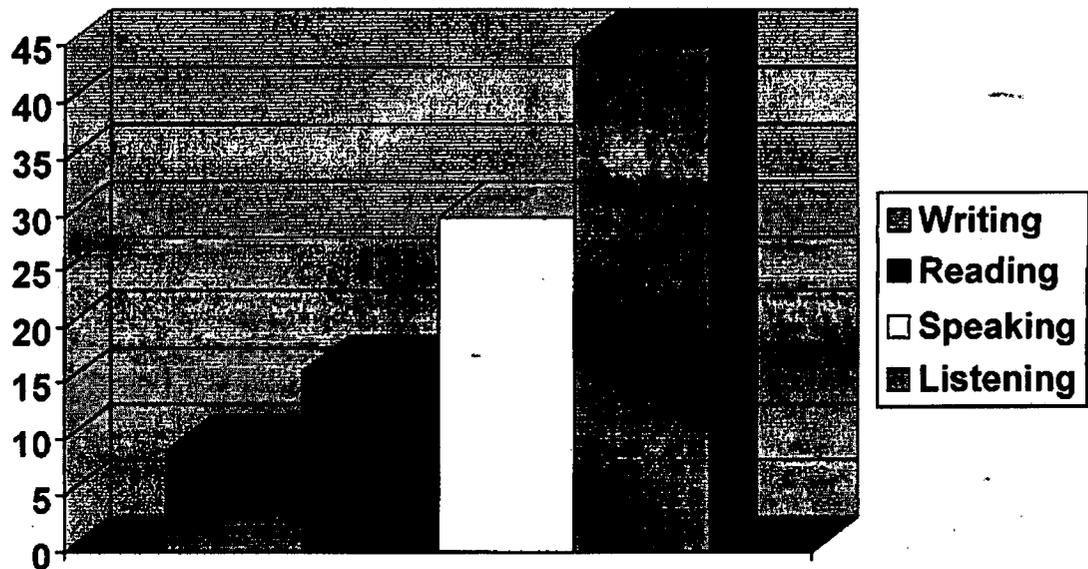


Figure 4-2

Definition. Listening is paying close attention to and making sense of what is being heard. It is the channel used most often for learning. Ironically, it is the least understood function of all. When thinking about listening, the tendency is to assume that listening is basically the same as hearing. This is a dangerous misconception because it leads many to believe that effective listening is instinctive. As a result, little effort is made to learn how to develop listening skills and unknowingly a vital communication function is neglected. Consequently, misunderstandings, confused instructions, loss of important information, and frustration are created.

Exercises. There are exercises that can be performed to increase awareness of listening efficiency. A common exercise is for an individual who will be the listener to pick a person as the speaker and ask that person to do a listening check. The listener will listen to the speaker. The listening check involves summarizing what the listener thinks the speaker said. If the listener is unable to summarize, ask the speaker to help examine what is lowering listening efficiency. Another exercise is simply writing all the sounds heard in a certain time frame. Over a period of time, listening practice should help improve listening efficiency and two-way communication in the classroom.

(a) **Instructor Barriers to Listening.** As instructors, be aware of signals that give students the perception that you are not listening to them. These barriers interrupt the communication process as the model depicts below.

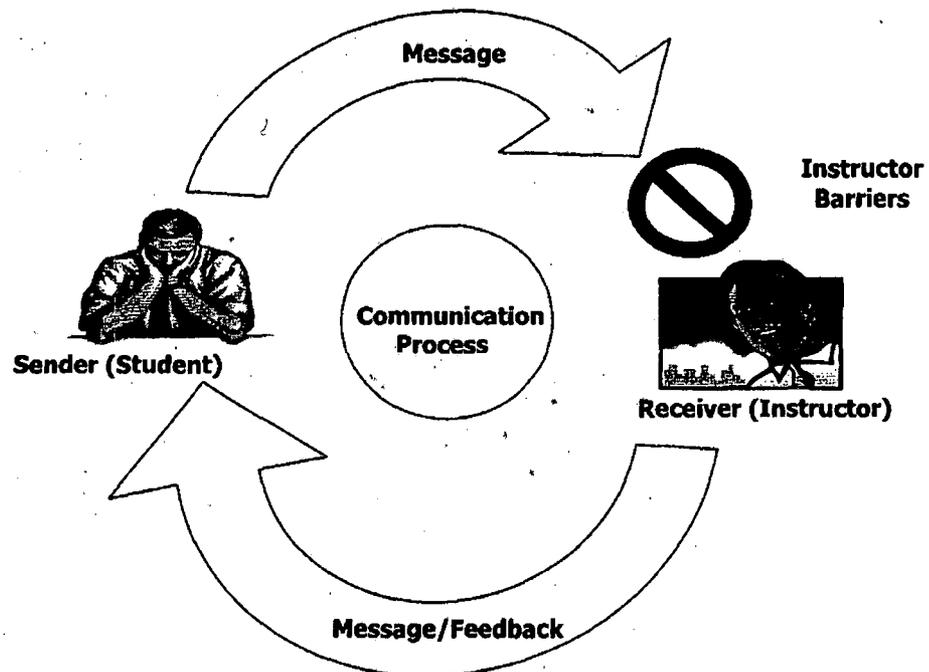


Figure 4-3 Instructor Barriers to Listening

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- (1) It is important for instructors to orient their body towards the speaker (student) and maintain eye contact when answering or receiving a question.
 - (2) Folded arms or hands on hips are examples of different types of body language or gestures that can indicate an instructor has a lack of interest in the speaker or may intimidate the speaker (student).
 - (3) Rolling eyes are some instructor facial expressions that may signal disapproval or disinterest.
 - (4) Instructor should not allow emotionally laden words to distract him/her during questions. Examples: a student uses the word 'sex vice gender or WM vice female Marine.
 - (5) Instructors should avoid using words or phrases that may have a negative effect on students when directed by instructors/fellow students such as: rock, idiot, stupid, lost one, wonder child, you fail to understand, you do this all the time, or are you confused again?
-

- (b) **Student Barriers to Listening.** An instructor must be aware of possibilities that cause student barriers to listening. Below are five reasons for poor listening along with signs that will cue the instructor. This will assist tremendously with identifying these barriers and help minimize the interruption of the communication process.

→ **Lack of Concentration.** The brain is incredibly efficient. Although we talk at a rate of 120-150 words per minute, the brain can process 400-800 words a minute. This would seem to make listening very easy, but it actually has the opposite effect. Because the brain can take in a speaker's words and still have plenty of spare "brain time," there may be the temptation to give into physical or mental distractions. Concentrating is hard work.

⇒ **Signs:** Lack of eye contact with instructor, tapping foot or pencil, fidgeting, doodling, clock-watching, inability to answer questions, a look of confusion, or lack of involvement in class discussions

→ **Listening Too Hard.** Listening too hard happens when a student tries to turn into a human sponge, soaking up a speaker's every word as if every word were equally important. Students try to remember all the names, all the dates, and all the places. In the process, students often miss the speaker's point by concentrating on too many details. Even worse, they may end up confusing the facts as well. It is impossible to remember everything a teacher says.

⇒ **Signs:** Student is frantically trying to write down every word; seems frustrated, confused or overwhelmed.

- ⇒ **Suggestions:** Tell the student to try highlighting the student outline, recording the class, and/or develop note-taking skills. The student should take notes in the form of a key-word outline. It is a rough outline that briefly notes a teachers main points and supporting evidence. Students who take effective notes usually receive higher grades than those who do not.
-
- **Jumping to Conclusions.** This may also be referred to as "putting words into an instructor's mouth." It is one reason why communication is poor between those who are close. A person does not listen to what is being said due to the belief that he/she knows what is meant. Another way of jumping to conclusions is by prematurely deciding a topic is boring or misguided. The student may decide that an instructor has nothing valuable to say. For example, the topic could be on arguments to support women being in combat. If a student disagrees with the precept, the instructor may be tuned out. Nearly every class has something to offer - whether it is information, point of view, or technique.
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- ⇒ **Signs:** Interrupting other students, not enthusiastic, disruptive behavior or lack of concentration.
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- **Focusing on Delivery and Personal Appearance.** People tend to be judged by how they look or speak. Some people become so distracted by a speaker's accent, personal appearance, or vocal mannerisms that they lose sight of the message. Focusing on a speaker's delivery or personal appearance is one of the major barriers in the communication process, and it is something that always needs to be guarded against.
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- ⇒ **Signs:** Disrespectful to the instructor, know-it-all, distractive behavior.
 - ⇒ **Suggestions:** Apply speaking techniques discussed earlier, class management techniques, rehearse the lesson, and maintain high appearance standards.
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4. **Questioning.** By asking questions throughout the lesson instructors can emphasize a teaching point, monitor student comprehension, stimulate thinking, increase interest, and promote student participation. Instructors tend to ask questions in the "knowledge" category 80% to 90% of the time. These questions are not bad, but using them all the time is. Instructors should try to use higher order level of questions as defined by Bloom's Taxonomy of learning. Questions that cause the learner to process, synthesize, and apply the knowledge presented during the instruction lead to better comprehension and application. A key component of effective questioning is to provide a pause once a question is asked to allow the student to assimilate the question and formulate a response.

↳ **Characteristics of a Well Constructed Question**

- **Clear** - state questions in language familiar to the students and phrase the question so that the students understand its meaning.

- **Concise** - contains only one idea and is short enough for students to remember (not too wordy).
 - **Relevant** - relates to the subject or material taught in the lesson.
 - **Thought Provoking** - state so that the answer is not suggested in the question; open-ended (cannot be answered with a yes or no response); answer must not be displayed in the classroom (media); apply Bloom's Taxonomy (range of higher-level questions) as discussed in Chapter 6.
-

↳ **Asking students questions**

- Step 1 - ASK** the question (call students by name). Ensure the question is well constructed.
- Step 2 - PAUSE** to allow the student time to think (5-10 seconds is normal). If the student cannot answer, rephrase the question or redirect the question to another student. For example: "Can someone help him/her out?" or "Sgt Smith, can you help him/her out?" Once the question has been answered move to the next step. Avoid rapid "machine gun questioning" as a way to summatively evaluate the students mastery of the learning objectives.
- Step 3 - ENSURE EVERYONE HEARD** the answer. For example, "Did everyone hear his/her answer?"
- Step 4 - PROVIDE FEEDBACK.** Inform the class whether or not the answer was correct. For example: "That's right" or "Good job." Avoid saying "wrong answer"; try to rephrase your response. For example: "That wasn't quite what I was looking for; can someone help him/her out?" or "Does everyone agree with that?" or "Does anyone have anything to add to that?" If no one can answer the question, provide the answer and clear up any confusion.

↳ **Receiving questions from students.** The situation will dictate whether or not Steps 2 and 3 are necessary. Therefore, both steps are left up to the discretion of the instructor (optional).

- Step 1 - RECEIVE** the question. Ensure students raise their hands and solicit one student at a time (by name).
- Step 2 - REPHRASE.** If the question is unclear, rephrase it or have the student rephrase it. If the instructor rephrases the question, **verify** the student's question before moving to the next step. For example, "Let me make sure I understood your question. You wanted to know if we are off this weekend. Was that your question?" (OPTIONAL STEP)

- ☑ **Step 3 - ENSURE THE QUESTION WAS HEARD.** State -"Did everyone hear SSgt Hall's question?" If you know the question was obviously loud enough for everyone to hear, then this step may be skipped. If it was not loud enough, then repeat it (paraphrase if needed) or have the student repeat it. (OPTIONAL STEP)
- ☑ **Step 4 - ANSWER** the question. The instructor can either answer the question or redirect the question to the entire class to allow for student participation. For example, "That's a good question, can anyone answer it?" If it cannot be answered then provide the answer. If the instructor does not know the answer, let the student know that he/she will find out and get back with him/her at the break or after class.
- ☑ **Step 5 - VERIFY.** Ask the student if the answer provided was adequate. For example: "Did that help you out?" "Did that clear up any confusion?," or "Did that answer your question?"

Facilitation Techniques

Mastery of LOs refers to the extent to which students learned material/skills in the instructional setting that could be readily applied on the job. The instructor influences the transfer of learning through facilitation techniques. The way a lesson is presented will influence the success of the instruction. The instructor should strive to provide real world relevance, focus students, control the lesson, foster motivation, and interact with students. Below is a discussion of each.

- (1) **Real World Relevance.** Whenever possible, reproduce the exact conditions between the instruction and the job situation to show relevance. The instructor can also physically organize the instructional environment to create a realistic job setting for instruction.
- (2) **Students Focus.** The most common attention getting techniques used by instructors are:

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- ★ **Direct Attention.** Essentially, it consists of directing students' attention to what was said or will be said through the use of verbal statements, gestures, or even a pause. For example: "Know this diagram well!" A combination is even more effective, but be careful not to overuse these techniques. "
 - ★ **Present Concepts from Simple to Complex.** Discuss basic principles and ensure they are understood before introducing complicated details.
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- (3) **Control the Lesson.** Ensure the objectives of the class are met and that the discussion/questions do not go beyond the focus of the class. In addition, create a comfortable learning environment and use discretion/tact when correcting a student's inappropriate or disruptive behavior so that it is not detrimental to the learning environment.
- (4) **Motivation Techniques.** For learning to be effective, students must be motivated to learn. There exists a shared responsibility for motivation between the instructor and the student. The learner controls the desire to learn, and the instructor controls the stimulation. Below is a list of what instructors can do to stimulate motivation in students.

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- **Give Recognition.** When students do something worthy of recognition, instructors need to give positive feedback to the student. Such recognition makes the student feel alive, important, and significant.
 - **Serve as a Good Role Model.** An instructor has considerable influence over students' motivation through the example that is set. Show them the proper way to complete a task, wear a uniform, or treat students—*PRACTICE WHAT YOU PREACH*. Research indicates that teachers with low self-concepts tend to have students in their classroom with lower self-concepts, and vice-versa.
 - **Stimulate Cooperation 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 especially if it isolates a person. With cooperation, everyone can experience the success of the group, and no one is viewed as the winner or loser.
 - **Consider Mastery Learning.** Mastery is defined in terms of a specific set of major objectives that students are expected to exhibit by subject completion. Using this approach, a student's performance is measured against objectives rather than against the performance of other students. Students learn at different rates, therefore the instructor sets expectations for each individual. This allows time for learning to vary, so all or almost all students achieve the desired level of mastery.
 - **Have High but Reasonable Expectations for Students.** There is a considerable amount of research that suggests that students perform to the expectations that instructors have for them. Students 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.
 - **Recognize Potential in Students.** Behavioral scientists have concluded that human's function at 10 percent or less of their potential. Negative self-concepts certainly stand in the way of releasing the potential of students.
 - **Providing Examples and Analogies.** Providing a variety of examples and analogies when teaching concepts or skills will help solidify the key elements of the material and can further motivate students to learn.
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- **Recognizing Individual Differences.** Some students learn at a slower pace than others and some students require different stimuli to become motivated to learn. The instructor must establish an effective student-instructor relationship. It is important that the instructor does not create barriers, but builds a rapport with the students and shows empathy and genuine concern for their learning.
 - **Providing Feedback.** Student performance improves when the instructor provides meaningful feedback. Timely and constructive comments about student performance provide recognition of their efforts and help to correct errors. Used appropriately, feedback should clearly specify the action being reinforced and should be believable. Examples: "Good point!" "Outstanding," "Sgt Frost, that's a good idea! Let's discuss what might happen if you implemented that concept." Provide written comments on student assignments about the strengths and weaknesses of the student's ideas/concepts. If praise is used too often or inappropriately, however, it can have a negative effect on the motivation of adult learners.
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- (5) **Interaction with Students.** Learning is an active process for adult learners. The instructor should strive to involve students in the instruction process. To do so, the instructor should be aware of students' prior knowledge, the context in which the material is presented, how learning will be applied to the job, and the realization that student understanding of new information depends on how well it relates to their prior knowledge. Probe throughout the lesson to increase interaction. Have students answer each other's questions whenever possible, and allow the adult learner every opportunity to take responsibility for his or her own learning.

STEPS IN CONDUCTING THE LESSON

Present the Introduction

- The instructor provides the students with a brief preview of the class by explaining the purpose of the class, reviewing the learning objectives, and describing how the lesson will be taught (including any administrative instructions) and how and when students will be evaluated.
- The first element (Gain Attention and WIIFM) must always be mentioned first, and the remaining elements should be mentioned as a structured event using the acronym **GOLMEST** (Gain Attention, Overview, Learning Objectives, Method/Media, Evaluation, Safety, and Transitions). By employing this sequence, your students will become familiar with the important elements of the introduction and this will help reduce the number of student questions that always seem to pop up about the introduction. The introduction must be completed prior to transitioning into the body of the lesson.

STEP 1

WIIFM – What Is In It For Me? Why do I need to listen to this class?

GOLMEST - (Gain Attention, Overview, Learning Objectives, Method/Media, Evaluation, Safety, and Transitions).

STEP 2

Present the Body

- After presenting the introduction, present the body of the lesson. The body will be presented in the same sequence as the learning objectives in order for the lesson to "flow smoothly."
- Transitions tie together the main ideas in the lesson, smoothly summarizing one main idea and introducing the next one. They essentially form "bridges" that reinforce the conceptual framework, enabling the instructor to probe for understanding and gather feedback from students before opening the next main idea.
- The term "probing" simply means asking follow-up questions to students. Probes can ask for specifics, clarifications, consequences, elaborations, parallel examples, relationships to other issues, or explanations. Probes are important because they help students explore and express what they know even when they aren't sure they know it. You should probe throughout the lesson to assess students' comprehension of the material. You can probe at any time, but the questions must be thought provoking and should not be simple answer questions that simply demonstrate a student's rote memorization of a single detail.

STEP 3

Present the Summary

- Once finished with the last main idea, transition into the summary. In the summary, the instructor must mention all main ideas that were covered in the lesson. In addition, provide closure that explains why the student just sat through the lesson. Then provide closing instructions to alleviate any concerns the student may have (i.e., fill out IRFs and take a ten-minute break).

METHOD EMPLOYMENT

The definition of instructional methods is "an educational approach for turning knowledge into learning." Instructional methods are the "how to" in the delivery of training. The methods used in any learning situation are primarily dictated by the learning objectives decided upon by the course developers. In many cases, a combination of methods is used to intensify the learning experiences. All instructors need to understand the following methods and their responsibilities in using them: lecture, indirect discourse, demonstration, reading, self-paced, questioning, non-directed discussion, guided discussion, practical application, field trips, simulations, case study, and coaching. The lecture method and the demonstration method are the two most commonly used in Marine Corps training. However, for purposes of this chapter, the methods are discussed as sequenced above.

Lecture (Formal, Informal, Briefing, Guest)

The lecture method is an instructional presentation of information, concepts, or principles. Its main purpose is to present a large amount of information in a short period of time. The lecture method is an efficient way to introduce a new topic of study or present background material students need for future classes.

- A ***formal*** lecture allows instructors to present a subject to a large audience because they use no media and there is no interaction between the students and the instructor. The lecture method depends primarily on student listening and note-taking skills for the transfer of learning. The instructor must have effective speaking skills, an in-depth knowledge of the subject matter, and find realistic examples and analogies to use with explanations. In preparing to deliver a lecture, the instructor must set clear-cut goals and objectives. The instructor should remember that the only feedback received from the audience will be nonverbal communications. Since the audience may lose interest with no active part in the instruction, the lecture should last no more than 30 minutes. Lectures should be short, well organized, and to the point.

- 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. 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. An ***informal*** lecture with media is commonly used in the Marine Corps for presenting information, concepts, and principles. Most learning takes place through the sense of sight. It follows then that all students must be able to see the media being used, which will limit class size. The media used can reduce the amount of explanation time required for students to grasp concepts, structures, and relationships. Instructors simply cannot get some ideas across to students without the use of media. For example, think how difficult an explanation of the operation of the internal combustion engine would be without the use of media.

When using **informal lecture** with media, the instructor must prepare properly. That includes practicing with the actual media in the places they will be used. Instructors should plan the timing of the use of media to keep the students' attention and to stress important points. Since the instructor's explanation of the media will require the use of effective instructor techniques, he/she needs to decide which ones to use. Mentally rehearse those techniques and practice using the media until the lecture can be presented smoothly.

- A ***briefing*** is a formal or informal presentation in which a variety of significant facts are presented as concisely as possible. The briefing is rarely concerned with material beyond the knowledge level and is almost always accompanied by media in various forms. Strictly speaking, the briefing is not a teaching method, but it is sometimes used in school situations.

- A ***quest 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.

Indirect Discourse (Panel discussion, Dialogue, Teaching Interview)

These 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. When a question-and-answer period follows the interview, students can interact with the expert.

- A ***dialogue*** is an interaction between two or more persons, one of whom may be the instructor. It is generally used 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.
- A ***panel*** is 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.
- A ***teaching interview*** is when 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 on the spur of the moment from general experience.

Demonstration

The basic, and most often used, method of instruction for teaching skill-type subjects is the demonstration method. It covers all of the steps the students need to learn a skill in an effective learning sequence. Though it primarily appeals to auditory and visual learners, it is also extremely effective when used in conjunction with lecture and prior to practical application. This method always includes a demonstration step and a performance step and allows other steps as needed. Use the following techniques when giving an actual demonstration:

- **Position the students and media properly.** Direct the students to gather around a worktable or media and make sure every student has an unobstructed view. Make sure that all students will be able to see and hear the demonstration. This should be accomplished right before the lesson; someone else may have used the classroom and rearranged the setting. A demonstration will not be effective if someone cannot see it.
- **Show and explain the operations.** Perform the operations in step-by-step order. Whenever possible, present the telling and doing simultaneously. Do not hurry; the instructor will not normally emphasize speed in performing operations or in moving from one operation to another in the demonstration step. Make certain the students understand the first step before proceeding to the second, and so on. Repeat difficult operations. Pause briefly after each operation to observe student reaction and to check student comprehension.

- **Observe safety precautions.** Rigging a safety line, donning a safety mask, or tagging an electric cable may take a few more seconds, but time is not wasted. Instead, the instructor has impressed the students with the importance of exercising extreme care in dealing with potentially dangerous equipment.
- **Give proper attention to terminology.** Call each part of the media used by its proper name each time attention is called to it. Getting students to retain the correct nomenclature requires more than just mentioning the name. The following suggestions should prove helpful:

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- ↳ **List the names of parts.**
 - ↳ **Refer students to any available chart that shows the parts and names of parts.**
 - ↳ **Conduct a terminology drill on the parts of the actual item/object while it is being assembled or disassembled, as appropriate.**
-

- **Check student comprehension carefully.** Ask questions during the demonstration step that require the students to recall nomenclature, procedural steps, underlying principles, safety precautions, and the like. Watch the class for reactions indicating lack of attention, confusion, or doubt. Do not depend solely upon visual observations.
- **Obtain necessary assistance.** When teaching skills, such as donning a field protective mask, in which a distinction between right and left is important, utilize an assistant instructor. Ask the assistant to stand so that the class may see what he or she is doing. The instructor should direct the assistant to perform the activity while he/she observes the reaction of the students.
- **Check equipment and tools.** The most important items to check are the equipment and tools that will be used to conduct the demonstration. Ensure all equipment is functioning properly.
- **Rehearse.** When the instructor rehearses, he or she needs to perform the actual demonstration. Rehearsing in the mind is not the same as rehearsing by doing. Rehearsal by doing will reveal possible problems. If an assistant is being used, practice with that person as discussed in Section 4300 (Prepare for Instruction).
- **Start simple.** Always proceed from simple to complex in a logical sequence; show the correct way to perform the steps the first time you demonstrate them. Along with teaching a skill, develop proper attitudes, such as the desire to perform safely, and the desire to exercise economy of time and effort.

Reading (Books, Periodicals, Microfilms, Manuals, Handouts)

- Reading assignments for students may include the following printed materials: books, periodicals, microfilms, manuals and regulations, and handouts. This is very effective and time efficient method of presenting materials since students can progress at their own pace.
- However, since individuals read at different speeds, keeping the entire class on schedule can be a challenge. Individual reading is also dependent on the availability of resources. Reading is geared for individual instruction and the instructor must be very knowledgeable with the material.

Self-Paced (Programmed, Modular, Computer Assisted, Mediated)

- ***Programmed instruction*** is a method of instruction, which usually includes a carefully planned sequence of small units of instruction that 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.
- ***Modular instructions*** are 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.
- ***Computer-assisted instruction*** is a learning experience that uses a computer as the vehicle for interaction between the learner and the planned course of instruction.
- ***Mediated instruction*** includes such devices as slides, films, tapes, and cassettes used to present the planned course of instruction to the learner.

Questioning (Socratic Method, Student Query)

For those instructors who want to emphasize a point and stimulate student thinking, this method is very effective. It not only keeps the student focused, but it also checks understanding and seeks clarification in the students. Two examples of this method are *Socratic Method* and *Student Query*. Both require a high level of instructor expertise.

- ***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.
- ***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 can 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 a skilled responder can also control the session to a certain extent. Students' questions may often be a measure of the degree of their understanding of a particular subject. That is, they "know enough to ask the right questions."

Discussion-Non Directed (Peer Teaching, Small Group, Free Discussion)

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. 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.

Guided Discussion

The guided discussion is an activity in which people talk together to share information about a topic or problem or to seek possible available evidence on a solution. When using discussion, make sure the seating arrangement allows all participants to have eye contact with each other. This limits class size.

- This method involves an interchange of ideas by the students while the instructors provide guidance. Used alone or in combination with other methods, it stimulates every student to think constructively. It also encourages students to share their personal experiences and knowledge with their classmates and to contribute ideas as a means of solving problems.
- Initiating discussion and channeling students' thinking and responses along predetermined lines is called "directed discussion." This method is useful in teaching skills such as problem solving and understanding cause-and-effect relationships.
- Directed discussion is often used in training that is conducted for the purpose of developing favorable attitudes toward a subject or situation. When that is your purpose, directed discussion gives students more freedom to express their opinions. The success of directed discussion depends to a large extent on instructor leadership.
- As in previous methods discussed, the success of a discussion depends on careful planning. Remember that some elements of the discussion method are included in every other method of instruction except for a formal lecture. The goal in using the discussion method is to actively involve your students in the learning process. The old Chinese proverb, "I hear and I forget, I see and I remember, I do and I understand," certainly applies in the training arena. Strive for maximum student involvement.

Practical Application

This is a method of practice used to reinforce a skill or a task as it relates to the work place. ***This is not an examination.*** The student should be supervised and then provided feedback to determine if more practice is needed. This method generally follows an instructor demonstration and the student replicates the instructor demonstration alone or in groups.

→ **Individual/Group Projects**

- (1) **Determine Size.** Determine whether or not the exercise will be accomplished on an individual basis or in groups.
- (2) **Adequate Space.** If the lesson will be conducted in a classroom, make sure there is adequate room for the students to perform any necessary skills. If it is outside, ensure the area is clear and safe.
- (3) **Double-Check.** Double-check the materials, equipment, and tools the students will be using when conducting the practical exercise. Ensure all the material is current and available. Also, ensure the equipment is functioning properly.

- **Supervise, Observe, Help.** The job of the instructor is to supervise, observe and provide help. The instructor or assistant instructors should supervise to facilitate learning, watching the students and correcting any mistakes made during the exercise. It is a good idea to talk to your assistant instructors to determine if they have observed anything additional.

Field Trips

Field trips are extensions of classroom instruction and provide worthwhile learning opportunities for students to participate in unique and enriching educational experiences. Instructors should develop systematic procedures for ensuring that all trips provide optimal learning opportunities for students. The following minimal procedures should be used when conducting field trips:

- Identify any special requirements for participation on the trip—special skills, fitness, certification—as well as any hazards or dangers on the trip or at the site that might affect the health and safety of the students.
- Obtain approval where appropriate.
- Ask students to advise you of any special disabilities, problems or needs that may need to be accommodated.
- Consider the need for special clothing or equipment needed in case of weather or other conditions.
- Determine transportation needs—reservation of vehicles, drivers, need for site supervision.
- Plan for emergencies—theft, illness, vehicle emergency, weather delays, student misconduct, or threats to the safety of others.
- Communicate information to students in advance about schedules, departure locations, route, rest and meal stops, lodging, emergency procedures, protocol for problems, and rules of conduct.
- Familiarize students with the site and their surroundings.

Simulations (Role-playing, Games)

Many Marines in supervisory or administrative billets require proficiency in two separate and distinct skill sets. The first skill set is MOS related, while the second deals with leadership and interpersonal skills. Simulations are a preferred method for building proficiency in these two areas.

- Role-playing requires the students to assume active roles in a low risk simulated situation that involves effective, realistic behaviors. It may involve individuals, groups or whole units. The role-play is followed by a group discussion that gives students a chance to re-examine their behavior. It is particularly useful in teaching the development of interpersonal skills (e.g., leadership or counseling skills). The new skill is normally taught through lecture and then practiced within the role-play. For example, one student could play the role of an instructor and the other one could play the role of the student. However, it is also used in MOS training, such as firefighting, flight training, and M1A1 training. In these examples training simulators are used to create "real life" situations while controlling risk to personnel and equipment.
- Successful role-playing provides a chance for every student to take part in the lesson. It provides vivid experiences both for the participants and for the observers. Simulation mainly prepares or refreshes both MOS and interpersonal skills. However, it does not eliminate the need for Marines to learn through application on-the-job. Prior to selecting the type of role-play to be used the instructor must consider how many students are involved and how to deal with difficult students (overly defensive or non-participating). The instructor must check the master lesson file for a detailed orientation package that describes the student's role in the overall scenario and any supporting information.

