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DEPARTMENT OF PERSONNEL**

**OGDEN AIR LOGISTICS DEPARTMENT OF
PERSONNEL HANDBOOK 36-4**



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**PERSONNEL
OO-ALC/DP COURSEWARE
DEVELOPMENT ADMINISTRATIVE AND
MANAGEMENT PROCEDURES**

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This handbook is for the Manpower, Personnel and Training Directorate (OO-ALC/OO-ALC/DP) and is being published for the management and administration of the Instructional System Development. This Handbook implements regulatory guidance for Instructional System Development methodology and activities as they apply to functional courseware development and management at Hill Air Force Base (HILL AFB). It implements regulatory guidance contained in AFD 36-4, *Air Force Civilian Training, Education and Development*; AFD 36-22, *Air Force Military Training*; AFD 36-23, *Military Education*; AFI 36-2201, *Air Force Training Program*; AFI 36-401, *Employee Training and Development*; AFMCI 36-201, *Education and Training*; AFI 36-2232 AFMC Supplement 1, *Maintenance Training*; and AFMAN 36-2234, *Instructional System Development*. This handbook applies to all military, civilian, and contractor personnel responsible for developing and managing Hill AFB functional training courseware. Ensure that all records created as a result of the processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records* and disposed of in accordance with the AF Records Disposition Schedule (RDS) located at <https://www.my.af.afirms/afirms/afirms/rims.cfm>. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, Recommendation for Change of Publication, route AF Form 847s from the field through the appropriate chain of command.

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1. INTRODUCTION

1.1. Scope. In order for participants in the HILL AFB Courseware Development and Management Process to work efficiently and effectively together, procedures must be well documented. Such documentation is particularly valuable when applying a complex and dynamic methodology such as Instructional System Development (ISD). This handbook promotes standardization of courseware development and management activities across HILL AFB and reduces the time needed to train new participants entering the process. It lists the typical activities that are used for the full spectrum of courseware issues, and allows the courseware program/project manager to select only those activities that are appropriate for a particular situation.

1.2. Application. Use of the process in this handbook and the minimum evaluation criteria for performed activities is mandatory for the development of formal, functional training provided to HILL AFB audiences. It is optional for the development of education and employee development instruction. It applies to military, civilian and contractor personnel

performing one or more activities in the HILL AFB organic Courseware Development and Management Process for functional training. Effective on the date of this publication, contract specifications for functional courseware products and services shall be written to ensure conformity with this handbook.

1.2.1. Instruction Defined. Instruction is information provided in a structured manner for education, employee development or training purposes.

1.2.2. Formal Training Defined. Formal training is an organized learning experience that has at least one defined learning objective and is documented in employee training records upon completion. It enables the Instructor/Trainer and/or Facilitator to provide accurate, complete and consistent information at the same proficiency level of learning time after time. Coaching, tutoring, and informal on-the-job training that is based entirely on the variables of the situation (e.g., actual workload, prior experience of the employee, background) improving their perspective or morale, employee development instruction does not directly relate to specific job tasks. The effectiveness of employee development learning events cannot be fully evaluated because they do not have performance-based learning objectives.

1.2.3. Functional Training Defined. Functional training is instruction that helps employees learn how to perform specific work processes so that they can efficiently and economically accomplish the mission. It differs from education and employee development instruction which focus on learning for the growth of the individual rather than immediate support of the mission. Soft skills such as teambuilding, change management, communication, etc., are considered functional training, for purposes of this guide, if they are implemented to directly support performance in the workplace.

1.2.4. Education Defined. Education is instruction that helps learners acquire new knowledge disciplines, skill sets, and viewpoints that are not based on the performance requirements of the current job. It prepares learners for non-specific future requirements, and its effectiveness cannot be fully evaluated until the learner is on a job that requires performance related to the educational learning objectives.

1.2.5. Employee Development Defined. Employee development is instruction that focuses on the growth of the individual rather than the performance of a job. While it may indirectly help the mission by increasing the promotion potential of employees or improving their perspective or morale, employee development instruction doesn't directly relate to specific job tasks. The effectiveness of employee development learning events cannot be fully evaluated because they do not have performance-based learning objectives.

1.2.6. Instructional System Defined. An instructional system is the organized combination of procedures, techniques, and resources (e.g., instructors, students, courseware, equipment, tools, facilities, etc.) that are used to instruct specified learning objectives.

1.2.7. Courseware Defined. Courseware is the term commonly used in the Department of Defense (DoD) for course control documents, instructional materials, evaluation materials, and supporting documentation for an instructional system. Examples of courseware items are plans of instruction, training simulation programs, instructional

presentations, student exercises, written tests, source code and authoring files, correspondence, decision documentation, etc.

1.3. Scope. This handbook does not address the methods and resources needed to deliver the instruction after courseware validation. This handbook does cover:

- 1.3.1. Planning of courseware projects.
- 1.3.2. Analysis of instructional requirements.
- 1.3.3. Design of instructional systems.
- 1.3.4. Development of courseware.
- 1.3.5. Initial implementation of instruction.
- 1.3.6. Formal re-evaluation of instructional systems.
- 1.3.7. Management of courseware.

1.4. How to Use This Handbook. Depending on the situation, users may choose to go directly to the phase and activity that applies only to their current assignment, or they may view the entire process as illustrated in the flow charts in Paragraph 2.9, and decide which parts of the handbook will help them in performing their roles.

1.4.1. Content of the Handbook. This handbook contains a group of activities typically performed during functional courseware development and management.

1.4.1.1. Minimal Steps and Formats. When an activity can be accomplished in many effective ways and there is no great value to standardize, or when the outcome of an activity is likely to be impacted by rapidly changing technology, this handbook does not specify the method or format for accomplishing the outcome. Instead, reference is made to additional guidance in the AFMC ISD Courseware Resource Site, (<https://opoc4jsi.hill.af.mil/tor-web/crs/index.html>).

1.4.1.2. Reference to Additional Guidance. The AFMC ISD Courseware Resource Site (<https://opoc4jsi.hill.af.mil/tor-web/crs/index.html>), provides novices with valuable working aids, but does not restrict experienced developers from incorporating creative ideas, quality improvements, and emerging technology into their processes and products.

1.4.1.3. Robust Glossary. This handbook includes a comprehensive glossary of terminology commonly encountered when developing and managing courseware. Attachment 1, *Glossary of References and Supporting Information* has terms that an individual who plans, evaluates or manages courseware should understand when communicating with professional instructional designers. The glossary also defines learning theories and instructional design models that are the foundation of a successful instructional system.

1.4.2. Structure of the Handbook.

1.4.2.1. Overview of the HILL AFB Process. Chapter 2 contains an overview of the ISD model and the HILL AFB Courseware Development and Management Process. It includes flow charts for each phase and function and explains how to apply the process to specific situations.

1.4.2.2. Courseware Activity Chapters. Chapters 3 - 9 describe the various activities that typically take place in the phases and functions of the courseware process. Each activity includes the following categories of information:

1.4.2.2.1. Purpose. Explains the reason the activity is performed.

1.4.2.2.2. Activity Outcomes. Defines the typical deliverables and decisions that result from the activity.

1.4.2.2.3. Additional Guidance. Lists the working aids (procedural guidance, examples, templates, worksheets, quality checklists, etc.) and references found in the AFMC ISD Courseware Resource Site or other sources.

1.4.2.2.4. Evaluation Criteria. Identifies the elements and factors that should be considered when deciding if an activity has been accomplished well enough to move to the next step in the process.

1.4.2.2.5. Decision Tree for Next Activity. Illustrates in a flow chart format the variables involved in deciding where to go next in the courseware process.

1.4.2.3. Attachment 1 includes:

1.4.2.3.1. Courseware references and supporting information.

1.4.3. AFMC ISD Courseware Resource Site. This handbook is augmented by the AFMC ISD Courseware Resource Site.

1.4.3.1. This site contains the most current version of worksheets, templates, samples, quality checklists, and other working aids that support the activities of the HILL AFB courseware process. It also contains references, points of contact, and links to information about ISD, learning theory, educational technology, and other topics related to the development and management of instructional systems.

1.4.3.2. The AFMC ISD Courseware Resource Site is used in conjunction with this handbook to ensure the efficient and effective application of the HILL AFB courseware process.

1.5. Common Participant Roles and Responsibilities. While anyone in any organization may be assigned an activity in the Courseware Development and Management Process, the responsibilities of such individuals can be categorized into a few basic roles.

1.5.1. Training Manager. A training manager may be a supervisor in a training function, or a designated training specialist in any organization. The training manager is responsible for ensuring that the HILL AFB Courseware Development and Management Process is used to develop relevant, effective and economical instructional systems within his/her span of control. The *AFMC Functional Courseware Management* course and the *AFMC Functional Courseware Development Procedures* course help to prepare the training manager for the duties relating to the processing of training gaps, courseware/training/non-training issue worksheets, search for existing content, conduct periodic re-evaluation of existing courseware, manage courseware documentation, etc. As part of his/her responsibility, the training manager:

1.5.1.1. Ensures that sufficient numbers of competent individuals are assigned as courseware developers and managers.

- 1.5.1.2. Provides adequate instruction for inexperienced participants in the HILL AFB Courseware Development and Management Process.
- 1.5.1.3. Coordinates instructional system requirements through the appropriate chains of command.
- 1.5.1.4. Arranges for resources (e.g., people, funds, materials, equipment, time, etc.) to support the Courseware Development and Management Process.
- 1.5.1.5. Ensures that adequate Planning Phase activities are accomplished before a project enters a later phase in the Courseware Development and Management Process.
- 1.5.1.6. Authorizes courseware to be developed or revised only when it is determined that: (1) there is a valid instructional need; (2) the proposed instruction is an effective, cost-efficient solution; and, (3) existing material cannot meet the defined requirement.
- 1.5.1.7. Initiates planning for training in support of upcoming workload, changes in work processes, acquisition of new systems, etc., as early as possible to provide adequate lead time and resources for developing needed instruction.
- 1.5.1.8. Conducts periodic evaluation of instructional systems for which responsible and eliminates instruction unrelated to the mission/job.
- 1.5.1.9. Bases decisions on careful analysis of data collected from the customer and other expert sources, and not on assumptions or incomplete information.
- 1.5.1.10. Sets reasonable suspense dates for courseware activities, realizing that development of instructional systems can be a relatively slow and complex process.
- 1.5.1.11. Ensures that contract documents for the acquisition of functional courseware products and services conform to this handbook.

Note: Education officers and employee development managers perform the same role as training managers for education and employee development courseware.

1.5.2. **Courseware Program Manager.** A courseware program manager is responsible for applying ISD methodology and the HILL AFB Courseware Development and Management Process for a functional area or installation. The primary role is to serve as a liaison between their areas of responsibility and higher education and training (E&T) offices on matters related to courseware. The AFMC Instructional System Development Theory, AFMC Functional Courseware Management, and AFMC Functional Courseware Development Procedures courses help to prepare the Courseware Program Manager to effectively address these issues.

1.5.3. **Courseware Project Manager.** A courseware project manager is responsible for monitoring the progress of assigned courseware projects, assisting the courseware development team in removing obstacles that threaten the timeline or budget of the project, and reporting project status to appropriate E&T offices and customer representatives. Courseware project managers oversee tasks in each ISD phase and function, where their qualifications enable them to identify and prioritize instructional requirements, and to intercede as necessary to ensure that they are met. The AFMC *Instructional System Development Theory, AFMC Functional Courseware Management,*

and *AFMC Functional Courseware Development Procedures* courses help to prepare the courseware project manager to perform these and other critical functions.

1.5.3.1. Qualifications. A courseware project manager demonstrates knowledge of the following:

1.5.3.1.1. The principles of learning, systems engineering, and quality improvement that are the foundation of ISD.

1.5.3.1.2. The various instructional design models, methods, techniques, and media used in a blended learning approach to instruction.

1.5.3.1.3. Processes within Air Force and HILL AFB education, training and employee development programs.

1.5.3.1.4. Reason for each activity in the courseware process.

1.5.3.1.5. Risks of not performing a particular activity in the courseware process.

1.5.3.1.6. Formulas and adjustment factors for computing assignment priority and rough order of magnitude of resources need to accomplish courseware projects.

1.5.4. Courseware Developer. A courseware developer is responsible for creating relevant, engaging, and effective instruction in an efficient and low-risk manner. The developer performs most of the tasks in the Analysis, Design, Development, and Implementation Phases. The *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* course help to prepare the courseware developer to perform these tasks.

1.5.4.1. Qualifications. A courseware developer demonstrates knowledge of the following:

1.5.4.1.1. The principles of learning, systems engineering and quality improvement that are the foundation of ISD.

1.5.4.1.2. The various instructional design models, methods, and techniques used to develop instruction.

1.5.4.1.3. The various methods, techniques, and media used in a blended learning approach to instruction.

1.5.4.1.4. The purpose and value of each activity in the HILL AFB courseware process.

1.5.5. Instructor or Trainer. As the individual who delivers the information to students, the instructor or trainer serves as the expert on the effectiveness of instructional and evaluation activities and materials in meeting their intended purpose. The *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses help to prepare the instructor or trainer for these and other duties. As part of his/her responsibility, an instructor or trainer typically:

1.5.5.1. Assists in planning the course or learning aid.

- 1.5.5.2. Provides input on the flow of the course, and the design and content of the instructional and evaluation materials.
- 1.5.5.3. Tests and provides feedback on effectiveness of the presentation and learning activities.
- 1.5.5.4. Attends train-the-trainer events as needed to become qualified to teach new courses.
- 1.5.5.5. Conducts formal re-evaluation (periodic review) of courses.
- 1.5.5.6. Initiates Interim Changes and out-of-cycle reviews of courseware as needed.
- 1.5.6. Subject Matter Expert (SME). The SME has a high level of knowledge and skill in a particular topic, task, system or process. The primary role of the SME is to verify accuracy and completeness of course content. The SME typically:
 - 1.5.6.1. Assists in planning the course or learning aid.
 - 1.5.6.2. Advises on the specific tasks, performance steps and decision points to be covered, and the conditions and standards for acceptable performance.
 - 1.5.6.3. Contributes to the content of instructional and evaluation materials.
 - 1.5.6.4. Verifies the accuracy and completeness of information in instructional and evaluation materials.
 - 1.5.6.5. Assists in formal re-evaluation (periodic review) of courseware related to the area of expertise to verify currency and accuracy of the materials.
 - 1.5.6.6. Participates in technical reviews, small group tryouts and operational tryouts of the courseware to advise on content and provide input on ways to add relevance (real-world examples, lessons learned, etc.) to the instruction.
 - 1.5.6.7. Alerts instructors or the appropriate E&T office about changes to work processes, directives, or systems when such changes may impact instruction.
- 1.5.7. Subject Area Program Manager or System OPR (Officer of Primary Responsibility). A subject area program manager is responsible for implementing a program that crosses functional areas, such as safety, security, personnel, acquisition, finance, quality assurance, production acceptance certification, etc. A system OPR is responsible for implementing an automated management system that supports one or more functional areas. Both subject area program managers and system OPRs typically:
 - 1.5.7.1. Assist in obtaining necessary resources (e.g., people, funds, equipment, time, etc.) for any instruction that directly supports their program or system.
 - 1.5.7.2. Initiate planning as early as possible for training in support of program changes or new/modified systems, in order to provide adequate lead time.
 - 1.5.7.3. Assist in planning and development of courses and learning aids associated with their program or system.
 - 1.5.7.4. Make certain that training on any new or modified system or equipment item integrates both operational (how to use the system/equipment itself) and functional (how to perform the work process using the system/equipment) instruction.

1.5.7.5. Ensure that contract documents for the acquisition of courseware associated with their program/function contain guidelines outlined in this handbook.

1.5.7.6. Serve as SMEs, or recommend reliable experts who can perform the SME role detailed in Paragraph 1.5.6.

1.5.7.7. Verify that existing instruction adequately supports the directives, policies and strategic plan for their program/system. Report perceived training deficiencies, duplications, or gaps to appropriate E&T office.

1.5.7.8. Assist in formal re-evaluation (periodic review) of courseware related to their program/system to verify accuracy and relevance of materials. Recommend archival or revision of outdated courseware.

1.5.7.9. Immediately alert instructors or the appropriate E&T office about potential/actual changes to their directives, programs or systems when such changes may impact instruction.

1.5.8. Functional Area Supervisor. The functional area supervisor is ultimately responsible for training, qualification and/or certification of assigned personnel. From a courseware development standpoint, a supervisor typically:

1.5.8.1. Works with the appropriate E&T office to identify work center training requirements based on regulatory guidance and work center tasks.

1.5.8.2. Provides SMEs and students as requested in support of courseware development and management activities.

1.5.8.3. Provides graduate assessment survey feedback to evaluate the relevancy and effectiveness of courses and learning aids.

1.5.9. ISD Evaluation Board Member. The ISD Evaluation Board at each installation is comprised of experts on the application of the ISD methodology and the HILL AFB Courseware Development and Management Process. Only experienced courseware developers or courseware program/project managers with the authority to interpret courseware policy for their installation shall be assigned this role. The ISD Evaluation Board member reviews courseware activities performed by others to verify that evaluation criteria in this handbook have been met and the project complies with the intent of the ISD process. If there is no one on staff (or on base) with the qualifications, experience and expertise required to serve as an ISD Board member, the AFMC *Instructional System Development Theory* course, *AFMC Functional Courseware Management* course and the *AFMC Functional Courseware Development Procedures* course help to prepare the appropriate personnel to perform this function.

1.5.10. Courseware Documentation Manager. A courseware documentation manager is responsible for maintaining configuration control of the courseware master files. As part of this responsibility, a courseware documentation manager typically:

1.5.10.1. Assigns course numbers as outlined in AFMCI 36-201.

1.5.10.2. Maintains electronic and physical courseware master libraries.

1.5.10.3. Implements and tracks official changes to courseware master files and processes courseware Interim Change Memos as needed.

1.5.10.4. Distributes courseware to authorized individuals for review or implementation.

1.5.10.5. Activates, archives, deactivates and reactivates courseware upon request from authorized individuals.

2. OVERVIEW OF THE HILL AFB INSTRUCTIONAL DEVELOPMENT PROCESS

2.1. Instructional System Development (ISD) Defined. ISD is a practical and flexible approach for developing and delivering instruction that promotes transfer of learning from the instructional setting to the workplace. It adapts the systems engineering process to provide a means for sound decision making, and integrates art and technology with the scientific principles of psychology, sociology, andragogy, and anthropology to ensure quality of instruction. ISD produces relevant, effective and economical instructional systems.

2.2. Benefits of ISD. Although the ISD method may look cumbersome and costly, it has proven itself to be both efficient and inexpensive in the long run. Because ISD requires systematic collection and careful analysis of data, it encourages objectivity. Because it focuses on the specific requirements and expectations of the customer, it promotes relevancy. Use of the ISD process results in learning objectives that are based on job performance requirements, and instruction that is effective and economical to sustain.

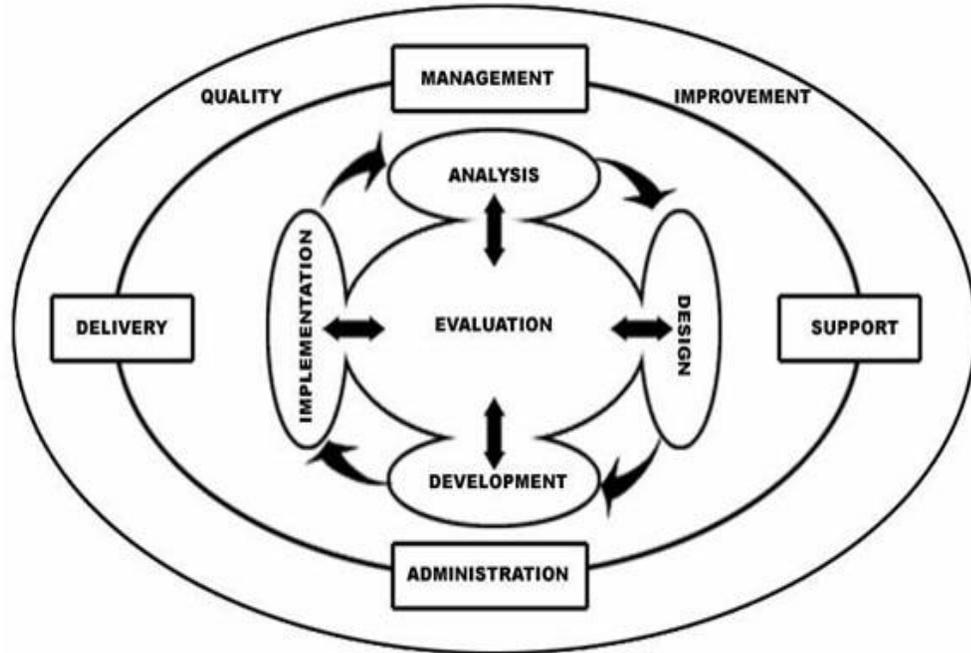
2.3. History of ISD. ISD is not new. It has its roots in a 1950s partnership between the Army and Florida State University (FSU) to research better ways to develop instruction for adult learners. In the 1960s, the Department of Defense (DoD) commissioned faculty members from FSU to formally define a process for the development and delivery of instruction for all DoD services. Those efforts resulted in the original ISD model.