(1) Types of Role-Play

- ↳ **Single.** The simplest role-play involves two people who are asked to re-enact a problem either from a description or one that came up in a previous discussion. The advantage here is the whole group is able to see and then discuss the same problem. The disadvantage is that the chosen players may feel self-conscious about being the focus of attention and only those two players get to practice the behaviors. It is recommended that the instructor ask for volunteers for the role-play.
- ↳ **Double.** Each player has an alter ego who stands behind the player adding comments or questions during the role-play that perhaps the primary person may be thinking but not saying. The second player can be assigned to the role or participants can spontaneously get into the action when they think of an additional response. They can also help out the primary player with a new idea or get that player back to reality. The facilitator should demonstrate this type of role-play before getting others to try it.
- ↳ **Reverse.** During the role-play, the facilitator asks the two students to switch roles and seats.
- ↳ **Rotation.** During the role-play, the facilitator asks new participants to continue the role-play.

↳ **Multiple.** Small groups are formed and they simultaneously enact the role-play. Processing may be more difficult.

(2) **Employment.** The instructor must ensure that all students understand related material and the objective of the role-play. The instructor must state the behavioral objectives, step-by-step instructions, any rules, and tell the students that the role-play is not a pass/fail exercise.

↳ **Pass out Role Play Information.** Hand out all background information and allow the students enough time to read it carefully and provide clarification as needed.

↳ **Demonstrate.** Conduct a demonstration of a role-play prior to its first time being used in course.

↳ **Assign and Define Roles.** Verbally designate roles or distribute printed descriptions of the roles and observers. Think about how to handle students who have been part of a similar situation, get overly defensive, or do not want to participate.

↳ **Monitor.** Create a comfortable environment to encourage active participation.

↳ **Focus.** Ensure participants focus on the process of practicing interpersonal skills rather than the content of the situation.

Supervise, Observe, and Provide Guidance. The job of the instructor is to supervise, observe, and provide guidance to the students. The instructor or assistant instructors should facilitate learning by refocusing the group and correcting any mistakes students make during the exercise. It is a good idea to talk to any assistant instructors to determine if they have observed anything additional.

Case Study

Case studies are normally developed from actual events that have occurred in the operating forces or supporting establishment. Case studies focus predominantly on analyzing and understanding the process of making decisions and making sense of complex or ambiguous information. Case studies are an excellent method for bringing together multiple learning points under a culminating exercise that causes students to process, analyze, and synthesize information. The instructor will normally present a case study in printed form, but it may also be presented using pictures, films, role-playing, or oral presentations. After the case study is presented, the class can be divided into groups. The students then analyze, discuss, and report the key elements of the case and the lessons to be learned.

→ **Objective.** The main objective of a case study is for students to gain practical knowledge from an actual event and to develop analytical and problem-solving skills. The greatest value of the case study is that it challenges students to apply what they know and comprehend to a realistic situation. Normally in the case study, concepts and principles are not taught directly. Instead, they emerge gradually as students are forced to formulate theories to support their case decisions. In preparation, the instructor should do the following:

(1) **Distribute Copies of the Case**

(2) **Make the Following Suggestions**

- ↳ **Skim.** Read the first few paragraphs of the case and then skim the rest to find out, in general, what the case is about and what kind of information is included for analysis.
- ↳ **Facts as you go.** Put yourself in the position of the main character in the case and ask yourself what the basic issue/problem is, how the issues/problems are affected by the information presented in the case, and how those issues/problems should be handled.
- ↳ **Take Notes.** Note the basic issues on a sheet of paper. Then read through the case again, jotting down the relevant considerations for each problem.

(3) **Develop Solutions.** Instruct the students to develop possible solutions to the case issues as they are reading. Solutions must be supported by evidence found in the case.

(4) **Instruct the Students to Begin Reading.** Allow ample time for careful reading of the case.

(5) **Re-Read.** Go back and carefully read the entire case, underlining key to the case.

(6) **Opening Question.** Some case leaders begin with the question, "What is the issue here?" Then go on to, "What are the pertinent facts?" Others begin with a more general question, "What action should be taken?" The approach depends on the intellectual maturity of the students and the subject matter.

(7) **Refrain from Lecturing.** The case study method is inherently a student-centered approach. Keep instructor comments to a minimum and let the students do the talking.

(8) **Be Non-Directive.** In most case studies, there is no single correct answer. It is more important to lead the students toward the application of sound principles than to persist in an endless search for a single correct answer. The instructor should focus on facilitation and must avoid imposing personal views and passing judgment on student contributions. The instructor's role is to encourage independent thinking and the achievement of the lesson objective.

(9) **Summarize.** Summarize the key learning points (should be no more than 3-4) and ensure they tie back to the learning objective.

Control the Participation. The case discussion is controlled much like the guided discussion; except that in this case, the instructor may feel free to enter the discussion. However, he/she needs to remain neutral. The instructor can keep track of the discussion on the chalkboard, turn chart, dry erase board, etc., so that the entire class has a visual record of where the discussion has been and where it is going.

Coaching

This method is an intensive learning experience for individuals or small groups. It is 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.

→ **Preparation.** Preparation is the key to coaching. The first thing the instructor must do is to identify the student's current strengths, weaknesses, and overall level of competence. After identifying these key elements, the instructor/coach takes the following steps:

- (1) **Identify Needs.** List specific knowledge, skills, or attitudes to be addressed with the application.
- (2) **Determine Desired Goal.** The goals should address the identified needs.
- (3) **Select Activities.** List resources, strategies, and initiatives needed for development.
- (4) **Determine Target Dates.** Identify the timeline.

→ **Employment**

- (1) **Define Roles.** Discuss your role, goals, and target dates with the student and reach an agreement.
- (2) **Probe.** Determine what the student already knows and build on that knowledge throughout a step-by-step process. Use thought-provoking questions (Effective Communication) and have the student explain performance. Demonstration prior to the exercise is highly recommended.
- (3) **Problem Solving.** Teach the students to search for alternatives and solve problems on their own. Strive to make them self-sufficient (minimal guidance needed). This will increase their confidence and ensure they do not immediately request assistance. Provide suggestions if needed.
- (4) **Intervention.** Know when to intervene, when to stand back from situations, and let the learner figure out a solution. Become involved in risky situations that demand your intervention, but avoid unnecessary involvement that will detract from your learners' training and achievement.
- (5) **Feedback.** It is extremely important to tell the student what they are doing throughout the exercise so they can get a sense of achievement.
- (6) **Supervise and Observe.** The job of the instructor is to supervise and observe. The instructor or assistant instructors should supervise to facilitate learning by watching the students and correcting any mistakes made during the exercise. Observe the exercise for any discrepancies.
- (7) **Collect and Analyze Performance Data**
- (8) **As Needed Review and Modify Goals or Training**
- (9) **Evaluate Performance**

5005. ADMINISTER TESTS

SECTION

5

The primary purpose for administering tests is to determine if the learning objectives have been met, improve instruction, and thereby increase student learning. This is accomplished by having a well thought out evaluation process. The following is a basic process to be used by FLCs. However, some schools may need to modify this process because of the unique nature of their instruction and/or resource constraints.

TYPES OF TESTS

A student's knowledge and skill level can be tested at different intervals before, during, and after the course of instruction. This is accomplished by a pre-test, progress test, and post-test.

- **Pre-Test.** A pre-test is administered to students prior to entry into a course or unit of instruction to determine the knowledge, skills, and behaviors the students already possess in a given subject. A pre-test is useful for tailoring instruction to match the entering student's knowledge and skill level. Example: A pre-test may reveal that incoming students have in-depth knowledge of M16 rifle loading and unloading procedures. With this information, an instructor can teach loading and unloading procedures as a refresher only.
- **Progress Test.** A progress test is administered throughout a course to evaluate student progress and to determine the degree to which students are accomplishing the learning objectives.
- **Post-Test.** A post-test reveals the effectiveness of instruction and how well the student learned by determining whether or not the learning objectives were achieved. Test items are designed to duplicate the behavior expressed in the learning objectives so that this determination can be made.

METHODS OF TESTING

Performance-Based Testing

A performance test duplicates the job behavior(s) by using the same equipment, resources, setting, or circumstances that the student will encounter on the job. The Marine Corps strives for performance-based instruction and testing to increase the transfer of learning from the instructional environment to the job. Normally, a performance checklist is used to record the student's level of mastery on the test. The test must have specific instructions for both the instructor and the student.

Knowledge-Based Testing

Knowledge-based test can be oral or written. This method of testing does not evaluate the student's ability to perform the required job skills; however, it does determine if the student knows how to perform the required job skills. The advantages of knowledge-based tests are high degree of objectivity in scoring and the capability of measuring a large numbers of facts, ideas, or principles in a relatively short time. The most frequently used knowledge tests are:

- Multiple-choice
- Matching
- True-false
- Essay
- Short answer
- Completion (fill-in-the-blank)

There are other knowledge-based tests known as authentic assessments. These include:

Take-home tests. This type of test allows students to take the test at home with the use of references and resources.

Open-book tests. This type of test can reduce stress, but may decrease the student's motivation to study.

Paired testing. This type of test allows students to work in pairs on single essay exams. Pairs can be self-selected or assigned.

Portfolios. This may not be a specific test but merely a collection of student's work. A student's portfolio may include, sample papers (first drafts and revisions), journal entries, essay exams, and other work representative of the student's progress. Portfolios may be given a letter grade or mastery/non-mastery qualification.

STEPS IN ADMINISTERING STUDENT TESTS

Gather Test Materials

When gathering test materials, an instructor needs to know the materials required, the type of test to be given, and have access to the materials.

STEP 1

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- The materials needed to administer a test will depend on the type of test to be given.**
 - If the test is knowledge-based, the instructor needs enough copies of the test, test booklets, and answer sheets for each student. The instructor should also ensure the students have a writing instrument (pen/pencil) to answer the questions.**
 - Extra answer sheets and pencils or materials that may be needed should be available.**
 - If the test is performance-based, such as disassemble/assemble an M16, the instructor will need at least one M16 and performance checklists for the students to demonstrate the ability to disassemble/assemble the M16.**
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When gathering test materials, here are some simple questions an instructor should ask prior to a test:

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- Who** will be administering the test?
 - What** type of test is being administered?
 - Where** are test materials located and does liaison need to be made to access materials?
 - Where** is the test being administered?
 - When** is the test being administered?
 - How** is the test being administered?
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STEP 2

Prepare the Environment

When preparing the environment, the selection of a place to administer a test is very important for reliable evaluation results. Some of the key elements that need to be considered are as follows:

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- **Arrange for tests to be administered in the morning when students are fresh and alert. Students have a higher probability of not doing as well in the afternoon due to fatigue. Note: This does not apply if the conditions of the test require fatigue or a specific time of day. Example: Conduct a *night* attack.**
 - **Ensure the environment is prepared and conducive to the testing. The environment should be quiet, well ventilated, have adequate lighting, and provide the student with ample working space.**
 - **Arrive at the testing room well in advance of the class to ensure all testing materials have been gathered, are assembled, and ready when administering the test to the students. Some instructors prefer to have the tests and other materials in place prior to the students arriving.**
 - **Post a sign or a placard outside each doorway to inform that a test is being conducted.**
 - **Instructors should follow their local Standing Operating Procedures (SOP) for handling visits by distinguished guests.**
 - **Ensure that logistical and safety requirements are met.**
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STEP 3

Clarify Directions

When administering a test, provide clear and concise instructions/directions to avoid confusion. When students understand exactly what they are supposed to do, they are less likely to become nervous or tense. Therefore, their test scores will represent a more accurate picture of their achievement. Although carefully written instructions/directions for taking the test should be a part of the evaluation, oral directions should be given as well. When providing instructions/directions to the students, there are some key elements that need to be kept in mind. A complete set of instructions provided in written form, orally, and/or by media should specify at a minimum the following:

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- **The test instructions.** These should be kept uniform from class to class.
 - **How the test will be collected.** After conducting the test, the evaluator must collect all test materials in a predetermined order.

- **The time allowed for each part of the test.**
- **Beginning and ending test times.** If the test has time limits, these need to be announced and observed. Example: Beginning and ending times written on the chalk or dry erase board.
- **How students will proceed when taking the test.** Students should be directed on whether to proceed individually, from part to part, from page to page, or whether to wait for a signal or further instructions.
- **The number of test items on the test and how the student is to respond.** It is often a good plan to provide a sample test item with the correct response.
- **What references or tools may be used during the test.**
- **Inform the students the procedure(s) to follow when they have completed the test.** Are they free to turn in their papers and leave the room or are they to remain seated until all materials are collected?
- **Inform students to keep their eyes on their own paper.**

Provide An Opportunity For Questions

After providing the students with instructions/directions and prior to the students taking the test, the evaluator needs to invite the students to ask questions concerning procedures and make it clear whether questions may or may not be asked of the instructor after the test begins. If any questions arise from the student(s), clarify the instructions/directions and check back with the student(s) to see if they understand the directions mentioned.

STEP 4

Conduct the Test

After the test materials have been gathered, the environment prepared, the instructions/directions given, and an opportunity for questions has been provided, the evaluator is ready to conduct the test. Some elements that the evaluator should apply, as well as keep in mind when conducting a test, are as follows:

STEP 5

- **Start and stop the test on time if a time has been given.**
- **Monitor the test throughout the testing period by frequently walking about the classroom.**
- **Keep distractions to a minimum.**
- **Collect the tests in a pre-determined order.**

The review should cover the correct performance that was expected of the student. This review should always be conducted before the students receive their results.

- Before conducting a review with the students, the instructor should pass out Examination Rating Forms (ERFs) to at least 10% of the students that took the test. This is to gather data on the students' impression of the test and its overall process.
- Conduct a review of the test with the students. The review should cover the correct performance that was expected of the student. This review should always be conducted before the students receive their results. Students will always try to debate or justify their answers once they learn their grade. This type of exchange will hinder the review process and could create student/instructor barriers that will be difficult to overcome. In the event a student does want to debate their answers, inform them to wait until they receive their results, as that is the appropriate time for recourse.

Scoring and Grading

A test may be valid, reliable, and comprehensive, but if not scored and graded properly individual scores and grades are useless.



STEP 6

- **Knowledge-Based Tests.** When scoring and grading knowledge tests, an answer key along with a grading key must be obtained to maintain standard results for each test being scored and graded. Scoring is nothing more than marking the correct answers on a copy of the test answer sheet and then utilizing it to score the students' test answer sheets. Grading is done after the test has been scored by assigning numerical values in accordance with the grading key.

Example:

When using a bubble sheet test, involving a, b, c, d, or e, it is possible to take a copy of that evaluation and punch out the desired answers, then utilize it as a key to score the test answer sheets.

- **Performance-Based Tests.** When scoring and grading a performance test, a performance checklist is usually made. This checklist must be configured to a skill level, which shows whether the student has accomplished the desired skill. Some performance checklists may only involve a mastery or non-mastery qualification. In this case, if multiple instructors are involved in the scoring and grading process, all instructors must use the same scoring and grading procedure.

Example:

If one instructor assigns a "Poor" score and another instructor assigns a "Good" score to the same paper, the grades may express instructors' bias and not student proficiency.

5006. AFTER-LESSON MANAGEMENT

SECTION

6

The primary purpose for employing after-lesson management is to ensure the effective and efficient use of school resources. By ensuring the instructional environment is well maintained, the instructor is saving the school valuable resources. The secondary purpose is to capture specific lesson related data for future use in the school's evaluation program.

After-lesson management actions are all the activities that must be performed after the lesson has been conducted. These activities include:

-
- **Removal of media from the instructional environment.**
 - **Securing all classified material.**
 - **Leaving the instructional environment as it was found.**
 - **Conducting a cleanup of outdoor facilities.**
 - **Turning in any equipment and resources temporarily borrowed for the lesson.**
 - **Reviewing the school SOP. There may be additional after lesson management actions or requirements (e.g., march the students to chow).**
 - **Complete the After Instruction Report (AIR).**
-

COMPLETING AN AFTER-INSTRUCTION REPORT

After conducting a lesson, it is an instructor's responsibility to assess the effectiveness of instruction. The primary means of recording this assessment is the After-Instruction Report (AIR). Included in the AIR is the compilation of IRF data, instructor's analysis, and recommendations for improvement. The AIR is a single document that summarizes one iteration of a lesson. To have an effective AIR, the following must be completed: collect data, analyze data, record data, make recommendations, and submit the completed AIR. See MCO 1553.2_ Appendix O-52 for a sample AIR.

Collect Data

STEP 1

This is predominantly done through two sources:

Students. By providing Instructional Rating Forms (IRFs) to students and allowing them the opportunity to respond to the lessons, FLCs are provided data to make future revisions, if necessary. Data feedback that comes from the students may include, but is not limited to, problems with a lesson, instructors, or other materials associated with instruction. IRFs should be completed for each lesson. The frequency and number of rating forms used will depend upon the school's Standing Operating Procedures (SOP). At a minimum, survey ten percent of the students. When a lesson is being given for the first time, it is recommended that all students complete an IRF. More information on the IRF can be found in Chapter 5, Section 5205. See Appendix O-44 for a sample IRF.

Instructors. Instructors are a valuable source of data. They can report problems with any part of the instruction. This could include, but is not limited to, the instructor's observation of student difficulties with certain learning objectives/outcomes, the amount of time spent in presenting a lesson, the instructional environment, and opinions about instructional materials. Instructors can make any recommendations associated with the lesson, and the course as a whole. All instructor comments are recorded on the AIR.

Analyze Data

STEP 2

Before data can be analyzed, the instructor should organize data into topics areas. For example, an instructor could organize using the four broad categories listed below:

- Problems with the course material.
- Problems with student performance.
- Problems with instructor performance.
- Problems with the instructional environment.

Instructors should review their notes and comments for each of the topic areas that were identified. Then, look for any trends in the data and draw tentative conclusions concerning effectiveness or efficiency of the lesson. The process of identifying trends involves the instructor looking for data that occurs more than once. A single, provocative comment would not be considered a trend. For example, a trend might be recorded of students missing a particular question or several of the same comments from IRFs. From these trends, identify problem areas and make recommendations for change. Problem areas can also be identified from singular comments on an IRF. For example, if a student pointed out that the outline quoted a Marine Corps Order that was superceded; this would be an immediate problem area, with no need to establish a trend of similar comments.

Begin Recording Data

Once all data has been collected and analyzed, record the data on the AIR. Listed below are the procedure for recording data:

STEP 3

Instructional Rating Form (IRF) Data. After the block of instruction, the instructor should collect all IRFs and compile all the data. Record the compiled data on the appropriate block of the AIR. This is done right after instruction because the instructor still has a fresh memory of what took place during instruction and can analyze the feedback given from the students. After analyzing the data, the instructor can also make comments and recommendations related to areas of concern dealing with students, instruction, and the feedback given back from the students.

Time-Critical Operational Risk Assessments. If new safety requirements are identified during the lesson, the instructor should record the ORM lessons learned, additional controls used, and/or occurrences in the Instructor Comments area labeled "Reassessment of ORA." By allowing the Risk Assessment to be included in the AIR, other instructors will benefit in the future.

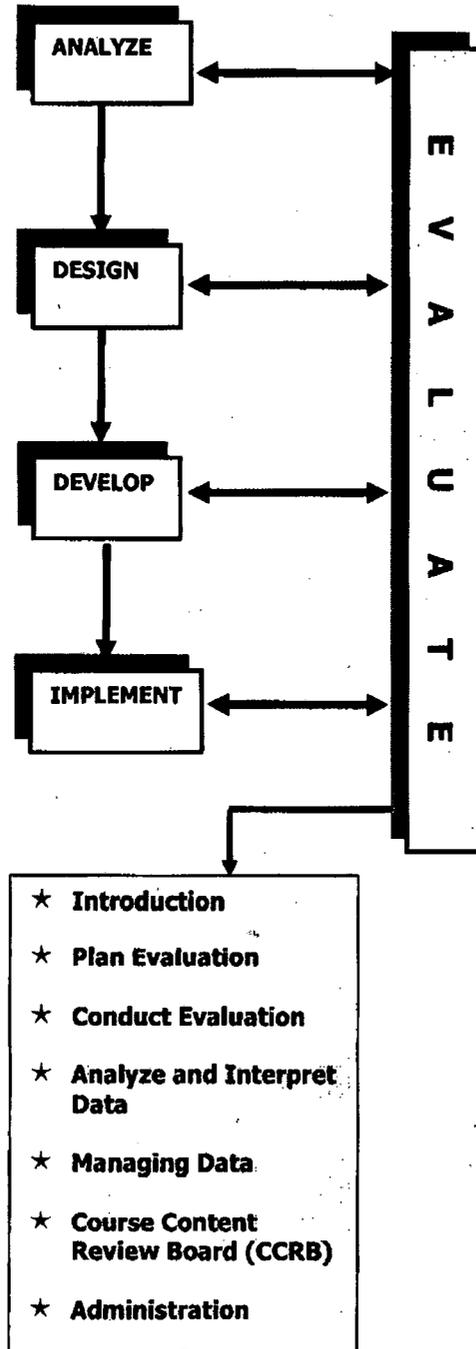
Make Recommendations

Recommendations come in the form of instructor comments. These recommendations are based on the instructor's analysis of the identified trends. Recommendations to revise instruction should include the following:

STEP 4

- A statement of the problem (for example, only 10% of the students stated that their knowledge increased as result of the lesson).
- The probable cause(s) of the problem (for example, the lesson is written for a much less experienced target population).
- All possible alternative solutions to the problem. (For example, a suggested solution may be to redesign the lesson for the experienced target population or make the lesson a self-paced homework assignment).

EVALUATION



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Chapter 6000. INTRODUCTION

6

The purpose of evaluation within the Systems Approach to Training (SAT) process is to determine the effectiveness and efficiency of an instructional program. Evaluation is not merely a single phase within the SAT process, but rather occurs continuously throughout all phases. This chapter provides guidance for a systematic and standardized approach to assessing the effectiveness and efficiency of an instructional program in each phase of the SAT. It details specific steps, the evaluation instruments used, and statistical methodologies which allow for ease of reference about how to conduct, analyze, and interpret evaluation results. Evaluation data is used to ensure that instruction is resulting in combat-effective Marines, to monitor the allocation of funding and resources for an instructional program, and to provide the basis for decision-making concerning the maintenance, revision, continuation, or termination of an instructional program. Using the processes and procedures outlined in this chapter, Formal Schools and Unit Commanders can establish a systematic evaluation program to evaluate instruction, identify training deficiencies, document evaluation results, and make recommendations for use by decision-makers to modify, continue, or terminate a program.

This chapter has six sections. The first five cover the five evaluation processes and the sixth provides administrative responsibilities as follows:

Plan Evaluation. This section provides an introduction to the types of evaluation and guidance for determining the focus of an evaluation.

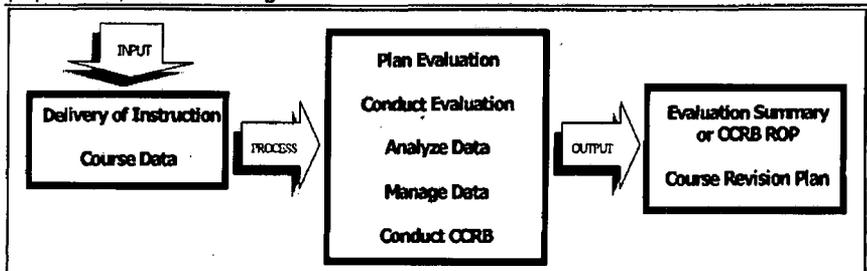
Conduct Evaluation. This section explains how evaluation takes place within each phase of the SAT to provide checks and balances. It addresses specific ways to conduct evaluation for each phase of the SAT process.

Analyze Data. This section takes the evaluator through the steps of organizing, quantifying, interpreting, and summarizing data so that information supporting changes to the POI can be presented in a Course Content Review Board (CCRB).

Manage Data. This section addresses how to manage the documentation of evaluation results and recommendations for revising or refining an instructional program.

Conduct Course Content Review Board (CCRB). This section addresses how to prepare and conduct for a CCRB.

Administration. This section references the directives requiring evaluation at FLCs. It also covers the development of an evaluation plan, how to sample a population, and the design of evaluation instruments.



6001. PLAN PROGRAM EVALUATION

SECTION

1

Thorough and systematic planning is key to a successful evaluation. For an evaluation to provide the information required for making decisions concerning an instructional program, the evaluation must identify the critical issues and topics influencing the program. These topics will define the focus of the evaluation. Potential evaluation questions, criteria, and issues need to be identified and specific evaluation topics selected. Recognizing important questions and avoiding minor issues will enhance the merit of the evaluation by providing the data required for making informed decisions about an instructional program. This section provides an introduction to the types of evaluation and guidance for determining the focus of an evaluation. A few questions are listed in Figure 6-1 to assist in providing focus to the evaluation process by establishing the need.

QUESTIONS FOR DETERMINING EVALUATION NEED

- Does the instructional program affect a large segment of the Marine Corps?
- Are multiple iterations of the instructional program planned? Normally, a one-time program will not be evaluated.
- Have instructional program deficiencies been identified by the using command(s)?
- Has there been an equipment change, technology advance, or doctrinal change that may affect the instructional program?
- Will evaluation information affect important instructional program decisions scheduled to take place? Such decisions may relate to course content, course length, funding, continuation, instructor requirements, or student throughput.
- How long has it been since the program was last evaluated? Has the program evolved since the last evaluation?

Figure 6-1. Questions for Determining Evaluation Need.

IDENTIFY EVALUATION TYPE

There are two types of evaluation. A distinction between the two types of evaluation can be made by first determining when the evaluation will be conducted, and then what will be the focus of the evaluation.

Formative Evaluation

Formative evaluation is conducted during the development of an instructional program with the express purpose of providing recommendations for improvement. It is also possible to conduct formative evaluation through the first iteration of implementation, but this is not the preferred method for validating instruction. Validating instruction (formative) will involve content reviews by Subject Matter Experts (SME), and field trials. These validation methods are discussed in more detail in Chapter 3, Section 3601. Formative evaluation provides useful information for improving an instructional program and leads to decisions concerning instructional program development. For example, during the development of a course curriculum, formative evaluation could involve review of Training and Readiness (T&R) Events, content review of course materials by SMEs, and validation of instruction. Formative evaluation results in feedback for the curriculum developer, who then uses the information to make the necessary revisions to course materials (e.g., lesson plans, concept cards, student materials, media, test items).

The primary object of formative evaluation is to review the effectiveness and efficiency of course materials and to make any revisions necessary prior to implementation of the course materials.

Summative Evaluation

Summative evaluation is conducted after a Program of Instruction (POI) has been implemented. It provides judgments about a program's worth or merit. This type of evaluation can be conducted by schoolhouse personnel or by personnel external to the school (i.e., a TECOM instructional system specialist). Summative evaluation leads to decisions concerning program improvement, continuation, extension, or termination. For example, after a course curriculum is completely developed, a summative evaluation might be conducted to determine how well graduates are performing on the job following instruction. Summative evaluation assesses effectiveness of student performance, course materials, instructor performance, and/or instructional environment. Summative evaluation can also be a comprehensive assessment of all these factors to evaluate the instructional program's overall effectiveness and efficiency.

Summative evaluation leads to decisions concerning program improvement, continuation, extension or termination.

IDENTIFY EVALUATION ISSUES

A school commander must identify the curriculum and instruction issues to be addressed during the evaluation so that the proper information can be gathered to determine the effectiveness of the program.

Gather Information

The evaluator begins the identification process by generating an exhaustive list of potentially important questions, criteria, and issues. Possible questions to use for each phase of the SAT process can be found in the next section. To develop this comprehensive list, the evaluator must gather information from a variety of sources including:

- Subject matter experts, instructors, students, and managers to identify questions, concerns, and goals regarding the instructional program within the Formal Learning Center. The evaluator should focus on obtaining input from those individuals who are or will be affected by the results of the evaluation.**
- Existing curriculum, instructional documentation, previous evaluation data, Marine Corps directives, local Standing Operating Procedures (SOP), and other appropriate doctrinal publications.**

Select Evaluation Topics

It is usually not feasible to address all issues in one evaluation. Practical considerations, such as availability of resources and time constraints, will limit what can be addressed. If resources are not available and the evaluation is critical, it must be postponed until they are available. The evaluator must narrow the scope of the evaluation to address the most critical questions and issues affecting the instructional program. The conduct of the evaluation will be driven by the topics selected. Figure 6-2 provides criteria that can be used for selecting evaluation topics.

Criteria That Can Be Used in Selecting Evaluation Topics
<input checked="" type="checkbox"/> Who will use the information?
<input checked="" type="checkbox"/> Issues that reduce present uncertainty, provide information not already available, or yield important information.
<input checked="" type="checkbox"/> Issues that address a critical concern of the instructional program.
<input checked="" type="checkbox"/> Issues that, if not addressed, seriously limit the scope or comprehensiveness of the evaluation.