2.4. Evolution of the ISD Model. Over time, advances in instructional technology added more conditions and variables to the original ISD model. The systems engineering process was adapted to control and manage the increasingly complex process. Next, the ISD process was made flexible and interactive with the introduction of phases that could be entered at any point depending on the specific situation. This Analysis, Design, Development, Implementation, Evaluation (ADDIE) model is the basis of nearly all instructional design methodologies in use today. Most recently, advances in learning theory and educational technology caused major changes in some of the ISD variables, and continual evaluation and quality improvement were embedded into all phases and functions of the ISD process to facilitate sound decision-making based on research and analysis.

2.5. Variations of the ISD Process. Nearly all businesses, academic institutions and government agencies that use the ISD process modify it somewhat to meet their specific needs. Some of the variations go by different names such as the Systems Approach to Training (SAT), Instructional Development (ID), or Instructional Systems Design & Development (ISDD). However, the systems engineering process and the generic ADDIE model are still at the core of all of these customized methodologies.

2.6. Current Department of Defense (DoD) ISD Model (Figure 2.1). Figure 2.1 is an illustration of the DoD ISD model that is the basis of the Air Force and HILL AFB ISD processes. MIL-HDBK-1379-2, MIL-HDBK-29612-2A, AFMAN 36-2234, and AFH 36-2235 provide additional information on the ISD model and methodology. This handbook includes a brief overview to provide context for later chapters.

Figure 2.1. DoD ISD Model



2.7. Quality Improvement (QI) Infrastructure. The phases and functions of the ISD model are embedded in, and held together by, an overarching QI process. This QI infrastructure permeates every activity and outcome of the ISD process. It continually generates refinements to the instructional system based on the evaluation of activity outcomes against defined performance requirements. If a product or service resulting from an activity does not meet specified standards, then quality controls in each phase of the ISD process enable management to quickly redirect the project to the appropriate step or activity so that needed remedies or requested improvements are accomplished with little threat to budget or schedule.

2.7.1. ISD System Functions. Management, support, administration, delivery and evaluation are the basic functions that sustain the QI infrastructure and the core phases of the ISD process. Each of these functions involves numerous responsibilities and activities that ensure instructional systems are developed, delivered and maintained in an effective manner.

2.7.1.1. Management. This function directs, monitors and controls all activities associated with the instructional system throughout its life cycle. Various participants (e.g., supervisors, instructors, courseware developers, etc.) can perform management roles. Some of the basic management activities are:

2.7.1.1.1. Planning for instructional system activities.

2.7.1.1.2. Arranging resources such as skills, facilities, equipment, funding, etc., needed to accomplish planned activities in support of the instructional system.

2.7.1.1.3. Reporting on the status of instructional system elements and activities.

2.7.1.2. Support. This function involves long-range and day-to-day tasks that are performed in order to implement and maintain the instructional system throughout its life cycle. Some of the basic support activities are:

2.7.1.2.1. Providing funding, facilities, manpower authorizations, and services in support of instructional activities.

2.7.1.2.2. Supplying equipment, skilled personnel, courseware and instructional aids.

2.7.1.2.3. Maintaining facilities, equipment, skilled personnel, courseware and instructional aids.

2.7.1.3. Administration. This function conducts the day-to-day operations of the instructional system throughout its life cycle. Some of the basic administration activities are:

2.7.1.3.1. Preparing documentation such as instructional materials, course control documents, plans and reports.

2.7.1.3.2. Maintaining records such as courseware master files, rosters, test scores, student completions, budgets, and contracts.

2.7.1.3.3. Providing staff support such as processing personnel actions, and maintaining employee development programs.

2.7.1.3.4. Scheduling resources such as personnel, equipment and facilities.

2.7.1.3.5. Implementing and maintaining automated information management systems and other tools to support instructional system activities.

2.7.1.3.6. Administering funds and contracts.

2.7.1.4. Delivery. This function provides the instruction to students throughout its life cycle. Some of the basic delivery activities are:

2.7.1.4.1. Providing an infrastructure for distance learning including an on-line course management system, equipment, and facilities.

2.7.1.4.2. Supplying skilled personnel to instruct courses.

2.7.1.4.3. Maintaining current, effective and appealing courseware.

2.7.1.5. Evaluation. This function is the bridge between the Quality Improvement (QI) infrastructure and the system phases of the ISD process. It is a continual measurement of activity outcomes against defined performance requirements, and is part of every step in the ISD process. The evaluation function gathers feedback to assess the instructional system and student performance. Some basic evaluation activities include:

2.7.1.5.1. Formative evaluation such as internal reviews, individual tryouts, small group tryouts, and ISD Evaluation Board validations conducted during the Analysis, Design and Development Phases.

2.7.1.5.2. Summative evaluation such as operational tryouts during Implementation Phase.

2.7.1.5.3. Operational evaluation such as periodic Instructor/Trainer and/or Facilitator review, subject matter expert/program manager review, graduate assessment surveys and other types of review of the instructional system after implementation.

2.8. HILL AFB Functional Courseware Development and Management Process. HILL AFB has applied the DoD Instructional System Development (ISD) model to its standardized process for courseware development and management. The HILL AFB process includes Planning, Analysis, Design, Development, and Implementation Phases, Courseware Re-Evaluation, and the Courseware Management Acquisition and Contract Oversight Functions, as defined below:

2.8.1. Planning Phase. Analyze performance deficiencies, define training requirements, decide on instructional strategies, identify the activities and deliverables of the proposed courseware project, and estimate the resources needed to accomplish it. **Note:** AFH 36-2235, Volume 1 provides additional Air Force related information and guidance for completing the Planning Phase of the ISD process.

2.8.2. Analysis Phase. Further analyze requirements to determine precisely what should be included in the instruction, the types of learning involved, the proficiency level of learning needed for the target audience, and any prerequisite or follow-on instruction required. **Note:** AFH 36-2235, Volume 2 provides additional Air Force related information and guidance for completing the Analysis Phase of the ISD process.

2.8.3. Design Phase. Create a blueprint of the course or learning aid that shows what instruction, evaluation, and media will be used in each module to meet the defined requirements. **Note:** AFH 36-2235, Volume 3 provides additional Air Force related information and guidance for completing the Design Phase of the ISD process.

2.8.4. Development Phase. Develop, test, and revise instructional and evaluation materials, and prepare the instructional system for full operational tryout in the field. **Note:** AFH 36-2235, Volume 4 provides additional Air Force related information and guidance for completing the Development Phase of the ISD process.

2.8.5. Implementation Phase. Validate the instructional system under field conditions, make final changes, post the official courseware master file in the appropriate installation functional courseware library, distribute courseware to authorized users, and personalize lesson plans so that the course or learning aid is fully operational and ready for use in the field. **Note:** AFH 36-2235, Volume 5 provides additional Air Force related information and guidance for completing the Development Phase of the ISD process.

2.8.6. Courseware Re-Evaluation. Periodically review courseware to determine what changes are needed, and either revalidate instruction or initiate a revision project.

2.8.7. Courseware Management Function. Establish courseware policies, programs, procedures and working aids; plan, obtain, distribute and manage resources; monitor, assess and report on the health of courseware; control Interim Changes and distribution of instructional materials; promote standardization and re-use of instructional materials; and implement quality improvement measures in support of courseware development and sustainment.

2.9. HILL AFB Process Flow Charts. The flow charts that follow show the activities associated with the various phases and functions of HILL AFB functional courseware development and management. *Keep in mind that this is by no means a rigid or linear process, and individual projects include only those activities needed to ensure relevant, effective and economical instructional systems.*

Figure 2.2. Planning Phase

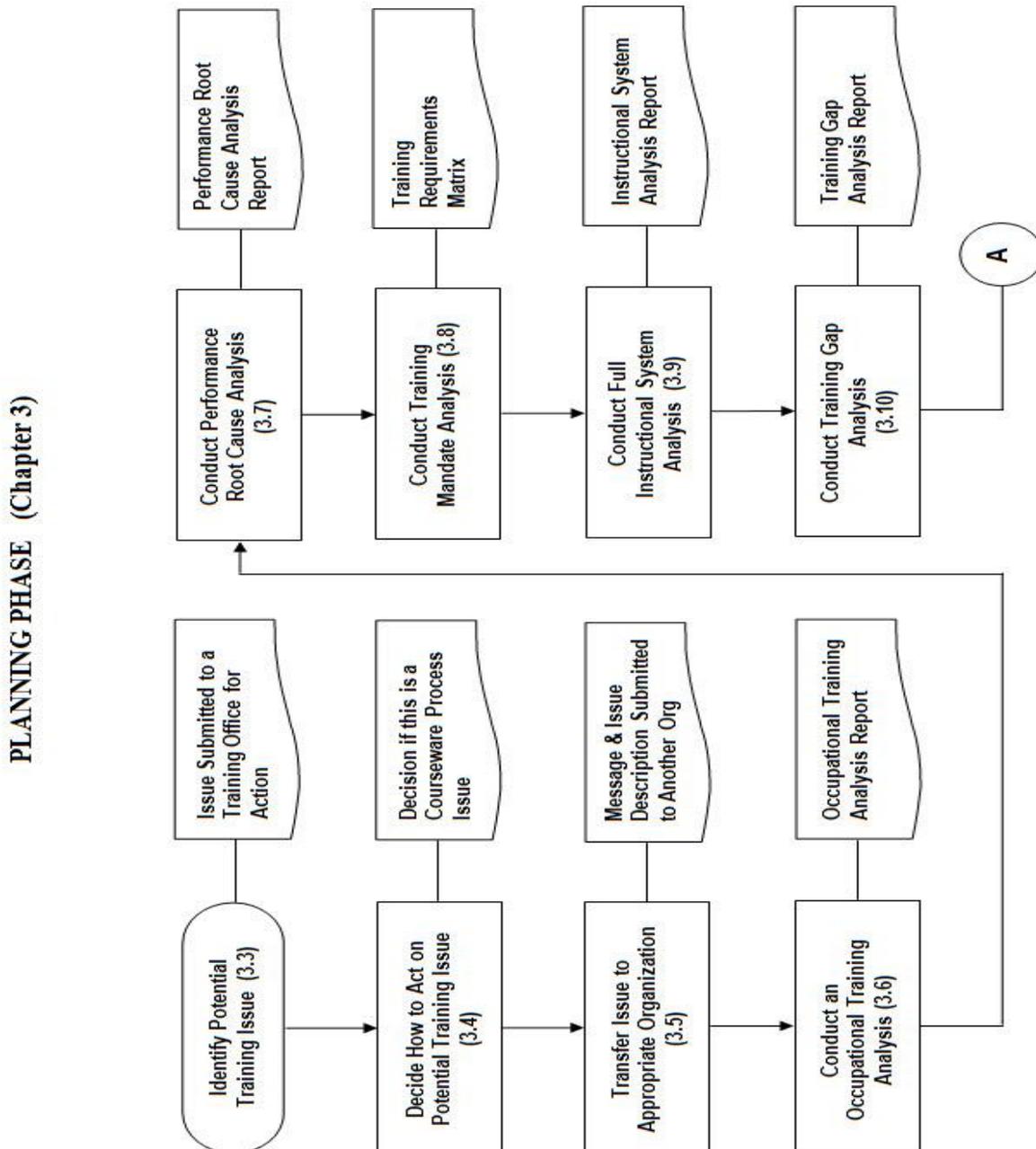


Figure 2.3. Planning Phase (Continued)

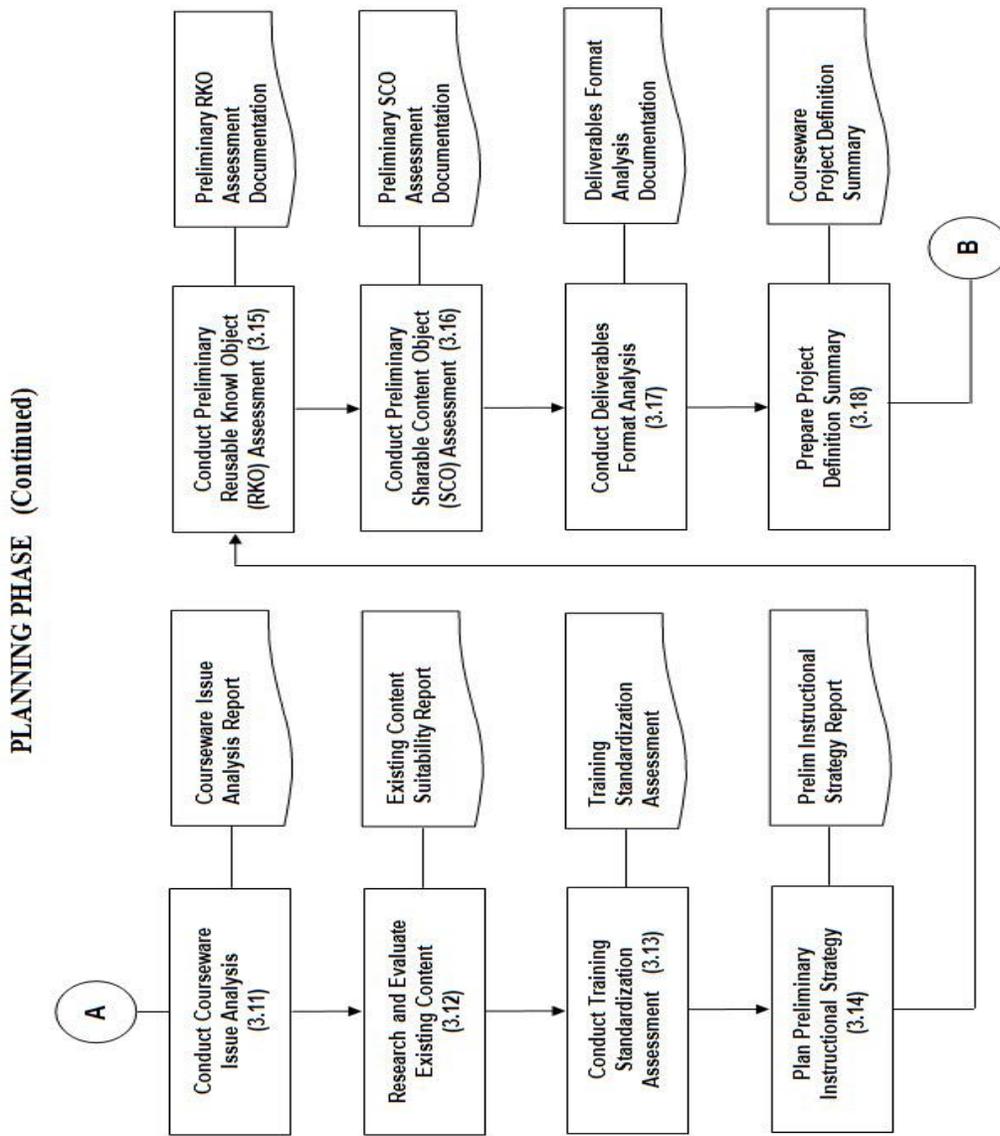


Figure 2.4. Planning Phase (Continued)

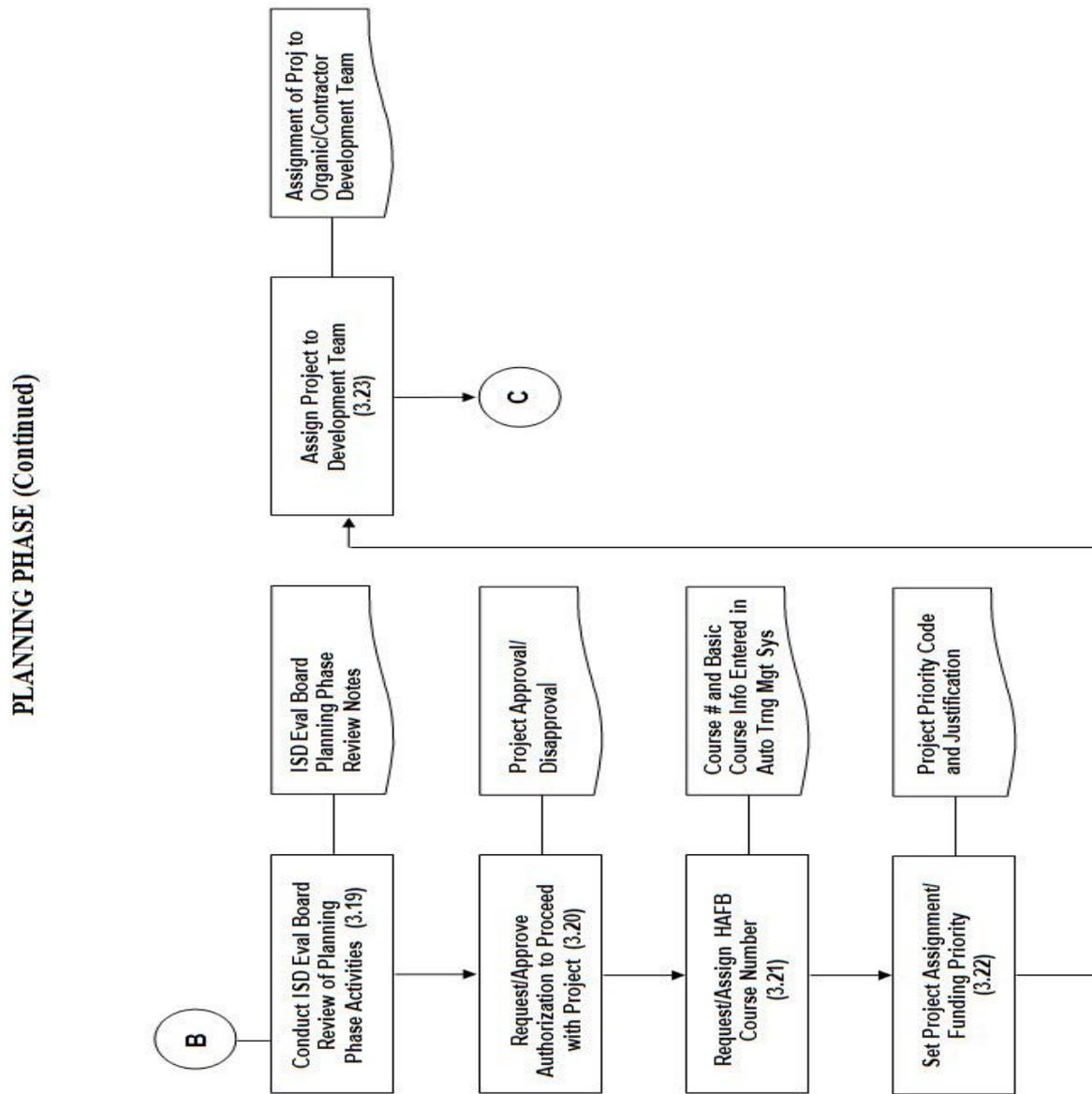


Figure 2.5. Analysis Phase (Chapter 4)

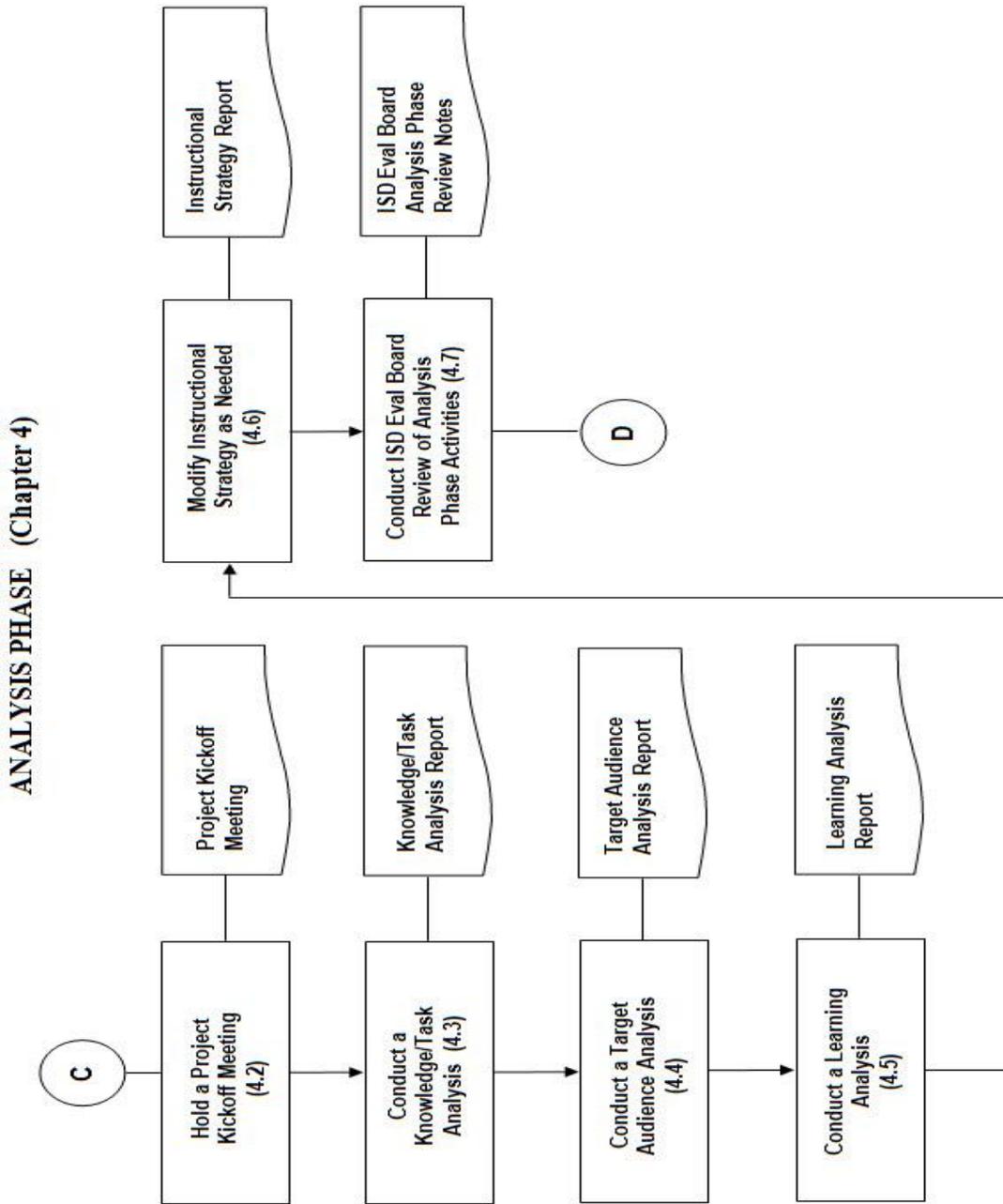


Figure 2.6. Design Phase (Chapter 5)

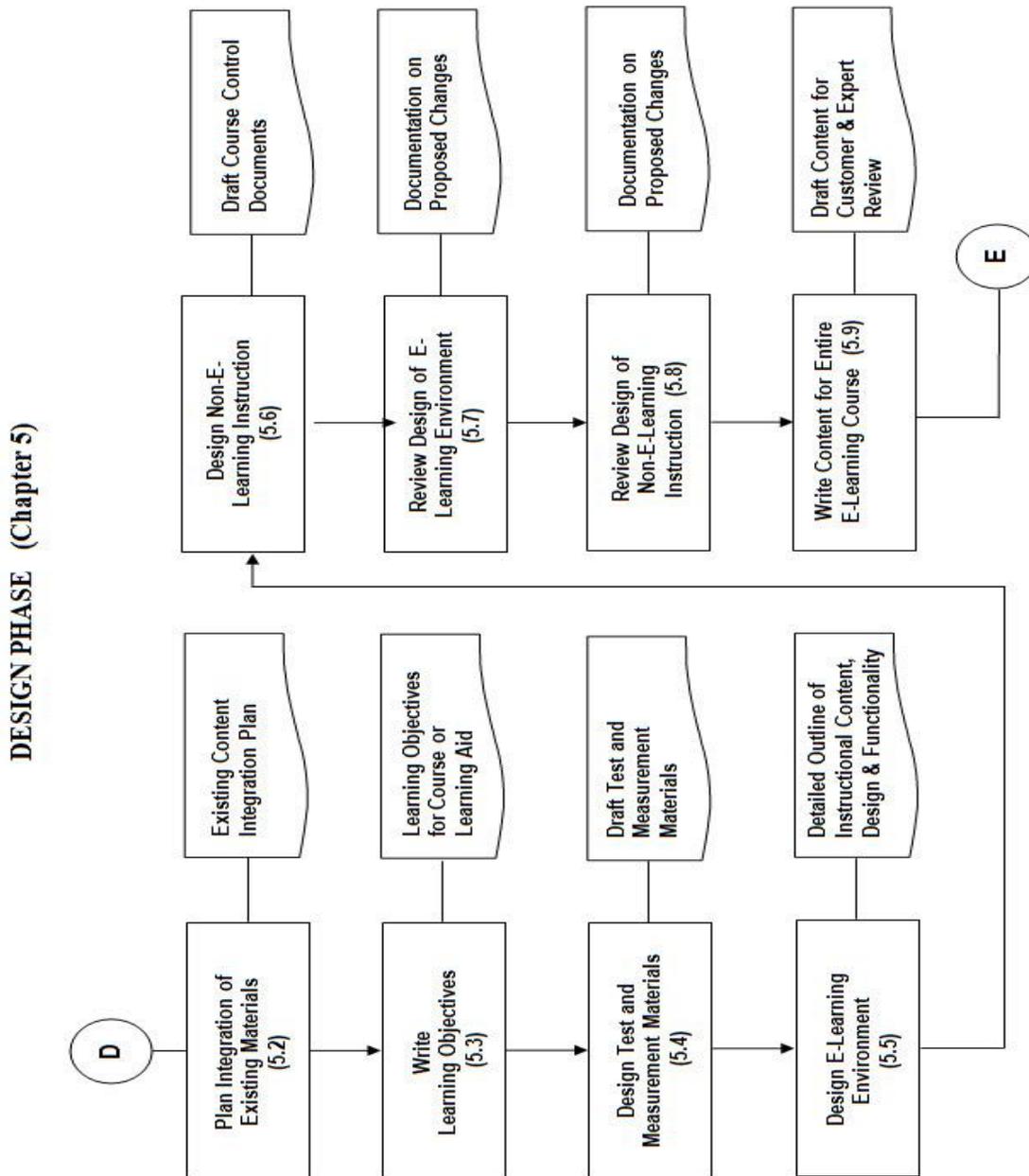


Figure 2.7. Design Phase (Continued)

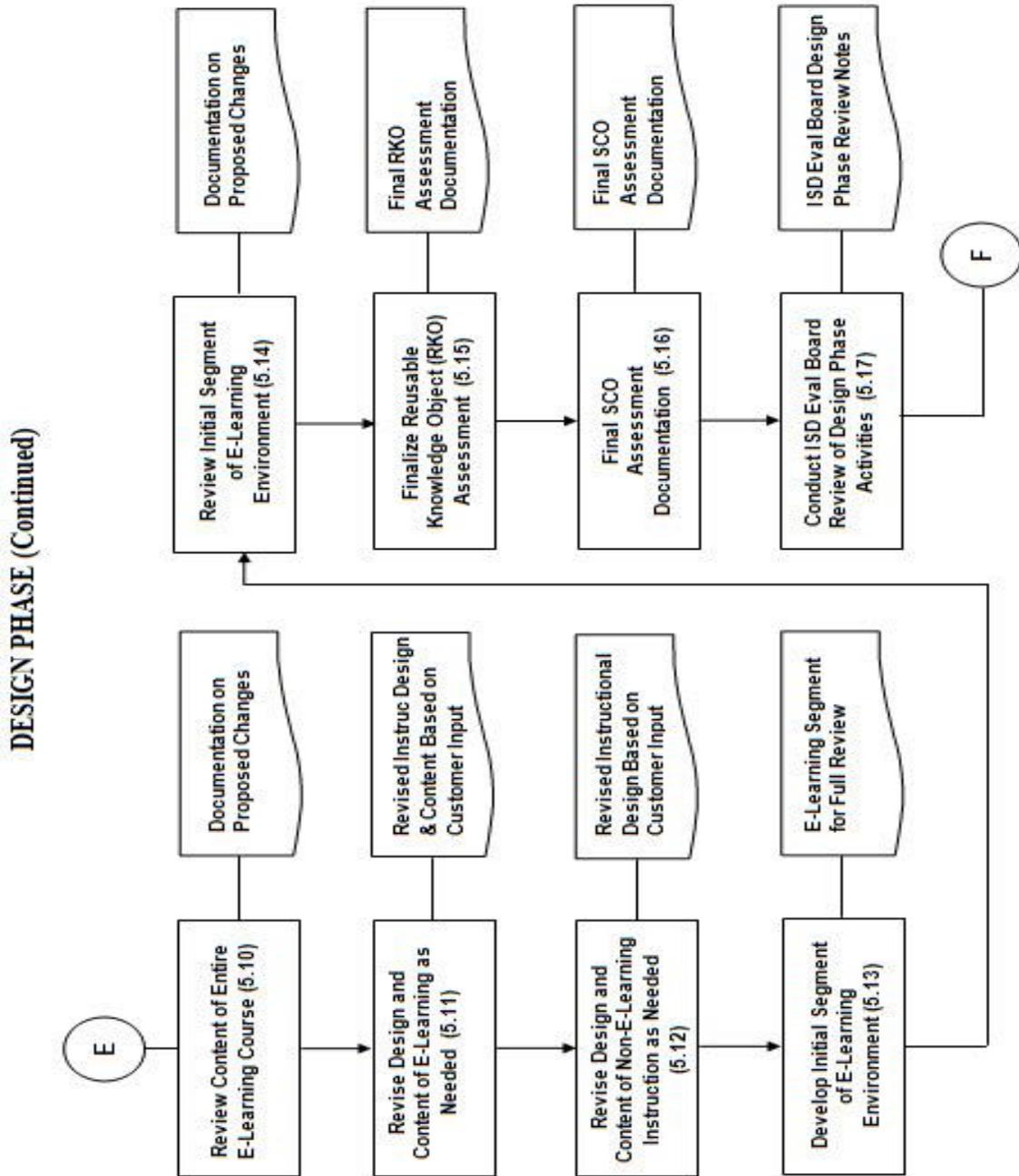


Figure 2.8. Development Phase (Chapter 6)

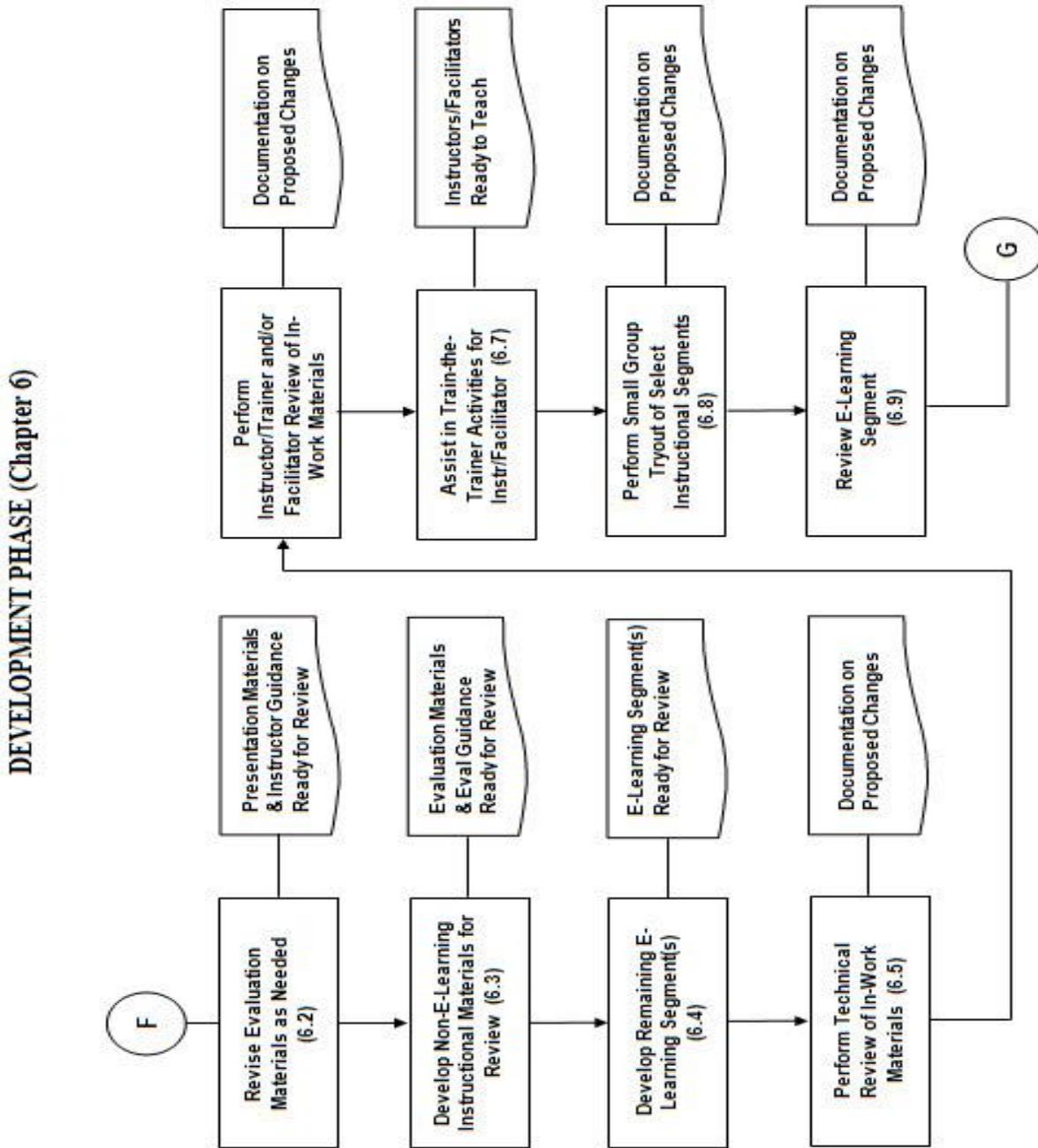


Figure 2.9. Development Phase (Continued)

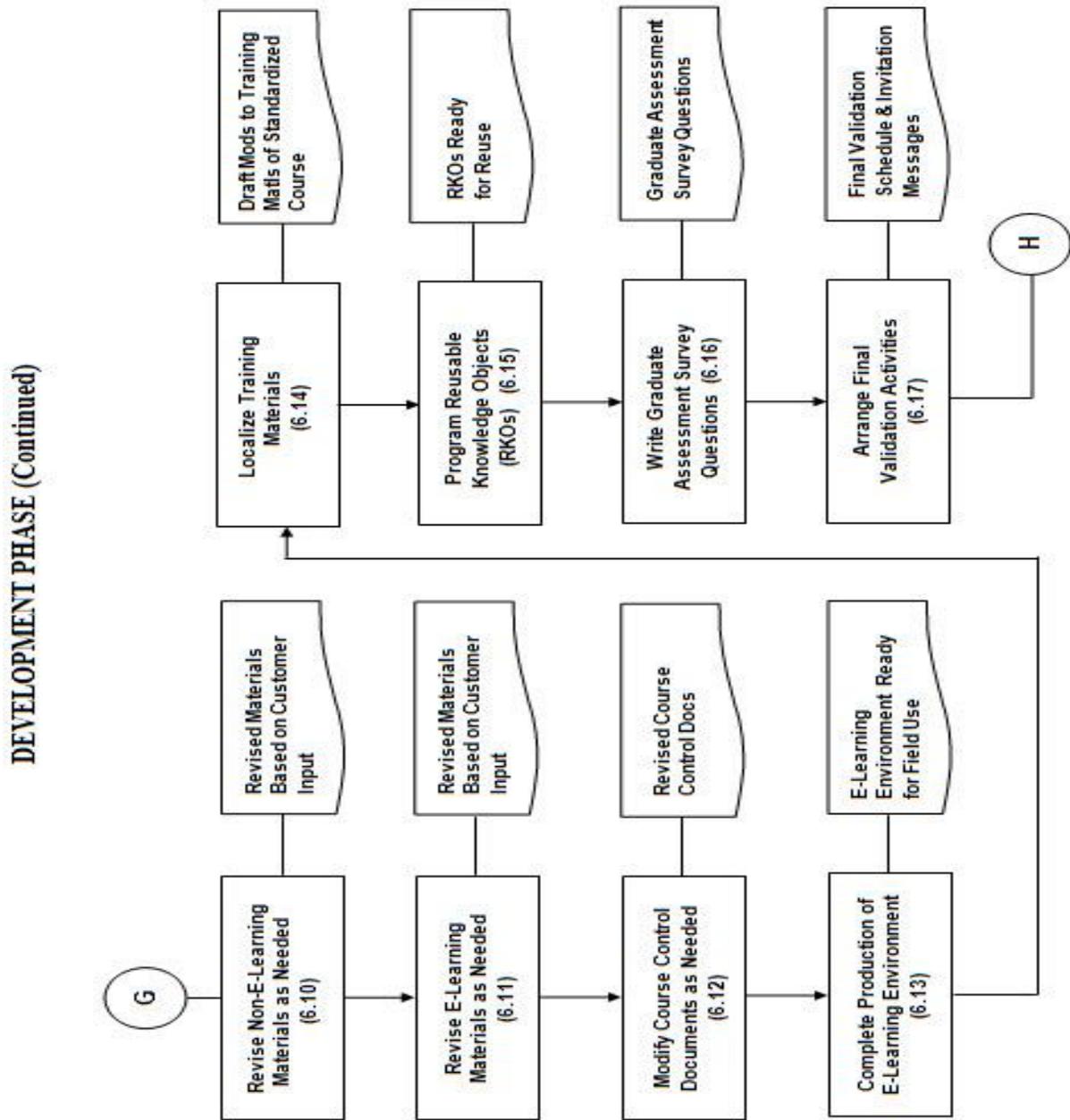


Figure 2.10. Development Phase (Continued)

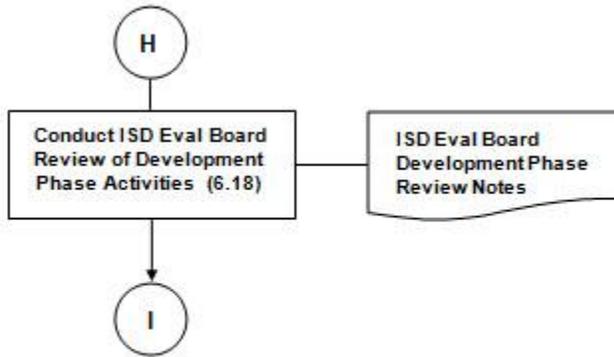


Figure 2.11. Implementation Phase (Chapter 7)