Figure 6-2. Criteria Used in Selecting Evaluation Topics.

In addition to the above criteria, the selection process may also be based on decisions that will be made as a result of the evaluation. These can include decisions concerning:

-
- Whether instructional needs are being met.**
 - The development or acquisition of new training aids, devices, or systems.**
 - The continuation, modification, expansion, or termination of an instructional program.**
 - The extent to which the instructional program is being implemented as designed.**
 - The relative value/cost of an instructional program compared to comparable programs.**
-

SELECT EVALUATION APPROACH

Once the focus of the evaluation is defined, the evaluation approach is selected. Three approaches to evaluation are recommended for use in the Marine Corps: objectives-oriented, management-oriented, and operational test and evaluation. These approaches are based on the goal of the evaluation; they determine the focus of the evaluation but do not change the procedure for conducting evaluation.

Objectives-Oriented Evaluation

The objectives-oriented approach determines the extent to which learning objectives have been achieved. It is the most common evaluation approach used in the Marine Corps. Information obtained from such an evaluation can be used to revise the goals of the instructional program, the program itself, or the instruments and methods used to measure instructional effectiveness. Figure 6-3 describes the focus of objective-oriented evaluation.

When using Objective-Oriented Evaluation, the focus is on determining whether:

- Students master the learning objectives.
- Learning objectives meet the goal(s) of the program and support the Training and Readiness (T&R) Events.
- The standards in the learning objectives are realistic and obtainable.
- Student assessments accurately measure the stated learning objectives.
- Graduates are able to perform the tasks in the operating forces.

Figure 6-3. Objective-Oriented Evaluation.

Management-Oriented Evaluation

The management-oriented approach to evaluation entails collecting information to aid management decision-making as an instructional program operates, grows, or changes. This approach enables the school director to determine if an instructional program responds to changes in technology, resources, new developments in instruction, or day-to-day operations. For example, if an upgrade to a computer program for inventory control is being implemented, the school director may direct that an evaluation be conducted to determine the upgrade's affect on the instructional program. The FLCs concerns, informational needs, and criteria for instructional effectiveness guide the direction of the evaluation. Figure 6-4 provides how management-oriented evaluation assists the decision-maker.

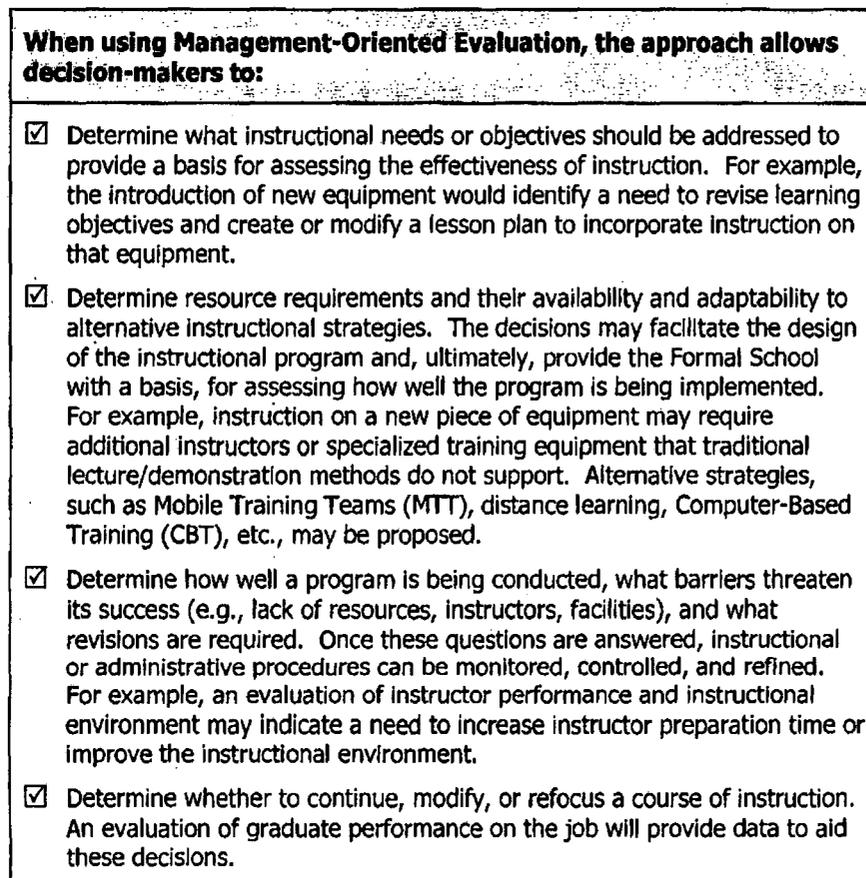


Figure 6-4. Management-Oriented Evaluation.

Operational Test and Evaluation

Operational test and evaluation is an approach that enables the evaluator to determine whether a product represents a significant improvement or benefit over alternative products. Example products include an off-the-shelf instructional program, an instructional method or media, a training system/device, etc. This approach is effective when an existing product is being evaluated for implementation. This approach also allows the evaluator to assess the effectiveness of a product while it is still under development. When determining whether an alternative product represents an improvement over an existing product, the evaluator should consider the following factors: cost, benefits, effectiveness, and feasibility. Figure 6-5 provides how operational test and evaluation assists the decision-maker.

Figure 6-5. Operational Test and Evaluation.

When using Operational Test and Evaluation, decision-makers are able to consider:	
<input checked="" type="checkbox"/>	Cost. Cost is analyzed to determine if it will be cost efficient to invest in an alternative product or upgrade the existing product.
<input checked="" type="checkbox"/>	Benefits. This analysis includes determining how the benefits among products will be measured. The analysis results in the determination of whether the benefits are worth the expenditure of resources (e.g., time, money, personnel) to implement.
<input checked="" type="checkbox"/>	Effectiveness. An analysis of product effectiveness is performed to determine whether an alternative product will be more effective than an existing product in meeting the goals of the instructional program.
<input checked="" type="checkbox"/>	Feasibility. A final analysis is that of feasibility. How feasible would it be for the school to invest the resources necessary to educate their personnel and structure/acquire the facilities required to use the alternative product? If the benefits and effectiveness of the alternative product are minimal, would it be feasible to alter the school budget to implement an alternative product?

6002. CONDUCT EVALUATION

SECTION

2

In Marines Corps training, the revision of courses is paramount to meeting the needs of the operating forces. Whether it is affected by new equipment, new orders, or new technology, how a task is performed in the operating forces can change. Formal Learning Centers must be prepared to obtain data compiled from different phases of the SAT process in order to improve the overall result. As the SAT model shows on page 5-0, evaluation can require revisiting any phase of the SAT process. The diagram in Figure 6-6 shows the variety of routes that can be taken in evaluation.

This section describes how evaluation takes place within each phase of the SAT to provide a system of checks and balances. This section allows the user of this manual to address specific ways to conduct evaluation for each phase of the SAT process. For a new course being developed, this process shows how formative evaluation occurs during the initial stages of course development when limited data is available. Evaluation during this time can reveal potential problems prior to course implementation. Using summative evaluation, data can be collected regarding existing courses, which may be used to assist in identifying the strengths and weaknesses within the course in question. Evaluation instruments have been identified and information is provided on conducting the evaluation. However, specific guidelines on the development of evaluation instruments and sampling a population can be found in Section 5600. Referrals to other sections are made regarding how data is analyzed and interpreted after it is collected.

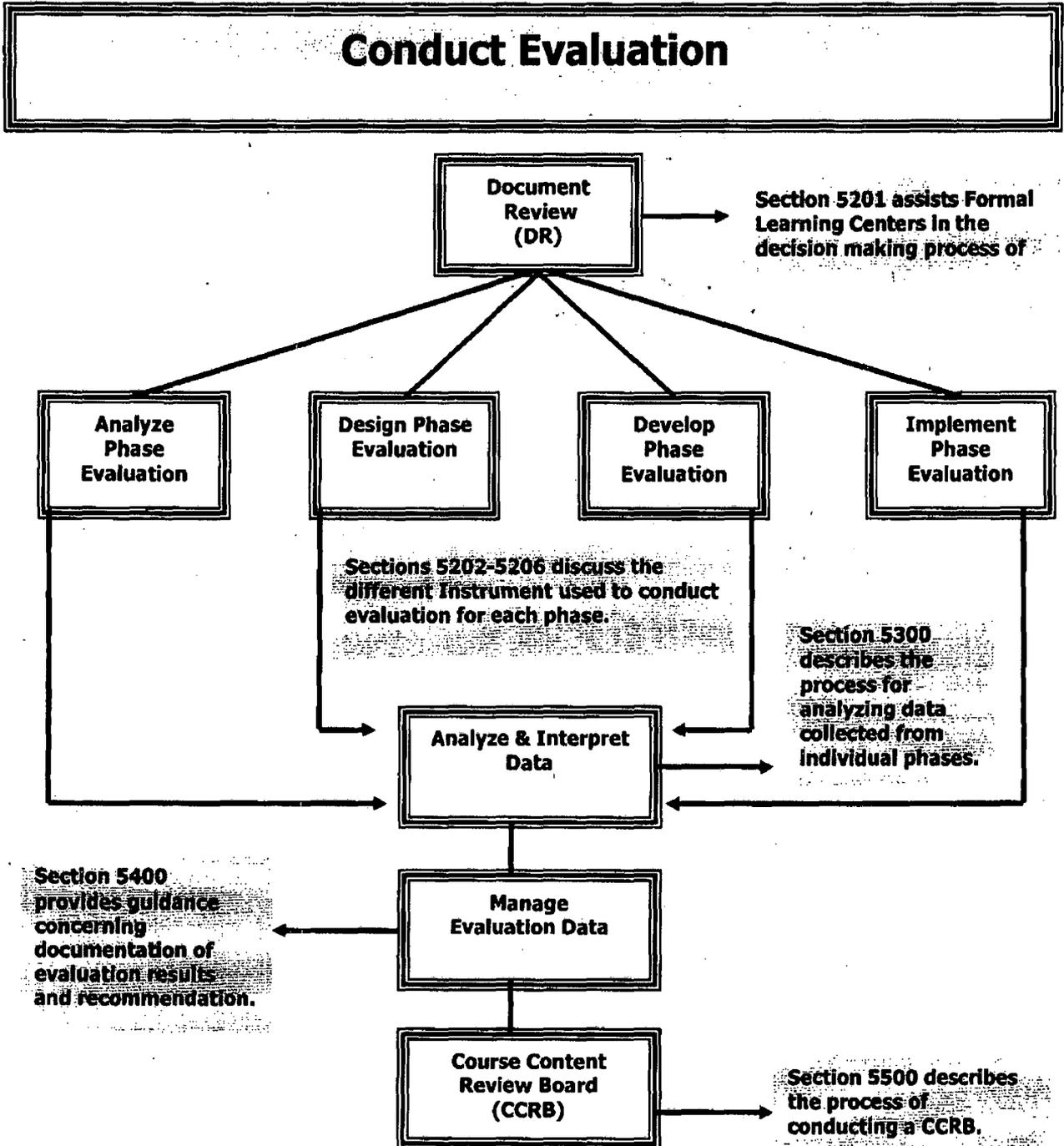


Figure 6-6. Course Evaluation.

DOCUMENT REVIEW

During any stage of the evaluation process, a review of documents significant to the course and school can assist in the decision-making process and approach to evaluation. Some of the documents listed may or may not be available depending on whether the evaluation is for a new course/school or an existing course. Additional documents to those discussed here may also be available. Listed below are documents to be discussed in more detail later in this section.

-
- Training and Readiness (T&R) Manual**
 - Program of Instruction (POI)**
 - Master Lesson File (MLF)**
 - School's Standing Operating Procedures (SOP)**
 - School's Evaluation Plan**
 - Inspection Reports/Assist Visit Reports (if applicable)**
 - Record of Proceedings (ROP)**
-

TRAINING AND READINESS MANUAL

The T&R manual defines individual and collective training requirement and serves as the base upon which instruction is built. Therefore, the T&R must always be reviewed to assure the association between the curriculum and the training standard. For instance, if evaluation data indicates a problem with Terminal Learning Objectives (TLOs) MCO 1553.2_ Ch. 2, provides the procedure for downgrading the TLO or procedures to update a T&R event out of cycle.

PROGRAM OF INSTRUCTION (POI)

According to MCO 1553.2_, all existing courses will have a current POI. These documents (maintained in MCTIMS) provide the resources required for the course, learning objectives, instructional hours, number of instructors required for each class, methods and media, and more. This information is vital to the evaluation of a course. For example, an evaluator needs to ensure that the class structure reflects the POI. If there are problems with the approved POI, then the data needs to be gathered so that it can be presented at a Course Content Review Board (CCRB).

MASTER LESSON FILE (MLF)

An MLF is required for each class that is taught in the course. All of the documentation required to conduct the class is in the MLF. More information on specific contents can be found in MCO Ch. 1, Par. 6. If the course is new, then this file will not be produced until the end of the develop phase. For existing courses, the MLF can be used to standardize current course materials. For instance, if a student comments on an Instructional Rating Form (IRF) that numerous words are misspelled in the student handout, then the MLF can be pulled and checked for misspelled words. If the words are not misspelled in the MLF, then there is an internal problem that exists—the MLF is not being used as the source document.

SCHOOL STANDING OPERATING PROCEDURES (SOP)

The school's SOP or Academic SOP specifies academic policy for the school. The SOP may provide information about how data is gathered and compiled for the school and what resources are available to provide evaluation data. This is valuable information for evaluation of the design, develop, and implementation phases. This document may not be available to a new school, but needs to be developed to provide policy and procedures. A checklist providing some key elements to include in an SOP can be found in MCO 1553.2_ Appendix O-59.

EVALUATION PLAN

If an evaluation plan has been established, it should be reviewed so that there is an understanding of the evaluation process in accordance with school policy. At some schools, the evaluation plan may be found in the school's SOP. Refer to Section 5602 for a detailed explanation of an evaluation plan.

INSPECTION REPORTS/ASSIST VISIT REPORTS

Some Military Occupational Specialties (MOSs) have inspection teams that visit the operating forces to ensure that the standards required by the Marine Corps are adhered to. If possible, retrieve information revealing strengths and weaknesses from the operating forces so the school can then use the data to assist in the improvement of the instructional program. The challenge comes in determining whether the strengths/weaknesses are linked to the schoolhouse, the operating forces, or both.

RECORD OF PROCEEDINGS (ROP)

The ROP provides documentation of the discussion items and recommendations made during a Course Content Review Board (CCRB). For existing courses, this document offers recommended changes, additional operational needs that were identified, or additional resources needed at the FLCs. Sometimes, the ROP will reveal areas where additional data needs to be collected to determine or support needs that were identified during the CCRB. Refer to section 5500 for more information on the ROP and CCRBs.

ANALYSIS PHASE EVALUATION

Data is collected during the Analysis Phase to identify the task list, T&R events, instructional setting, and the Target Population Description (TPD). Through the methods discussed in Chapter 1, the products of the Analysis Phase are determined by TECOM. Methods of evaluation are established to ensure the accuracy of the outputs from the Analysis Phase. If evaluation data at the FLC identifies a problem with the outputs, then all supporting data is sent to the Task Analyst at TECOM as a Formal Learning Center Evaluation Report (FLCER). The questions in Figure 6-7 are a few questions that will assist in examining the outcomes of the Analysis Phase.

Evaluating the Analysis Phase	
<input checked="" type="checkbox"/>	Does the T&R manual reflect the tasks necessary to perform the job in the operating forces?
<input checked="" type="checkbox"/>	Does the task analysis include all of the prerequisite skills and knowledge needed to perform the learning goal and is the prerequisite nature of these skills and knowledge accurately represented?
<input checked="" type="checkbox"/>	Does the environment accurately replicate, within the confines of resources, the environment where the job is performed?
<input checked="" type="checkbox"/>	Does the target population description accurately define those who perform the task?
<input checked="" type="checkbox"/>	Is there data from the operation forces suggesting changes are needed

Figure 6-7. Evaluating the Analysis Phase.

CONDUCT EVALUATION

For a Formal Learning Center an Analysis Phase review occurs prior to the commencement of a T&R conference via the FLCER. The FLCER is the FLCs voice in the T&R process to communicate end of course evaluation and post-course data indicating a gap between what is taught at the school and what is being performed in the operating forces. In accordance with MCO 1200.13, a Front-End Analysis (FEA) is initiated by TECOM when job requirements change or a performance deficiency is detected. A front-end analysis is an example of an Analysis Phase review.

DESIGN PHASE EVALUATION

During the Design Phase knowledge and skills are identified, learning objectives and test items are developed, the delivery system is selected, and the sequence of instruction is determined. Methods of evaluation must be established to ensure that these outputs are accurate. The questions in Figure 6-8 are questions that will assist in examining the outcomes of the Design Phase.

Figure 6-8. Evaluating the Design Phase.

Evaluating the Design Phase	
<input checked="" type="checkbox"/>	Do the knowledge and skills accurately reflect what needs to be taught for each performance step?
<input checked="" type="checkbox"/>	Do the learning objectives support the T&R events?
<input checked="" type="checkbox"/>	Do the learning objectives accurately and clearly state what knowledge/skill will be required for performing the job?
<input checked="" type="checkbox"/>	Does the test accurately measure the knowledge, skill, or the task being taught?
<input checked="" type="checkbox"/>	Are the testing methods appropriate to the subject matter (knowledge vs. performance-based)?
<input checked="" type="checkbox"/>	Do the test items consistently measure the same knowledge or performance?
<input checked="" type="checkbox"/>	Do the assessment instruments and their related mastery criteria reliably distinguish between competent and incompetent learners?
<input checked="" type="checkbox"/>	Is the delivery system selected appropriate for the level of knowledge that the target population will possess?
<input checked="" type="checkbox"/>	Is the sequence of instruction organized logically to enhance the process of learning the material?

CONDUCT EVALUATION

Throughout the Design and Develop phases of the SAT process, checklists are used to ensure accuracy and to guide decision-making. Checklists provide continuity to the process and a standard for the product. During the Design phase, checklists provide detailed questions on products of the Design phase. For new courses, these checklists must be completed and placed in the MLF for each class in the course. In existing courses, these should be reviewed if there are indicators that the products of this phase are flawed. The checklists are available in the appendices of MCO 1553.2. Additional items can be added to the checklists to meet school needs.

Learning Analysis Worksheet (LAW) Checklist. The LAW checklist ensures that components are recorded from the T&R manual verbatim. It also checks to make sure that the knowledge and skills were identified and grouped for each performance step. Refer to Chapter 2, Section 2200, for more information on learning analysis.

Learning Objective Worksheet (LOW) Checklist. The LOW checklist ensures that the behavior, condition, and standard of the learning objectives are accurate and clear. Refer to Chapter 2, Section 2202, for more information on learning objectives.

Test Item Checklist. The test item checklist ensures that test items replicate the behavior, standards, and conditions identified in the learning objectives. Many questions can be included on the checklist to require the test developer to assess each test question (knowledge or performance) for clarity and conciseness. Refer to Chapter 2, Section 2207, for more information on test items.

Construct a Test Checklist. The construct a test checklist ensures that the test is constructed to include detailed instructions, scoring criteria, appropriate grouping of test items, and any safety precautions. Refer to Chapter 3, Section 3500, for more information on constructing a test.

DEVELOP PHASE EVALUATION

During the Develop Phase, the course schedule is determined, the media is produced, Master Lesson Files (MLFs) are created, and the POI is generated. Methods of evaluation must be established to ensure that these outputs are accurate. The questions in Figure 6-9 are questions that will assist in examining the outcomes of the Develop Phase.

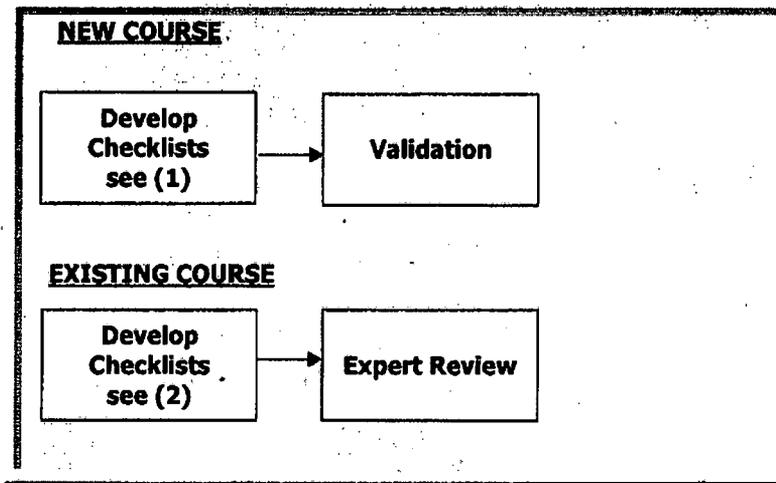
Evaluating the Develop Phase	
<input checked="" type="checkbox"/>	Does the content present a consistent perspective?
<input checked="" type="checkbox"/>	Do the instructional materials support the learning objectives?
<input checked="" type="checkbox"/>	Does the instructional method facilitate maximum learning?
<input checked="" type="checkbox"/>	Is the instructional method appropriate to the subject matter?
<input checked="" type="checkbox"/>	Are training aids suitable to the instruction and subject matter?
<input checked="" type="checkbox"/>	Are examples, practice exercises, and feedback realistic and accurate?
<input checked="" type="checkbox"/>	Is the approach consistent with current instructional theory in the content area?
<input checked="" type="checkbox"/>	Is sufficient time allotted for instruction and practice?

Figure 6-9. Evaluating the Develop Phase.

CONDUCT EVALUATION

Several forms of evaluation take place during the Develop phase. For both a new and existing course, checklists are used to evaluate the products of the phase. For a new course, the checklists are completed and placed in the MLF as source documents. Once the course development is completed, then validation takes place so that problems with the Program of Instruction (POI) are identified prior to implementation. When evaluating an existing course, the checklists in the MLF are still referenced and reviewed periodically. If evaluation indicates problems with the POI, then the checklists need to be reviewed. However, reviewing the checklists may not identify the problem and an expert review may be required. An expert review, not to be confused with an SME review, is discussed in more detail below. Figure 6-10 shows the different approaches that evaluation takes depending upon whether the course is new or existing.

Figure 6-10. Conduct of Evaluation in the Design Phase.



1. **Develop Phase Checklists.** During the Develop phase, checklists provide detailed questions on products of the develop phase. The checklists are available in the MCO 1553.2_ appendices. Additional items may be added to the checklists to meet school needs.
 - a. **Concept Card Checklist.** The concept card checklist ensures the contents and accuracy of the necessary components of the concept card. Refer to Chapter 3, Section 3200, for more information on concept cards.
 - b. **Lesson Plan Checklist.** The lesson plan checklist ensures that each component required in a lesson plan is present and complete. Refer to Chapter 3, Section 3402, for more information on lesson plans.
 - c. **Student Outline Checklist.** The student outline checklist ensures that each component required in the student outline is present. Refer to Chapter 3, Section 3403, for more information on student outlines.
 - d. **Method/Media Checklist.** The method/media checklist ensures that the method and media used are consistent with the learning objective behavior. Refer to Chapter 2, Section 2208, for more information on methods. Refer to Chapter 2, Section 2209, and Chapter 3, Section 3304/5, for more information on media.

2. **Expert Review.** An expert review can be held for further examination of the design and develop phases. These types of reviews are where experts review the material prior to implementing the instruction. An expert review is different from a Subject Matter Expert (SME) review in that the expert review involves more than SMEs. The experts may include: SMEs, seasoned curriculum developers, and/or experienced education specialists. During a content review, an SME examines the content of the instructional material for accuracy and completeness. Then an individual familiar with the target audience (perhaps someone from the operating forces) reviews for appropriateness. This individual may look at vocabulary, examples, and/or illustrations. The education specialist can evaluate presentation of the content with current educational thoughts and practices. Expert reviews can take place toward the end of the design phase or at the beginning of the develop stage for a new course. If an existing course, then this review can take place at any time.
3. **Validation.** The process of validation occurs for new courses prior to implementation. The best indication of whether the instruction is effective is to try it out on a population that is representative of those expected to be in the classroom. This will provide information on how well the learners are able to learn and the problems encountered with the instruction in its current form. Validation allows changes to be made prior to the implementation of the instruction. Methods of validation are covered at length in Chapter 3, Section 3600.

IMPLEMENT PHASE EVALUATION

During the Implement Phase, instruction is delivered. Evaluating the objectives of instruction is imperative to identifying the strengths and weaknesses of the course as a whole. The implement phase is where most evaluation data is compiled at the FLC. Once a course is implemented, evaluation is conducted for each iteration of a course. Since this is a continuous process, it is important that each school have an evaluation plan in place to ensure that data is collected properly and that there is standardization of the data collected. More information on writing an evaluation plan can be found in Section 5602. The four common topics evaluated in the Implementation Phase are course materials, instruction, instructional environment, and student performance. The questions in Figure 6-11 will assist in examining these four topics.

Figure 6-11. Evaluating Implementation.

Evaluating Course Materials
<input checked="" type="checkbox"/> Do the instructional materials support the learning objectives?
<input checked="" type="checkbox"/> Is the student outline easy to follow?
<input checked="" type="checkbox"/> Are training aids suitable to the instruction and subject matter?
<input checked="" type="checkbox"/> Are the test instructions clear and understandable?
<input checked="" type="checkbox"/> Is the format of the test easy to follow? (Students don't have to flip pages, like questions are grouped together, etc.)
<input checked="" type="checkbox"/> Do students have all of the materials (equipment, calculator, etc.) necessary to complete the test?
<input checked="" type="checkbox"/> Do students use the course materials available to them?
Evaluating Instructor
<input checked="" type="checkbox"/> Is the instructor's presentation of instruction effective?
<input checked="" type="checkbox"/> Does the instructor promote student participation?
<input checked="" type="checkbox"/> Does the instructor provide feedback to the students?
<input checked="" type="checkbox"/> Does the instructor have sufficient knowledge of the course material?
<input checked="" type="checkbox"/> Does the instructor communicate and interact effectively?
<input checked="" type="checkbox"/> Does the instructor utilize media effectively?
<input checked="" type="checkbox"/> Is the administration of tests effective?
Evaluating Instructional Environment
<input checked="" type="checkbox"/> Does the instructional setting facilitate maximum learning?
<input checked="" type="checkbox"/> Do available resources allow the course to be as performance-based as possible?
<input checked="" type="checkbox"/> Is the instructor to student ratio adequate?
<input checked="" type="checkbox"/> Is the instructional environment appropriate to the subject matter and realistic to the job setting?
Evaluating Student Performance
<input checked="" type="checkbox"/> Are students mastering the learning objectives?
<input checked="" type="checkbox"/> Are students able to perform tasks?
<input checked="" type="checkbox"/> Are there test items or tasks that students repeatedly have problems mastering?

CONDUCT EVALUATION

Figure 6-14 provides a breakdown of which instruments are used to provide data regarding course materials, instruction, instructional environment, and student performance, how the instrument is used, when it's used, and who completes the instrument. Most of the instruments will fall under more than one category. As identified in Figure 6-14, evaluation data for the implement phase is gathered during the course, immediately following the course, and even three months following the course. When reviewing data, keep in mind that all data has to be considered to get a true picture of instruction. Once the data is compiled, it is then compared and analyzed so that trends between classes can be identified. Examples of the following checklists can be found as appendices to MCO 1553.2.

1. **Instructional Rating Form (IRF).** The IRF is a student reaction form to instruction. Common types of feedback revealed by IRFs can be found in Figure 6-12. Information provided by the students can identify areas of strengths and weaknesses in a lesson. However, this should not be the sole indicator of proficiency or effectiveness. For every block of instruction, the IRF is distributed at the beginning of class to, at a minimum, 10 percent of the students. Students are provided time to complete the forms at the end of the class. The school SOP may designate a higher percentage of IRFs to be completed for each class, but it must be at least 10 percent. Students should be informed that IRFs are not restricted to the selected individuals and that anyone in the class can complete an IRF at any time. IRFs provide the student's immediate reaction to the lesson. Specific information regarding a particular lesson may be lost unless data is gathered for each lesson. Data from the IRF is transferred to the After Instruction Report (AIR) where the instructor also makes comments regarding the lesson. The AIR is discussed in detail later in this section and in Chapter 4, Section 4600. Information regarding quantifying and interpreting the results of questionnaires can be found in Section 5302.

Common Types of Feedback from Student Reaction Forms	
Progress with Objectives:	Did the instruction meet the stated learning objectives met?
Class Content:	Did the content make sense?
Instructional Materials:	Were the materials useful?
Pre-Work Materials:	Were the pre-work materials necessary and helpful?
Assignments:	Were the out-of-class assignments helpful?
Methods of Delivery:	Was/Were the method(s) of delivery appropriate for the objectives?
Instructor/Facilitator:	Was/Were the facilitator(s) effective?
Overall Evaluation:	What is your overall rating of the lesson/course?

Figure 6-12. Common types of Feedback from Student Reaction Forms.

2. **End of Course Critiques (ECC)**. Like the IRF, the ECC is also a student reaction form. It provides feedback on the areas listed in Figure 6-14. However, the ECC references the course in broader terms than the IRFs. This particular instrument reveals information on the course as a whole. ECCs should, if possible, be completed by 100 percent of the class. These critiques are completed after the program of instruction is complete. Students that may not have filled out an IRF or ERF during these periods may apply comments on the ECC in the areas of instruction or evaluation. Any information specific to a lesson gathered from the ECC is documented on the AIR for that lesson. The AIR is discussed in more detail later in this section and in Chapter 4, Section 4600. Information regarding quantifying and interpreting the results of questionnaires can be found in Section 5302.
3. **Instructor Evaluation Checklist**. This particular checklist is used when evaluating an instructor. The Instructor Evaluation Checklist critiques the same elements that are evaluated at the Formal School Instructor Course (FSIC), Instructional Management School. FSIC graduates have been taught and evaluated on all of the items of this checklist. The Instructor Evaluation Checklist reflects Marine Corps requirements for FLC instructors to provide standardization of instruction. It covers platform techniques, thorough coverage of the lesson, questioning techniques, communication skills, employment of method/media, and instructor/student interaction. Additional requirements can be added to the checklist by schools, but the requirements should not be modified unless revised and adopted by the Instructional Management School and TECOM. The evaluators of instructors need to be graduates of the FSIC so that they are familiar with the requirements. Information regarding quantifying and interpreting the results of a checklist can be found in Section 5302.
4. **Observation Checklist**. An observation checklist is available to be used by an evaluator who is reviewing a class in session. The class may be in a classroom setting or field setting. This checklist provides a list of items to assist in evaluating course materials, instruction, instructional setting, student interaction, and class exercises. Unlike the Instructor Evaluation Checklist, the focus provided by this checklist is not on the instructor, but rather on class content and effectiveness. This checklist allows an observer to evaluate whether the instruction, student materials, and media follow the lesson plan and materials submitted in the MLF. This checklist allows room for other comments by the observer. Comments may include recommendations to change the method, media, student materials, instructional environment, etc. If the changes are minor, then they may be made immediately. Otherwise, data gathered from the checklist remains as documentation for the next convening Course Content Review Board. Evaluators should be familiar with the program of instruction, graduates of the Curriculum Developers Course (CDC), and graduates of the Formal School Instructor Course (FSIC). The frequency of observations can be determined in the school SOP. Additions can be made to this checklist to meet the needs of an individual school. Information regarding quantifying and interpreting the results of a checklist can be found in Section 5302.

5. **Environment Checklist.** The environment checklist reveals information about physical conditions and training conditions. If training takes place in a classroom environment, then information regarding lighting, noise, classroom setup, ventilation, room temperature, etc., is available through an environment checklist. This checklist can be completed by the instructor prior to the class or by a classroom observer during the class. An environment checklist for training that occurs outside of a classroom can reveal information about setup and availability of equipment, ventilation, noise, facilities, and the overall conditions that training took place under. Safety can be included in the environment checklist to eliminate the additional safety checklist. Information regarding quantifying and interpreting the results of a checklist can be found in Section 5302.
6. **Safety Questionnaire.** The safety questionnaire is distributed to students so that they have an opportunity to assess whether he/she was informed about safety issues. Were students provided ample instructions regarding safety? Was safety emphasized in the instruction? Did the instructor exemplify safety in the training environment? The FLCs SOP may have specific guidelines about how this is assessed. Courses where students are exposed to potentially dangerous situations must ensure that Operational Risk Management (ORM) is referenced. Refer to MCO 3500.27 for more information on ORM. Information regarding quantifying and interpreting the results of a questionnaire can be found in Section 5302.
7. **Safety Checklist.** This checklist is to be completed by the instructor or a qualified observer. The items on the checklist indicate whether the training facility has been set up to present a safe working environment. It can also be used in addition to the observation checklist to provide information on whether the instructor provided ample instructions regarding safety, emphasized safety, and practiced safety in the training environment. Courses where students are exposed to potentially dangerous situations must ensure that Operational Risk Management (ORM) Policy is referenced. Information regarding quantifying and interpreting the results of this questionnaire can be found in Section 5302.
8. **Examination Rating Form (ERF).** Immediately following an examination (performance or written), ERFs are distributed to, at a minimum, 10 percent of the students. Students are advised that these forms will not be viewed until after the students have received their grades for the test. The ERF allows the school to assess the students' perception of a test's suitability and fairness. This does not provide the students with the final say on the validity of the test, nor does it suggest that their judgment is necessarily accurate. However, it does provide the students' reactions to the test providing information that cannot be assessed through mere test scores. This information can be used to adjust confusing questions, instructions, facilities, equipment, etc. The results should be indicated on the After Instruction Report (AIR) of the class teaching the learning objectives tested. The AIR is discussed in detail later in this section and in Chapter 4, Section 4600. Information regarding quantifying and interpreting the results of this questionnaire can be found in Section 5302.

9. **Practical Application/Class Exercises.** Practical application and class exercises are evaluative tools that the instructor(s) use to assess the progress of students. If students are having a particular problem with a practical application or during a class exercise, then it may be necessary to make adjustments in the training schedule (late training day or extra work during lunch) to spend more time on the problem area. This is especially necessary when the course builds on elements learned in previous material. This information needs to be annotated under "Instructor Comments" on the After Instruction Report (AIR) for documentation.
10. **Tests.** During the Course Implementation Stage, pre-test, written examinations, and performance examinations can be given. Each test has a different purpose. This is discussed more in-depth in Chapter 3, Section 3500. Test scores reveal how well an individual in the class performed. Item analysis reveals how well students performed on each item in comparison with the rest of the class. This information should be tracked over time and aids in determining the validity and reliability of the test. Refer to Section 5302 for more information on test analysis and determining the validity and reliability of tests.
 - a. **Pre-Test.** The results of a pre-test can be used for tailoring instruction to the target audience. It can also be used to compare with post-test data to determine if instruction was effective. For instance, if students are unable to perform a task before instruction, but can perform that task after instruction, a general determination can be made as to the effectiveness of instruction. Of course, there are other factors outside of instruction, such as peer teaching and additional reading, that may have attributed to learning.
 - b. **Performance/Written Examinations.** Results from performance and written examinations reveal whether the student has mastered the learning objectives. Test scores can be compared; specific problem items can be identified and linked to specific classes or learning objectives, and defective test items can be identified. Refer to Section 5302 for more information on test analysis.

INSTRUMENTS USED FOR OVERALL COURSE EVALUATION

The instruments discussed above have been specific to course materials, instructor, instructional setting, or student performance. This section will discuss student data forms, after instruction reports (AIR), post-graduate surveys, and site visits normally associated with formal evaluation within the SAT process. Questions that these evaluation instruments can be designed to answer are found in Figure 6-13.

Questions for Course Evaluation	
<input checked="" type="checkbox"/>	Who is represented in the student population?
<input checked="" type="checkbox"/>	Have there been changes to the method of performing the task?
<input checked="" type="checkbox"/>	Are tasks performed differently in the operating forces?
<input checked="" type="checkbox"/>	Is there new equipment or computer programs being used in the operating forces?
<input checked="" type="checkbox"/>	Has the environment changed?
<input checked="" type="checkbox"/>	Are students who pass the test (evaluation) able to perform their job successfully?
<input checked="" type="checkbox"/>	Do supervisors feel confident in the graduates from the FLC?
<input checked="" type="checkbox"/>	Do the students feel confident in the skills taught at the FLC when they get to the operating forces?
<input checked="" type="checkbox"/>	Do graduates of the course believe non-essential instruction is contained in the instructional program?
<input checked="" type="checkbox"/>	Are graduates performing well on the job?
<input checked="" type="checkbox"/>	Are graduates performing better than they did before instruction?
<input checked="" type="checkbox"/>	What tasks are causing graduates difficulty on the job?

Figure 6-13. Questions of Evaluation.

1. **Student Data Form.** Student data will reveal information about the population. This data is generally collected at the beginning of the course. Some of the student data may be available from the Student Registrar module of MCTIMS. A student data form completed by the student reveals background knowledge, computer experience, student expectations, language proficiency, etc. This data can be helpful in determining why students do particularly well or not so well on a test.
2. **After Instruction Report (AIR).** An AIR is a report that consolidates the student reaction, instructor reaction, and test scores into one form so that data analysis can be performed. Refer to Chapter 4, Section 4600 for information on how an AIR is completed.
3. **Post-Graduate Survey.** The post-graduate survey is developed to assess how well the graduate felt that he/she was prepared for his/her job. It can also be developed to find out types of equipment being used, computer programs used, content not covered, suggestions/recommendations, etc. Post-graduate surveys are course specific and sent to graduates approximately 3 months after graduation. For courses with extenuating circumstances where graduates are being delayed from performing the job (e.g., a backlog of obtaining security clearances), the timeframe may be extended up to 120 calendar days after the graduation month. Document the reasons for extending the 90-day timeframe. Surveys can be mailed, emailed, or used for interviewing graduates over the phone or in person.

4. **Site Visit.** Site visits provide the school with an opportunity to visit where graduates from the school will perform their duties. Both interviews and observations can be conducted during a site visit. Environment, work conditions, and equipment can be viewed, while allowing school representatives to conduct interviews with supervisors and graduates. School representatives need to possess a thorough knowledge of the instructional programs related to the site in order to be effective. Additionally, they need to possess knowledge of educational and training principles so that recommendations for improvement to the program can be documented and presented at the next CCRB.
 - a. **Observation.** Observation will reveal the environment that the graduate contends with, how well he/she is able to perform in the environment, how well he/she implements what was taught in the course, and how well what was taught in the course coincides with what is happening in the operating forces. Developing a checklist for use during the observation provides a standard of comparison. When observing graduates, it is recommended to observe recent graduates as well as graduates who have been in the operating forces for a while. This provides the ability to compare what is learned through on-the-job training and the consistency between operating forces and the FLC. Section 5302 provides guidance on how to quantify and interpret data from a checklist. Designing checklists is covered in Section 5604.
 - b. **Interview.** During a site visit, interviews are conducted with supervisors and graduates from the course. Supervisors and graduates will provide different information. Therefore, these interviews should be conducted separately and the evaluation instruments should be developed with the intended audience in mind (graduate or supervisor). Although site visits are ideal for conducting such interviews, interviews can also be conducted over the phone or by email. Refer to Section 5604 for how to prepare for an interview. Section 5302 provides guidance on quantifying and interpreting data.

EVALUATION INSTRUMENTS				
Evaluation Topic	Instrument Used	How Evaluation is Administered	When Conducted	Who Completes Instrument
Course Materials	Instructional Rating Form (IRF)	Instructor distributes at the beginning of each lesson to a percentage (at a minimum, 10%) of students determined by local SOP.	Completed at end of each lesson	Student
	Observation Checklist	Observation checklist is used to review course materials during implementation. Normally completed by sitting in the back of the classroom with all of the paper-based course materials on-hand.	During Lesson	Curriculum Developer Academics
	End of Course Critique (ECC)	Instructor/academics distributes ECC to 100% of the class at the end of the course.	Completed at end of each course	Student
Instructor	Instructor Evaluation Checklist	Instructor is evaluated using the checklist. Normally evaluator sits at the back of the class to minimize distractions.	During Lesson	Academics
	Instructional Rating Form (IRF)	Instructor distributes at the beginning of the class to a percentage (at a minimum, 10%) of students determined by local SOP.	Completed at end of each lesson	Student
	End of Course Critique (ECC)	Instructor/academics distributes ECC to 100% of the class at the end of the course.	Completed at end of each course	Student
	Safety Questionnaire	Instructor distributes questionnaires at beginning of lesson.	Completed at end of lesson	Student
Instructional Environment	Instructional Rating Form (IRF)	Instructor distributes at the beginning of the class to a percentage (at a minimum, 10%) of students determined by local Standing Operating Procedures (SOP).	Completed at end of each lesson	Student
	Observation Checklist	Observation checklist is used to review instructional environment during implementation. Normally completed by sitting in the back of the classroom with all of the paper-based course materials on-hand.	During Class	Curriculum Developer Academics
	Environmental Checklist	Used by instructor to review environment prior to conducting the class. Good device for classroom management. An observer uses this instrument during the class.	Prior to Lesson During Lesson	Instructor Classroom observer

Figure 6-14. Evaluation Instruments

EVALUATION INSTRUMENTS (Continued)				
Evaluation Topic	Instrument Used	How Evaluation is Administered	When Conducted	Who Completes Instrument
Instructional Environment (cont)	Safety Checklist	Instructor/observer completes to ensure that the training facility presents a safe learning environment.	Prior to Class During Class	Instructor Classroom observer
	End of Course Critiques (ECC)	Instructor/academics distributes ECC to 100% of the class at the end of the course.	Completed at end of each course	Student
Student Performance	Examination Rating Form (ERF)	Distributed by instructor after exam is complete to a percentage (at a minimum, 10%) of students. ERFs should not be viewed until after all students have received scores to eliminate any chance of bias during grading.	Immediately Following Exam	Student
	Practical Application/Lesson Exercise	A part of the standard curriculum that provides instructors an opportunity to informally evaluate how well the class is learning the material.	During the Lesson; Determined by Curriculum (approved lesson plan)	Instructor can note observation on the After Instruction Report (AIR) if needed
	Tests	Instructor administers the test in accordance with Program of Instruction (POI) and local Standing Operating Procedures (SOP).	Determined by Curriculum	Student
	End of Course Critiques (ECC)	Instructor/academics distributes ECC to 100% of the class at the end of the course.	Completed at end of each course	Student
Other Data Collected	Student Data Form	Instructor distributes to 100% of students to be completed at beginning of course.	Day one of Course	Student
	After Instruction Report (AIR)	Consolidated report of student reaction, instructor reaction, and test scores. Completed for every class.	Completed after each Lesson	Instructor
Other Data Collected	Post Graduate Survey	Mailed or emailed to 100% of graduates.	3 months after each graduation	Graduate
	Site Visits	Interviews, surveys, and observation checklists can be completed during the site visit.	Anytime	Instructor Curriculum Developer Academics

Figure 6-14. Evaluation Instruments (cont.).

6003. ANALYZE AND INTREPRET DATA

SECTION 3

Evaluations involve data analysis and interpretation to produce meaningful results. Data analysis reduces and combines information to make it easier to make comparisons for drawing conclusions. Interpretation involves making sense of the data so outcomes and relationships can be described, conclusions drawn, and recommendations made concerning any element of an instructional program. The decisions for creating, revising, maintaining, continuing, and improving an instructional program rests with sound data collection methods and thorough data analysis and interpretation. This section takes the evaluator through the steps of organizing, quantifying, interpreting, and summarizing data so that information supporting changes to the POI/MLF/Lesson Plan can be presented in a Course Content Review Board (CCRB). Figure 6-15 provides a diagram showing the process and steps of analyzing and interpreting data.

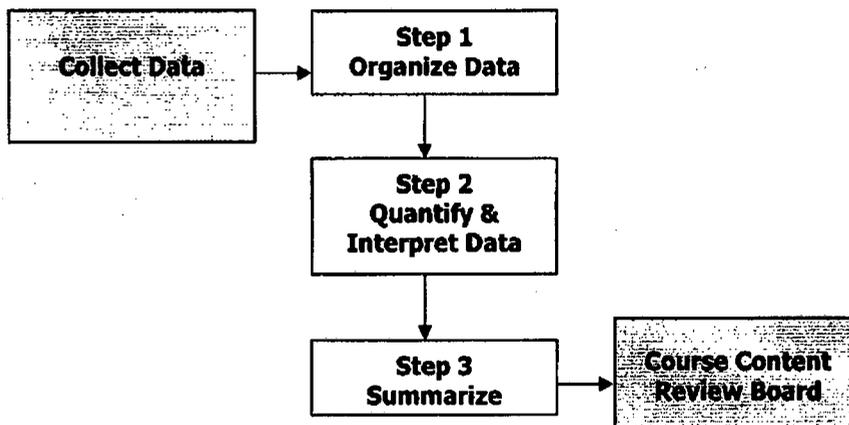


Figure 6-15. Process of Analyzing and Interpreting Data

ORGANIZE DATA

Data must be compiled and organized before it can be analyzed and interpreted. The focus of the evaluation will guide what data should be compiled. Data needs to be organized by topic. The organization of the data will depend upon the questions that need to be answered. For example, an evaluator might organize data into topics of "Course Data," "Instructor Data," "Student Performance Data," etc. Figure 6-14 at the end of Section 5200 identifies the instruments that provide information for each of the categories. Organizing the compiled data into topic areas further isolates data pertaining to the questions that need to be answered. Data is also organized so that categories can be established for data comparison.

ESTABLISH CATEGORIES FOR DATA COMPARISON

Determinations must be made regarding what comparisons will need to be made to provide meaning to the data. It is necessary to determine which comparisons will provide results that can reliably identify both strong and weak areas within the training program. Evaluators should compare data from several different sources. Categories are established for data comparisons so that these comparisons can be made when interpreting data. Such comparisons will minimize decisions being made based upon one data source. Some examples of possible comparisons that can be made are in Figure 6-16.

Figure 6-16. Examples of Possible Comparisons.

Examples of Possible Comparisons	
<input checked="" type="checkbox"/>	Percent of students accomplishing an objective with a previously established standard or with performance of previous classes on the same objective.
<input checked="" type="checkbox"/>	Job performance data with class performance data.
<input checked="" type="checkbox"/>	Job performance before and after attending instruction.
<input checked="" type="checkbox"/>	The frequency of responses on different Instructional Rating Form (IRF) items, on different test items, or within multiple-choice items.
<input checked="" type="checkbox"/>	Student opinions about the course with their test performance.
<input checked="" type="checkbox"/>	Student comments about the course with those of the school staff.
<input checked="" type="checkbox"/>	Final test scores between 2 classes.
<input checked="" type="checkbox"/>	Number of remedial instruction sessions per iteration of the course over a period of a year or more.

QUANTIFY AND INTERPRET DATA

Quantifying data is systematically assigning numbers to data allowing statistical analysis to be performed so that trends and relationships can be identified and interpreted. Through quantifying the data, the interpretation of data is possible. For test items, item analysis is used to quantify data so that defective test items are identified. Another way that data is quantified and interpreted is through descriptive statistics. Some of the data may need to be coded prior to performing statistics. In these cases, it is important to understand the scales of measurement: nominal, ordinal, interval, and ratio. The scales of measurement provide an understanding of what statistical procedures can be performed for different types of instruments. Item analysis, descriptive statistics, and assigned numbers allow the evaluator to pinpoint trends. Trends can be defined as a pattern or prevailing theme. These trends can reveal strengths and weaknesses within the instructional program. Interpreting data also involves analyzing the test results for validity and reliability. This section will discuss what an evaluator is looking for in the test results to find out if the test is valid and reliable. The use of computer programs can make the process of data interpretation an easier task. Data must be interpreted to identify the problems so that recommendations can be made and solutions generated.

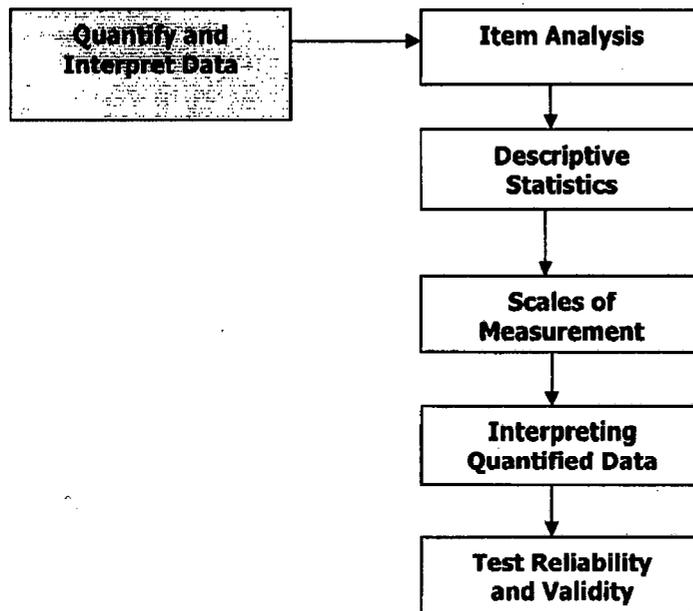


Figure 6-17. Quantify and Interpret Data.

ITEM ANALYSIS

Item analysis provides information about the reliability and validity of test items. Reliability and validity are discussed later in this section. There are two purposes for doing an item analysis. First, the analysis identifies defective test items. Secondly, it indicates areas where learners have not mastered the learning objective(s). Through item analysis, trends are identified as far as which test items are problematic. An example of one way to determine item difficulty and item discrimination can be found in Figure 6-18.

1. **Item Difficulty**. The frequency of students who answered an item correctly determines the level of difficulty. For example, if 45 of 50 students answer an item correctly, then the level of difficulty is low (.90) since 90 percent were able to answer correctly. However, if 10 out of 50 students answer correctly, then the level of difficulty is high (.20). The Individual Response Report in the Student Evaluation module of MCTIMS provides the number and percentage of students who answered each item correctly. This makes it easy to determine the level of difficulty of an item through percentages. The difficulty index is calculated below.

Difficulty Index (p). Proportion of students who answered item correctly.

$$p = \frac{\text{Number of students selecting correct answer}}{\text{Total number of students attempting the test item}}$$

$$p = \frac{45}{50} = .90$$

When Difficulty Index (p level) is less than about .25, the item is considered relatively difficult. When Difficulty Index (p level) is above .75, the item is considered relatively easy. Test construction experts try to build tests with an **average** p level (difficulty) of about .50 for the test.

2. **Item Discrimination**. A percentage of high-test scorers (U) are compared to a percentage of low-test scorers (L) to determine how both groups of test scorers performed on the same item. To perform item discrimination, a percentage of high-test scorers and low-test scorers must be designated. (Example: Compare the top 10% test scorers to the bottom 10% test scorers who answered the test item correctly.) If a high percentage from both groups missed the item, then more extensive evaluation of the test item and/or instructional process is needed.

Item Discrimination Index (D). Measure of the extent to which a test item discriminates or differentiates between students who perform well on the overall test and those who do not perform well on the overall test.

$$D = \frac{(\text{Number who got item correct in upper group}) - (\text{Number with item correct in lower group})}{\text{Number of students in either group}}$$

Some experts insist that D should be at least .30, while others believe that as long as D has a positive value, the item's discrimination ability is adequate.

There are three types of discrimination indexes:

- a. **Positive discrimination index** - those who did well (U) on the overall test chose the correct answer for a particular item more often than those who did poorly (L) on the overall test.
- b. **Negative discrimination index** - those who did poorly (L) on the overall test chose the correct answer for a particular item more often than those who did well (U) on the overall test.
- c. **Zero discrimination index** - those who did well (U) and those who did poorly (L) on the overall test choose the correct answer for a particular item with equal frequency.

Item	U (10 stu)	M (10 stu)	L (10 stu)	Difficulty (U + M + L)	Discrimination (U-L)
1	7	4	3	14	4
2	10	10	9	29	1
3	8	6	4	18	4
4	4	4	6	14	-2
5	6	7	6	19	0
6	8	7	4	19	4
7	3	0	0	3	3
8	10	7	5	22	5
9	1	2	8	11	-7
10	8	5	3	16	5

Figure 6-18. Item Analysis: Number of Learners Giving Correct Response in Each Criterion Group.

The table above shows a simple analysis using a percentage of 33 percent to divide a class into three groups – Upper (U), Middle (M), and Lower (L). For instance, if you have a class of 30 students, then the students would be divided by test scores into the following groups: 10 (U) students (33 percent), 10 (M) students (33 percent), and 10 (L) students (33 percent).

Using the above table, a measure of item difficulty is obtained by adding Upper (U) + Middle (M) + Lower (L). The difficulty index for item 2 is found by dividing 29 by 30 equaling .97 (97% of students answered correctly). Either the material is covered extremely well in the class or the question does not have convincing distracters. MCTIMS' Individual Response Report provides a look at the distracters and is discussed in the next section. On item 7, 3 students answered the question correctly. This is an Indicator that the material has not been covered adequately, the test question is poorly written, or answer is miskeyed.

A rough index (ratio) of the discriminative value (Upper test scorers compared to the Lower test scorers) of each item can be provided by subtracting the number of individuals answering an item correctly in the Lower (L) group from the number of individuals answering an item correctly in the Upper (U) group (Ex: U-L). Negative numbers indicate that there were more students from the Upper (U) group who missed the question. Positive numbers indicate that more students in the Lower (L) group missed the item. Zero indicates that there was no difference between the Upper (U) group and the Lower (L) group.

1. **Frequency of Collection.** Descriptive statistics should be calculated every time a test, questionnaire, survey, etc., is administered. Even if these data are not used immediately to summarize results in a report or to provide feedback to respondents, these data can be useful for future analysis to identify trends or relationships among groups.
2. **Types of Descriptive Statistics.** This section presents information and detail concerning descriptive statistics.
 - a. **Frequency.** Frequencies are determined by counting the number of occurrences. As example in Figure 6-20, the score 75 has a frequency of 3 because it occurs 3 times. Frequency counts are used to describe data (e.g., responses, scores, factors, variables) in raw numbers. Arranging variables into a frequency distribution makes the description of the variables easier than it would be if the scores were just listed in order. To illustrate, Figure 6-20 presents ten scores on a test and the same ten scores listed in a frequency distribution below.

Uses. Frequency counts are useful for counting the number of students who took a particular test, the number of students who passed a particular test, the number of students who selected answer A on item 13 of a test, the number of people who responded to a survey questionnaire, the number of people who rated an instructional program as effective, etc.

Figure 6-20. Frequency Distribution.

FREQUENCY	
Test Scores: 75, 75, 85, 90, 60, 65, 65, 75, 100, 85	
Frequency Distribution	
Score	Frequency
100	1
90	1
85	2
75	3
65	2
60	1

Appropriate Scale of Measurement. Frequency counts can be performed on data represented by nominal, ordinal, interval, and ratio scales (Scales of Measurement will be discussed in detail later in this section).

Graphic Representation. Frequency distribution data can be readily interpreted by the use of graphs.

- (1) The simplest graph, known as a frequency polygon, involves representing the frequency count (expressed in raw numbers or by percent) on the Y-axis (vertical). Test scores should be divided into equal intervals and plotted on the X-axis (horizontal). Using the data in Figure 6-20 and grouping the test scores in three intervals, Figure 6-21 displays the frequency distribution in graphic form. A frequency polygon is useful for displaying data within a group or data across groups. An example of data within a group is student scores on a test. Subsequent class scores can be plotted on the same graph to display data across groups.

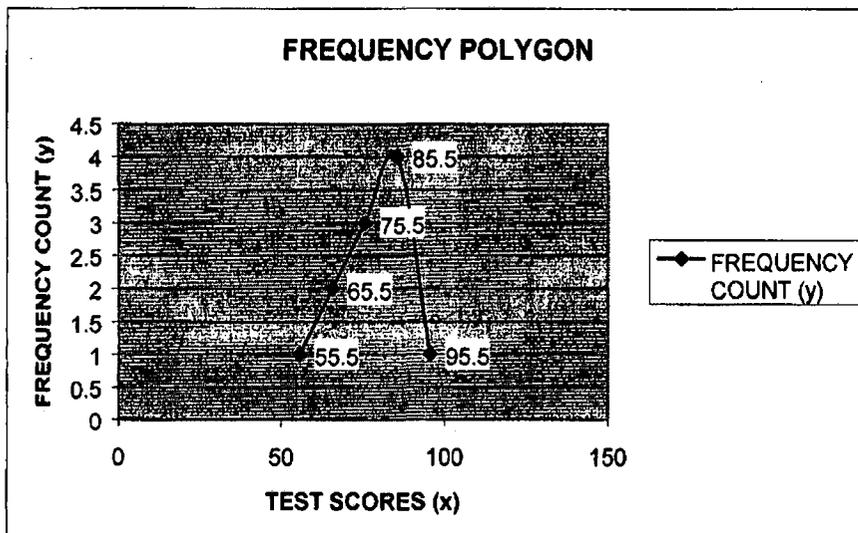
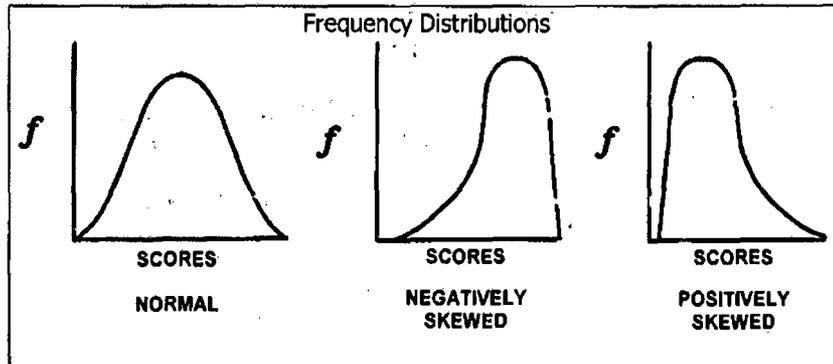


Figure 6-21. Frequency Polygon.

- (3) Figure 6-22 presents different frequency distributions in graphic form. A frequency distribution is said to be "normal" when it represents a bell-shaped curve. It is important to graph data to see if it is "normal" before performing any statistical analyses. A frequency distribution in which scores trail off at either the high end or the low end of the spectrum is said to be skewed. Where these scores trail off is referred to as the "tail" of the distribution. If the tail of the distribution extends toward the low or negative end of the scale, the distribution is considered negatively skewed; if the tail extends toward the high or positive end of the scale, the distribution is positively skewed.