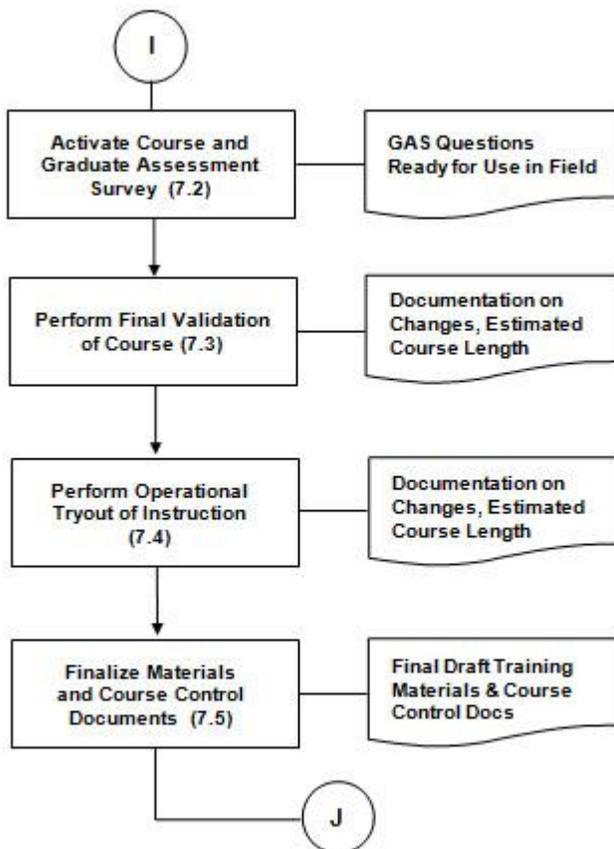


Figure 2.12. Implementation Phase (Continued)

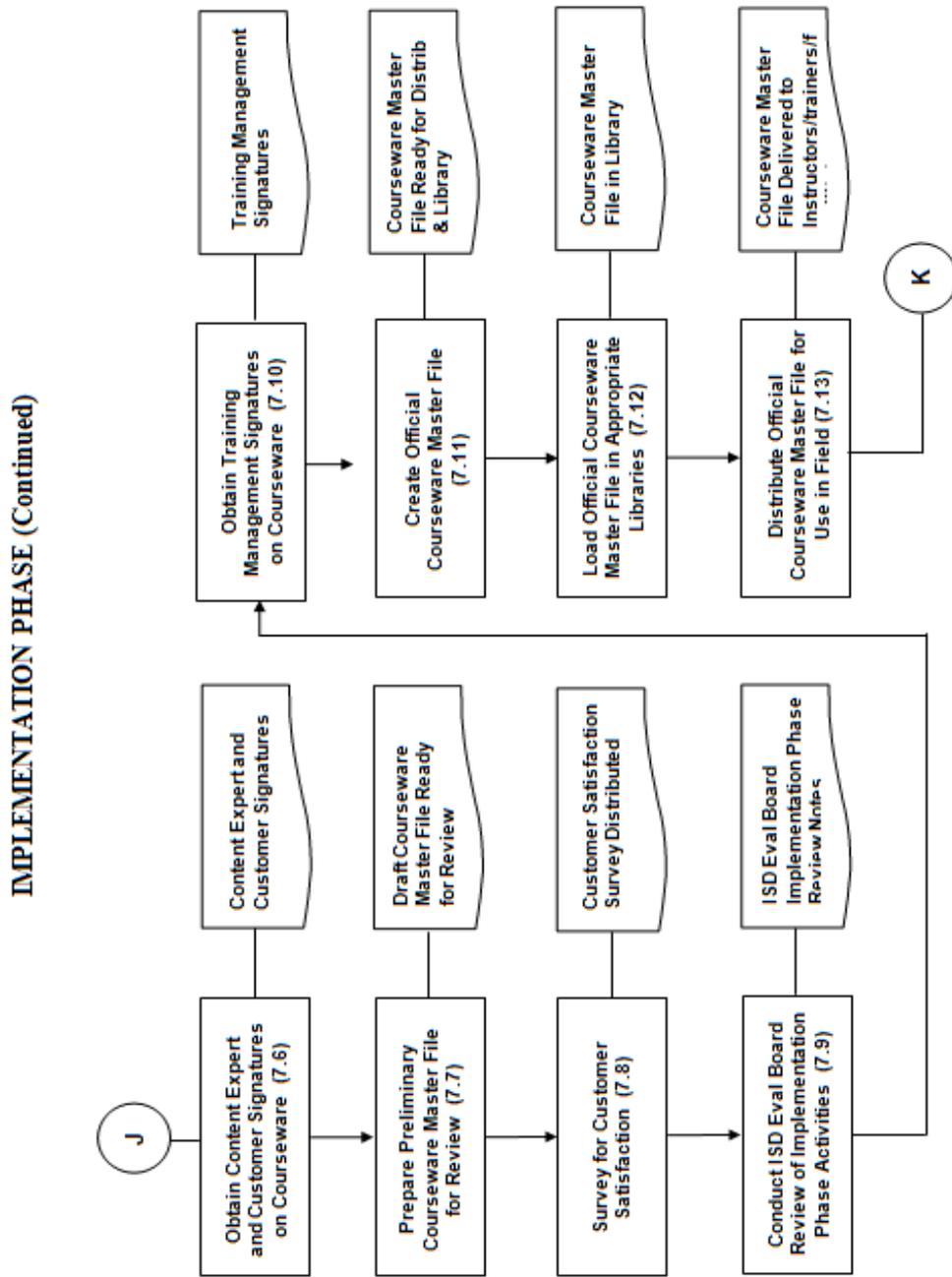


Figure 2.13. Implementation Phase (Continued)

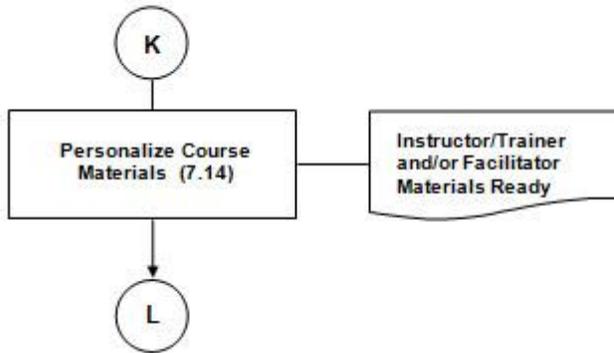


Figure 2.14. Courseware Re-evaluation

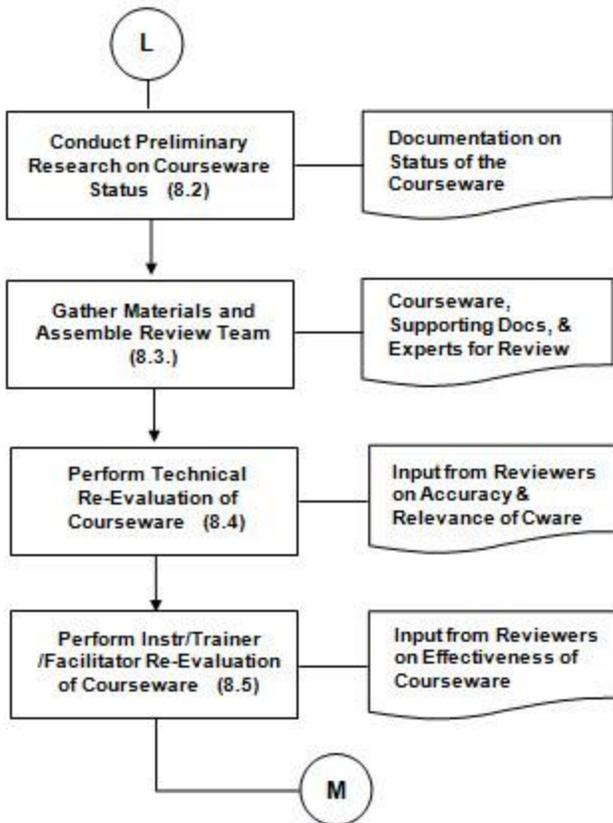


Figure 2.15. Courseware Re-evaluation (Continuation)

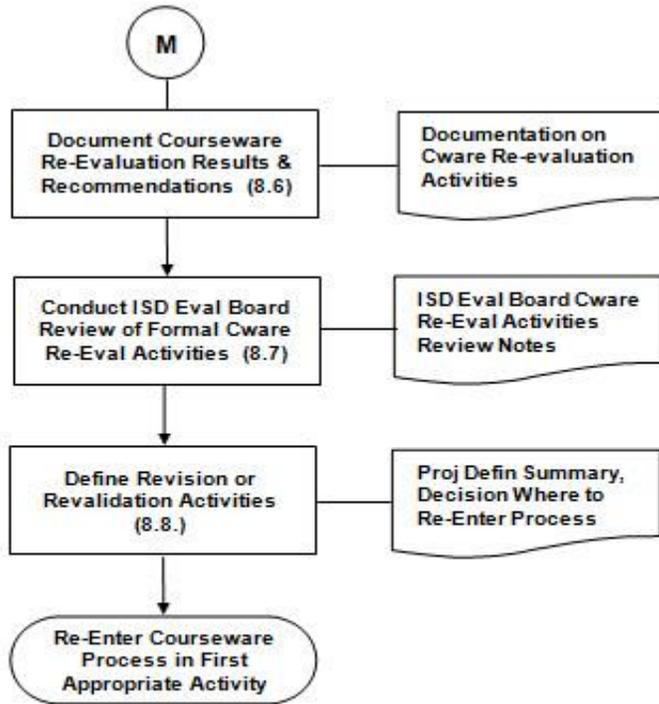


Figure 2.16. Courseware Management Function (Chapter 9)

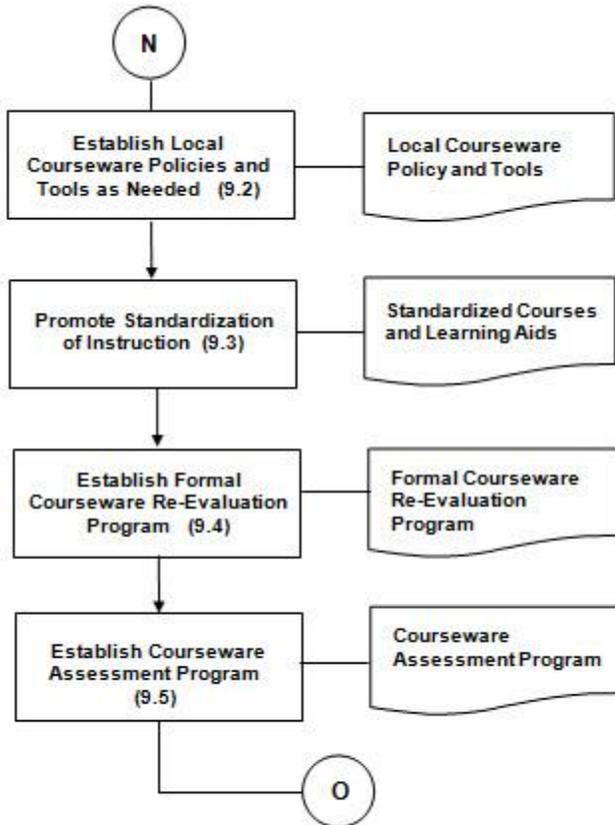


Figure 2.17. Courseware Management Function (Continued)

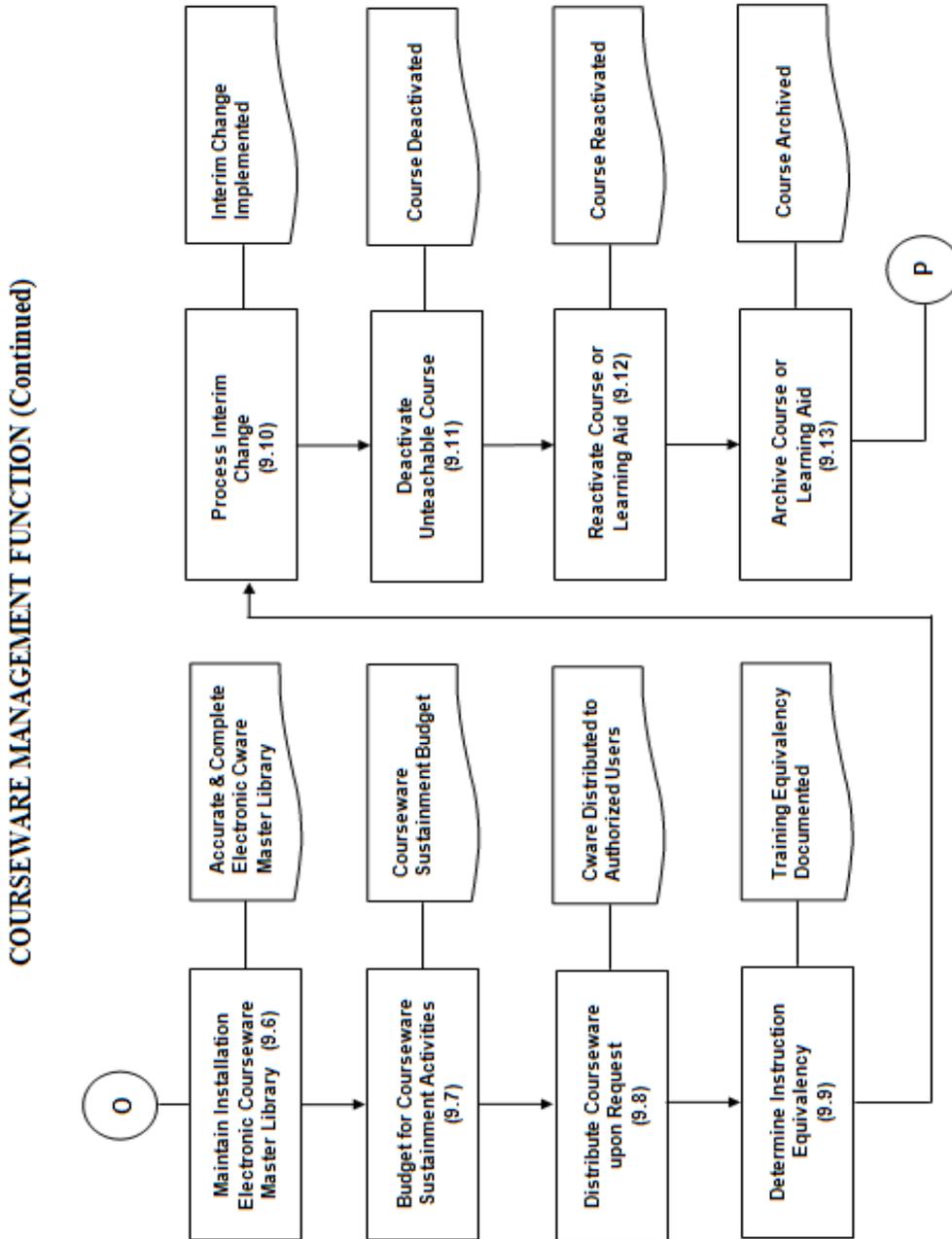
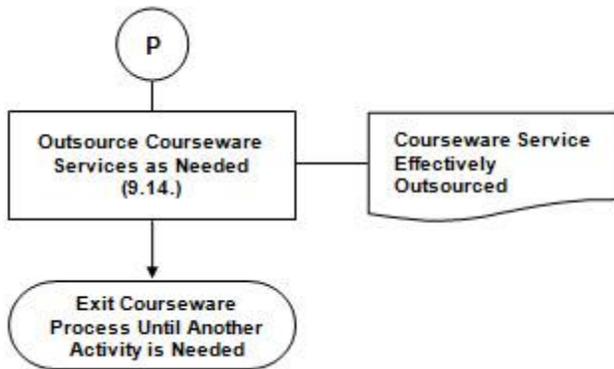


Figure 2.18. Courseware Management Function (Continued)



2.10. Applying the HILL AFB Courseware Process. The HILL AFB Courseware and Development Process for functional training may at first appear intimidating, restrictive, and too time-consuming to be practical in the real world. Actually, it is quite flexible and serves more as a problem-solving and decision-making model than a mandatory list of activities.

2.10.1. Choosing the Activities. The courseware project manager or other instructional design expert decides which activities will likely be needed in each phase, depending on the constraints and requirements of the particular project. The flow charts in this section are useful tools when selecting appropriate activities.

2.10.2. Entering and Re-Entering the Process. Issues and projects enter the courseware process in the first step of Planning Phase (3.3, *Identify Potential Training Issue*). After the second step of the Planning Phase (3.4, *Decide How to Act on Potential Training Issue*), however, the courseware project manager and courseware development team enter or re-enter the process after deciding on the next appropriate step for the situation.

2.10.3. Adapting the Process. The steps in the HILL AFB courseware process are intended to remind participants of the activities involved in developing and managing instructional systems in a variety of situations and are not supposed to be an obstacle course of rules that must be followed. Issues often arise that require quick and ingenious solutions and the courseware project manager and courseware developer may need to bypass, modify, switch the sequence, or add new steps of their own in response. *If constraints of a particular situation prevent them from following the standard courseware process, they determine ways to mitigate the risks, document their decisions, and implement the plan.*

2.10.4. Flexible Sequence of Activities. While the flow charts illustrate the courseware process in a linear manner, the steps and phases should not be thought of as consecutive in nature. For example, one activity does not have to be completed before the next one is started and steps do not always have to be accomplished in the recommended sequence. Each project has its own natural flow of activities depending on the situation. *As long as the required activities are completed, and the variation in sequence does not waste resources or add unacceptable risk, flexibility is encouraged.*

2.10.5. Making Decisions Based on Data. The ISD approach is successful largely because decisions are based on careful analysis of data collected from customers and

other expert sources rather than on assumptions. Skipping Planning and Analysis steps out of convenience, or making decisions based on assumptions or incomplete data threatens the success of a project.

2.10.6. Evaluation and Quality Control. Evaluation and quality control measures have been built into the courseware process to ensure that instruction is relevant, economical and effective. If an activity outcome does not meet the evaluation criteria or does not provide enough information to make a sound decision, the ISD Evaluation Board official or courseware project manager should not hesitate to request rework or to re-insert the project into a remedial activity to mitigate risk and ensure quality.

2.10.7. Documenting Decisions. Decisions to skip a step, modify requirements for an activity outcome, or redirect the project are documented for audit. Supporting documents/arguments are typically provided in the ISD Evaluation Board review notes.

2.10.8. Experience Counts. The less experience that participants have with developing and managing courseware, the closer they should follow the HILL AFB process in this handbook. Not fully understanding the scientific principles and theories underlying ISD and the reason for each activity in the courseware process has led many novices in the wrong direction, resulting in wasted resources and unnecessary, ineffective or inefficient instruction.

2.11. Adapting the HILL AFB Courseware Process to Education and Employee Development. The HILL AFB Functional Courseware and Development Process can be adapted easily to the development and management of education and employee development instruction. Whenever an activity specifies “training,” simply substitute “education” or “employee development” as appropriate, and the guidance will readily apply.

2.11.1. Planning Phase Activities. Because functional training is the most complex type of instruction, some of the activities in Planning Phase may not be necessary when developing education and employee development courseware.

2.11.2. Academic Accreditation. Accreditation guidance for developing education courseware for formal schools is not covered in this handbook, but may be obtained from the academic institution where the instruction will be delivered.

3. PLANNING PHASE

3.1. Planning Phase Defined. This is the foundation of the courseware process. During the Planning Phase, Subject Matter Experts (SMEs), functional area supervisors, subject area program managers, and automated system Officers of Primary Responsibility (OPRs) work together with courseware specialists to analyze performance deficiencies, define training requirements, decide on instructional strategies, identify the activities and deliverables of the proposed courseware project, and estimate the resources needed to accomplish it. For additional information and guidance relating to the Planning Phase of the Air Force Instructional System Development (ISD) process, refer to AFH 36-2235, Volume 1.

3.2. Reason for Separate Planning Phase. Most major courseware development and revision projects in HILL AFB are contracted out to professional instructional designers. This means that many of the activities which normally fall under the Analysis Phase of the ISD model need to be accomplished before writing contract requirements documents. A second reason

for establishing a separate Planning Phase is to emphasize the importance of these often overlooked activities. Keep in mind that data collected and decisions made during Planning Phase are later validated and adjusted as needed during Analysis Phase, based on changes in the situation and deeper analyses of student demographics and content to be trained.

3.3. Identify Potential Training Issue. In this activity, a customer or training specialist identifies a perceived training issue and submits it to the appropriate Education and Training (E&T) office for action.

3.3.1. Purpose. This activity represents the start of the courseware process regardless of what other activity (e.g., courseware review, occupational training analysis, performance root cause analysis, etc.) triggers it.

3.3.2. Activity Outcome. Outcome is an issue submitted to the appropriate E&T office for action.

3.3.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as lists of directives that provide guidance on education, employee development and training function jurisdictions.