Figure 6-22. Frequency Distributions.



b. **Measures of Central Tendency.** While frequency distributions typically represent a breakdown of individual scores or variables among many, it is often useful to characterize a group as a whole. Measures of central tendency are measures of the location of the middle or the center of a distribution. The definition of "middle" or "center" is purposely left somewhat vague so that the term "central tendency" can refer to a wide variety of measures. Three measures of central tendency are the mode, median, and mean. The mean is the most commonly used measure of central tendency. Figure 6-23 provides a description and sample of how to determine each.

Figure 6-23. Measures of Central Tendency.

Measures of Central Tendency	
Mode	The mode is the most frequently occurring response or score. Sample Test Scores: 52, 78, 85, 88, 90, 93, 93, 100 Mode = 93 NOTE: More than one mode can exist in a set of data.
Median	The median is the score above and below which 50 percent of the scores in the sample fall. It is sometimes referred to as the "breaking point." 1. Place numbers in order from least to greatest. 2. If number of scores is even, then the median is the central number or midpoint. 3. If number of scores is odd, then add the two middle scores and divide by two. Sample Test Scores: 52, 78, 85, 88, 90, 93, 93, 100 $88+90=178/2=89$ Median = 89
Mean	Mean is the "average" score. Sample Test Scores: 52, 78, 85, 88, 90, 93, 93, 100 $52+78+85+88+90+93+93+100 = 679/8 = 84.875$ Mean = 84.875

Figure 6-24 provides the scales of measurement (to be discussed next), the data types (i.e., test items, questionnaires), and how the measures of central tendency can be used for each.

- (1) **Mode.** As the most frequently occurring response, mode is simple to compute. The mode is not affected by extreme values. However, it is usually not very descriptive of the data so it is important that other measures of central tendency are used to describe the data.
 - A. Mode is useful for determining what most students score on a given test or test item.
 - B. Mode is particularly useful for determining what response most students select in a multiple-choice test item, thereby allowing analysis of the item's ability to clearly discriminate between correct and incorrect responses (a good multiple-choice test item has a clear "correct" response and several plausible distracters).
- (2) **Median.** Median is useful for splitting a group into halves. The median is the middle of a distribution; half the scores are above the median and half are below the median. The median is less sensitive to extreme scores than the mean and this makes it a better measure than the mean for highly skewed distributions. For example, the median income is usually more informative than the mean income.
 - A. The median is not affected by extreme values and it always exists.
 - B. Though median is easy to compute, the numbers must be properly ordered to compute the correct median.
- (3) **Mean.** Mean is the "average."
 - A. Mean is calculated to produce an average response per test item across a class or to produce an average response per respondent.
 - B. Mean is also useful for determining overall attitudes toward a topic when using a Likert rating scale. For example, using a five-response Likert scale, a student rates the overall effectiveness of a course by answering 20 questions concerning course content, instructor performance, use of media, etc. The value circled for each response can then be summed for a total score. This score is then divided by the number of questions (20) to come up with the mean. In this case, the mean is a total rating of course effectiveness.

C. Mean is generally the preferred measure of central tendency because it is the most consistent or stable measure from sample to sample. The mean is good measure of central tendency for roughly symmetric distributions but can be misleading in skewed distributions since it can be greatly influenced by extreme scores. For example, ten students score the following: 20, 86, 88, 94, 92, 90, 40, 88, 76, and 83. Although the mean is 76, it hardly reflects the typical score in the set. Mode or median may be more representative of that group's performance as a whole. When the distribution of scores is widely dispersed, median is the most appropriate measure of central tendency. For example, if five students achieved test scores of 60, 65, 70, 72, and 74, and three students achieved scores of 90, 95, and 100, the overall class score should be reported as a median score. Since the scores achieved by the second group of students are much higher than those of the first group, calculating a mean score would inflate the value of the scores achieved by the lower scoring group. In this example, the mean score is 78, while the median score is 73. When a distribution is extremely skewed, it is recommended that all three measures be reported and the data be interpreted based on the direction and amount of skew.

Figure 6-24. Type of Data Measured By Central Tendency.

Measure of Central Tendency	Measurement Scale	Instrument Type	Type of Data Measured
Mode	Nominal Scale	Student Data Test Data Questionnaires Interview	Most frequent score Most frequent answer
Median	Ordinal Scale Interval Scale Ratio Scale	Test Data	Useful for splitting groups in halves i.e. Mastery and Non-Mastery
Mean	Ordinal Scale	Test Data Questionnaires Interview	Avg. response per test item Avg. response per respondent Overall attitudes toward topic/total rating of course effectiveness
	Interval Scale Ratio Scale	Test Data Questionnaires Interview	Allows comparisons of individuals to overall class mean (test scores, responses to particular items)

c. **Variability.** The variability of a set of scores is the typical degree of spread among the scores. Range, variance, and standard deviation are used to report variability.

(1) **Range.** Range is the difference between the highest and the lowest scores in the set. Range is typically not the best measure of variability because it is dependent upon the spread in a set of scores, which can vary widely. For example, 10 students take a test and score as follows: 100, 92, 94, 94, 96, 100, 90, 93, 97, and 62. The range of scores varies from 100 to 62 so the range is 38 (100-62 = 38). If the lowest score were dropped, the range would be 10 (100-90 = 10), which more accurately reflects the sample. Range serves as a rough index to variability and can be useful to report when the mean of a set of scores is not really representative due to a wide ranging of scores.

(2) **Variance.** Variance is a more widely accepted measure of variability because it measures the average squared distance of the scores from the mean of the set in which they appear. An example of how to determine variance from a population is shown in Figure 6-25. The variance (136) is the average of the squared deviation of the scores and is used to calculate standard deviation, which is the most widely accepted measure of variability.

Student Scores (X)	X-Mean	(X-Mean) ²
100	100-88 = 12	144
90	90-88 = 2	4
70	70-88 = -18	324
80	80-88 = -8	64
<u>100</u>	100-88 = 12	<u>144</u>
440		680

Number of Scores = 5

Mean = $\frac{\sum X}{\text{Number of Scores}} = \frac{440}{5} = 88$

Variance = $\frac{\sum (X-\text{Mean})^2}{\text{Number of Scores}} = \frac{680}{5} = 136$

Standard Deviation = $\sqrt{136} = 11.7$

Figure 6-25. Variance and Standard Deviation of Test Scores.

- (3) **Standard Deviation.** Standard deviation is the square root of the variance for a set of variables. Standard deviation can reflect the amount of variability among a set of variables, responses, characteristics, scores, etc. In Figure 6-25, the variance score is 136. When the square root of 136 is taken, the standard deviation is 11.7. This means that the average distance of the students' scores from the class mean is 11.7. As another example, the mean score on a test is 70 with a standard deviation of 10. Thus, the average amount students deviated from the mean score of 70 is 10 points. If student A scored a 90 on the test, 20 points above the mean score, we interpret this as a very good score, deviating from the norm twice as much as the average student. This is often referred to as deviating from the mean by 2 standard deviation (SD) units (z score or standard score). If student B scored a 30 on the test, 40 points below the mean score, we interpret this as a very bad score, deviating from the norm four times as much as the average student.

SCALES OF MEASUREMENT

Scales of measurement specify how the numbers assigned to variables relate to what is being evaluated or measured. It tells whether a number is a label (nominal), a ranking order (ordinal), represented in equal intervals (interval), or describing a relationship between two variables (ratio). The type of measurement scale used affects the way data is statistically analyzed. Scales of measurement represent the varying degree of a particular variable. Figure 6-30 provides the types of statistical analysis that can be performed for different instruments using the scales. Sample questions illustrating the use of the following scales can be found in Section 5604, Design Evaluation Instruments.

1. **Nominal Scale.** A nominal scale measurement is simply a classification system. For instance, observation data can be labeled and categorized into mutually exclusive categories. Nominal numbering involves arbitrarily assigning labels to whatever is being measured. Assigning a 1 to a "yes" response and a 0 to a "no" response is an example of nominal numbering; so is assigning a 1 to "male" respondents and a 0 to "female" respondents. Quantification of data by nominal numbering should be done only when an arbitrary number is needed to distinguish between groups, responses, etc. Characteristics of a nominal scale are listed in Figure 6-26.

Characteristics of a Nominal Scale

- ☑ Characterized by a lack of degree of magnitude. In other words, assigning a 1 to a variable does not mean that it is of a greater value than a variable assigned a 0. Using the example below, answering "yes" is not of greater value than answering "no." The numbers serve only to distinguish among different responses or different characteristics.
YES = 1
NO = 0
- ☑ Does not reflect equal intervals between assigned numbers. For example, the numbers distinguishing the military branches are just data labels.
Air Force = 1
Army = 2
Navy = 3
Marine Corps = 4
- ☑ Does not have a true zero; because a variable is assigned a 0 does not mean that it lacks the property being measured. Using the example below, assigning the number "0" to those who answered female on a student data sheet does not mean that the participant lacks gender.
MALE = 1
FEMALE = 0

Figure 6-26. Characteristics of a Nominal Scale.

Figure 6-27.
Characteristics of Ordinal Scale.

2. **Ordinal Scale.** The ordinal scale permits a "ranking" between values. Differences cannot be "quantified" between two ordinal values. A Likert scale is an example of an ordinal scale. For example, rating the effectiveness of instruction from 1 (Ineffective) to 5 (very effective) permits comparisons to be made regarding the level of effectiveness; a larger number indicates more of the property being measured. Characteristics of an ordinal scale are listed in Figure 6-27.

Characteristics of an Ordinal Scale				
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5
<input checked="" type="checkbox"/> Degree of magnitude exists in ordinal numbers because each higher rating indicates more of the property being measured. Above, the level of agreement is being measured. A 5 indicates a higher level of agreement than a 2.				
<input checked="" type="checkbox"/> Equal intervals do not exist between ordinal numbers. For example, a rating of a 4 in the above example is not twice as effective as a rating of 2. Numbers used in an ordinal scale should not be added or multiplied because this can produce misleading results [i.e., two ratings of 2 (disagree) do not equal a single rating of 4 (agree)]. A 4 means something totally different than a 2.				
<input checked="" type="checkbox"/> There is no true zero in an ordinal scale. In the above example, it is meaningless to assign a 0 to a variable to indicate a lack of effectiveness because a rating of 1 indicates "ineffective."				

3. **Interval Scale.** Interval numbering allows comparisons about the extent of differences between variables. For example, on test X, student A scored 20 points higher than student B. An example of an interval numbering system is a response to a question asking the respondent's age, the number of years in grade, etc. Characteristics of an interval scale are listed in Figure 6-28. This will help the evaluator determine when to quantify data using an interval scale.

Figure 6-30.
Characteristics of Interval Scale.

Characteristics of an Interval Scale
<input checked="" type="checkbox"/> Degree of magnitude exists in interval numbers because each higher rating indicates more of the property being measured. For example, a score of 95 is better than a score of 90 on a test.
<input checked="" type="checkbox"/> Equal intervals exist between interval numbers. For example, 30 years in service is 10 more years than 20 years in service, which is 10 more years than 10 years in service.
<input checked="" type="checkbox"/> There is no true zero in an interval scale. Temperature is an example because temperatures can dip below 0 degrees and a temperature of 0 degrees does not indicate an absence of temperature.

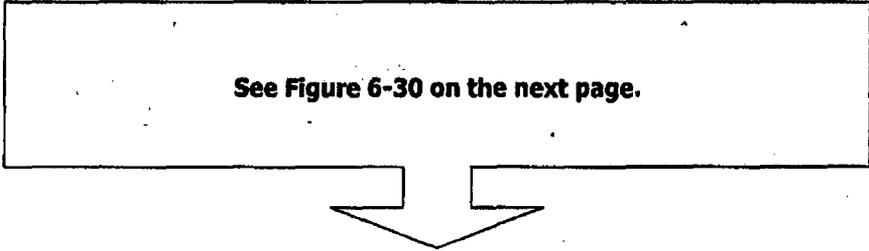
4. **Ratio Scale.** A ratio scale has equal intervals and a meaningful zero point. Point values assigned to responses to score a test is an example of a ratio scale. Ratio numbering permits precise relationships among variables to be made. For example, student A received a score of 40 on the test, which is twice as good as student B's score of 20. Characteristics of a ratio scale are listed in Figure 6-31. This will help the evaluator determine when to quantify data using a ratio scale.

Characteristics of a Ratio Scale	
<input checked="" type="checkbox"/>	Degree of magnitude exists in a ratio numbering scale. Test scores are an example of a ratio scale illustrating degree of magnitude (e.g., a score of 80 is better than a score of 70).
<input checked="" type="checkbox"/>	Equal intervals exist on a ratio numbering scale (e.g., a score of 90 is twice as good as a score of 45).
<input checked="" type="checkbox"/>	A true zero exists in a ratio numbering scale (e.g., a score of 0 indicates no score). A ratio numbering system is typically used to quantify pass/fail data on a performance checklist, with "pass" quantified by a 1 and "fail" quantified by a 0.

Figure 6-31. Characteristics of a Ratio Scale.

**GUIDE TO QUANTIFYING DATA TO PERMIT STATISTICAL
ANALYSIS**

The following is presented to aid the evaluator in quantifying data and selecting appropriate statistical analyses based on the evaluation instrument being used (see Figure 6-30).



See Figure 6-30 on the next page.

GUIDELINES FOR QUANTIFYING DATA TO PERMIT STATISTICAL ANALYSIS				
Evaluation Instrument	Scale of Measurement	Examples of Qualifying Data	Statistical Analyses That Can Be Performed	Statistical Analyses That Cannot Be Performed
Multiple-choice Test Item	Nominal	A = 1, B = 2, C = 3, D = 4, etc.	Frequency counts of responses per test item Mode (most frequently selected responses per test item) Item Analysis (when used in conjunction with a ratio scale)	Mean (average response per test item or per student) Median Overall test score per student Variability (range, variance, standard deviation)
	Ratio	Point system: 1 = correct answer 0 = incorrect answer	Frequency counts for correct/incorrect responses <input checked="" type="checkbox"/> Per test item <input checked="" type="checkbox"/> Per student Mean (calculated to produce item difficulty) Median (score for overall test which splits class in half) Item analysis (but cannot determine where problem lie) Overall test score per student Variability of overall test scores	Frequency counts for all incorrect responses (distracters) Mean (average response per test item or per student) Mode (most frequently selected response per test item) Variability of responses per test item
True/False Test Item	Ratio	Point system: 1 = correct answer 0 = incorrect answer	Frequency counts for correct/incorrect responses <input checked="" type="checkbox"/> Per test item <input checked="" type="checkbox"/> Per student Mean (calculated to produce item difficulty) Median (score for overall test which splits class in half) Item analysis Overall test score per student Variability of overall test scores	Mean (average response per test item or student) Mode (most frequently selected response per test item)
Fill-in-the-blank Short-Answer Test Item	Ratio	Point system: Points for correct response and partial credit	Frequency counts of responses <input checked="" type="checkbox"/> Per test item <input checked="" type="checkbox"/> Per student Mean score per test item and per student Mode (most frequently scored points per test item) Median (score for overall test which splits class in half) Preliminary item analysis Overall test score per student Variability of overall test scores and points scored per test item	

Figure 6-30. Guidelines for Quantifying Data to Permit Statistical Analysis.

GUIDELINES FOR QUANTIFYING DATA TO PERMIT STATISTICAL ANALYSIS (cont.)				
Evaluation Instrument	Scale of Measurement	Examples of Qualifying Data	Statistical Analyses That Can Be Performed	Statistical Analyses That Cannot Be Performed
Fill-in-the-blank/Short-Answer Test Item (cont.)	Ratio (cont.)	Point system: 1=correct answer 0=incorrect answer	Frequency counts of correct/incorrect responses <input checked="" type="checkbox"/> Per student <input checked="" type="checkbox"/> Per test item Mean (calculated to produce item difficulty) Median Preliminary item analysis Overall test score per student Variability of overall test scores	Frequency counts for all incorrect responses Mean (average response per test item or per student) Mode (most frequent response per test item) Variability of responses per test item
	Nominal	Categorize responses and assign a number to each response	Frequency counts of all responses per test item Mode (most frequently occurring response) Item analysis	Mean (average response per test item or per student) Median Overall test score per student Variability of responses per test item
Performance-Based Test Item	Ratio	Point system: 1=pass 0=fail	Frequency counts of pass/fail <input checked="" type="checkbox"/> Per student <input checked="" type="checkbox"/> Per test item Mean (calculated to produce item difficulty) Median Preliminary item analysis Overall test score per student Variability of overall test scores	Mean (average response per test item or per student) Mode (most frequent response per test item) Variability of outcomes per test item

Figure 6-30. Guidelines for Quantifying Data to Permit Statistical Analysis (cont.).

GUIDELINES FOR QUANTIFYING DATA TO PERMIT STATISTICAL ANALYSIS				
(cont.)				
Evaluation Instrument	Scale of Measurement	Examples of Qualifying Data	Statistical Analyses That Can Be Performed	Statistical Analyses That Cannot Be Performed
Interview/ Survey Questionnaire	Nominal	Categorize responses and assign a number to each response	Frequency counts of responses per item Mode (most frequently occurring response) Variability of responses per item	Frequency counts per student Mean response per item and per student Median
	Ordinal	Likert scale	Frequency counts of responses per item Mean response per item Mean response per student (assuming scale is same throughout survey) Median (response per item which splits respondent group in half) Mode (most frequently occurring response per item) Variability of responses per item	
	Interval	Response serves as the code when response is numerical (e.g., age, years in service)	Frequency counts of responses per item Mean response per item Median (response per item which splits respondent group in half) Mode (most frequently occurring response) Variability of responses per item	Mean response per student

Figure 6-30. Guidelines for Quantifying Data to Permit Statistical Analysis (cont.).

INTERPRETING QUANTIFIED DATA

1. **Multiple-Choice Test Item.** Both nominal and ratio scales can be used for multiple-choice test items. Using these scales to analyze multiple-choice test items is explained below.

a. **Nominal Scale.** Labels are assigned to different responses. For example, in a 4-choice item, answer "a" is coded as 1, answer "b" as 2, answer "c" as 3, and answer "d" as 4.

(1) A nominal scale permits frequency counts, mode, and item analysis of individual test items to be performed. Figure 6-34 presents data from three students who took the same 10-item test and their responses to each question. Next to each response is the number assigned to categorize the response (an asterisk indicates an incorrect response). Nominal numbers can be added across test items to calculate frequency counts (e.g., two out of three students selected response "a" on test item 1; all three students selected response "b" on test item 2). Mode can be determined for an item by looking for the most frequently occurring response an item (e.g., the mode for test item 1 is "a").

Figure 6-31. Student Test Data.

Test Item	Student #1	Student #2	Student #3
1.	a 1	*d 4	a 1
2.	b 2	b 2	b 2
3.	*a 1	*d 4	*b 2
4.	c 3	c 3	*a 1
5.	d 4	d 4	d 4
6.	a 1	a 1	a 1
7.	b 2	*d 4	b 2
8.	d 4	*a 1	d 4
9.	c 3	c 3	c 3
10.	d 4	d 4	d 4

(2) Nominal numbers cannot be summed to provide an overall score on the test for each student because a nominal scale only assigns labels to responses and does not reflect degree of magnitude (a higher score does not reflect a better score). In Figure 6-31, it would be incorrect to sum the coded responses to provide an overall score of 25 for student #1, 30 for student #2, and 24 for student #3. In actuality, student #1 performed the best with only 1 incorrect answer, student #3 performed second best with two incorrect answers, and student #2 had four incorrect answers.

- (3) A nominal scale cannot be used to calculate mean, median, or variability (range, variance, and standard deviation) because these data are meaningless in this context. For example, in Figure 6-34, a calculated mean or average response to test item #1 $[(1 + 4 + 1) \text{ divided by } 3 = 2]$ is meaningless because it would reflect that the average response to item #1 is "b." It would also be incorrect to calculate a mean by, for example, adding student #1's scores for each item and dividing by the number of items (25 divided by 10) to produce a mean response of 2.5. To interpret this would mean that the average response is halfway between a response of "b" and a response of "c," which is a meaningless calculation.
- b. **Ratio Scale.** A ratio scale can be used in conjunction with a nominal scale when quantifying responses to multiple-choice test items or it may be used as the only means of quantifying the data.
- (1) If an evaluator is solely interested in how many questions a student answers correctly, a simple scoring system is needed to count the number of correct and incorrect responses so a total score for the test can be calculated for each student. To do this, multiple-choice test items can be quantified using a ratio scale (e.g., 1 point is given to each correct answer and a 0 is given to each incorrect answer). This numbering system permits some frequency count data to be gathered (e.g., 22 of 50 students answered test item #1 correctly), but it does not permit frequency counts to be made across responses. This is because every incorrect response is assigned a 0, making it impossible to discern how many students selected any response other than the correct response. This numbering system permits preliminary item analysis to be performed (e.g., determining the percentage of students who got the answer right and those who did not), but it does not permit further item analysis to determine the item difficulty level of each response.
- (2) The evaluator can code the data using a ratio scale by assigning point values for correct responses and no points for an incorrect response. This allows the calculation of an overall test score per student by summing the point values for each question. A median (i.e., score for overall test which splits the class in half) can also be calculated, as can the variability of overall test scores.

- (3) A ratio scale can also enable the calculation of mean to produce item difficulty rating. When responses are quantified with either of two numbers (e.g., 0 and 1), the evaluator can sum the responses to get a frequency count. The frequency counts relate to the number of correct and incorrect answers. The frequency count is then used to calculate item difficulty. Item difficulty is calculated by dividing the number of students who got the item correct by the total number of students taking the test. Therefore, if 20 students answered a test item correctly and five answered incorrectly, the item difficulty would be .80.

$$\frac{\text{\# of Students Who Answered Correctly} = 20}{\text{\# of Students Taking the Test} = 25} = .80$$

- (4) Quantifying data using a ratio scale does not, however, permit calculation of a mean response per student or per test item. Variability is not calculated for the same reason.
- (5) Mode (i.e., most frequently selected response per test item) is not calculated when using a ratio scale on a multiple-choice test item. This is because test data are coded as incorrect or correct rather than labeling all of the responses as is done with a nominal scale.
2. **True/False Test Items.** A true/false test item is typically quantified using a ratio scale (1 point for a correct response 0 points for an incorrect response). This allows frequency counts, mean (calculated to produce item difficulty), median (overall test score that splits the class in half), an overall test score per student, and variability of overall tests scores to be calculated. However, a mean response per test item or per student and a mode cannot be calculated because the actual response of "true" or "false" is not quantified; the correctness of the answer is.
3. **Fill-in-the-Blank and Short-Answer Test Items.** Fill-in-the-blank and short-answer test items can be quantified using a ratio scale and a nominal scale.
- a. One method for quantifying this type of data is to devise a scoring system so that answers are given points based on the "correctness" of the response. This is typically done by creating an answer key that details the levels of acceptable responses to each question. For instance, a test question may require the student to list, in order, the seven essential qualities of leadership. The answer key may be established so that the student receives 1 point for each correct quality listed and another 3 points if they are listed in correct order. This creates a scale of measurement that ranks performance on each item by the response's level of correctness. This is a good scale of measurement if there is some flexibility in the answers so that partial credit may be given to some information.

- (1) This type of scoring system permits frequency counts of responses per test item and per student, a mean score per test item, a mode (most frequently scored points) per test item, a median test score that splits the class in half, preliminary item analysis, an overall test score per student, the variability (range, variance, and standard deviation) of overall test scores, and the variability in the point spread among students per their overall test scores and per test item.
 - (2) Item difficulty and item discriminability may be calculated per test item to determine the percentage of students who answered correctly and the percentage who did not. However, an analysis of responses to determine if students responded incorrectly, but in similar ways, cannot be performed. For instance, it may be useful to know that students who missed a particular test question all responded with the same "wrong" answer. These data would help determine if the question was worded poorly so that it may be reworded in the future to remove any uncertainty or misinterpretation of its meaning. This can only be accomplished through use of a nominal scale.
- b. Another ratio scale involves establishing a scale of measurement with equal intervals and a true zero. Unlike the previous example where each response is keyed to a point system that may or may not be the same for each response, this method uses a point system that is the same for all responses. Such a system may be as simple as assigning a 1 to a correct response and a 0 to an incorrect response. This scale of measurement is only useful if there is a clearly defined correct and incorrect response for the item. This scoring system permits the same statistical analyses to be performed that a ratio scale for a multiple-choice test item permits.
 - c. Fill-in-the-blank and short-answer test items can also be quantified using a nominal scale, although this can be time consuming. To quantify data using a nominal scale, the responses must first be categorized into same or like responses. This can be difficult if the responses in the group vary greatly. If the responses can be categorized, the data are then quantified by assigning a number to each category through use of a nominal scale. Frequency counts, mode, and item analysis can be calculated. Mean (i.e., average response per test item or per student), median, an overall test score per student, and variability cannot be calculated.
4. **Performance-Based Test Items.** Performance-based test items are typically pass/fail items quantified as either a 1 (pass) or a 0 (fail). This scoring system permits the same statistical analyses to be performed that a ratio scale for a multiple-choice test item permits.

5. **Interview Data/Survey Questionnaires.** Interview data and survey questionnaires are structured to collect data through fill-in-the-blank/short-answer questions, multiple-choice items, and Likert rating scales.

a. **Nominal**

(1) **Fill-in-the-Blank/Short-Answer Response.** Survey and interview data of this nature can be difficult to quantify because they require a subjective judgment by the evaluator to categorize responses into meaningful groups of like responses. Unlike test data, survey and interview data are not quantified by "points" that can be added up for a total score but, rather, by using numbers to assign labels to responses (nominal scale). The difficulty lies in grouping the responses because an open-ended question can produce a multitude of different responses. For example, Figure 6-32 presents an open-ended question. Just below the question are the categories of responses identified during analysis of the test. The responses should be categorized into the smallest number of groups possible. In this example, all responses were easily categorized into one of five groups and quantified accordingly. Care should be taken when constructing a survey questionnaire to minimize fill-in-the-blank/short-answer items so the data can be easily quantified and analyzed (see Section 5604). In this example, the question was better suited to be a multiple-choice item that could have been quantified readily by allowing respondents to select their responses.

Figure 6-32. Categorizing Responses to an Open-Ended Question.

CATEGORIZING RESPONSES TO AN OPEN-ENDED QUESTION	
How often did you receive hands-on training with the equipment while attending the Radio Repairman Course?	
<hr/>	
Less than once a week	= 1
Once a week	= 2
Twice a week	= 3
Three times a week	= 4
More than three times a week	= 5

(2) **Multiple-Choice Response.** Survey and interview data that use a multiple-choice response format can be quantified like their counterpart knowledge-based test items using a nominal scale to assign labels to responses.

- b. **Ordinal.** An ordinal scale is used to measure responses gathered using a Likert rating scale. A Likert rating scale is the primary data collection tool that employs an ordinal scale. Typically, responses to a subject are rated across a continuum using a scale that varies from three to seven possible responses. The bottom of the scale typically represents a low amount of the property being measured while the top of the scale typically represents a high amount of the property being measured.
- (1) Unlike knowledge and performance-based test items and other types of survey/interview questions, a Likert rating scale is a measure where the mean (i.e., typical response per item) per respondent is calculated. When using a Likert scale, it is appropriate to add the responses and divide by the number of questions per student to produce a student's overall response or attitude to a subject. For example, a survey evaluating the improvements made to a training program uses a 3-point Likert scale. Respondents answer questions concerning the improvements made with 1 = "not improved," 2 = "improved," and 3 = "greatly improved." In this example, it would be appropriate to calculate a mean response to the survey per student. It would be possible for a student's mean response to be 2.5 which could be interpreted as the training program overall is considered to be improved.
 - (2) A mean is calculated using a Likert scale only if the same scale is used throughout the survey and the whole survey measures the same topic. For example, half of a survey measures the effectiveness of graduate job performance on a 5-point Likert scale from "ineffective" to "very effective." The other half of the survey measures graduate training in terms of effectiveness by using the same 5-point scale. It would be inappropriate to calculate an average response per respondent to the overall survey when the survey is measuring two different topics.
- c. **Interval.** Responses to a survey questionnaire or interview that are numerical in nature (e.g., respondent's age, years in service) are quantified using an interval scale. An interval scale quantifies the responses by the value of the response. If a respondent answers 23 to a question asking his age, his response is coded as 23. An interval scale permits the following statistics to be performed on a per item basis only: frequency counts, mean response, mode (most frequently occurring response), median (the response that splits the respondent pool in half), and variability (range, variance, and standard deviation). Unlike a Likert scale that may be the same scale used throughout a survey, an interval scale is not usually the same throughout a survey. A survey is usually designed with interval questions to gather primarily demographic data. Therefore, it is not appropriate to sum responses in an interval scale to calculate the above descriptive statistics for the overall survey.

TEST RELIABILITY AND VALIDITY

The reliability and validity of a test provide the foundation for effective evaluation of student performance. Both the reliability and validity of a test should be assessed to identify the appropriateness of the test as an accurate measure of instructional effectiveness.