3.3.4. Evaluation Criteria. Is documentation of the training issue sufficient to determine:

3.3.4.1. Nature of the perceived problem?

3.3.4.2. Priority of the assignment?

3.3.4.3. Appropriate organization to handle the tasking request?

Figure 3.1. Decision Tree for Next Activity



3.4. Decide How to Act on Potential Training Issue. In this activity, the training function decides how to act on a perceived training issue submitted by the customer or training specialist.

3.4.1. Purpose. This activity allows the training function to decide where to enter the courseware process based on how much is known about the training issue. It enables experienced participants to solve a problem efficiently without compromising the effectiveness or relevance of the outcome.

3.4.2. Activity Outcomes. Outcomes for this activity are:

3.4.2.1. Decision that either the issue is outside the scope of the courseware process, or a decision that the courseware process will be used to address the education, training or employee development issue.

3.4.2.2. Decision on which organization should handle the issue at this point.

3.4.2.3. Decision on where to go next in the courseware process.

3.4.3. Additional Guidance. It also contains items such as:

3.4.3.1. References on education, training, and employee development function jurisdictions.

3.4.3.2. Instructional materials from the *AFMC Instructional System Development Theory*, *HILL AFB Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on this decision process

3.4.4. Evaluation Criteria.

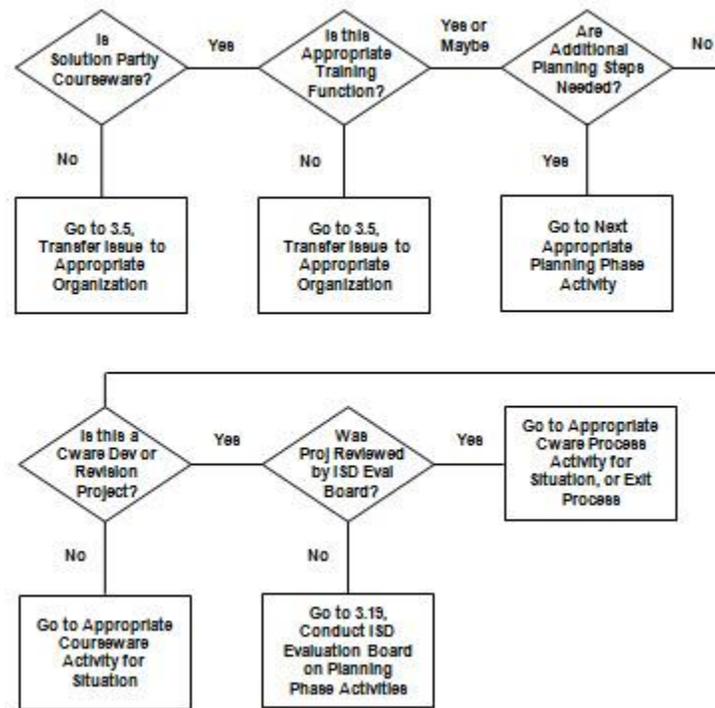
3.4.4.1. Is there enough information in the issue description to justify a determination that courseware is not a direct part of the solution to this problem?

3.4.4.2. Is the decision to send this issue to another organization for action without accomplishing additional activities supported by regulation, policy, or sound logic?

3.4.4.3. Is the decision to skip follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome?

3.4.4.4. If this is a courseware development or revision project, is paragraph 3.19., a planned activity?

Figure 3.2. Decision Tree for Next Activity



3.5. Transfer Issue to Appropriate Organization. In this activity, a training specialist forwards the issue to a more appropriate organization to handle remaining project activities.

3.5.1. Purpose. This activity allows the training function to forward an issue to an organization that is more responsible for the subject matter or the scope of the work involved in it.

3.5.2. Activity Outcome. Outcome is a message with attached issue description that is submitted to a more appropriate organization.

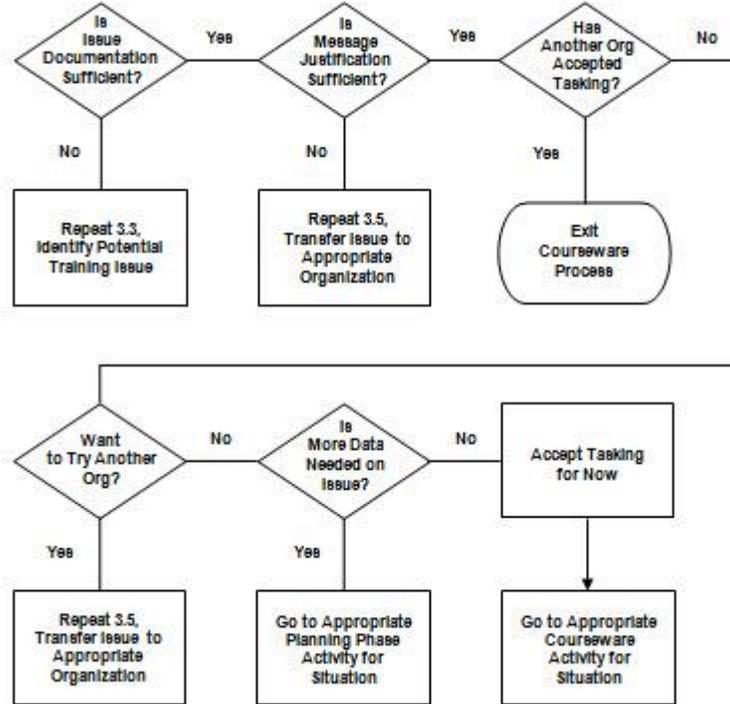
3.5.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. See the AFMC ISD Courseware Resource Site for references on education, training and employee development function jurisdictions.

3.5.4. Evaluation Criteria. Does justification in the message explain:

3.5.4.1. Why approached training function is not most appropriate for tasking?

3.5.4.2. Why this falls into the jurisdiction of another organization?

Figure 3.3. Decision Tree for Next Activity



3.6. Conduct an Occupational Training Analysis. In this activity, a training office identifies the training needed to perform the work of an occupation from entry level through advanced journeyman. It is performed in support of Civilian Career Field Education and Training Plan, Civilian Training Plan, Career Development Plan, Occupational Training Template development, etc. Military occupational training analysis is not addressed here because clear guidance already exists in AFI 36-2201 Volume 5, *Air Force Training Program, Career Field Education and Training*.

3.6.1. Purpose. This activity consolidates several other courseware activities to identify the functional training needed for an occupation. Occupational training analysis helps supervisors and training specialists develop individual and occupational training plans for employees, and assists courseware developers by identifying training requirements and target populations.

3.6.2. Activity Outcomes.

3.6.2.1. Occupational Training Analysis Report.

3.6.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.6.2.3. Decision on where to go next in the courseware process.

3.6.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as references on occupational training analysis and guidance, worksheets, and examples.

3.6.4. Evaluation Criteria.

3.6.4.1. Does the Occupational Training Analysis Report include, at a minimum:

3.6.4.1.1. Knowledge/Task Analysis Report that meets criteria for that analysis activity? (See paragraph 4.3. for evaluation criteria.)

3.6.4.1.2. Training Requirements Matrix that meets criteria for that activity? (See paragraph 3.8. for evaluation criteria.)

3.6.4.1.3. Instructional System Analysis Report that meets criteria for that activity? (See paragraph 3.9. for evaluation criteria.)

3.6.4.1.4. Training Standardization Assessment that meets criteria for that activity? (See paragraph 3.13. for evaluation criteria.)

3.6.4.1.5. Completed tasking worksheets for any action items defined during the occupational training analysis?

3.6.4.2. Did the data come from, or was it approved by, those in authority to define training requirements for the subject area?

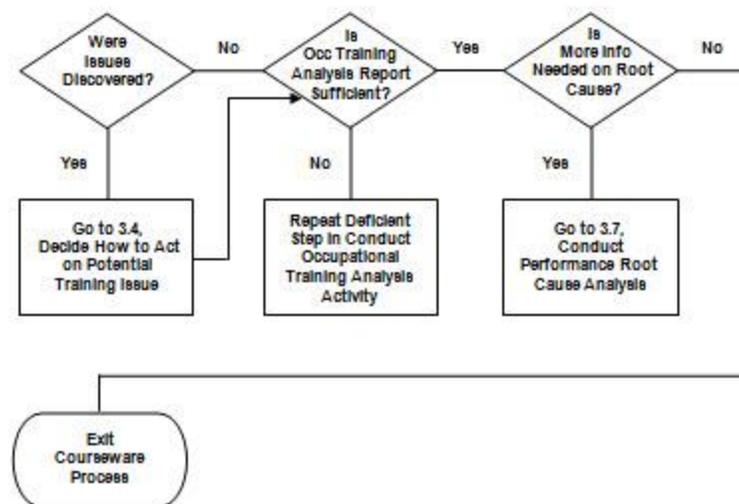
3.6.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

3.6.4.3.1. Nature of the perceived problem?

3.6.4.3.2. Priority of the assignment?

3.6.4.3.3. Appropriate organization to handle the tasking request?

Figure 3.4. Decision Tree for Next Activity



3.7. Conduct Performance Root Cause Analysis. In this activity, an E&T Office or customer organization examines a performance deficiency, analyzes the underlying causes, and determines the solution.

3.7.1. Purpose. This activity identifies causes and effects of a performance deficiency and proposes holistic solutions for improving performance which may or may not include a training intervention. Performance root cause analysis considers not only the lack of skills or knowledge, but other factors that might contribute to the performance deficiency.

3.7.2. Activity Outcomes. Outcomes for this activity are:

3.7.2.1. Performance Root Cause Analysis Report.

3.7.2.2. Decision on where to go next in the courseware process.

3.7.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.7.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.7.3.1. Performance root cause analysis guidance and examples.

3.7.3.2. Performance root cause analysis electronic tool.

3.7.3.3. Root cause analysis instructional materials and references.

3.7.4. Evaluation Criteria.

3.7.4.1. Were appropriate personnel involved in collection and analysis of data?

3.7.4.2. Was adequate data collected to support the analyses and recommendations?

3.7.4.3. Were appropriate analysis methods and statistical process control techniques used to evaluate and illustrate data?

3.7.4.4. Does the problem statement focus on what the deficiency is and not on why it exists? (Watch for “lack of” and “no” statements, as they imply solutions.)

3.7.4.5. Does each cause statement clearly define the cause and effect of the performance deficiency so that anyone who becomes involved from this point forward can understand the reason for the proposed corrective actions?

3.7.4.6. Are plans included to evaluate the effectiveness of the intervention(s) after they have been implemented?

3.7.4.7. Is the proposed solution logical, feasible, and cost-effective?

3.7.4.8. For each root cause identified:

3.7.4.8.1. Would the performance deficiency have occurred had the cause not been present?

3.7.4.8.2. Will correction or elimination of the cause prevent recurrence of a like condition?

3.7.4.9. Does the Performance Root Cause Analysis Report clearly:

3.7.4.9.1. Define the performance deficiency?

3.7.4.9.2. Describe facts and root causes?

3.7.4.9.3. Identify pros and cons of possible corrective actions?

3.7.4.9.4. Provide recommendations on how to proceed?

3.7.4.9.5. Identify initial tasks for instruction if training is part of the performance deficiency’s root cause?

3.7.4.10. Are any issues/action items that emerged during this activity documented sufficiently to determine:

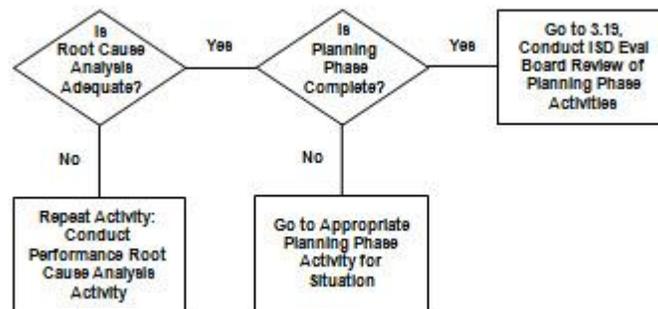
3.7.4.10.1. Nature of the perceived problem?

3.7.4.10.2. Priority of the assignment?

3.7.4.10.3. Appropriate organization to handle the tasking request?

3.7.4.11. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.5. Decision Tree for Next Activity



3.8. Conduct Training Mandate Analysis. In this activity, the E&T office or customer organization documents all of the training that is mandated and recommended (from initial awareness through refresher) for each target population in support of a particular work process, program, system, or subject area.

3.8.1. Purpose. This activity helps supervisors and training specialists develop individual and group training plans for employees, and assists developers by identifying training mandates and target populations.

3.8.2. Activity Outcomes. Outcomes for this activity are:

3.8.2.1. Training Requirements Matrix.

3.8.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.8.2.3. Decision on where to go next in the courseware process.

3.8.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.8.3.1. Training mandate analysis guidance and examples.

3.8.3.2. Training Requirements Matrix instructions, quality checklist, examples.

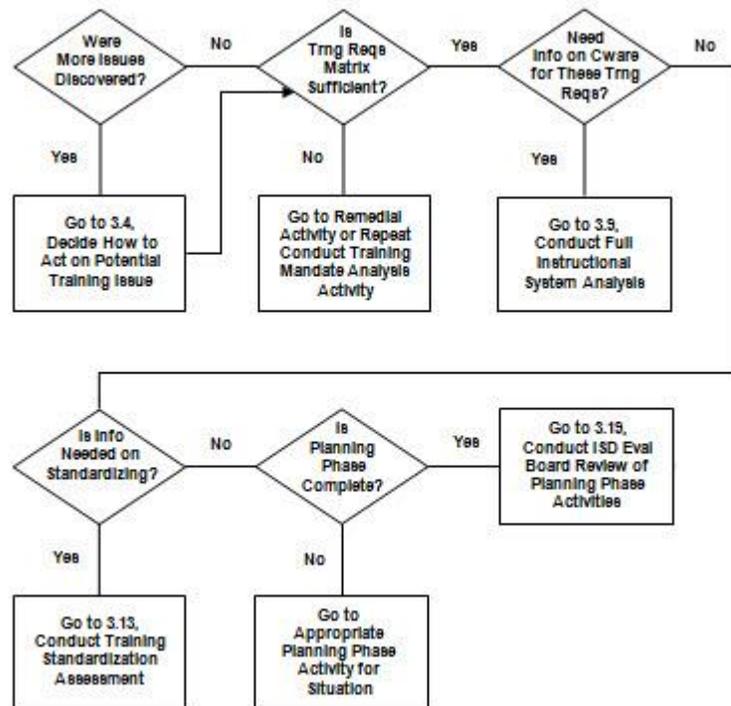
3.8.3.3. Appropriate instructions relating to bargaining unit obligations.

3.8.4. Evaluation Criteria.

3.8.4.1. Does the Training Requirements Matrix include, at a minimum:

- 3.8.4.1.1. Description of each separate target population that requires training in the subject area?
- 3.8.4.1.2. Description of the training (from initial awareness through refresher courses) needed by each target population?
- 3.8.4.1.3. Numbers and titles of directives, training plans, occupational templates, etc., which prescribe the training?
- 3.8.4.1.4. Names and titles of subject area program managers, system OPRs, and others in authority who have identified additional training that is required or recommended for the subject area?
- 3.8.4.1.5. Synopsis of what each directive/reference mandates (or recommends)?
- 3.8.4.1.6. List of all existing or proposed instruction (including training gaps)?
- 3.8.4.2. Did the data come from, or was it approved by, those in authority to define training requirements for the subject area?
- 3.8.4.3. Are any issues/action items (e.g., training gaps, courseware deficiencies, incorrect frequency of training currently in place, incorrect target population currently being taught, etc.) that emerged during this activity documented sufficiently to determine:
 - 3.8.4.3.1. Nature of the perceived problem?
 - 3.8.4.3.2. Priority of the assignment?
 - 3.8.4.3.3. Appropriate organization to handle the tasking request?
- 3.8.4.4. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.6. Decision Tree for Next Activity



3.9. Conduct Full Instructional System Analysis. In this activity, a courseware project manager or courseware developer analyzes all courses and learning aids within an entire instructional system for a particular work process, program, system, or subject area. It is highly recommended that a Training Mandate Analysis (see 3.8 above) be accomplished before analyzing the full instructional system.

3.9.1. Purpose. This activity determines the health of the full instructional system for a particular work process, program, system, or subject area. It is performed in order to identify gaps and duplication, and to decide if existing courses and learning aids within the system are effective in meeting the defined training requirements (from initial awareness through refresher) for all target populations.

3.9.2. Activity Outcomes. Outcomes for this activity are:

3.9.2.1. Instructional System Analysis Report.

3.9.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.9.2.3. Decision on where to go next in the courseware process.

3.9.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.9.3.1. Full instructional system analysis guidance and worksheets.

3.9.3.2. Instructional System Analysis Report instructions, quality checklist, and examples.

3.9.4. Evaluation Criteria.

3.9.4.1. Does the Instructional System Analysis Report adequately describe the following:

3.9.4.1.1. All courses and learning aids that exist or are in work for the instructional system?

3.9.4.1.2. Any gaps in instruction that appear to exist, in terms of tasks that need to be taught and the proficiency level of learning required?

3.9.4.1.3. Any duplication of instruction that appears to exist?

3.9.4.1.4. Any unnecessary instruction that appears to exist?

3.9.4.1.5. Any courseware deficiencies that appear to exist, in terms of tasks that need to be taught and the proficiency level of learning required?

3.9.4.2. Did the data come from an adequate mix of novices, SMEs, training managers, subject area program managers, system OPRs, instructors, trainers, courseware developers, and other customer representatives to ensure accurate and complete information on which to base findings and recommendations?

3.9.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

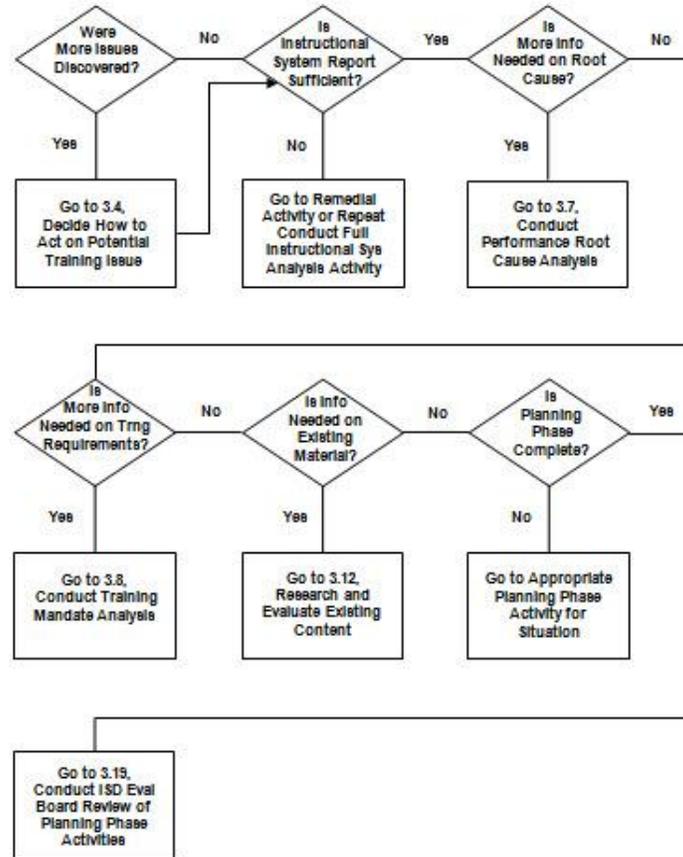
3.9.4.3.1. Nature of the perceived problem?

3.9.4.3.2. Priority of the assignment?

3.9.4.3.3. Appropriate organization to handle the tasking request?

3.9.4.4. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.7. Decision Tree for Next Activity



3.10. Conduct Training Gap Analysis. In this activity, a courseware project manager or courseware developer works with the customer to better define and analyze a perceived gap in training and determine the nature and scope of the fix.

3.10.1. Purpose. This activity analyzes a perceived training gap identified by a customer or training specialist so that a solution can be planned.

3.10.2. Activity Outcomes. Outcomes for this activity are:

3.10.2.1. Training Gap Analysis Report.

3.10.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.10.2.3. Decision on whether currently tasked training function should continue to handle this project for now.

3.10.2.4. Decision on where to go next in the courseware process.

3.10.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.10.3.1. Training gap analysis guidance and examples.