1. **Reliability.** Reliability refers to the ability of an instrument to measure skills and knowledge consistently. The reliability of a test is determined based on the calculation of a reliability coefficient (r). It is recommended that this coefficient be computed using a computer statistical analysis software package. A reliability coefficient is the correlation, or degree of association, between two sets of scores. Correlation coefficients range from -1.0 to +1.0. The closer a coefficient gets to -1.0 or to +1.0, the stronger the relationship. The sign of the coefficient tells whether the relationship is positive or negative.

Coefficient	Strength	Direction
$r = -.85$	Strong	Negative
$r = +.82$	Strong	Positive
$r = +.22$	Weak	Positive
$r = +.03$	Very Weak	Positive
$r = -.42$	Moderate	Negative

The different methods of estimating reliability fall within three categories: determining the internal consistency of a test, determining the stability of a test over time, and determining the equivalence of two forms of a test:

- a. **Test-Retest.** Test-retest is a method of estimating reliability by giving the test twice and comparing the first set of scores and the second set of scores. For example, suppose a test on Naval correspondence is given to six students on Monday and again on the following Monday without any teaching between these times. If the test scores do not fluctuate, then it is concluded that the test is reliable. The problem with test-retest reliability is that there is usually some memory or experience involved the second time the test is taken. Generally, the longer the interval between test administration, the lower the correlation.

Student	First Administration Score	Second Administration Score
1	85	87
2	93	93
3	78	75
4	80	85
5	65	61
6	83	80

- b. **Alternate Forms.** If there are two equivalent forms of a test, these forms can be used to obtain an estimate of the reliability of the test. Both forms of the test are administered to the same group of students and the correlation between the two sets of scores is determined. If there is a large difference in a student's score on the two forms of the test that are suppose to measures the same behavior, then it indicates that the test is unreliable. To use this method of estimating reliability, two equivalent forms of the test must be available and they must be administered under conditions as nearly equivalent as possible.
 - c. **Split-Half Method.** If the test in question is designed to measure a single basic concept, then the split-half method can be used to determine reliability. To find the split-half (or odd-even) reliability, each item is assigned to one half or the other. Then, the total score for each student on each half is determined and the correlation between the two total scores for both halves is computed. Essentially, one test is used to make two shorter alternate forms. This method has the advantage that only one test administration is required, so memory or practice effects are not issues. This method underestimates what the actual reliability of the full test would be.
2. **Interpreting Reliability**
- a. **Scoring reliability limits test reliability.** If tests are unreliably scored, then error is introduced that limits the reliability of the test.
 - b. **The more items included in a test, the higher the test's reliability.** When more items are added to a test, the test is better able to sample the student's knowledge or skill that is being measured.
 - c. **Reliability tends to decrease as tests are too easy or too difficult.** Score distributions become similar which makes it tough to know whether the instrument is measuring knowledge and skills consistently. When tests are too difficult, guessing is encouraged which creates a source of error in the test results.
3. **Validity.** The term validity refers to how well an instrument measures what it is suppose to measure. Validity can be assessed for tests, questionnaires, interviews, etc. However, validity is most often calculated for tests. Without establishing its validity, a test is of questionable usage since the evaluator does not know for sure whether the test is measuring the concepts it is intended to measure. There are several types of validity that can be determined.
- a. **Content Validity.** Content validity assesses the relevance of the test items to the subject matter being tested. Content validity is established by examining an instrument to determine whether it provides an adequate representation of the skills and knowledge it is designed to measure. No statistical test is used to establish content validity. To determine whether a test has content validity, SMEs review the test items and make a judgment regarding the validity of each item. For this approach to be effective, two major assumptions must be met. First, the SMEs must have the background and expertise to make a judgment regarding the content of the test. Second, the objectives to which the test is compared must be valid.

- b. **Criterion-Related Validity.** Criterion-related validity is established when test scores are compared to a criterion (such as graduate performance on the job) to determine how well a test predicts the criterion. For example, the validity of a test on map reading can be determined by comparing the scores students received on the test with their performance on a field exercise in land navigation. The test will have criterion-related validity if a student who received a high score on the map reading test receives a high score on the map reading portion of the land navigation exercise. Criterion-related validity is usually expressed as a correlation. There are two types of criterion-related validity: concurrent and predictive validity.
- (1) **Concurrent Validity.** To establish the criterion-related validity of a test, it is often faster to test people already considered successful on the criterion (e.g., individuals who were rated highly on their job performance). If successful individuals are used, valuable time is saved since they already have job performance scores ready for comparison with the test scores. If the test correlates highly with the job performance data, then the test has concurrent validity. In other words, if the successful job performers also score highly on the test, then the test is shown to be related to the criterion (successful job performance). The test is able to identify which individuals are doing well in their jobs. Once a test has been determined to possess concurrent validity, predictive validity is often tested or inferred.
 - (2) **Predictive Validity.** Predictive validity refers to how well the test predicts some future behavior of the student. This form of validity is particularly useful for aptitude tests, which attempt to predict how well the test taker will do in some future setting. The predictive validity of a test is determined by administering the test to a group of subjects, then measuring the subjects on whatever the test is supposed to predict after a period of time has elapsed. Often an instructor will want to design a test to try to predict how well students will perform on a criterion. If the test is able to predict the student's scores on the criterion with a good deal of accuracy, then the test has predictive validity. Predictive validity is very useful to instructors. If an instructor is able to predict future performance with a good deal of accuracy, he/she can identify students who need more attention in order to succeed.

USING A COMPUTER TO PERFORM STATISTICAL ANALYSIS

Use of computer statistical programs enables an evaluator to perform data analysis quickly and to generate a variety of statistics based on the specific requirements of the evaluation. Statistical analysis is currently not a discipline required of Marine Corps evaluators; however, it can greatly improve the evaluator's ability to analyze and interpret evaluation data by providing the tools to describe and define outcomes, compare relationships, and identify trends. Skill in statistical analysis is generally acquired through training or schooling. However, it can be learned and practiced, particularly if the evaluator has a computer statistical package. Along with learning the computer program, the key to performing statistical analysis on a computer is understanding the different statistical procedures, when to use them, how to use them, and how to interpret their results. Throughout this section, specific statistical analysis procedures have been discussed. Many of these statistics can be calculated by hand (e.g., frequency, mean, mode, median, range, item analysis). However, many of the more complex statistics are time consuming to calculate and leave greater room for human error in their calculation. An easier way to calculate these is through use of a computer statistical program.

1. **Use of Computer Programs.** There are many statistical programs that run on standard personal computers. Most of these programs are designed to allow the user to enter data from tests, questionnaires, etc., and select the type of statistics desired. The use of statistical software packages enables the user to perform data analysis quickly and efficiently and generate a variety of statistics based on the specific requirements of the evaluation. One of the most widely available computer programs is SPSS (Statistical Package for the Social Sciences). SPSS is a powerful tool that allows the calculation of all the statistics discussed in this Manual. Additionally, SPSS allows the calculation of several other higher-order statistics too complicated to discuss here.
2. **The Marine Corps Training Information Management System (MCTIMS).** The evaluation module of MCTIMS can produce reports and statistics. Individual reports can be tailored to include an array of information. For instance, MCTIMS can retrieve the class test results, an individual response report, an incorrect response report, an absentee report, and GPA/class standings reports for use by administrators. Within test statistics, MCTIMS automatically configures the mean, median, mode, and standard deviation. It also provides the number of perfect scores, number tested, number passed, and number failed. Refer to the MCTIMS User Manual for more information and guidance.

SUMMARIZE DATA

After data is assimilated, it should be summarized for ease of interpreting the results. Decisions must be made regarding how the data should be summarized. Data may be summarized in paragraph form and/or a table, graph, chart, or matrix. Strengths and problem areas are identified so that solutions can be formed and recorded.

IDENTIFY STRENGTHS

By identifying and documenting strengths, support is available to prevent changes being made to components of the program that work well.

IDENTIFY PROBLEM AREAS

The evaluator should identify any problem areas found during the interpretation of data. It is this step that identifies where changes may be necessary or what areas need to be reviewed for trends. Problem areas should be identified within the summarized data. Descriptive statistics, graphic summarization, and paragraph form are three ways that data can be summarized.

1. **Descriptive Statistics.** Descriptive Statistics are ideal for summarizing evaluation results. Descriptive statistics can be used to present evaluation results in paragraph form. Some examples:
 - 80 out of 100 students passed the written exam resulting in a pass rate of 80%.
 - Scores on the test ranged from a low of 65 to a high of 100, with a class mean of 92.5.
 - Students were asked to complete a comprehensive questionnaire rating the effectiveness of the instructional program. Students indicated responses on a scale of 1 to 5, 5 representing extremely effective. The mean value of class responses was 4.1, indicating an overall impression that the instructional program was very effective.
 - Of the 125 graduates surveyed, only 3 felt the instructional program did not prepare them for performance on their current job.

Graphic Summarization of Evaluation Results. Graphs, tables, and charts can be used to summarize evaluation results so that they are easily understood. Many types of data can be easily plotted on bar charts or line graphs to show relationships, indicate trends, or explain results. To provide comprehensive information, the results may need to be explained in paragraph form.

DETERMINE SOLUTIONS

Decisions must be made based upon the interpretation of the data. Any recommended solution should consider future goals and the feasibility of the change within the school. A plan of action should be formed. If revisions can be made to correct the identified problems, they should be made in a timely manner. A Course Content Review Board can be held at any time if major changes are necessary.

RECORD SOLUTIONS

Evaluation results must always be documented in some form. Evaluation results are used to inform personnel about the findings resulting from the collection, analysis, and interpretation of evaluation information. Once evaluation information is interpreted, there are **three courses of action** that can be taken:

1. All evaluation data are recorded and preserved for future use should no revisions to the course be determined.
2. Evaluation is continued through the collection of additional data by the FLC. The focus of this evaluation is targeted at the suspected deficiency in the instructional program.
3. Revisions to course materials are identified and presented at a CCRB.

SECTION 4

6004. MANAGE EVALUATION DATA

The next step in the evaluation process is to manage the documentation of evaluation results and recommendations for revising or refining an instructional program. These documents and reports are prepared to serve as a historical record of the evaluation, provide an audit trail for the continuing development and improvement of instruction, and direct the activities for implementing changes to the instructional program. Efficient data management therefore, requires that the information presented in these documents be clear, concise, and accurate. This chapter provides guidance concerning the documentation of evaluation results.

MARINE CORPS TRAINING INFORMATION MANAGEMENT SYSTEM

A POI is maintained by each FLC in MCTIMS for every formal course of instruction. MCTIMS can also track the drops, progress, and absenteeism of students through the use of the Student Management module. Once test items/questions for questionnaires are entered into MCTIMS, then the test data/questionnaire data can be scanned or manually entered. Using MCTIMS for Tests/Questionnaires is optional. MCTIMS has the capability to print reports that can be used for statistical analysis for the test/questionnaires entered into the data system. Refer to the MCTIMS User Manual for specific guidance.

DATABASES/SPREADSHEETS

To meet specific school needs in maintaining and managing data, some schools develop databases or spreadsheets to assist in conducting analysis and interpreting data. Specific reports can be generated from databases that compile entered data for easy interpretation. Prior to building such a database, the focus of the evaluation and the development of evaluation instruments should be complete. Formulas can be applied so that the database/spreadsheet will provide statistical data. Users skilled with both MCTIMS and standard spreadsheet or database applications can benefit from MCTIMS' ability to produce Student and Evaluation Data Export files for use in other applications.

COURSE HISTORY FOLDERS

Course history folders are the paper-based version of maintaining data. Schools must maintain course booklets for at least five years. The data placed in the course history folders can be paper-based, printed out of databases, MCTIMS, or other computer programs. However, by maintaining a folder for each iteration of a course, all data regarding a particular class can be easily assessed for reviews, inspections, or Course Content Review Boards. The following documentation, at a minimum, should be maintained in course history folders:

1. Enrollment rosters
2. Student data sheet information
3. Test results (i.e., reports, statistics, item analysis)
4. After Instruction Reports
5. End of Course Critique Summary
6. Graduation Roster

RECORD OF PROCEEDINGS

The Record of Proceedings (ROP) is generated from the Course Content Review Board (CCRB). CCRBs are discussed in detail in the next section. A ROP documents evaluation results and recommendations for revising a POI identified during the conduct of a CCRB. Within the FLC, the ROP not only documents an evaluation, it also functions as a record submitted to higher headquarters for implementing changes to a POI. If there are no recommended changes, then the ROP is simply maintained for documentation purposes at the school. The ROP also serves to initiate action at higher headquarters to address requirements outside the scope of the Formal School. To ensure that changes to instruction are implemented properly and that recommendations for changes outside the scope of the Formal School are addressed.

**CCRB- Course Content
Review Board.**

SECTION 5

6005. COURSE CONTENT REVIEW BOARD

MCO 1553.2¹ mandates that FLC convene a Course Content Review Board (CCRB) within 120 days of a signed T&R manual to ensure the efficiency and effectiveness of an instructional program. However, a CCRB can be more frequent if the need arises. Figure 6-36 provides a Conduct a CCRB Checklist to assist the host in the preparation and conduct of a CCRB.

Examples of When to Conduct CCRB

- As part of a battle rhythm within 120 days of a signed T&R manual.
- When doctrine is updated or new requirements surface.
- If evaluation results reveal a need to revise some facet of an instructional program, then a CCRB is held.

CCRB FUNCTIONS

A CCRB functions to record information and make recommendations to improve the effectiveness and efficiency of an instructional program. The Record of Proceedings (ROP) must provide justification and recommended courses of action for implementing any revisions to the POI/MLF/Lesson Plan. All recommended lesson and/or course revisions must be reflected in the ROP.

CCRBs include, but are not limited to:

-
- **Review of formative and summative evaluation data.**
 - **Review of higher headquarters policy change or direction, which affects a Program of Instruction.**
 - **Review of recommended lesson/course modifications to instructional materials.**
 - **Review of lesson additions/deletions to instructional materials.**
 -
-

CCRB USES

Changes pertaining to instructional time, resources, or inclusion of changes from the T&R conference that form the basis for the course may be identified by a CCRB. TECOM must approve any recommended changes that fall outside of content revisions. A CCRB's ROP can be used to communicate to higher changes made to the POI, and as a historical record of changes to the POI.

1. **Revising Instructional Resources.** A CCRB is the means to record and present recommended changes to resources. All recommended changes to training time, personnel, equipment, facilities, or budget must be submitted to TECOM with justification via an updated POI. TECOM will review and staff the changes, providing the school with guidance.
2. **Modifying Instruction to Include T&R Changes.** The changes resulting from a T&R conference need to be incorporated into current Lesson Plans. A CCRB reviews these T&R changes and identifies needed updates to current POI/MLF/Lesson Plan.
3. **Revise T&R Events and/or the Task List.** A CCRB is **not** the mechanism to record recommended changes to T&R events and task lists. The FLCER is the schools voluntary opportunity to present their findings at the appropriate T&R conference. FLC can also send representation to the T&R conferences.

CCRB PREPARATION

Initial planning for a CCRB should be conducted three months prior to the CCRB. Regardless of CCRB composition, all proceedings and findings are formally recorded by the CCRB Recorder (discussed later in this section). In addition, a CCRB can be videotaped. Figure 6-34 lists the FLC responsibilities and Figure 6-35 lists the CCRB member responsibilities.

Figure 6-34. FLC Responsibilities.

FLC Responsibilities
<input checked="" type="checkbox"/> Scheduling the time, date, and location for the CCRB.
<input checked="" type="checkbox"/> Providing guidance to members in advance of the CCRB so they will be prepared to discuss agenda items. This guidance includes the agenda, evaluation data, and any directions from higher headquarters. The CCRB agenda is based on a review of evaluation data and focuses on identified or perceived instructional deficiencies.
<input checked="" type="checkbox"/> Assigning a Recorder to record the CCRB minutes. These minutes are used to develop the Record of Proceedings (ROP).
<input checked="" type="checkbox"/> Assigning a facilitator to manage and guide the CCRB.
<input checked="" type="checkbox"/> Funding for CCRB participants has to be worked out by the sponsoring school.

Figure 6-35. Assigned CCRB Member Responsibilities.

Assigned CCRB Member Responsibilities
<input checked="" type="checkbox"/> Study all collected evaluation data and directions from higher headquarters that are related to the agenda items.
<input checked="" type="checkbox"/> Be prepared to discuss recommended changes to instructional materials. If revisions are necessary, determine the specific changes and discuss how they should be made and how they will affect the instructional program. Recommendations must be specific and comprehensive and they must detail how changes should be implemented to best meet instructional needs.

CCRB MEMBERS

A CCRB will consist of:

-
- * **Representation from instructors/curriculum developers from the Formal School.**
 - * **School supervisors.**
 - * **Occupational Field (OccFld) Specialist and Task Analyst representation (if possible).**
 - * **Operating Force Subject Matter Experts.**
-

APPOINTMENT

CCRB members are appointed by the Director of the school or as directed by Standing Operating Procedures (SOP). Potential members may be contacted either by phone or e-mail correspondence. A CCRB should have representatives from each phase of the instructional program such as SMEs, curriculum developers, and instructors. Should major changes to the instructional program (e.g., resources, T&R events) be foreseen, a Training and Education Command task-analyst should be invited to attend the CCRB. CCRB composition is critical to success of the CCRB. To maintain the integrity of the process and provide formal courses that meet the needs of the Operating Forces, the Operating Forces must have sufficient representation to carry the vote on all CCRB agenda items.

FACILITATE DISCUSSION OF AGENDA ITEMS

1. **CCRB Chairman.** This is the individual who controls the meeting, ensures that all agenda items are discussed, and that recommendations are recorded. The CCRB Chairman will establish guidelines or parameters for making decisions. This may include the number of sources and type of evaluation information that will be reviewed and analyzed. This may also include the order/priority of agenda items and any imposed time constraints of the proceedings. Additionally, the CCRB Chairman should encourage and promote participation by all CCRB members. Contributions from all CCRB members should be treated respectfully and discussed.
 - a. Specific recommendations to each agenda item must be made. It is not necessary for all CCRB members to agree on a decision or an approach, but all recommendations must be reached by consensus. This is accomplished by weighing all information from all sources, dismissing unnecessary information; further analyzing points for clarification, and assimilating information into a solid recommendation.

- b. Recommendations should be detailed. They must provide justification and they should include methods for implementing revisions to the instructional program. Recommendations for each agenda item should be reviewed and summarized by the facilitator.
 - c. All CCRB members must understand the recommendations and a consensus must be reached before the next agenda item is addressed.
2. **Recorder.** Under the guidance of the CCRB Chairman, the recorder should record all recommendations legibly. The ROP must clearly state CCRB findings and recommended courses of action in a detailed, concise format. The required format for the ROP can be found in MCO 1553.2_ Appendix G-3.

Record of Proceedings (ROP)

MCO 1553.2_ mandates that evaluation results and recommendations for revising instruction at FLCs be documented through the publication of an ROP. ROPs are generated based on CCRBs and are used to revise instructional materials, provide information and judgments about the effectiveness of an instructional program, and effect changes in a program beyond the scope of the school. The ROP provides a summary of evaluation results, recommendations, and justification for revising training.

1. **Format.** The required format for the ROP can be found in MCO 1553.2_ Appendix G-3. It must contain justification for any recommended revisions to instruction. The CCRB may make recommendations on revising instruction where appropriate. Changes to a POI per MCO 1553.2_ will be formalized by submission of a POI for approval.
2. **Members Review.** The ROP must be checked and approved by CCRB members to ensure that specific recommendations have been made for each issue encountered in the instructional program. This review also ensures that each recommendation is documented with solid justification and that the content is an accurate reflection of the conduct of the CCRB.
3. **Member Certification.** The members of the CCRB then sign the ROP certifying the accuracy of the content. Signature does **not** represent concurrence, and all in attendance should ensure dissenting opinions are captured within the ROP prior to signature.

Recommendations should be detailed.

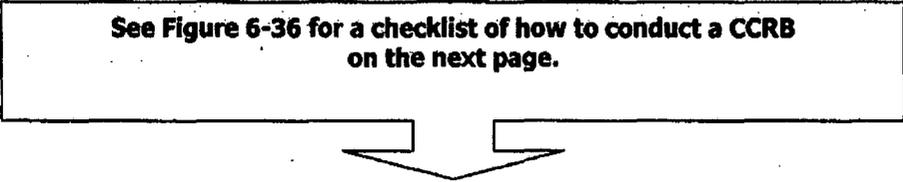
They must provide justification.

They should include methods for implementing revisions to the instructional program/POI.

SUBMITTING THE ROP

Submit the final ROP to the CO/Director of the FLC for as part of the POI submission process. A copy of the ROP will remain on file at the FLC.

**See Figure 6-36 for a checklist of how to conduct a CCRB
on the next page.**



CONDUCT A CCRB CHECKLIST

PREPARE FOR THE CCRB	YES	NO
1. Study evaluation data and directions from higher HQ		
2. Set a time and date		
3. Ensure members are appointed (travel (TAD) must be addressed here)		
4. Provide guidance to members (agenda, data, etc.)		
5. Assign a recorder		
CONDUCT THE CCRB	YES	NO
1. Open meeting on time		
2. Explain purpose of meeting		
3. Avoid stating preferences as to outcomes		
4. Explain ground rules:		
a. Establish discussion method (s)		
b. Establish decision making method (s)		
c. Establish time limits		
5. Employ effective group communication techniques:		
a. Promote systematic problem solving		
b. Keep group focused on problem solving		
c. Create/maintain suitable atmosphere		
d. Show respect and interest in group members		
e. Avoid making friction points personal		
f. Maintain impartiality		
g. Encourage balanced participation		
h. Refrain from dominating the group (do not allow individuals)		
i. Deal with conflict effectively		
j. Consider several courses of action		
k. Consider drawbacks of preferred course of action (wargame COAs)		
l. Consider problems of implementation		
m. Provide "second chance" to air remaining doubts		
CLOSE THE CCRB	YES	NO
1. Review minutes		
2. Seek approval from members concerning the minutes		
3. Close CCRB on time		
COMPLETE THE CCRB	YES	NO
1. Write the Record of Proceedings (ROP) based on the minutes		
2. ROP reviewed and certified by all CCRB members		
3. Submit Record of Proceedings to director for approval and to CG, TECOM		
4. Evaluate the conduct of the CCRB		

Figure 6-36. Conduct a CCRB Checklist.

6006. ADMINISTRATION

SECTION

6

This section provides the evaluation requirement as stated by various Marine Corps Orders and Publications. These documents provide guidance to FLCs regarding requirements in training. With the requirements being understood, personnel working in academics at the FLCs need to carefully consider the approach to evaluation. This is done through an evaluation plan for the school. The evaluation plan discusses how, where, and when to conduct evaluation, the types of data retrieved, and what to do with the data. Details on types of sampling are referred to in detail so that this can be addressed in the plan. In addition, specific information on how to design questionnaires, interview questions, and evaluation checklists is covered so that schools are able to ensure that the instruments used are meeting the needs of the school. Instruments should be designed with ease of data compilation and interpretation in mind.

EVALUATION REQUIREMENTS

FLC leaders need to be familiar with the requirement for evaluation. The first step in evaluation planning involves the identification of an evaluation requirement. The source and scope of this requirement will drive subsequent evaluation activities. Establishing this requirement ensures that personnel and resources are allocated appropriately and effectively in support of an instructional program. This section provides direction and guidance in identifying an evaluation requirement and focusing on the source of this requirement—Marine Corps doctrinal publications.

MARINE CORPS REQUIREMENT FOR EVALUATION

Marine Corps doctrine or local SOPs mandate the conduct of certain evaluations including their frequency, the type of evaluation to be conducted, and the specific issues to be evaluated. The following subparagraphs briefly describe the 1553 series of Marine Corps Orders (MCO) and Marine Corps Reference Publications (MCRP) as they pertain to instructional evaluation. The evaluator should be familiar with the effect of these orders on the organization's evaluation activities. In addition to these documents, Marine Corps Training and Education Command (TECOM) may be contacted for guidance concerning the conduct of evaluation.

MCO 1553.1. MCO 1553.1, Marine Corps Training and Education System, establishes CG, Training and Education Command as the organization that evaluates Marine Corps training and education policy, plans, concepts, and programs; conducts and reviews evaluations of training and education performed in units and institutions; and resolves emergent issues.

MCO 1553.2. MCO 1553.2, Management for Marine Corps Formal Schools and Training Detachments, addresses Course Content Review Board (CCRB) requirements, curriculum assistance visits conducted by Training and Education Command, and the conduct of a Training Situation Analysis (TSA) to assess a formal school's philosophy, management, facilities, staffing, curriculum, and instructional support.

MCO 1553.3. MCO 1553.3, Marine Corps Unit Training Management (UTM), establishes a Marine Corps-wide Training Management (TM) process wherein all individual and collective training conducted by units within the operating forces and supporting establishment shall be requirements driven, standards based, and performance-oriented and prioritized by the commander relative to assigned missions. Additionally, the Marine Corps Training and Readiness (T&R) Evaluation process is identified as the training management and diagnostic tool to improve training.

MCO 1553.6. MCO 1553.6, Development, Management, and Acquisition of Interactive Courseware (ICW) for Marine Corps Instruction, establishes policy, prescribes requirements, and assigns responsibilities for the development, management, and acquisition of ICW for Marine Corps Instructional programs.

MCO 1553.7. MCO 1553.7 provides information, guidance, and the responsibilities concerning the use of By-Name Assignment which is now found within the Student Registrar Module of MCTIMS.

MCO 3500.14. MCO 3500.14, Aviation Training and Readiness (T&R) Program, establishes training standards, regulations, and policies regarding the training of Marine Corps aircrews, Marine Command and Control System (MACCS) operators, Airfield Emergency Services and Meteorological and Oceanographic (METOC) personnel.

MCO P3500.72. MCO P3500.72, Marine Corps Ground Training and Readiness (T&R) program, establishes training standards, regulations and policies regarding the training of Marines and assigned Navy personnel in ground combat, combat support, and combat service support occupational fields.

MCRP 3-0A, Unit Training Management/MCRP 3-0B, How to Conduct Training. MCRP 3-0A and MCRP 3-0B set forth evaluation requirements for unit training. These manuals provide guidance to plan, prepare, and evaluate training conducted at battalion or squadron level units. These manuals help evaluators determine if unit training produces technically and tactically proficient Marines capable of accomplishing their assigned missions.

Formal Learning Center Evaluation Requirement. Evaluation is a continuous process whereby information is gathered to assess the value, worth, or merit of a program. A school may conduct an evaluation any time it is deemed necessary to verify the effectiveness of an instructional program, identify instructional deficiencies, or determine the most efficient allocation of instructional resources.

PREPARE AN EVALUATION PLAN

After an evaluation requirement has been identified, a plan for conducting the evaluation is developed to ensure that no important steps in the process are overlooked. This section presents the critical elements of an evaluation plan, including supporting data, sources of data, sampling, an evaluation schedule, and data collection, analysis, and interpretation.

ELEMENTS OF AN EVALUATION PLAN

Whether the evaluation will be formative or summative, the planning topics discussed below will help ensure effectiveness. The evaluator must be prepared to modify the plan as required during the conduct of the evaluation if new issues are identified or events mandate revision of the plan. Any changes to the plan should be carefully documented. A sample evaluation plan is provided in MCO 1553.2, Appendix O-60.

1. **Data Required to Support the Evaluation.** This element of the evaluation plan is a clear and detailed statement of the data required to support the evaluation. For example, if the evaluation focuses on student mastery of learning objectives, student performance (test) data must be collected. If the focus concerns whether course graduates meet the needs of using commands, graduate on-the-job performance data are required. Throughout the planning process and during data collection, the evaluator should review this portion of the plan to ensure the appropriate data are collected to support conclusions and recommendations concerning the revision, maintenance, or termination of an instructional program.
2. **Sources of Data.** As part of the evaluation plan, the evaluator must determine who will provide the data and what sources of information will be used. Sources include existing data, instructors and other school personnel, students, graduates, SMEs, and/or using commands.
 - a. Existing data include all task and course materials (e.g., T&R Manual, POI, lesson plans), documentation from higher headquarters that may change the course requirements, and previous evaluation data (e.g., CCRB or SME Conference reports, test data).
 - b. Data from individuals include student performance data (test results), instructor performance data, and graduate performance data.
3. **Sampling.** This element of the evaluation plan should identify, when applicable, the sampling procedure including sample size and sampling technique to be used. Sampling is discussed later in this section.
4. **Evaluation Schedule.** The evaluation plan should indicate when the evaluation would take place. In addition, the evaluation plan should include a schedule for each evaluation task or event. The schedule should be developed to ensure the evaluation is conducted when the most reliable data can be collected.
 - a. **Timely Evaluation.** An evaluation should be planned to ensure timely collection of data. For example, if the evaluation focuses on graduate job performance, the graduates should have been on the job for at least 30 days, but less than three months to ensure valid data can be collected. Graduates new on the job may not have had the opportunity to perform certain tasks; and if they have been on the job longer than three months, they may have trouble separating what they learned in school from what they learned on the job. As an additional example, if the evaluation is being conducted to determine the consistency of instructional results, the instructional program must have been in place through several iterations. This will ensure the data collected will provide a comprehensive basis for decision making about an instructional program.

- (2) **External Evaluator.** An external evaluator is more likely to be impartial because he/she has no vested interest in the program's success or failure. His/her findings may be viewed as more credible, especially if the program is controversial and evaluation findings are to be used in settling a dispute. In addition, personnel associated with an instructional program are often more willing to reveal sensitive information to an external evaluator (since an internal evaluator may inadvertently breach their confidentiality). On the other hand, an external evaluator may be unfamiliar with the instructional program, requiring him/her to devote time to learn about it, and he/she may not have the ability to identify subtle issues or concerns related to the instructional program. If possible, an organization should use an external evaluator when the answer to any of the following questions is no.

Figure 6-37. Internal and External Evaluators

Internal vs. External	
<input checked="" type="checkbox"/>	Are technically qualified internal evaluators available to effectively and competently evaluate the program?
<input checked="" type="checkbox"/>	Can internal evaluators be fully committed to the evaluation? That is, are they without additional duty responsibilities that would hinder the evaluation effort?
<input checked="" type="checkbox"/>	Will there be sufficient internal evaluators to sustain an evaluation?
<input checked="" type="checkbox"/>	Will the internal evaluator have the credibility to perform the evaluation objectively?

- b. **Plan for Briefing/Training Data Collectors.** Once personnel requirements have been identified, a plan for briefing and training data collectors should be developed.
- (1) **Personnel Brief.** The brief should include the intent of the evaluation, the role of the data collectors, when and how they will collect the data, how to monitor the process, and how to ensure that data collected are complete.
- (2) **Personnel Training.** A relatively simple orientation for data collection personnel is all that will be needed for most evaluation instruments. However, if interview or observation instruments are to be used, personnel may need training sessions on their use, including written instructions, job aids, and/or practice. Procedures (including time tables) for this training should be included in the evaluation plan.

- c. **Conditions Under Which Data Will be Collected.** The plan should also specify the appropriate conditions for data collection. For example, will students be observed during a class? Will they be tested in groups or individually? Will graduate performance on the job be assessed? Will evaluation instruments be mailed, emailed, or administered in person? Planning the data collection effort will ensure that valid data can be collected under the conditions specified.
 - d. **Data Collection Arrangements.** The evaluation plan should also specify the administrative requirements to support data collection. Depending on the evaluation to be conducted, these requirements may include contacting school or command personnel to schedule visits, making travel reservations, ensuring that evaluation instruments are duplicated and mailed on schedule (if not carried by the evaluator), etc.
6. **Method for Data Analysis and Interpretation.** The evaluation plan should specify the method for data analysis and interpretation. This includes formatting, coding, organizing, storing, and retrieving the data along with the statistical techniques used to analyze the raw data and methods for interpreting results. Refer to Section 5302 for information on the analysis and interpretation of evaluation data.
 7. **Method for Reporting.** The evaluation plan should specify the method for making recommendations and reporting evaluation results.

SAMPLING

It is not always feasible to survey or test every member of a specific population (e.g., every Marine in the Marine Corps). Therefore, a sample representative of the population is selected for evaluation. When selecting a sample, the larger the sample, the more precise the estimate of the characteristic in the population. Sampling techniques are particularly common when conducting surveys or interviews rather than testing individual performance in school or on the job where it is important to test everyone. Often the target population (the people or events that are of interest) is too large to survey practically, so an evaluator focuses instead on a subset of the population known as a sample.

SAMPLING TECHNIQUES

When a sample is selected, it is important that the sample be unbiased or truly representative of the whole population to provide the highest degree of reliability and validity with respect to making conclusions and recommendations regarding an instructional program. There are two basic ways to achieve a representative sample: simple random sampling and stratified random sampling.

1. **Simple Random Sample.** A simple random sample is one in which every member of the population has an equal chance of being selected for the sample and the selection of any one member of the population does not influence the chances of any other member being selected.

2. **Stratified Random Sample.** A stratified random sample involves dividing the population into two, three, or more strata (e.g., rank, military occupational specialty [MOS]) and then randomly sampling from each stratum. "Strata" refers to subpopulations. This method of sampling allows the evaluator to generalize results to the population as a whole, particularly if the population is not homogenous. A stratified random sampling procedure ensures that segments of the population having a low frequency of occurrence (e.g., female Marines) are represented in the sample.

PROCESS FOR SELECTING A SAMPLE SIZE

The selection of a sample size is not a subjective process. In lieu of any other method, evaluators can rely on their past experiences to select a sample size. However, there is a standardized method that can be used to determine an appropriate sample size. To calculate sample size, an expected response rate and confidence level must be identified. The expected response rate is the proportion of responses expected from the population being sampled. For example, if a survey is sent to 100 Marines and it is expected that 30 Marines will return the survey, the expected response rate is 30%. The confidence level corresponds to the degree of assurance or confidence that a given value will occur other than by chance. The most commonly used confidence levels are 95% and 99% such that a 95% confidence level means that the likelihood of a value occurring by chance is 5 in 100 and a 99% confidence level corresponds to the likelihood of a chance occurrence of 1 in 100.

1. **Determining Sample Size for a Random Sample.** MCO 1553.2
Appendix O-62 provides a sampling table and formula for determining sample size. For example, for a population of 4,200 course graduates, an estimated (desired) return rate of 85%, and a confidence level of 95%, sample size would be determined using the following procedure:
 - a. **Using Appendix O-62, locate the number corresponding to the population size. Since 4,200 is not provided in the table, round the number up or down to the nearest value. For example, the population value of 4,200 would be rounded down to 4,000.**
 - b. **Locate the value corresponding to the 95% confidence level with a population size of 4,000. Using Appeneix O-62, this value is 364 (meaning that 364 questionnaires are required). This figure should be 85% of the questionnaires mailed out.**
 - c. **To determine the number of questionnaires that need to be mailed out to obtain 364 usable questionnaires, substitute the values in the formula provided in Appeneix O-62. Using our example, for a population of 4,200 and an expected return rate of 85%, the desired sample size would be 364. Therefore, to obtain an 85% response rate (364 responses), 428 questionnaires need to be gathered.**

2. **Determining Sample Size for a Stratified Sample.** If an evaluator wishes to divide a population into several strata (such as rank or MOS) and select sample sizes based on these strata, sample size is determined in the same way described above. In a stratified sample, population size corresponds to the number of individuals within each stratum. For example, given a graduating class of 200 students in which 160 are male and 40 are female, two sample sizes would be calculated, one for a population size of 160 and another for a population size of 40.

DESIGN EVALUATION INSTRUMENTS

The evaluation instrument is the tool that elicits information to accurately assess the effectiveness and efficiency of an instructional program. An evaluation instrument controls the nature and type of information collected and the reliability and validity of that information. This section provides additional guidance on the design of evaluation instruments such as survey questionnaires and interviews, and the use of evaluation checklists. Particular emphasis is placed on guidelines and considerations for developing and using standardized evaluation instruments, stressing the importance of clarity, consistency, and brevity in their design.

SURVEY QUESTIONNAIRES

A survey questionnaire must be well-organized and easy to read to be an effective data collection tool. When selecting or designing survey questionnaires, the following guidelines should be followed:

Format. Format is important in gaining the cooperation of respondents, analyzing the data, and interpreting the results. Design the layout or structure of a questionnaire so that it is attractive and uncluttered, permitting the respondent to readily determine what types of questions are being asked and how to record responses. A respondent should be able to complete the questionnaire within a short period; respondents will often put aside and fail to complete a questionnaire that requires more than 20 minutes of their time.

Instructions. To ensure that the questionnaire is completed properly, clear, concise instructions should be included at the beginning of the questionnaire. These should include a brief explanation of the purpose of the questionnaire, how it is organized, and how responses should be recorded. If the questionnaire is mailed or distributed for later return by respondents, instructions for its return should be provided and a metered return envelope should be included.

Questionnaire Items. Questions should be grouped by topic or subject and presented in a logical format. For example, in a questionnaire administered to graduates of Basic Rifleman covering both M16 Service Rifle and M203 Grenade Launcher, all questions pertaining to the Service Rifle should be grouped together and all questions pertaining to the Grenade Launcher should be grouped together.

Response Format. When possible, the method for responding to questionnaire items should be consistent to avoid confusion and facilitate the recording of accurate responses. If a variety of answer formats must be used, group items with the same answer format together. Survey questionnaires involve self-reporting by respondents and, therefore, provide qualitative data. For those data to be scored for later analysis and interpretation, they must be quantified. The response format of the questionnaire controls the way the data are gathered, how they can be quantified, and the ease or difficulty of their quantification. Response formats include open-ended and fixed alternative (or closed) questions. The fixed alternative format, which includes nominal, ordinal, and interval scale responses, provides data that are more easily quantified for later scoring and analysis. Open-ended responses may also be quantified for data analysis, although it is a much more time-consuming process. Figure 6-39 provides examples of questionnaire response formats.

1. **Open-ended.** An open-ended question has no pre-determined response category. It allows the respondent to answer the question in his/her own words without restricting the kind of answer he/she can give. Data collected using open-ended questions can be quantified by categorizing the responses and assigning a number to each category. Open-ended questions in survey questionnaires or interviews allow respondents to provide additional comments, descriptions, and rationale or explanation for their answers. They are useful for collecting information pertaining to perceived effectiveness of a particular course of instruction. Unlike rating scales and checklists, information gathered from open-ended questions can be difficult to collate, analyze, and quantify because scores or ratings are not assigned to responses. However, an answer key can be made to allow open-ended (e.g., essay) questions to be scored for partial and full credit through the assignment of point values. Refer to Section 5302 for information on quantifying data.
2. **Nominal Scale.** A nominal scale response format is used primarily to elicit information that falls within a single measurement dimension in which responses can be easily categorized such as sex (e.g., male, female) or rank (e.g., corporal, sergeant, captain). This type of scale is particularly appropriate for gathering demographic information.
3. **Ordinal Scale.** A Likert rating scale is an example of an ordinal scale response format and is most commonly used to measure respondents' attitudes, preferences, or feelings about a topic. A Likert rating may involve a 1-3, 1-4, 1-5, 1-6, or 1-7 scale. Level of agreement, level of preparedness, and level of ability are a few examples of what the scale can measure. Each statement requires only one judgment and carefully avoids ambiguity in expression or interpretation. Figure 6-38 provides more information on the Likert rating scale.

Likert Rating Scale	
<input checked="" type="checkbox"/>	Method of recording responses to a question.
<input checked="" type="checkbox"/>	Scale that responds to a spectrum of responses (e.g., behavioral ratings, frequency ratings, attitudinal ratings) concerning a certain topic.
<input checked="" type="checkbox"/>	Respondents check the response that corresponds to the intensity of their judgment of the topic.
<input checked="" type="checkbox"/>	Ideal for obtaining varying judgments or scores on a topic by using a number of statements on the same subject and giving an intensity value for each.

Figure 6-38. Likert Rating Scale.

<u>QUESTIONNAIRE RESPONSE FORMATS</u>	
<u>Open-Ended</u>	
1. What do you feel is the most important information you received while attending the Supply Officer Course?	

<u>Nominal Scale</u>	
2. Which of these qualities do you feel is the most important for an instructor to possess? (Circle the appropriate number below.)	
1. In-depth knowledge of subject matter	
2. Professionalism	
3. Sincerity	
<u>Ordinal Scale</u>	
3. The Supply Officer School's minimum rank requirement for attendance is Major. Which of the following expresses your opinion concerning this statement? (Circle the appropriate number below.)	
1. Strongly disagree	
2. Disagree	
3. Agree	
4. Strongly agree	
<u>Interval Scale</u>	
4. How many personnel are assigned to your unit? (Circle the appropriate number below.)	
1. Under 25	
2. 26-50	
3. 51-75	
4. 76-100	
5. Over 100	

Figure 6-39. Questionnaire Response Formats.

4. **Interval Scale.** An interval scale response format elicits information that is quantifiable in terms of absolute or continuous values such as age, years of service, time in billet, etc. This type of question can be designed to require the respondent to either write in his response or select a particular interval in which a value falls.
5. **Development of Questionnaire Items.** Questionnaire items should be short, direct, and written at a reading level appropriate to the respondent population. The evaluator should adhere to the following guidelines when developing questionnaire items. Figure 6-40 provides examples of good and poor questions.

Figure 6-40. Guidelines for Writing Questionnaire Items.

<u>GUIDELINES FOR WRITING QUESTIONNAIRE ITEMS</u>	
1. Avoid the use of negatives.	POOR: The instructor was not available to answer my questions. (Yes/No) GOOD: The instructor was available to answer my questions. (Yes/No)
2. Use short, common words; avoid jargon.	POOR: Does the AIR include IRFs? GOOD: Does the After Instruction Report (AIR) include Instructional Rating Forms (IRF)?
3. Do not combine two issues in one questionnaire item.	POOR: Was the instructor knowledgeable and effective? GOOD: Was the instructor knowledgeable? Was the instructor effective?
4. Avoid leading questions.	POOR: Do you feel the school needs to lengthen the course to better equip the graduates? GOOD: Are there changes the school can make to the course to better equip the graduates?
5. Ensure the question can be answered by the respondent.	POOR: Was your knowledge comparable to the previous students' knowledge when you entered the class? GOOD: Do you feel you had the prerequisite knowledge and skills to succeed in this course?
6. Avoid the use of emotionally-tinged words and embarrassing questions.	POOR: Did you have difficulty understanding the materials? GOOD: Were the materials presented in a manner easy to understand?

6. **Distribution.** In addition to well-written questions, valid results from survey questionnaires depend on the selection of respondents. A representative sampling is essential. Variations in job requirements occur because of command, geographic locations, organization level, etc. Therefore, the sample should include respondents assigned to each using location in the population. Section 5603 provides detailed information on sampling.
 - (a) **When to Send Questionnaires.** Proper timing is important when sending questionnaires. For example, questionnaires should be in graduates' hands one to three months after graduation and assignment to the using command. Beyond three months, it may be difficult to determine whether the graduate learned a skill from the instructional program or on the job. If the questionnaire is distributed too soon after course completion, the graduate may not have had time or occasion to perform all of the tasks taught. However, the optimum time for questionnaire distribution is also dependent on the complexity of the job/tasks the instruction covered.
 - (b) **Follow-up.** Follow-up can ensure the return of a sufficient number of completed questionnaires to support valid and reliable data analysis. Procedures for appropriate follow-up should be included in the evaluation plan. These would include the timing of the follow-up, a method for identifying non-respondents, and the method of follow-up (e.g., phone, mail). When the date for follow-up arrives, reminder calls or notices to non-respondents should be made to encourage their completion of the questionnaire. It is also a good practice to thank respondents for their participation. Sending a simple thank-you form requires little time but can be very worthwhile in motivating respondents to cooperate in future surveys.

INTERVIEWS

Although interviews may be structured or unstructured, the collection of reliable data for evaluation purposes is best obtained from structured interviews. The following are guidelines that can be used when conducting interviews. The advantages and disadvantages of interviews are listed in Figures 5-42 and 5-43.

1. **Introductory Statement.** The interview should always begin with an introductory statement that outlines the purpose and structure of the interview. The purpose should be explained in terms the respondent can understand and should identify what types of questions will be asked. The introductory statement should also provide a clear transition to the interview itself.
2. **Conducting the Interview.** The goal of the interviewer is to maximize the flow of information from the respondent.

Figure 6-41. Conducting the Interview.

Conducting the Interview	
<input checked="" type="checkbox"/>	Keep the language pitched to the level of the respondent. Do not use technical terms or acronyms unless the respondent is familiar with them.
<input checked="" type="checkbox"/>	Choose words that have the same meaning for everyone.
<input checked="" type="checkbox"/>	Do not assume the respondent has factual or firsthand information.
<input checked="" type="checkbox"/>	Establish the frame of reference for the questions being asked. For example, to narrow a respondent's comment on the effectiveness of testing, the interviewer may ask the respondent to focus on performance testing during the last three weeks of a course.
<input checked="" type="checkbox"/>	If asked, either suggest all possible responses to a question or do not suggest any.
<input checked="" type="checkbox"/>	If unpleasant questions must be asked, give the respondent a chance to express his positive feelings first by structuring the interview so those questions are asked first.
<input checked="" type="checkbox"/>	Speak clearly and slowly and listen to the respondent's answer before recording the response.
<input checked="" type="checkbox"/>	Include a closing statement to let the respondent know the interview is concluded.

3. **Types of Interview Questions.** The type of interview questions developed should be based on the objective of the interview.
 - (a) **Open-ended Questions.** A question that asks for narrative responses and allows respondents to respond in their own words is an open-ended question. Open-ended questions are used when a discrete answer is not desired or possible (i.e., there is no yes/no or categorical response possible). These questions often rely on the respondent's opinion and judgment rather than the respondent's knowledge of information or facts.
 - (b) **Probing or Clarifying Questions.** Ask probing or follow-up questions to confirm a respondent's answer or to clarify what the respondent has said. The respondent's statements should be included in the probe to provide a point of reference and elicit elaboration or clarification of a topic.
 - (c) **Closed Questions.** A question that limits respondents' answers to predetermined response categories is a closed-ended question. Multiple choice and yes/no questions are examples of closed-ended questions. Closed questions employ a nominal, ordinal, or interval scale response format. Closed questions are used to elicit information that is easily categorized or to elicit specific factual information such as rank, age, etc. Closed questions restrict the range of responses received.

4. **Recording Responses.** For open-ended questions or questions in which probing or clarifying responses have been provided, the interviewer should:

- * Record responses using the **exact words and phrases** used by the respondent.
- * Use key words or phrases to further clarify a response or as a reminder of what was said.

Advantages of Interview

- If the questions are few and easy to answer, the interview method results in a higher percentage of responses and, therefore, better sample results than a survey questionnaire.
- The interview method ensures that the targeted audience answers the questions. The individuals required to answer the questions can be pre-selected, ensuring the evaluation information is obtained.
- An interviewer can judge the sincerity of the respondent as he gives his answers.
- An interview can be conducted simultaneously with observation of performance. Observation of performance adds merit to the interview information obtained.

Figure 6-42. Advantages of Interview.

Disadvantages of Interview

- Face-to-face interviews can be expensive and time consuming based on the time required to conduct the interview and location of the interview.
- Interviews do not allow respondents to remain anonymous which can affect their responses.
- Interviews preclude the respondent from returning to a question at a later date.
- If a respondent cannot be present during the scheduled time, it can be difficult to reschedule the interview.
- An interviewer can introduce bias into the study by suggesting a possible answer to a question when the respondent has difficulty giving one. This produces questionable evaluation results.

Figure 6-43. Disadvantages of Interview.

EVALUATION CHECKLISTS

Checklists are typically used when the evaluation consists of a review of documentation, course materials, etc., or an observation of performance. Checklists that are used as evaluation instruments are not simply lists of items that can be "checked off" as they are identified or located. These checklists consist of carefully worded questions that the evaluator answers by his review of course materials or observation of course components (e.g., graduate or instructor performance, conduct of a class). If existing materials will be reviewed as part of the evaluation, data are collected via checklists as the evaluator reviews the applicable documents. To perform an evaluation of an instructional program, two or more of these checklists may be used, as required. Checklists can be used to conduct both formative and summative evaluations of an instructional program.

Use of Checklists During Formative Evaluation. During instructional program development, checklists can be used to ensure instructional development is proceeding according to plan. Checklists are also used to assess and validate instructional materials. The use of checklists helps the evaluator ensure that the materials being developed (e.g., learning objectives, test items, lesson plans, student materials, instructional setting, media) will result in an effective and efficient course of instruction. Using evaluation checklists as a systematic method for validating instruction ensures:

1. The instruction does not contain unnecessary information, maximizes the use of instructional time and media, follows the SAT process, and prepares graduates to perform their job tasks to the specified standard.
2. An audit trail is created that enables evaluators to track each component of the instructional program to the T&R event it supports and to document the SAT methodology followed. To create an audit trail, a progress or process method can be used.
 - (a) **Progress Method.** This method is used to keep management informed of the progress of the course development effort. In consultation with the course manager(s), the evaluator should identify what information the manager needs to make effective decisions concerning the course and how frequently it is needed. A recommended approach is to report on the completion of key checkpoints in the course development (See Figure 6-44 for a portion of a sample project schedule). Often, managers need only to know that an activity was completed on time. If deviations occur, they should be explained and discussions held to produce an acceptable solution. When the development effort is complete, the project schedule will provide one form of an audit trail that can later be reviewed when evaluating an instructional program.

<u>Activity</u>	<u>Estimated Completion</u>	<u>Actual Completion</u>	<u>Note</u>
Develop Course Schedule	20 Sep	20 Sep	
Develop Lesson Plan	20 Dec	20 Jan	(1)
Develop Student Guide	20 Jan	20 Feb	(2)
Develop Media	30 Jun	30 Jun	

Notes:
 (1) Delay of travel funds caused site visit to be postponed.
 (2) Development was dependent on completed lesson plan.

Figure 6-44. Sample Project Schedule.

(b) **Process Method.** This method uses a checklist to describe and document the actual development process of a specific course. A recommended approach is to list every major activity of the course development process. Changes to the SAT procedures as well as steps or processes not completed should be documented. Figure 6-45 illustrates a sample process checklist, although any suitable form can be used. The important information to be captured is the explanation of any deviations so that future managers will know what was done during course development.

<u>Development Activity</u>	<u>Completed</u>		<u>Explanation</u>
	<u>YES</u>	<u>NO</u>	
Develop Course Schedule	[
Review Source Documents	[
Determine Course Structure	[
Organize TLO's and ELO's	[
Assign Lesson Titles	[Used existing titles
Assign Lesson Designators	[
Estimate Instructional Hours	[
Organize Information	[

Figure 6-45. Sample Process Checklist.

Use of Checklists During Summative Evaluation. During a summative evaluation, checklists provide the evaluator with a systematic method for examining an instructional program to ensure it prepares graduates to perform their job tasks to the specified standard. Checklists can be used to evaluate the following:

1. **Student Performance.** A pass-fail checklist is commonly used in performance tests where students are rated on mastery of learning objectives. A typical approach to this type of checklist is to list the learning objective behaviors (although it can also be detailed enough to list performance steps) on one half of the page. On the other half, present the checklist in two columns, one to be checked if the student successfully accomplishes the learning objective (Pass) and one column to be checked if the student does not accomplish the learning objective (Fail). This checklist is easy for an instructor to complete while observing student performance during a performance test. If an evaluation includes visits to using commands to evaluate graduate on-the-job performance, a very similar checklist may be used. Changes to the checklist may be required to account for differences between the instructional environment and that of the "real world."
2. **Instructor Performance.** Instructors are commonly evaluated and rated by students through Instructional Rating Forms (IRF) and Course Critique questionnaires. An evaluator can use a checklist during observation of a class to record data on the instructor's ability to effectively present the materials in the lesson plan (See MCO 1553.2_ Appendix O-44 for a sample checklist). The checklist can also be used to assess the instructor's qualifications.
3. **Course Materials.** Course materials (e.g., lesson plans, student materials, media, test items) should be reviewed and updated regularly. The evaluator should ensure that current materials are being used as planned and in accordance with an approved POI (see MCO 1553.2_ O-28 for the Master Lesson File checklists). In addition, a review of course materials should include course control documents including the POI, record of proceedings (ROP), etc. Course control documents provide an administrative check of how the course is being implemented in support of the SAT process.
4. **Instructional Environment and Instructional Equipment.** An evaluator can use checklists in determining whether existing instructional facilities are meeting the requirements of the instructional program. The evaluator should first review the course requirements for instructional equipment and facilities. Evaluation of the instructional environment should include appearance and cleanliness, condition, adequacy of space, and environmental factors (e.g., noise, lighting, distractions). The condition, operation, and appropriateness of instructional equipment should also be evaluated. A preventive maintenance plan should be followed to ensure training devices, simulators and computer equipment remain operable.

SAT USERS GUIDE

APPENDIX A

STANDARD VERB USAGE

The verbs in Sections I-III are the approved verbs for **task titles**. They also provide a partial source of verbs for **learning objectives** and **task performance steps**. The use of standard, well-defined verbs provides clarity, prevents duplicate work, and aids in providing quality training.

Standardized verbs:

Promote clarity

- Allows T&R task/review boards, task analysts, trainers, and Marines to understand what the task statement means. This is particularly important since:
 - The person who analyzes the task may not be the person who developed the task statement.
 - Task selection boards usually make their decisions based on the task statement, before the conditions and standards are fully developed.

Prevent duplication

- It is possible to write the same task many different ways, some so differently that it is almost impossible to tell if it is the same task. If you use standard verbs, it is easier to group tasks by verb and see if you have duplicated behaviors.

Promote application of sound training principles

- There are many words which may appear to be action verbs, but which don't actually refer to an observable action (such as 'know', 'understand,' 'appreciate,' and so on.) By using standard verbs, you will avoid these words and produce sound, observable tasks.

SAT USERS GUIDE

APPENDIX B

SECTION I

SAT STANDARD VERBS

Note: Tactical tasks from MCRP 5-12A Operational Terms and Graphics are Italicized and Underlined. Those verbs marked with an asterisk (*) in Section I, should be used with caution. For a fuller explanation, see Section II, VERBS TO BE USED WITH CAUTION.

*Achieve	To attain a desired end.
Adjust	<ol style="list-style-type: none">1. To correct the actions of a distant unit. <i>Example:</i> Adjust indirect fire.2. To bring parts of instruments into a truer or more effective relative position or setting.
*Administer	To manage or supervise the execution, use, or conduct of a relatively structured activity.
Advise	To counsel or recommend.
Alert	To make aware of.
Align	To place parts in the proper position to one another.
Allocate	To apportion for a specific purpose or to particular persons or things.
Ambush	<ol style="list-style-type: none">1. To attack (by surprise) a moving force with a stationary force. See: MCRP 5-12A Operational Terms and Graphics2. To conduct a surprise attack on another aircraft. <i>Example:</i> Ambush hostile aircraft. See: MCRP 5-12A Operational Terms and Graphics
*Analyze	To separate a whole into its constituents with a view to its examination and interpretation.
Annotate	To make or furnish critical or explanatory notes or comments.
*Apply	<ol style="list-style-type: none">1. To put on. <i>Example:</i> Apply a base coat of paint.2. To use practically.3. To concentrate.
Approve	To give formal or official sanction.
Assault	To carry out the close combat phase of an attack. See: MCRP 5-12A Operational Terms and Graphics
Assemble	<ol style="list-style-type: none">1. To fit the parts of an item together. <i>Note:</i> Usually said of a machine.2. To bring together. <i>Note:</i> Usually said of an organization or group.
*Assess	<ol style="list-style-type: none">1. To determine the importance, size, or value of.2. To fix the amount of.
Assign	<ol style="list-style-type: none">1. To give responsibility. <i>Note:</i> For the execution of a task.

2. To place under the control of.
Example: Assign Marines to EMI.
- Assist** To give aid by participating in a task.
- Attack** An offensive action characterized by movement supported by fire with the objective of defeating or destroying the enemy.
Example: Attack under conditions of limited visibility.
See: Attack by fire, MCRP 5-12A Operational Terms and Graphics
- Authenticate**
1. To verify identity in response to a challenge.
Note: See Challenge.
 2. To verify the authenticity of.
- Block**
1. A tactical mission task that denies the enemy access to an area or prevents his advance in a direction or along an avenue of approach.
 2. An obstacle effect that integrates fire planning and obstacle effort to stop an attacker along a specific avenue of approach or to prevent him from passing through an engagement area
See: MCRP 5-12A Operational Terms and Graphics
- Breach**
1. The employment of any means available to break through or secure a passage through an obstacle.
Note: As an enemy position.
See: MCRP 5-12A Operational Terms and Graphics
 2. To secure passage through.
Note: Usually said of an obstacle.
- Brief** To give information or final precise instructions.
- Bypass** A tactical mission task in which the commander directs his unit to maneuver around an obstacle, avoiding combat with an enemy force.
See: MCRP 5-12A Operational Terms and Graphics
- Calculate** To ascertain by computation.
- Camouflage** Concealing of personnel, equipment, and facilities.
See: MCRP 5-12A Operational Terms and Graphics
- Canalize** To restrict operations to a narrow zone by use of existing or reinforcing obstacles or by fire or bombing.
See: MCRP 5-12A Operational Terms and Graphics
- Challenge** To order to prove identity.
- Change** To make different in some particular.
- *Check** To inspect for satisfactory condition, accuracy, safety, or performance.
- Clear**
1. The total elimination or neutralization of an obstacle that is usually performed by follow-on engineers and is not done under fire.
Examples: Clear a trenchline. Clear a building.
 2. To approve or authorize, or obtain approval or authorization for:
 - a. a person or persons with regard to their actions, movements, duties, etc.;
 - b. an object or group of objects, as equipment or supplies, with regard to quality, quantity, purpose, movement, disposition, etc.
 - c. a request, with regard to correctness of form, validity, etc.
 3. To give a person a security clearance.
 4. To give one or more aircraft a clearance.
 5. To fly over an obstacle without touching it.
 6. To clear the air to gain either temporary or permanent air superiority or control in a

- given sector.
7. To operate a weapon / gun so as to unload it or make certain no ammunition remains.
Example: Clear a M16 rifle.
 8. To free a gun of stoppages.
Example: Clear a stoppage in a M240 machinegun.
 9. To clear an engine; to open the throttle of an idling engine to free it from carbon.
 10. A tactical mission task that requires the commander to remove all enemy forces and eliminate organized resistance in an assigned area.
 11. To pass a designated point, line, or object.
Example: The end of a column must pass the designated feature before the latter is cleared.
- Close**
1. To move into combat range of an enemy force.
Example: Close with, locate and destroy the enemy.
 2. To arrive at a designated position.
 3. To move in such a manner as to present passage through.
- Collate** To bring parts together to form a whole.
Note: Usually said of information or intelligence.
- Collect**
1. To gather or exact from a number of persons or sources.
Note: Usually said of information.
 2. To bring together in a group.
- Combine** To join two or more things such as units, or chemical substances into one.
- Communicate** To convey knowledge of or information about; to make known.
- *Compare** To examine the character or qualities of, especially in order to discover resemblances or differences.
Example: Compare courses of action.
- Complete** To bring to an end and especially into a perfected state.
- Comply** To act in accordance with orders, regulations, policy, etc.
- Compute** To determine, especially by mathematical means.
- *Conduct** To direct or control, lead, or guide.
See: MCRP 5-12A Operational Terms and Graphics
- Confirm** To validate.
- Connect**
1. To join.
 2. To fasten together.
- Consolidate**
1. To organize or reorganize, bringing separate parts together into one whole.
 2. To secure or complete an action.
Example: Consolidate on the objective.
- Construct** To build.
- Contain** To stop, hold, or surround the forces of the enemy or to cause the enemy to center activity on a given front and to prevent the withdrawal of any part of the enemy's force for use elsewhere.
See: MCRP 5-12A Operational Terms and Graphics
- Control**
1. Authority that may be less than full command exercised by a commander over part of the activities of subordinate or other organizations.
 2. Physical or psychological pressures exerted with the intent to assure that an agent

or group will respond as directed.