3.10.3.2. Training Gap Analysis Report instructions, quality checklist, and examples.

3.10.4. Evaluation Criteria.

3.10.4.1. Does the Training Gap Analysis Report include findings, recommendations, and supporting data sufficient to define:

3.10.4.1.1. Why the training gap exists?

3.10.4.1.2. How employees are (or not) currently obtaining needed knowledge/skills/attitudes?

3.10.4.1.3. The nature and scope of the needed instruction, in terms of tasks that need to be taught and the proficiency level of learning required?

3.10.4.1.4. Who needs the proposed instruction?

3.10.4.1.5. The impact of the training gap?

3.10.4.1.6. The benefits of various proposed solutions?

3.10.4.2. Did the data come from an adequate mix of novices, SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc., to ensure accurate and complete information on which to base findings and recommendations?

3.10.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

3.10.4.3.1. Nature of the perceived problem?

3.10.4.3.2. Priority of the assignment?

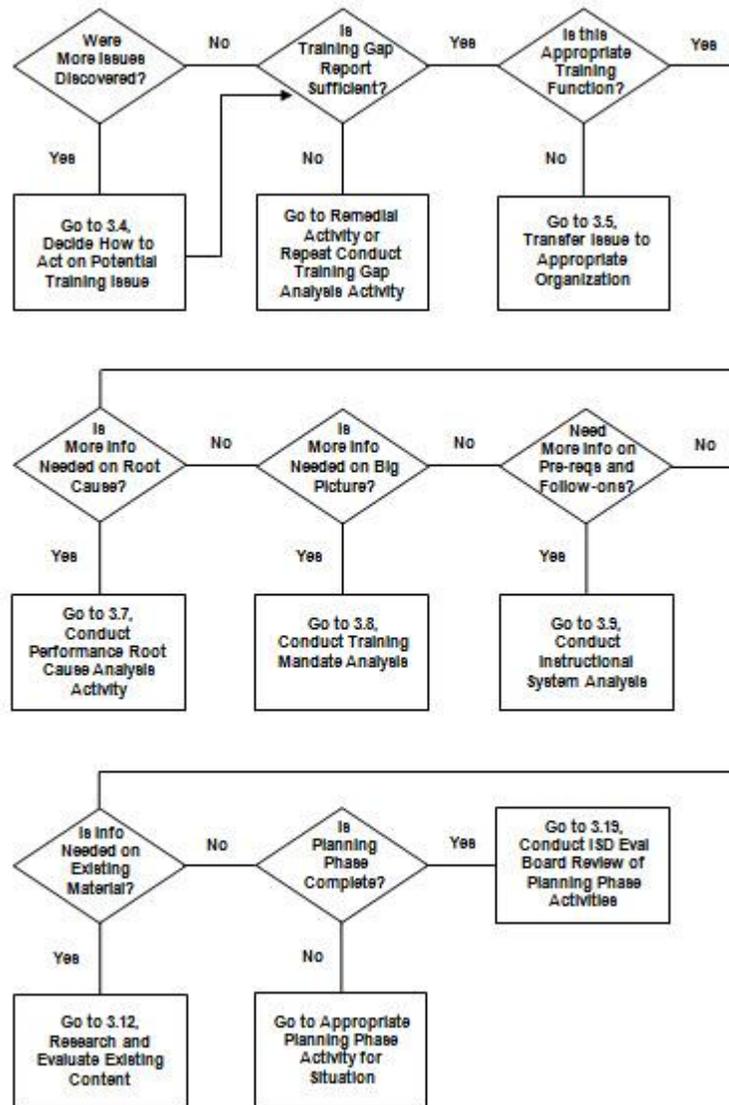
3.10.4.3.3. Appropriate organization to handle the tasking request?

3.10.4.3.4. Is the decision to send this training gap issue to another organization for action without accomplishing additional activities supported by regulation, policy, or sound logic?

3.10.4.4. Is the decision to send this training gap issue to another organization for action without accomplishing additional activities supported by regulation, policy, or sound logic?

3.10.4.5. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.8. Decision Tree for Next Activity



3.11. Conduct Courseware Issue Analysis. In this activity, a courseware project manager or courseware developer works with the customer to better define and analyze a perceived courseware deficiency and to determine the nature and scope of the fix.

3.11.1. Purpose. This activity analyzes a perceived courseware deficiency identified by a customer or training specialist so that a solution can be planned.

3.11.2. Activity Outcomes. Outcomes for this activity are:

3.11.2.1. Courseware Issue Analysis Report.

3.11.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.11.2.3. Decision on whether currently tasked training function should continue to handle this project for now.

3.11.2.4. Decision on where to go next in the courseware process.

3.11.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.11.3.1. . Courseware issue analysis guidance and examples.

3.11.3.2. Courseware Issue Analysis Report instructions, quality checklist, and examples.

3.11.4. Evaluation Criteria.

3.11.4.1. Does the Courseware Issue Analysis Report include findings, recommendations, and supporting data sufficient to define:

3.11.4.1.1. Why the courseware deficiency exists?

3.11.4.1.2. How employees are (are not) currently obtaining needed knowledge/skills/attitudes?

3.11.4.1.3. The nature and scope of the needed instruction, in terms of tasks that need to be taught and the proficiency level of learning required?

3.11.4.1.4. Who needs the proposed instruction?

3.11.4.1.5. The impact of the courseware deficiency?

3.11.4.1.6. The benefits of various proposed solutions?

3.11.4.2. Did the data come from an adequate mix of novices, SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc., to ensure accurate and complete information on which to base findings and recommendations?

3.11.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

3.11.4.3.1. Nature of the perceived problem?

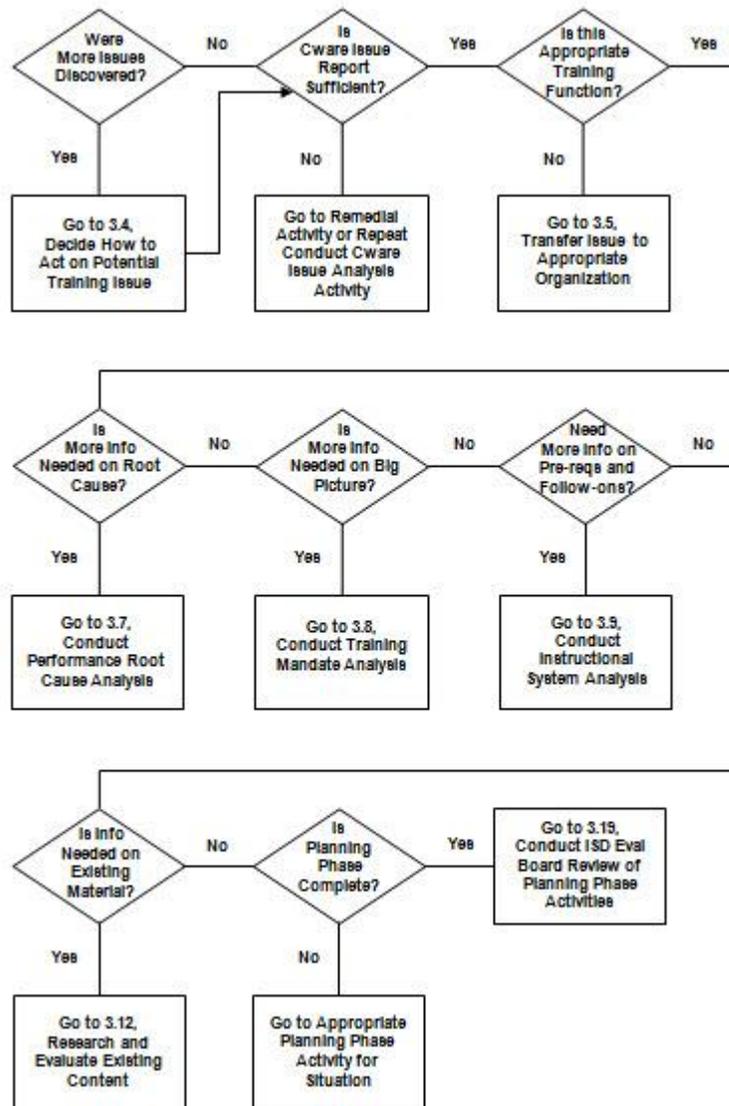
3.11.4.3.2. Priority of the assignment?

3.11.4.3.3. Appropriate organization to handle the tasking request?

3.11.4.3.4. Is the decision to send this courseware deficiency issue to another organization for action without accomplishing additional activities supported by regulation, policy, or sound logic?

3.11.4.3.5. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.9. Decision Tree for Next Activity



3.12. Research and Evaluate Existing Content. In this activity, a courseware specialist searches for any available materials (e.g., directives, technical data, working aids, courseware, vendor instruction, etc.) that might meet all or part of the defined requirement and evaluates its suitability. A decision is made as to what can be easily adopted and what remaining courseware development (if any) is needed.

3.12.1. Purpose. This activity saves resources by adopting as much existing documentation, courseware and vendor instruction as is practical.

3.12.2. Activity Outcomes. Outcomes for this activity are:

3.12.2.1. Existing Content Suitability Report.

3.12.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.12.2.3. Decision on where to go next in the courseware process.

3.12.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.12.3.1. Tips on research techniques and popular search sites, sources and repositories of reference material, courseware and vendor instruction.

3.12.3.2. Existing content research/evaluation guidance, worksheets, and examples.

3.12.3.3. Existing Content Suitability Report instructions, quality checklist, and examples.

3.12.4. Evaluation Criteria.

3.12.4.1. Does the Existing Content Suitability Report include:

3.12.4.1.1. Specific sites and sources searched for existing materials?

3.12.4.1.2. Key words used to search for existing materials?

3.12.4.1.3. List of potentially applicable directives, technical data, working aids, courseware, vendor instruction, etc. that were found?

3.12.4.1.4. Description of the suitability of each available item in meeting at least part of the requirements of the proposed course or learning aid?

3.12.4.1.5. If the material is copyrighted, proprietary, or classified?

3.12.4.1.6. If the material is current?

3.12.4.1.7. Estimate of how much rework of the materials or adjustment of the proposed instructional approach will be necessary if the found item or available instruction is incorporated or adopted?

3.12.4.2. Were logical key words describing the proposed instructional content used when searching?

3.12.4.3. Were the decisions on suitability of existing materials approved by lead SMEs, subject area program managers, system OPRs, training managers, instructors, trainers, courseware developers, etc.?

3.12.4.4. Were a satisfactory number of sites and sources in government, private sector and academia searched for existing materials, to include the Courseware Management Database?

3.12.4.5. Are any issues/action items that emerged during this activity documented sufficiently to determine:

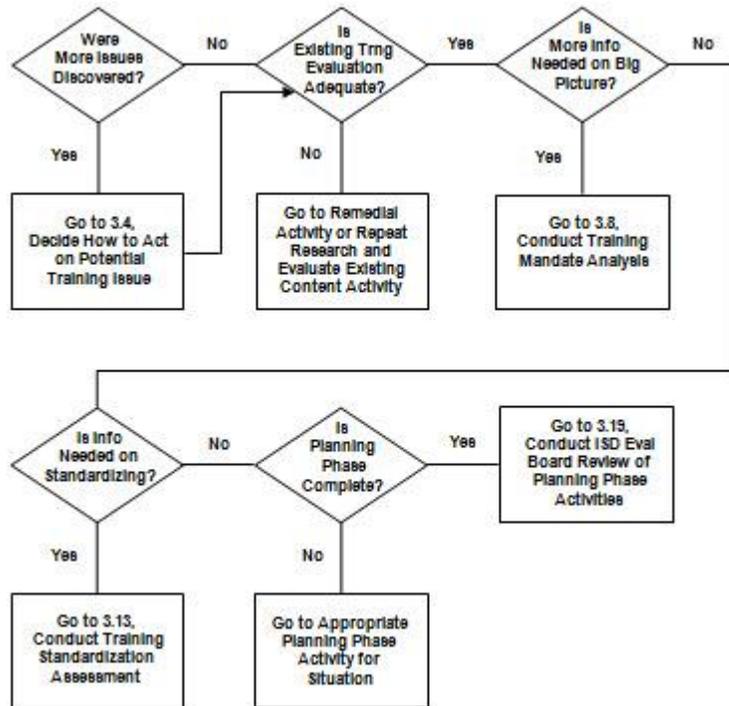
3.12.4.5.1. Nature of the perceived problem?

3.12.4.5.2. Priority of the assignment?

3.12.4.5.3. Appropriate organization to handle the tasking request?

3.12.4.6. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.10. Decision Tree for Next Activity



3.13. Conduct Training Standardization Assessment. In this activity, a training specialist determines if proposed training development or revision can be expanded to include other organizations, installations or agencies.

3.13.1. Purpose. This activity promotes consistency of instruction across organizations and saves resources by preventing duplicate courseware.

3.13.2. Activity Outcomes. Outcomes for this activity are:

3.13.2.1. Training Standardization Assessment with documented decision on whether existing or proposed training can be expanded to include other organizations, installations or agencies.

3.13.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.13.2.3. Decision on whether currently tasked training function should continue to handle this project for now.

3.13.2.4. Decision on where to go next in the courseware process.

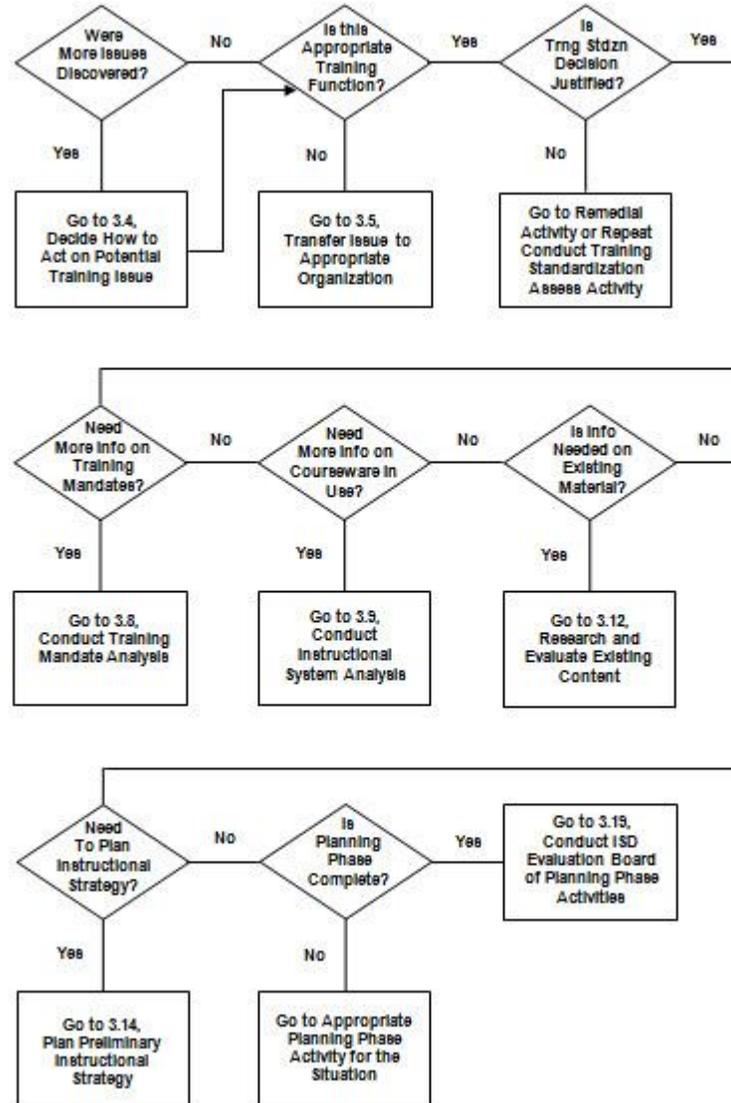
3.13.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as training standardization assessment guidance and examples.

3.13.4. Evaluation Criteria.

3.13.4.1. Is the decision on whether or not to standardize training supported by regulation, policy, or sound logic?

- 3.13.4.2. Does the decision documentation include findings, recommendations, and supporting data sufficient to justify whether or not to standardize training?
- 3.13.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 3.13.4.3.1. Nature of the perceived problem?
 - 3.13.4.3.2. Priority of the assignment?
 - 3.13.4.3.3. Appropriate organization to handle the tasking request?
- 3.13.4.4. Is the decision to skip follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?
- 3.13.4.5. If this is part of a courseware development or revision project, is paragraph 3.19., *Conduct ISD Evaluation Board Review of Planning Phase Activities* a planned activity?

Figure 3.11. Decision Tree for Next Activity



3.14. Plan Preliminary Instructional Strategy. In this activity, a courseware specialist analyzes data from previous Planning Phase activities and tentatively selects the most suitable approach for developing and delivering new or significantly revised courseware. This instructional strategy not only serves as a project plan, but also considers how to apply accepted learning theory to the situation.

3.14.1. Purpose. This activity is critical for determining rough order of magnitude of the resources needed to complete a new development or major revision project, and to implement the courseware in the field.

3.14.2. Activity Outcomes. Outcomes for this activity are:

3.14.2.1. Preliminary Instructional Strategy Report.

3.14.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.14.2.3. Decision on where to go next in the courseware process.

3.14.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.14.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

3.14.3.2. References on applying blended learning to courseware development.

3.14.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

3.14.3.4. References on selecting appropriate evaluation methods/tools and media based on the situation.

3.14.3.5. Delivery resources analysis guidance and examples.

3.14.3.6. Instructional strategy guidance and examples.

3.14.3.7. Instructional Strategy Report instructions, quality checklist, and examples.

3.14.4. Evaluation Criteria.

3.14.4.1. Does the Preliminary Instructional Strategy Report identify and justify the following aspects of the preliminary instructional plan:

3.14.4.1.1. Proposed delivery method(s)?

3.14.4.1.2. Proposed media?

3.14.4.1.3. Initial tasks and knowledge topics?

3.14.4.1.4. Initial proficiency levels of learning?

3.14.4.1.5. Planned instructional and evaluation methods?

3.14.4.1.6. Planned instructor and student materials?

3.14.4.1.7. Planned target population?

3.14.4.1.8. Anticipated length of instruction?

3.14.4.1.9. Anticipated location of the instruction?

3.14.4.1.10. Facilities, equipment, tools and materials that will be needed to deliver the instruction?

3.14.4.1.11. Skills (instructors, trainers, computer support, etc.) that will be needed to deliver the instruction? Determine what it will cost to get the instructor/trainer/facilitator trained and how long this will take.

3.14.4.1.12. Computer software, automated systems, training regions, licenses, network access, learning management systems, etc. that will be needed to deliver instruction?

3.14.4.1.13. Security clearances, controlled area access, etc., required by students

and instructors to deliver instruction?

3.14.4.2. Are the above elements described in enough detail to define the courseware activities and the rough order of magnitude of resources needed to accomplish the project?

3.14.4.3. Does the justification for proposed delivery method(s) and media address task frequency, task criticality, task learning difficulty, task performance difficulty, and incidence of poor task performance?

3.14.4.4. Are the proposed tasks, knowledge topics, instructional methods, evaluation methods, target population and length of instruction based on adequate data from appropriate experts, and is the reasoning documented in the Preliminary Instructional Strategy Report?

3.14.4.5. Do the planned instructional and evaluation materials support a blended learning approach to instruction?

3.14.4.6. Does the Preliminary Instructional Strategy Report adequately identify the resources needed to deliver this instruction once it is developed?

3.14.4.7. Did the analyst involve an adequate mix of SMEs, training managers, subject area program managers, system OPRs, instructors, trainers, courseware developers, and other customer representatives to ensure accurate and complete information on which to base findings and recommendations?

3.14.4.8. Did the owning/instructing organization(s) acknowledge responsibility for preparing instructors/trainers/facilitators; arranging for necessary facilities, tools, materials and equipment; and delivering and sustaining this training?

3.14.4.9. Has the preliminary instructional strategy been approved by lead SMEs, appropriate subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc.?