3. A tactical mission task that requires the commander to maintain physical influence over a specified area to prevent its use by an enemy.
4. Action taken that eliminates a hazard or reduces the risk from that hazard. Part of the third step in risk management.
5. Within command and control, the regulation of forces and other battlefield operating systems to accomplish the mission in accordance with the commander's intent.

See: MCRP 5-12A Operational Terms and Graphics

Coordinate	To bring into a common action, movement, or condition.
Correct	To alter or adjust so as to bring to some standard or required condition.
Correlate	To present or set forth so as to show relationship.
*Counsel	Advise or provide guidance.
<u>Counter</u>	To act in opposition to; nullify. MCRP 5-12A Operational Terms and Graphics
Cover	To afford protection or security to.
Cross	To pass over or through.
Cross-check	To check from various angles or sources to determine validity or accuracy.
Debrief	To obtain an oral report on an action or mission immediately afterwards. Example: Debrief a reconnaissance patrol.
Decontaminate	To cleanse or remove chemical or radiological contamination.
<u>Defeat</u>	<ol style="list-style-type: none">1. A tactical mission task that occurs when an enemy force has temporarily or permanently lost the physical means or the will to fight. The defeated force's commander is unwilling or unable to pursue his adopted course of action, thereby yielding to the friendly commander's will, and can no longer interfere to a significant degree with the actions of friendly.2. Defeat can result from the use of force or the threat of its use See: MCRP 5-12A Operational Terms and Graphics.
Defend	To ward off an actual or threatened action. See: Defensive operations, MCRP 5-12A Operational Terms and Graphics
*Define	<ol style="list-style-type: none">1. To determine the limits and nature.2. To state the meaning of.
Delay	To slow the advance of an enemy force without becoming decisively engaged. See: MCRP 5-12A Operational Terms and Graphics
Deliver	To send to an intended target or destination.
*Demonstrate	<ol style="list-style-type: none">1. To feign an action for the purposes of deceiving an enemy.2. To show by reasoning.3. To show the operation or working of.4. To explain by using examples, experiments, or action.
Deploy	<ol style="list-style-type: none">1. To spread out, utilize, or arrange, especially tactically. See: Deployment, MCRP 5-12A Operational Terms and Graphics2. To position for use.
Designate	<ol style="list-style-type: none">1. To indicate and set apart for a specific purpose, office, or duty.2. To select. Note: Usually said of a target.

<u>Destroy</u>	<ol style="list-style-type: none">1. A tactical mission task that physically renders an enemy force combat-ineffective until it is reconstituted. Example: Destroy attacking force.2. To damage a combat system so badly that it cannot perform any function or be restored to a usable condition without being entirely rebuilt. Example: Destroy enemy vehicles. See: MCRP 5-12A Operational Terms and Graphics
Detect	To discover.
Determine	<ol style="list-style-type: none">1. To settle or decide by choice of alternatives or possibilities.2. To fix precisely.
Develop	To set forth or make clear by degrees or in detail.
Direct	<ol style="list-style-type: none">1. To regulate the activities or course by acting through subordinate leaders.2. To control through suggestions and guidelines.
Disassemble	To take apart, usually for the purposes of cleaning or repair.
Disconnect	To sever the connection between.
<u>Disengage</u>	<ol style="list-style-type: none">1. To release or break contact with. Example: Disengage the drive shaft.2. A tactical mission task where a commander has his unit break contact with the enemy to allow the conduct of another mission or to avoid decisive engagement. Example: Disengage from enemy force. See: MCRP 5-12A Operational Terms and Graphics
Dismantle	To render inoperable by taking apart. Note: See Disassemble.
Dispatch	To send away with promptness or speed, especially on official business.
Displace	To leave one position and occupy another. See: MCRP 5-12A Operational Terms and Graphics
<u>Disrupt</u>	<ol style="list-style-type: none">1. A tactical mission task in which a commander integrates direct and indirect fires, terrain, and obstacles to upset an enemy's formation or tempo, interrupt his timetable, or cause his forces to commit prematurely or attack in piecemeal fashion.2. An engineer obstacle effect that focuses fire planning and obstacle effort to cause the enemy to break up his formation and tempo, interrupt his timetable, commit breaching assets prematurely, and attack in a piecemeal effort.3. In information operations, breaking and interrupting the flow of information between selected command and control nodes. See: MCRP 5-12A Operational Terms and Graphics
Disseminate	To disperse throughout. Note: Usually refers to orders, information, and similar matters.
Distribute	To give out or deliver, especially to members of a group.
Draft	To draw the preliminary sketch, version, or plan of.
*Effect	To cause the desired result or outcome. Note: See Achieve.
Emplace	To put in a prepared position. Example: Emplace the howitzer. See: Emplacement, MCRP 5-12A Operational Terms and Graphics
Employ	To make use of, usually in the role of a leader or commander.

Encrypt	Encipher, encode.
Enforce	To see that the provisions (of an order or regulation) are carried out effectively.
Engage	<ol style="list-style-type: none">1. To intermesh or interlock. Note: Usually refers to machinery.2. To fight. See: MCRP 5-12A Operational Terms and Graphics
*Ensure	<ol style="list-style-type: none">1. To make certain. To guarantee.
Enter	To come in.
Erect	To build or set up. Example: Erect OE-254 Antenna.
Establish	<ol style="list-style-type: none">1. To bring into existence.2. To introduce as a permanent entity or procedure.
Evacuate	To move from an area, usually for the purpose of treatment, repair, or prevention of capture. See: MCRP 5-12A Operational Terms and Graphics
Evade	To avoid. See: Evasion and Escape, MCRP 5-12A Operational Terms and Graphics
*Evaluate	To determine the significance or worth of, usually by careful appraisal and study.
Exchange	To part with for a substitute.
<u>Exfiltrate</u>	The removal of personnel or units from areas under enemy control by stealth, deception, surprise, or clandestine means. See: MCRP 5-12A Operational Terms and Graphics
Extend	<ol style="list-style-type: none">1. To increase the scope, meaning, or application of.2. To elongate or to increase the size. Example: Extend the legs of the tripod.
Extract	<ol style="list-style-type: none">1. To remove from an area, usually for combat purposes. Example: Extract a fire team under fire.2. To select and copy out or cite.
Finalize	To put in final or finished form: to give final approval to. Example: Finalize operations order.
Fire	To discharge a weapon.
<u>Fix</u>	To prevent the enemy from moving away from a specific location for a specific time. See: MCRP 5-12A Operational Terms and Graphics
<u>Follow and assume</u>	To follow a lead force and assume the mission if the lead force is fixed or attrited. See: MCRP 5-12A Operational Terms and Graphics
<u>Follow and support</u>	To follow the lead force and support its offensive operations. See: MCRP 5-12A Operational Terms and Graphics
Format	To produce a document or electronic report in a specified form or style.
Formulate	To put into a systematized statement or expression.
Forward	To send onward.
Fuel	To provide with fuel.
Ground	To connect electrically with a ground.
Guard	<ol style="list-style-type: none">1. To protect by physical security means.2. To prevent from escaping by physical security means.

	3. To protect by accepting combat. Example: Guard a flank. See: MCRP 5-12A Operational Terms and Graphics
Harden	To protect passively by providing or increasing resistance to projectiles and similar threats.
Hover	To hold a flying aircraft relatively motionless.
*Identify	<ol style="list-style-type: none">1. To determine critical or necessary conditions or other factors. Example: Identify all specified and implied missions.2. To determine the specific model of an item. Example: Identify threat armored vehicles.3. To ascertain the origin, nature, or definitive characteristics of.
Implement	To give practical effect to and ensure of actual fulfillment by concrete measures.
<u>Interdict</u>	A tactical mission task where the commander prevents, disrupts, or delays the enemy's use of an area or route. See: MCRP 5-12A Operational Terms and Graphics
Infiltrate	To move by small groups, usually clandestinely. See: Infiltration, MCRP 5-12A Operational Terms and Graphics
Inform	To make known.
Input	To provide information to or to enter information into a system.
*Inspect	To examine officially.
Install	To put in an indicated place, condition, or status.
Integrate	To form, coordinate, or blend into a functioning or unified whole.
Interpret	To present or delineate the meaning of. Example: Interpreting for Afghan and English speakers.
Issue	To give out. Example: Issue the operations order.
<u>Isolate</u>	A tactical mission task that requires a unit to seal off - both physically and psychologically - an enemy from his sources of support, deny an enemy freedom of movement, and prevent an enemy unit from having contact with other enemy forces. See: MCRP 5-12A Operational Terms and Graphics
Land	To bring an aircraft to earth.
Launch	<ol style="list-style-type: none">1. To send an aircraft or missile into the air. Note: See take off. Note: Launch usually refers to unmanned vehicles; however, launch may also mean a collective act of sending a manned aircraft aloft. Example: Launch an aircraft from the flight deck.2. To send boats and landing craft from a larger Naval vessel Example: Launch small boats from the well deck.
Lay	To point a weapon in a precise direction. Example: Lay the 60mm Mortar.
Lead	<ol style="list-style-type: none">1. To go at the head. Example: Lead a convoy.2. To exercise direct, low-level control. Example: Lead a fire team to the assault position.
Level	<ol style="list-style-type: none">1. To make even or uniform.2. To apportion equally.

Load	<ol style="list-style-type: none">1. To insert ammunition into a weapon or launcher.2. To place in or on a means of conveyance.
Locate	To determine or set the position of.
Log	To enter details of or about an event in a log.
Maintain	To preserve, fix, or keep in good repair.
Make	To create or cause to happen.
*Manage	<ol style="list-style-type: none">1. To handle or direct with a degree of skill or specialized knowledge.2. To exercise executive, administrative, and supervisory direction.
Modify	To make minor changes in/to.
*Monitor	To watch, observe, or check, especially for a special purpose. Example: Monitor enemy radio traffic.
Motivate	To provide with an incentive.
Move	To proceed from one point to another.
*Name	<ol style="list-style-type: none">1. To designate or mention by name.2. To appoint.3. To identify by giving the right name.4. To give a name.
Navigate	Determine and follow a course.
<u>Neutralize</u>	<ol style="list-style-type: none">1. To render ineffective or unusable2. To render enemy personnel or material incapable of interfering with operations3. To render safe mines, bombs, missiles or IEDs.4. To make harmless anything contaminated with a chemical agent. See: MCRP 5-12A Operational Terms and Graphics
Notify	To inform, to warn, to make known, or to make notice of.
Observe	To watch carefully.
Obtain	To gain or attain. Note: Usually by planned action or effort.
<u>Occupy</u>	A tactical mission task that involves a force moving into an area so that it can control the entire area. Both the force's movement to and occupation of the area occur without enemy opposition. Example: Occupy a Forward Operating Base (FOB). See: MCRP 5-12A Operational Terms and Graphics
Open	<ol style="list-style-type: none">1. To make ready for use. Example: Open a Forward Area Rearming and Refueling Point (FARP).2. To make available for entry or passage.
Operate	<ol style="list-style-type: none">1. To cause a piece of equipment to function.2. To perform a function.
*Orchestrate	<ol style="list-style-type: none">1. To compose/arrange music.2. To organize, manage, or arrange.
Order	To command a specific action to be executed. See: MCRP 5-12A Operational Terms and Graphics
Organize	To arrange by systematic planning and united support.
Orient	To point or look in a specific direction.

	Example: Orient weapons on assigned sector.
*Oversee	To watch over and direct.
Pack	To place in a container for transportation or storage.
Patrol	To conduct security or offensive operations with small, specially tailored groups. Example: Patrol the gaps between units. See: MCRP 5-12A Operational Terms and Graphics
*Perform	To carry out an action or pattern of behavior.
Place	Put in proper position or location. Note: "Position" or "locate" are usually better choices.
Plan	1. To devise or project. See: MCRP 5-12A Operational Terms and Graphics 2. To formulate a systematic scheme or program of action.
Plot	To mark or note on a map, chart, or graph.
Police	1. To provide protective or police services. 2. To make clean and put in order.
Position	To put in place; to set.
Post	1. To make transfer entries. 2. To position at a certain site. Example: Post the guard.
Predict	Foretell on the basis of observation, experience, or scientific reason.
Prepare	1. To put together. Example: Prepare launcher for firing. 2. To combine elements and produce a product. Example: Prepare a meal. 3. To make ready. Example: Prepare to continue the attack. 4. To make other persons or things ready. Example: Prepare a fighting position.
Prevent	To keep from occurring or recurring. Example: Prevent cold weather injuries.
*Prioritize	To put in order or rank. Note: Especially for the purpose of allocating resources.
Process	To initiate a series of actions or operations leading to a particular end. Example: Process a leave request.
Produce	To develop or create.
Project	To plan, calculate, or estimate for the future. Example: Project ammunition expenditures.
Protect	To shield from destruction; safeguard.
Provide	To supply or make available.
Publish	To produce for distribution. Example: Publish the duty roster.
Range	To determine the distance. Note: Usually to a target. See: MCRP 5-12A Operational Terms and Graphics
Reach	To arrive at a location.

React	To respond, usually to an emergency situation with a limited choice of actions. Example: React to Engine Failure in Flight.
Read	To examine carefully so as to understand.
Realign	To reorganize or make new groupings.
Reassess	To re-determine the extent or value.
Recall	To bring back (forces) to another location.
Receive	To acquire from someone else. Example: Receive Patients.
*Recognize	To determine the category of an item. Learning Objective Example: Recognize Threat Armor Vehicles.
Recommend	To endorse as worthy, fit, competent, exceptional, etc.
Reconnoiter	To obtain information by visual observation or other methods. Note: Reconnoiter usually implies a physical movement to the area to be observed. See: Reconnaissance, MCRP 5-12A Operational Terms and Graphics
Record	<ol style="list-style-type: none">1. To set down as a means of preserving information.2. To document.3. To mechanically or electronically save information.
Recover	To extract damaged or disabled equipment and move to a location for repair.
Redistribute	To reallocate, usually in response to uneven consumption or usage. Example: Redistribute ammunition.
<u>Reduce</u>	<ol style="list-style-type: none">1. To diminish in size, amount, extent, or number.2. A tactical mission task that involves the destruction of an encircled or bypassed enemy force.3. One of the five breaching fundamentals. The creation of a lane through, over, or around an obstacle. To render ineffective by partially dismantling. Example: Reduce an obstacle.4. To render operable by following a prescribed procedure to eliminate a malfunction. Example: Reduce a stoppage in a M249 Squad Automatic Weapon. See: MCRP 5-12A Operational Terms and Graphics
Reestablish	To establish again, usually in response to a combat loss or damage. Example: Reestablish communications.
Reexamine	To examine again.
Release	<ol style="list-style-type: none">1. To let go.2. To set free from configuration or condition.
Relieve	<ol style="list-style-type: none">1. To replace. Example: Relieve a Company in place.2. To reduce or eliminate pressure on. Example: Relieve an encircled unit. See: Relief in place, MCRP 5-12A Operational Terms and Graphics
Relocate	Establish or lay out in a new place.
Remove	<ol style="list-style-type: none">1. To take away or displace.2. To dismiss.3. To eliminate, kill, or destroy.
Reorganize	To organize again, usually as a result of combat damage or loss. See: Reorganization, MCRP 5-12A Operational Terms and Graphics

Repair	To restore to serviceable condition.
Replace	To substitute a new or workable item or person.
Replenish	To fill again.
Report	<ol style="list-style-type: none">1. To present an account officially.2. To formally or regularly carry back and repeat to another.3. To provide information on ongoing activities. <i>Example:</i> Report initial enemy contact.
Request	<ol style="list-style-type: none">1. To ask for.2. To ask someone to do something.
Resolve	To reduce by analysis.
Restate	To state again or in another way.
Resume	To begin again.
<u>Retain</u>	<ol style="list-style-type: none">1. A tactical task to occupy and hold a terrain feature to ensure that it is free of enemy occupation or use.2. A tactical mission task in which the commander ensures that a terrain feature already controlled by a friendly force remains free of enemy occupation or use. See: MCRP 5-12A Operational Terms and Graphics
Return	To restore to a former or proper place.
*Review	To go over for the purpose of determining correctness or currency.
Revise	To correct or improve. <i>Note:</i> Usually applied to a plan or document.
Rotate	To cause to turn about an axis or center.
Schedule	To appoint, assign, or designate for a fixed time.
<u>Secure</u>	<ol style="list-style-type: none">1. In an operational context, to gain possession of a position or terrain feature with or without force, and to make such disposition as will prevent, as far as possible, its destruction or loss by enemy action.2. A tactical mission task that involves preventing a unit, facility, or geographical location from being damaged or destroyed as a result of enemy action.3. One of the five breaching fundamentals. Those actions which eliminate the enemy's ability to interfere with the reduction and passage of combat power through a lane. Secure may be accomplished by maneuver or by fires.4. To make immobile, make safe or to fix tightly. See: MCRP 5-12A Operational Terms and Graphics
<u>Seize</u>	<ol style="list-style-type: none">1. To clear a designated area and obtain control of it.2. To employ combat forces to occupy physically and control a designated area.3. A tactical mission task that involves taking possession of a designated area using overwhelming force. See: MCRP 5-12A Operational Terms and Graphics
Select	To choose from among others to meet specific standards or criteria.
Send	To dispatch.
Set	To adjust a device to a desired position, to make ready for future action.
Set up	To erect or position components.
Sort	To examine and place into categories.
Splint	To support or restrict.

Stand to	To increase security by coming to full alertness, with all weapons manned and ready. Note: Derived from the phrase "Stand to Arms."
State	To declare or set forth; a condition. Example: Suppress Enemy Air Defenses (SEAD).
Stockpile	To accumulate supplies for use. Example: Stockpile ammunition on a battle position.
Store	To stock or deposit. Note: Store implies protecting from deterioration or pilferage.
Strike	1. To attack. 2. To disassemble. Example: Strike a tent.
Submit	To send forward for approval.
Supervise	1. To oversee. 2. To critically watch, motivate and direct the activities of subordinates.
<u>Support</u>	1. The action of a force that aids, protects, complements, or sustains another force in accordance with a directive requiring such action. 2. A unit which helps another unit in battle. 3. An element of a command which assists, protects, or supplies other forces in combat 4. To aid or help. Note: Usually refers to collective tasks. Example: Support by fire. See: MCRP 5-12A Operational Terms and Graphics
<u>Suppress</u>	1. A tactical mission task that results in temporary degradation of the performance of a force or weapons system below the level needed to accomplish the mission. 2. To actively prevent, usually by firing on. 3. One of the five breaching fundamentals. The focus of all fires on enemy personnel, weapons, or equipment to prevent effective fires on friendly forces. The purpose of suppression is to protect forces reducing and maneuvering through the obstacle and to soften the initial foothold. See: MCRP 5-12A Operational Terms and Graphics
Sweep	To move through and search an area.
Take charge	To assume control or command.
Take off	To send an aircraft into the air. Note: Usually said of a manned aircraft. Note: See Launch.
Task	To assign responsibility.
Template	To estimate or predict enemy dispositions or actions by applying known enemy doctrine.
Test	To examine to prove the value or ascertain the nature of something.
Track	1. To keep a moving target within the sight reticule. Example: Track a target with an Anti-armor Weapon. 2. To follow by means of marks or scent.
Train	To make proficient by instruction and practice. See: MCRP 5-12A Operational Terms and Graphics
Translate	To express in more comprehensible term, or in a different language.

Transmit	To send over a communications net.
Transport	To carry from one place to another, convey.
Treat	To care for medically.
Triage	To assess patients' physical condition to determine treatment priority.
Troubleshoot	To locate the source of trouble in equipment, systems, or operations.
Tune	To put on the proper setting or frequency. Note: As a radio.
<u>Turn</u>	<ol style="list-style-type: none">1. A tactical mission task that involves forcing an enemy force from one avenue of approach or movement corridor to another.2. A tactical obstacle effect that integrates fire planning and obstacle effort to drive an enemy formation from one avenue of approach to an adjacent avenue of approach or into an engagement area.3. To change the direction or orientation of something. See: MCRP 5-12A Operational Terms and Graphics
Update	To bring up to date or make current.
Validate	To substantiate accuracy by comparison or investigation.
Verify	To confirm or establish the accuracy or truth of something.
Wargame	To conduct comparisons of options using rules, data and procedures. Example: Wargame Courses of Action. See: MCRP 5-12A Operational Terms and Graphics
Wear	To bear or have on the person; to carry on the person.
Zero	To set a sight to enable a firearm to shoot a target.

SAT USERS GUIDE

APPENDIX C

SECTION II

VERBS TO BE USED WITH CAUTION FOR T&R TASK LISTS AND TLOS

These verbs should be used with care. Some are only variants of the verb 'Do,' and don't convey any special meaning. Their overuse defeats the purpose of standardized verbs and results in vague, "fuzzy" task statements.

Other verbs in this list are often used for procedural steps in the performance of the task. When selecting a verb for a task title:

1. Choose a verb you think is appropriate.
2. Give yourself the "why" test, i.e., ask "Why would a Marine perform this task?"
3. Determine if the answer to the "why" test is truly "to perform the entire task as written" or "to perform a task step." Your answer will indicate ---
 - a. You selected the correct verb for the task title;
 - b. You need to change the task verb;
 - c. You really have a task step.

Other verbs are most often used to define enabling objectives. For example, when teaching a student to repair an item of equipment, the instructor might require the student to LIST, NAME, or IDENTIFY the component parts of the item.

- Achieve** This verb implies you are going to measure the product (or quality), not the process. A common mistake is to use the verb "achieve" and then to use standards that represent steps in the task rather than the quality of the outcome.
- Administer** The use of this verb should be restricted to fairly mechanical or structured activities or to medical activities. It is not a synonym for 'Manage.'
- Analyze** One usually analyzes something in order to accomplish a real task.
- Apply** The use of "Apply" often leads to unobservable or unmeasurable task statements. **Improper Use Example:** Apply the Principles of War.
- Assess** Difficult to observe or measure. Usually the analyst will state what the individual has to do in order to assess something.
- Check** Checking is usually done as part of supervision or verification.
- Compare** The answer to the "why" test may indicate the "compare" statement is really a task step and not a task.

- Conduct** The verb 'Conduct' should be used ONLY when a more precise verb does not exist or when the use of a more precise verb would result in an unusually clumsy construction.
Example 1 of Proper Use: Conduct a Deliberate Attack.
Example 1 of Improper Use: Attack Deliberately.
Note: "Attack" is the proper verb in the above task statement -- - that's what you're going to do --- but the construction is so clumsy that in this case it is preferable to use "Conduct."
Example 2 of Proper Use: Suppress Enemy Fires.
Example 2 of Improper Use: Conduct Suppression Operations.
CAUTION: The verb "Conduct" (as well as "Perform" and other verbs that simply mean 'Do') is often used to mask a serious error ---using more than one verb in a task statement.
- Counsel** This has the connotation of simply providing general information. The verbs "advise" and "recommend" are usually what is really meant and indicate "action."
- Define** Use of this verb often indicates an enabling objective that would be used in a classroom setting, not the task itself. *Example Of Improper Use:* Define the Purpose of a Front End Analysis.
- Demonstrate** Like "define", "demonstrate" is usually indicative of an enabling objective. *Example Of Improper Use:* Demonstrate an understanding of Front End Analysis by defining the Purpose of a Front End Analysis.
- Effect** Similar in meaning to "achieve" but more vague.
- Ensure** Difficult to observe or measure. Usually the analyst would be better off stating what the individual or unit has to do in order to ensure something happens or doesn't happen.
- Evaluate** Usually indicates a step or enabling objective.
- Identify** May indicate a step or enabling objective.
Example Of Improper Task Title: Identify the Parts of the M16 Rifle.
- Inspect** Usually indicates a step or enabling objective.
- Manage** Difficult to observe or measure. Usually the analyst would be better off stating what the individual has to do in order to manage something. Since management is a complex set of skills, a task that uses the verb "manage" should be closely examined. It will often be found to be so broad that it must be split into several more well-defined tasks.
- Monitor** Usually indicates a step or enabling objective.
- Name** Nearly always indicates an enabling objective.
- Orchestrate** 1. To compose/arrange music.
2. To organize, manage, or arrange.

- Oversee** To watch over and direct.
- Perform** "Perform", like "conduct", is simply another way of saying "do."
- Prioritize** Usually indicates a step or enabling objective.
- Recognize** "Recognize" may be very appropriate for a learning objective, but caution must be used if it is used in a task title as the resulting statement may really be a task step.
Example: Recognize friendly aircraft" may be a step in the task "Report enemy aircraft."
- Review** Usually indicates a step or enabling objective.

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APPENDIX D

SECTION III

VERBS TO USE WITH CAUTION FOR
ENABLING LEARNING OBJECTIVES OR LEARNING ACTIVITIES

Describe	Usually indicates an enabling objective. Not an action verb.
Discuss	Usually indicates an enabling objective or a learning activity. Not an action verb.
Elucidate	Not measurable or observable. Not an action verb.
Explain	Usually indicates an enabling objective. Not an action verb.
List	Usually indicates an enabling objective. Not an action verb.

SECTION IV

VERBS WITH SIMILAR DEFINITIONS

Administer, Manage

"Administer" refers to relatively structured activities, while "manage" refers to broader activities requiring great depth of knowledge and experience. A clerk may administer the unit's publications. An executive or senior officer manages weapons procurement.

Assist, Support

"Support" usually indicates a collective task, while "assist" usually indicates an individual task.

Assist: An assistant participates in the action with the principal actor.

Illustration: The loader assists the gunner.

Support: Implies a different kind of activity than the primary activity.

Illustration: The ACE supports the MEF.

Decide, Determine

Decide: Refers to arriving at a conclusion and to pronounce that decision.

Determine: To settle or decide by choice of alternatives or possibilities and to fix precisely.

Disassemble, Dismantle

Disassemble implies taking apart for the purpose of repairing or cleaning. Dismantling implies taking apart on a relatively long term basis to render inoperable.

Lead, Command

"Lead" implies to go ahead, or to control the activities of a small group.

"Command" is a legal status, which includes not only direction, but also disciplinary authority.

Operate, Employ

"Operate" is to turn on, control, and turn off a piece of equipment.

"Employ" is to ensure that the equipment is used to further the mission of the organization.

Illustration: Sgt Aschinger operates the radio. Capt Garcia employs the communications system.

Recognize, Identify

"Recognize" implies a less stringent standard than "identify". A Marine may recognize a threat vehicle by a characteristic that is common to many different threat vehicles (for example, the boat-shaped nose on most Soviet-designed personnel carriers). In order to identify the vehicle, he would have to determine the model (for example, a BMP-80).

SECTION V

VERBS NOT TO BE USED

Appreciate	Not measurable or observable. Not an action verb.
Become aware of	Not measurable or observable. Not an action verb.
Be familiar with	Not measurable or observable. Not an action verb.
Believe	Not measurable or observable. Not an action verb.
Clarify	Usually indicates an enabling objective.
Consider	Rarely observable. Not an action verb.
Enjoy	Not measurable or observable. Not an action verb.
Execute	Vague. Another version of 'Do.'
Know	Not measurable or observable. Not an action verb.
Relate	Usually indicates an enabling objective. Not an action verb.
Summarize	Not an action verb.
Synthesize	Not measurable or observable. Not an action verb.
Understand	Not measurable or observable. Not an action verb.
Use	Vague. Another version of 'Do.'
Utilize	Vague. Another version of 'Do.'

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APPENDIX E

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APPENDIX F

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