3.14.4.10. Are any issues/action items that emerged during this activity documented sufficiently to determine:

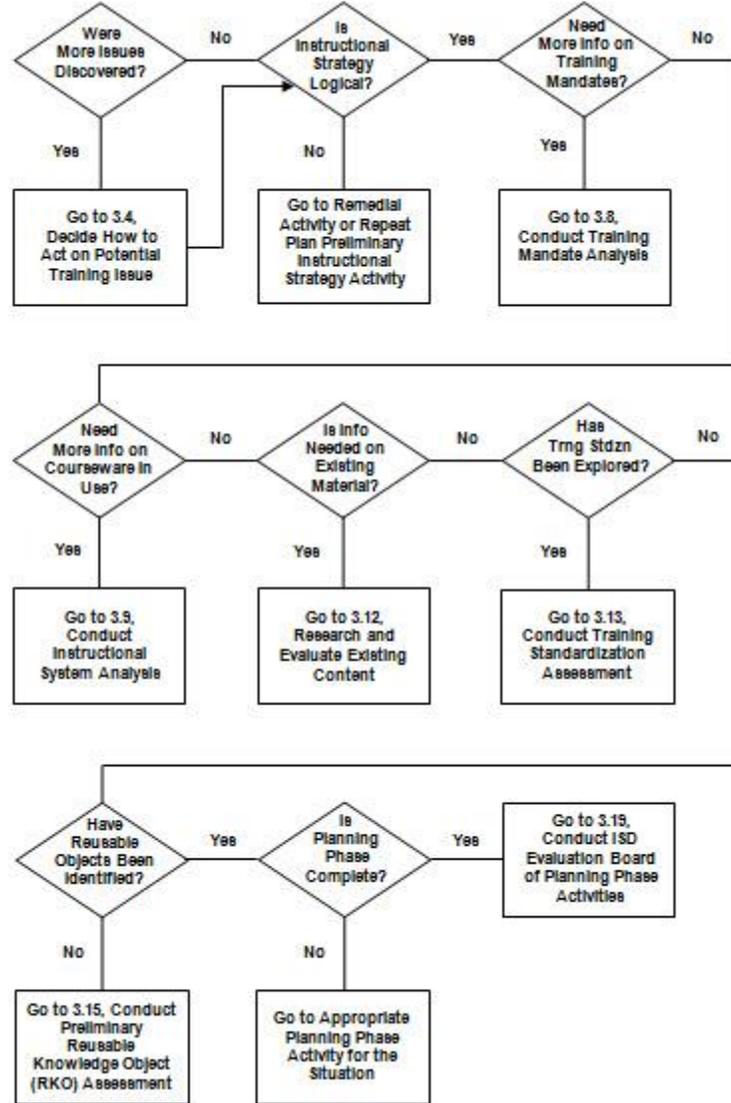
3.14.4.10.1. Nature of the perceived problem?

3.14.4.10.2. Priority of the assignment?

3.14.4.10.3. Appropriate organization to handle the tasking request?

3.14.4.11. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.12. Decision Tree for Next Activity



3.15. Conduct Preliminary Reusable Knowledge Object (RKO) Assessment. In this activity, a courseware project manager or courseware developer determines the reusability of courseware components. If a particular slide, video clip, photograph, chart, or other piece of information has high potential for being useful in future instruction or management activities, it can be coded as metadata and stored in an electronic repository for rapid search, retrieval and re-use.

3.15.1. Purpose. This activity estimates the amount of RKO that will likely be of value in later performance support activities (e.g., instruction, quality, process improvement, etc.) so that the labor involved in coding the objects with metadata tags can be calculated. A knowledge object that can be re-used saves the time and effort of creating a new item, promotes consistency in information provided to the workforce, and reinforces the retention of knowledge.

3.15.2. Activity Outcomes. Outcomes for this activity are:

3.15.2.1. Preliminary RKO assessment documentation.

3.15.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.15.2.3. Decision on where to go next in the courseware process.

3.15.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.15.3.1. References on electronic content management and reusable knowledge objects.

3.15.3.2. Directives, references and guidance on Sharable Content Object Reference Model, SCOs, metadata tagging, and content packaging.

3.15.3.3. RKO assessment documentation instructions, quality checklist, and examples.

3.15.4. Evaluation Criteria.

3.15.4.1. Does preliminary RKO assessment documentation include:

3.15.4.1.1. Why content of this instruction does or does not lend itself to reusability.

3.15.4.1.2. List of objects within the courseware that will likely have value as RKOs?

3.15.4.1.3. Speculation on how the objects might be re-used?

3.15.4.2. Is the preliminary RKO assessment based on recommendations from SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, information technology experts, and others who would have a good idea about the transferability of the content?

3.15.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

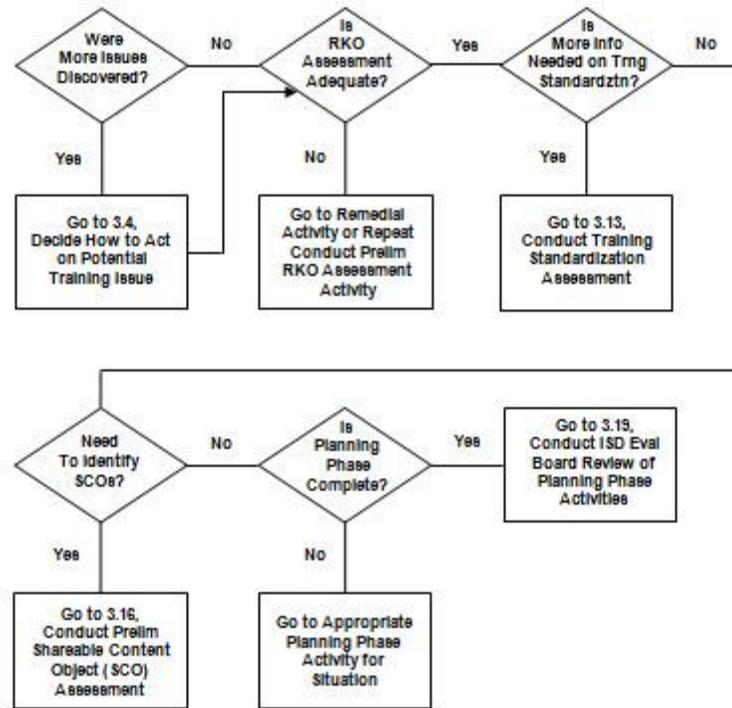
3.15.4.3.1. Nature of the perceived problem?

3.15.4.3.2. Priority of the assignment?

3.15.4.3.3. Appropriate organization to handle the tasking request?

3.15.4.4. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.13. Decision Tree for Next Activity



3.16. Conduct Preliminary Sharable Content Object (SCO) Assessment. A SCO is a self-contained package of knowledge objects (i.e., graphics, text, etc.) in an E-Learning Environment or learning aid that can be tracked electronically. In this activity, a courseware project manager or courseware developer determines the level of SCO packaging needed to support transportability of instruction to other courses, and to track student progress, test scores and completions for self-paced, E-Learning instruction.

3.16.1. Purpose. This activity predicts the level of SCO granularity needed so that the labor involved in coding the objects with metadata tags and launch assets can be roughly estimated.

3.16.2. Activity Outcomes. Outcomes for this activity are:

3.16.2.1. Preliminary SCO assessment documentation.

3.16.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.16.2.3. Decision on where to go next in the courseware process

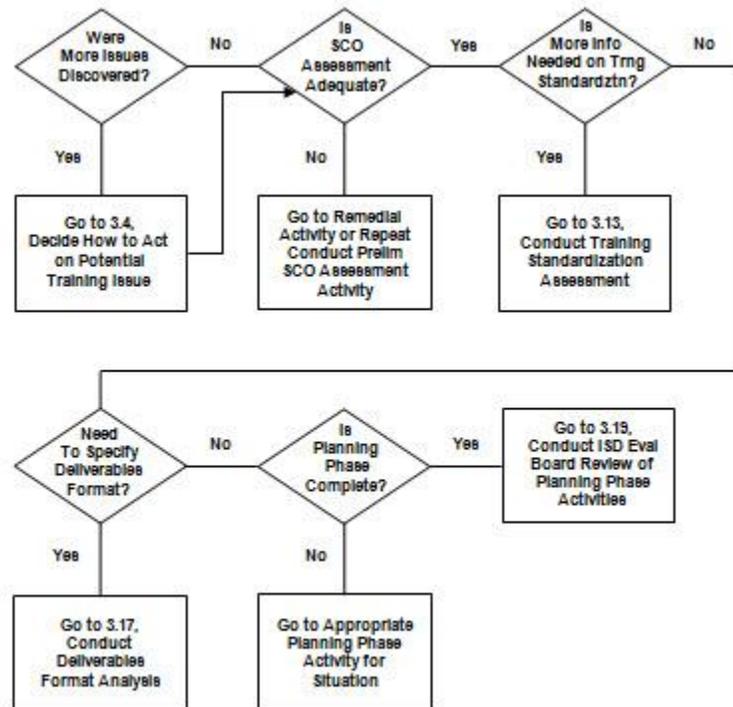
3.16.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.16.3.1. Directives, references and guidance on Sharable Content Object Reference Model, SCOs, metadata tagging, and content packaging.

3.16.3.2. SCO assessment guidance and examples.

- 3.16.3.3. SCO assessment documentation instructions, quality checklist, and examples.
- 3.16.4. Evaluation Criteria.
- 3.16.4.1. Does preliminary SCO assessment documentation include:
- 3.16.4.1.1. Recommended level of SCO granularity for the course?
 - 3.16.4.1.2. Why content of this course or learning aid requires the recommended level of SCOs, either for transportability of instruction to other courses, or for tracking student progress, test scores and completions?
 - 3.16.4.1.3. An estimated number of SCOs to be programmed?
- 3.16.4.2. Is the recommended level of SCO granularity at as high a level as possible in light of anticipated transportability and student tracking requirements? (SCO programming is expensive and should be kept to a minimum.)
- 3.16.4.3. Is the preliminary SCO assessment based on recommendations from SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, information technology experts, and others who would have a good idea about the transportability of the content and the need to track progress of students during the course?
- 3.16.4.4. Are any issues/action items that emerged during this activity documented sufficiently to determine:
- 3.16.4.4.1. Nature of the perceived problem?
 - 3.16.4.4.2. Priority of the assignment?
 - 3.16.4.4.3. Appropriate organization to handle the tasking request?
- 3.16.4.5. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.14. Decision Tree for Next Activity



3.17. Conduct Deliverables Format Analysis. In this activity, a courseware project manager or courseware developer decides if any of the deliverables need to be in a particular electronic format (e.g., an Adobe application, a Microsoft Office application, etc.) for easy maintenance and reusability.

3.17.1. Purpose. This activity ensures that the deliverables will be in a government-approved format (see AFMC ISD Courseware Resource Site for most recent listing), so that the government has organic capability to deliver and maintain courseware without buying additional software applications, licenses, training, etc. This activity also promotes blended learning by identifying deliverables that need to be in a format that is well-suited to posting on the Web for reference, or for transporting intact to other courseware.

3.17.2. Activity Outcomes. Outcomes for this activity are:

3.17.2.1. Deliverables format analysis documentation.

3.17.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.17.2.3. Decision on where to go next in the courseware process.

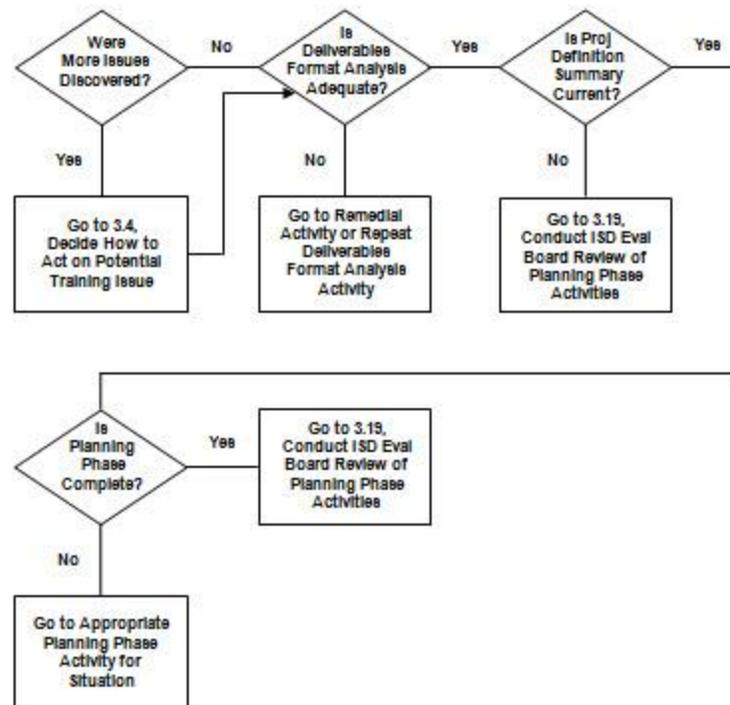
3.17.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as deliverables format analysis general guidance, instructions, quality checklist, and examples.

3.17.4. Evaluation Criteria.

3.17.4.1. Does deliverables format analysis documentation include:

- 3.17.4.1.1. List of deliverables that need to have a particular electronic format?
- 3.17.4.1.2. Reason that these particular deliverables need to be in the specified format?
- 3.17.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:
- 3.17.4.2.1. Nature of the perceived problem?
- 3.17.4.2.2. Priority of the assignment?
- 3.17.4.2.3. . Appropriate organization to handle the tasking request?
- 3.17.4.3. Is the deliverables format analysis based on recommendations from instructors, trainers, courseware developers, information technology experts and others who would have a good idea about functionality and sustainability of various computer applications?
- 3.17.4.4. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.15. Decision Tree for Next Activity



3.18. Prepare Project Definition Summary (PDS). In this activity, an experienced courseware project manager or courseware developer defines the activities, deliverables and resources needed to accomplish a courseware project.

3.18.1. Purpose. This activity prepares a courseware project for assignment or outsourcing and allows organizations to plan for the manpower/funding needed to accomplish the required tasks.

3.18.2. Activity Outcomes. Outcomes for this activity are:

3.18.2.1. Courseware PDS.

3.18.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.18.2.3. Decision on whether currently tasked training function should continue to handle this project for now.

3.18.2.4. Decision on where to go next in the courseware process.

3.18.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.18.3.1. PDS guidance, sample template, instructions, quality checklist, and examples.

3.18.3.2. Courseware estimate formulas, guidance, worksheets, quality checklist, and examples.

3.18.4. Evaluation Criteria.

3.18.4.1. Does the PDS have a Project Description section that (*as appropriate for the situation*) includes:

3.18.4.1.1. Reason for the project (e.g., to revise existing courseware, to fill a training gap, etc.)?

3.18.4.1.2. Area of project applicability (e.g., USAF, HILL AFB, Robins AFB, etc.)?

3.18.4.1.3. Primary delivery method (e.g., instructor-led; self-paced, Web-based; computer-aided instruction; etc.) of the courseware?

3.18.4.1.4. Target population (e.g., equipment specialists, Air Force spray painters, C-130 electricians, etc.) of the instruction?

3.18.4.1.5. Highest level of learning proficiency (e.g., B/2b, C/3c, etc.) required in the instruction?

3.18.4.1.6. Estimated length of the proposed course or learning aid in terms of hours of instruction?

3.18.4.1.7. Initial tasks and knowledge topics that are planned to be covered?

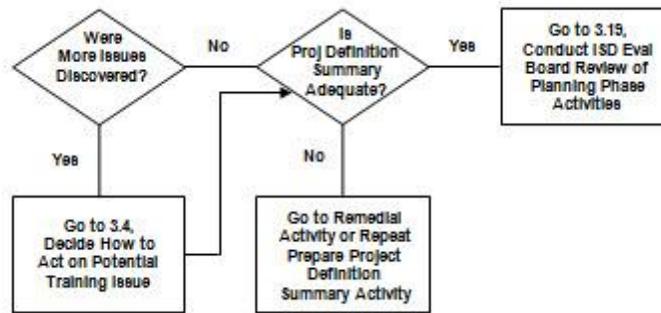
3.18.4.1.8. Course presentations, student handouts, reference guides and other support documents needed?

3.18.4.1.9. Whether specific types of evaluation (e.g., written test, proficiency evaluation, etc.) are required?

3.18.4.2. Does the PDS have a Basic Courseware Activities and Outcomes section that (*as appropriate for the situation*):

- 3.18.4.2.1. Describes each courseware activity (e.g., conduct knowledge/task analysis, develop learning objectives, etc.) that is required to accomplish this project?
- 3.18.4.2.2. Specifies the outcome documentation associated with each courseware activity?
- 3.18.4.2.3. Identifies the evaluation standards (e.g., directive, this handbook, an ISD Evaluation Board checklist, etc.) for each courseware activity?
- 3.18.4.3. Does the PDS have an Estimate of Resources Needed section that (*as appropriate for the situation*):
 - 3.18.4.3.1. Estimates the amount of hours needed to accomplish the tasks of the project in a worst case scenario (i.e., inexperienced organic courseware developer performing the work)?
 - 3.18.4.3.2. Explains the basic formula and adjustment factors used for determining the rough order of magnitude of resources needed for the proposed courseware project?
- 3.18.4.4. Does the PDS have attachments that include (*as applicable*) any Planning Phase activities documentation such as Training Requirements Matrix, Training Standardization Assessment, Training Gap Analysis Report, etc.?
- 3.18.4.5. Is the *Project Description* section formatted so that it can be easily inserted into the introductory portion of the *Description of Services* section of a Performance Work Statement (PWS)?
- 3.18.4.6. Is the *Basic Courseware Activities and Outcomes* section formatted so that it can be easily inserted into the *Basic Services* sub-section of a PWS?
- 3.18.4.7. Does the PDS appear to include all of the activities, deliverables, standards and other details needed for a potential service provider to prepare a realistic bid for this project?
- 3.18.4.8. Did an experienced courseware program/project manager oversee the formulas and adjustment factors used to determine the Rough Order of Magnitude (ROM) of resources needed to accomplish the project?
- 3.18.4.9. Did the information in the PDS come from the results of earlier planning activities and not from assumptions and incomplete data?
- 3.18.4.10. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 3.18.4.10.1. Nature of the perceived problem?
 - 3.18.4.10.2. Priority of the assignment?
 - 3.18.4.10.3. Appropriate organization to handle the tasking request?
- 3.18.4.11. Is the decision to skip any follow-on steps in the Planning Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 3.16. Decision Tree for Next Activity



3.19. Conduct ISD Evaluation Board Review of Planning Phase Activities. In this activity, at least one ISD Evaluation Board official reviews the activities performed during Planning Phase to determine if they meet the intent of the HILL AFB Courseware Development and Management Process and its underlying principles of systems engineering, instructional design, and quality improvement.

3.19.1. Purpose. This activity ensures that the HILL AFB Courseware Development and Management Process is applied so that instruction has a high probability of being relevant, effective and economical to sustain.

3.19.2. Activity Outcomes. Outcomes for this activity are:

3.19.2.1. Decision on whether currently tasked training function should continue to handle this project for now.

3.19.2.2. Decision that appropriate activities in the Planning Phase have been accomplished to the standards of this handbook, or that corrective actions are needed before the project is funded/assigned.

3.19.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.19.2.4. Decision on where to go next in the courseware process.

3.19.3. Additional Guidance. The basic procedures and sample review worksheets for conducting ISD Evaluation Board reviews are in the AFMC ISD Courseware Resource Site. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

3.19.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the HILL AFB Courseware Development and Management Process.

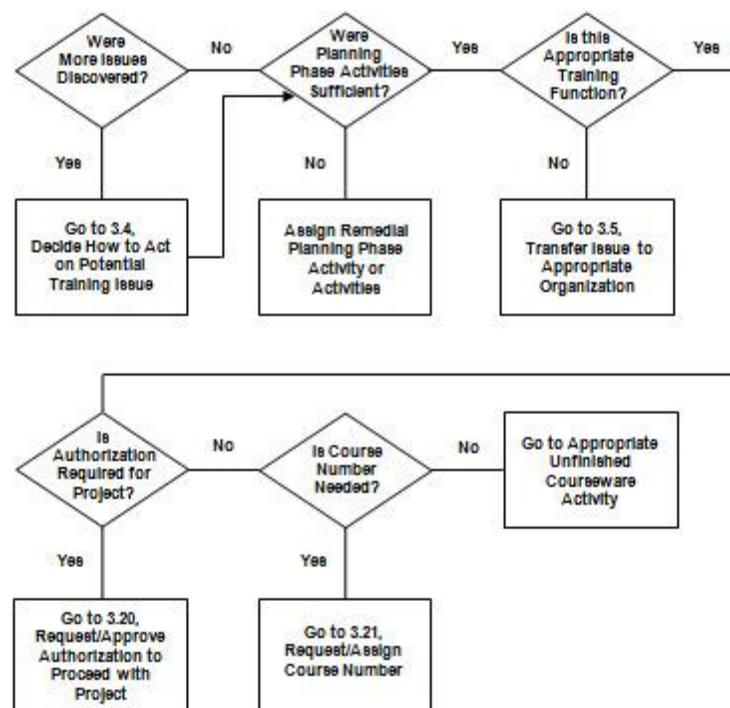
3.19.3.2. ISD Evaluation Board review guidance, sample worksheet templates, sample instructions, quality checklists and examples.

3.19.4. Evaluation Criteria.

3.19.4.1. Do the ISD Evaluation Board Notes for Planning Phase include:

- 3.19.4.1.1. Basic information about project, date of ISD review, and participants?
 - 3.19.4.1.2. Reasons typical Planning Phase activities were skipped, if applicable?
 - 3.19.4.1.3. Observations about compliance/non-compliance of Planning Phase activities with the standards set forth in this handbook and the AFMC ISD Courseware Resource Site?
 - 3.19.4.1.4. Explanations of waivers and adjustments of standards for Planning Phase activities, if applicable?
 - 3.19.4.1.5. Corrective actions which need to be accomplished with suspense dates, as applicable?
 - 3.19.4.1.6. Planning Phase review decision?
- 3.19.4.2. Is the decision to send this courseware project to another organization for action without accomplishing additional activities supported by regulation, policy, or sound logic?
- 3.19.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:
- 3.19.4.3.1. Nature of the perceived problem?
 - 3.19.4.3.2. Priority of the assignment?
 - 3.19.4.3.3. Appropriate organization to handle the tasking request?

Figure 3.17. Decision Tree for Next Activity



3.20. Request/Approve Authorization to Proceed with Project. In this activity, a subordinate E&T office obtains permission from a higher office to proceed with a courseware development or major (i.e., change in learning objectives or proficiency levels) revision project.

3.20.1. Purpose. This activity verifies that a proposed project does not duplicate existing courseware or another planned/in work project. It also ensures that training is standardized to the greatest extent practical.

3.20.2. Activity Outcomes. Outcomes for this activity are:

3.20.2.1. Request for authorization of courseware development or revision project.

3.20.2.2. Decision to approve or disapprove request to proceed with a courseware development or revision project.

3.20.2.3. Decision on where to go next in the courseware process.

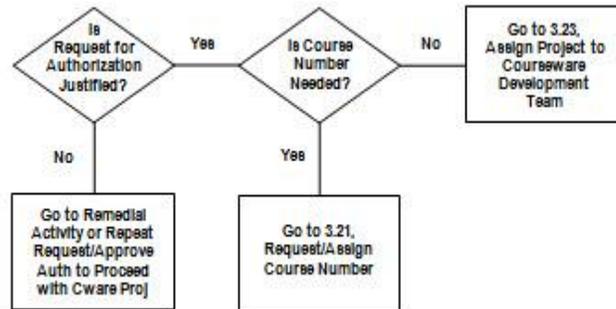
3.20.3. Additional Guidance. It also contains items such as project authorization request/evaluation guidance quality checklist, and examples.

3.20.4. Evaluation Criteria.

3.20.4.1. Did request for authorization of a courseware development or revision project include a Project Definition Summary with applicable Planning Phase reports and supporting documentation attached?

3.20.4.2. Is there adequate information to determine if proposed project duplicates any existing courseware or planned/in work project?

Figure 3.18. Decision Tree for Next Activity



3.21. Request/Assign Course Number(s). In this activity, a 15-character HILL AFB course number is assigned to a new course or learning aid, or to courseware that has undergone major revision (i.e., change in learning objectives or proficiency levels).

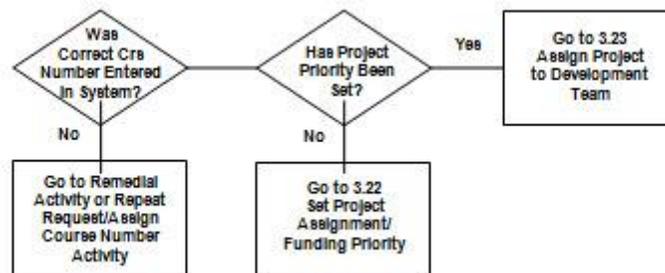
3.21.1. Purpose. This activity allows organizations to assign numbers to courses and learning aids so they can be managed easily and completions can automatically be documented in employee training records.

3.21.2. Activity Outcomes. Outcomes for this activity are:

3.21.2.1. Request for course number(s) from appropriate training office(s).

- 3.21.2.2. Assignment of course number(s) by appropriate training office(s).
- 3.21.2.3. Course number(s) and basic information entered in automated information systems such as the HILL AFB Education and Training Management System (ETMS) and the HILL AFB Courseware Management Database (CMD).
- 3.21.2.4. Decision on where to go next in the courseware process.
- 3.21.3. Additional Guidance. It also contains items such as course number request/evaluation guidance, course data sheet, and examples.
- 3.21.4. Evaluation Criteria.
- 3.21.4.1. Is course number request for an approved project?
- 3.21.4.2. Does the course number comply with applicable regulations as outlined in the AFMC ISD Courseware Resource Site?. Note: If the course is delivered in any Electronic Learning format and will need to be downloaded, a Software Request Worksheet must be initiated by the Unit Software License Manager and routed through the base. The request must be approved prior to downloading the course.
- 3.21.4.3. Was the course number and basic information about the course or learning aid entered in appropriate automated information systems such as ETMS and the CMD?

Figure 3.19. Decision Tree for Next Activity



3.22. Set Project Assignment/Funding Priority. In this activity, a training manager from the tasked Education and Training (E&T) office determines the priority of the project as compared to other projects that require funding or assignment.

3.22.1. Purpose. This activity evaluates emerging issues against those that are already prioritized so that an E&T office can determine which are most important to the customer and need to be worked first.

3.22.2. Activity Outcomes. Outcomes for this activity are:

3.22.2.1. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

3.22.2.2. Decision on where to go next in the courseware process.

3.22.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as priority justification guidance, worksheets, quality checklist, and examples.

3.22.4. Evaluation Criteria.

3.22.4.1. Does the assignment/funding priority assigned to this activity or project appear to be justified in light of activities/projects with lower and higher priorities?

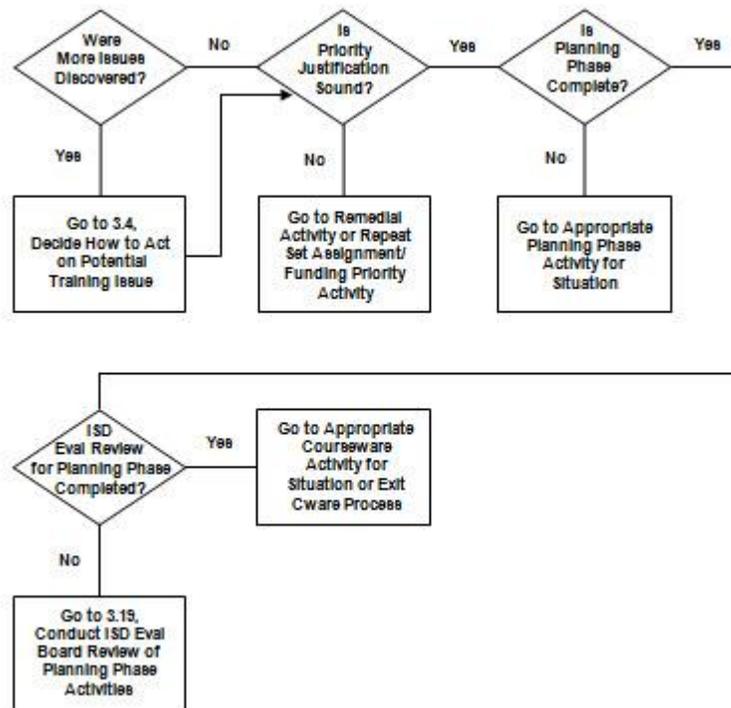
3.22.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

3.22.4.2.1. Nature of the perceived problem?

3.22.4.2.2. Priority of the assignment?

3.22.4.2.3. Appropriate organization to handle the tasking request?

Figure 3.20. Decision Tree for Next Activity



3.23. Obtain Training Management signatures for PDS and Course Direction. In this activity, the courseware developer obtains signatures from training managers, courseware managers, the ISD Evaluation Board official, and others who need to approve the courseware specifications after Planning Phase activities have been reviewed by the ISD Evaluation Board, and before designing and developing the course. Use Electronic Signatures when possible.

3.23.1. Purpose. This activity documents initial approval of the courseware specifications by Education and Training (E&T) office representatives prior to creation of the course materials.

3.23.2. Activity Outcomes. Outcomes for this activity are:

3.23.2.1. Signatures of appropriate representatives from E&T offices at installations where the instruction will be used.

3.23.2.2. Decision on where to go next in the courseware process.

3.23.3. Additional Guidance. Signature page template, instructions and quality checklist are in the AFMC ISD Courseware Resource Site. It also contains items such as signature guidance, processing procedures, and quality checklists for various functional areas.

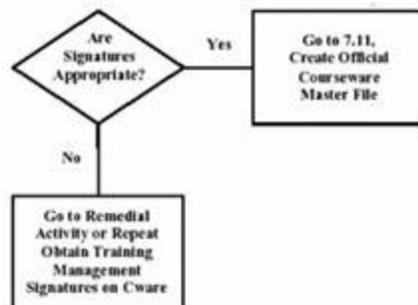
3.23.4. Evaluation Criteria.

3.23.4.1. Did signature page include ISD Evaluation Board Official and appropriate training manager(s), courseware program manager(s), etc., from E&T offices at installations where the instruction will be used?

3.23.4.2. Did the signature page meet the quality checklist criteria in this manual?

3.23.4.3. If a representative failed or refused to sign, was documentation on the default approval included in the courseware master file for reference and audit purposes?

Figure 3.21. Decision Tree for Next Activity



3.24. Assign Project to Development Team. In this activity, the responsible E&T office decides if a project should be assigned to an organic courseware development team, assigned to a level-of-effort contractor development team already in place, or outsourced to a contractor development team.

3.24.1. Purpose. This activity helps organizations to determine the best approach for accomplishing priority courseware projects in light of their resource constraints.

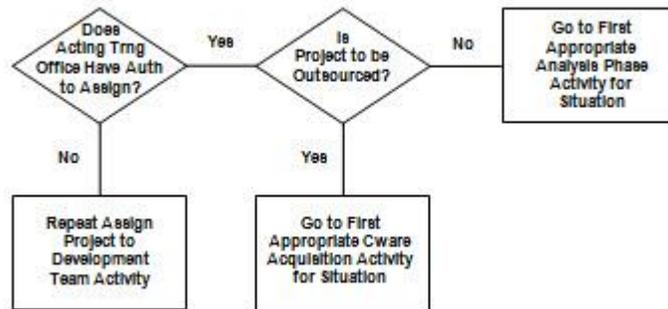
3.24.2. Activity Outcomes. Outcomes for this activity are:

3.24.2.1. Assignment of project to an organic or level-of-effort contractor development team, or decision to outsource project to a contractor development team.

3.24.2.2. Decision on where to go next in the courseware process.

3.24.3. Additional Guidance. See the AFMC ISD Courseware Resource Site for factors to consider when deciding if organic or contractor service providers are the correct choice for a project.

3.24.4. Evaluation Criteria. Did acting E&T office have authority to assign selected individual/team this courseware project?

Figure 3.22. Decision Tree for Next Activity

4. ANALYSIS PHASE

4.1. Analysis Phase Defined. Once adequate planning has been accomplished, the requirements are further analyzed to determine precisely what should be included in the instruction, the types of learning involved, the proficiency level of learning needed for the target audience, and any prerequisite or follow-on instruction required. For additional information and guidance relating to the Analysis Phase of the Air Force Instructional System Development (ISD) process, refer to AFH 36-2235, Volume 2.

4.2. Hold a Project Kickoff Meeting. In this activity, the courseware project manager hosts a kickoff meeting with primary participants in the project to verify roles and responsibilities and review the proposed project plan.

4.2.1. Purpose. This activity clarifies for all key participants in the project what role each of them will have and the planned project activities and timelines. This reduces misunderstandings and allows the government to emphasize the importance of Subject Matter Expert (SME), subject area program manager, system Officer of Primary Responsibility (OPR), Instructor/Trainer and/or Facilitator, courseware program manager, ISD Evaluation Board official, customer training manager, etc., involvement in the project.

4.2.2. Activity Outcomes. Outcomes for this activity are:

4.2.2.1. Courseware project kickoff meeting.

4.2.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

4.2.2.3. Decision on where to go next in the courseware process.

4.2.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains project kickoff meeting sample agendas and briefings.

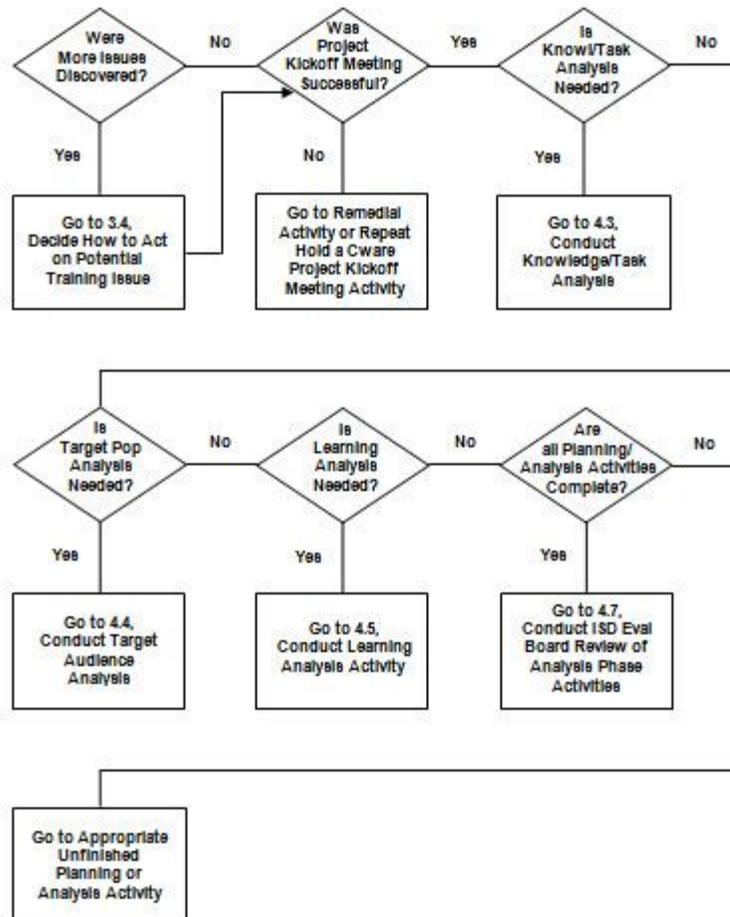
4.2.4. Evaluation Criteria.

4.2.4.1. Did meeting include lead SME(s), lead subject area program manager(s), lead system OPR, lead Instructor/Trainer and/or Facilitator, courseware program manager, assigned ISD Evaluation Board official, lead customer training manager, etc., as appropriate to kick off the project?

4.2.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

- 4.2.4.2.1. Nature of the perceived problem?
- 4.2.4.2.2. Priority of the assignment?
- 4.2.4.2.3. Appropriate organization to handle the tasking request?

Figure 4.1. Decision Tree for Next Activity



4.3. Conduct a Knowledge/Task Analysis. In this activity, the courseware developer identifies precisely those tasks and subtasks which require instruction, the conditions under which they are performed, the performance standard that must be achieved in the workplace, and the critical decisions and mental processes that separate the expert from the novice.

4.3.1. Purpose. This activity ensures that instruction will be relevant and efficient.

4.3.2. Activity Outcomes. Outcomes for this activity are:

4.3.2.1. Set of knowledge and task statements that are used to develop the learning objectives for the course and to sequence the instruction. (These topics and tasks

were originally identified during Planning Phase and need to be further analyzed and validated during this phase.)

4.3.2.2. Set of critical decision point statements that are later incorporated into instructional materials as points emphasized and lessons learned. (These will be further analyzed during Design Phase when instructional materials are developed.)

4.3.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

4.3.2.4. Decision on where to go next in the courseware process.

4.3.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

4.3.3.1. Knowledge/task analysis guidance.

4.3.3.2. Knowledge/Task Analysis Report quality checklist and examples.

4.3.4. Evaluation Criteria.

4.3.4.1. Does the Knowledge/Task Analysis Report include all tasks that are performed in the work center that pertain to the performance deficiency, even if some will not be included in this instruction?

4.3.4.2. Does the Knowledge/Task Analysis Report identify critical decision points in the work process/tasks/subtasks and describe the cognitive strategies used by experts to decide what to do next?

4.3.4.3. Does the Knowledge/Task Analysis Report identify those tasks and critical decision points that will be taught?

4.3.4.4. For any tasks that will be included in the instruction, does the Knowledge/Task Analysis Report contain task statements that include the workplace conditions and standards?

4.3.4.5. Has the Knowledge/Task Analysis Report been approved by SMEs, subject area program managers, system OPRs, instructors, trainers, etc., for topics that should be included in the instruction?

4.3.4.6. Are any issues/action items that emerged during this activity documented sufficiently to determine:

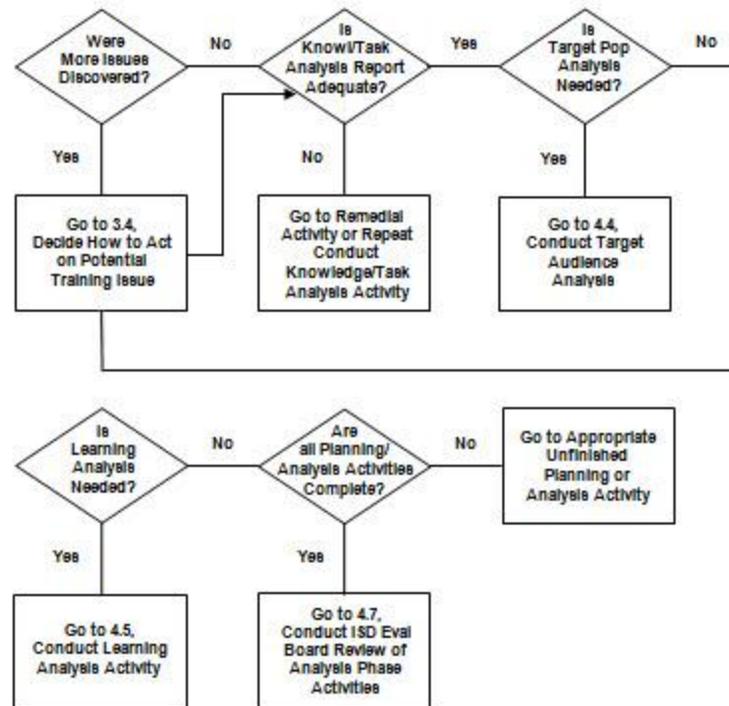
4.3.4.6.1. Nature of the perceived problem?

4.3.4.6.2. Priority of the assignment?

4.3.4.6.3. Appropriate organization to handle the tasking request?

4.3.4.7. Is the decision to skip any follow-on steps in the Analysis Phase an acceptable risk to the relevance and effectiveness of the outcome, and if so, was it documented in the ISD Evaluation Board review notes?

Figure 4.2. Decision Tree for Next Activity



4.4. Conduct a Target Audience Analysis. In this activity, the courseware developer analyzes the characteristics of the target audience.

4.4.1. Purpose. This activity helps the courseware developer decide what types of instructional methods, media, examples, exercises, and evaluation techniques will be most effective in gaining and holding the students' attention.

4.4.2. Activity Outcomes. Outcomes for this activity are:

4.4.2.1. Target Audience Analysis Report.

4.4.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

4.4.2.3. Decision on where to go next in the courseware process.

4.4.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

4.4.3.1. Target audience analysis guidance and examples.

4.4.3.2. Target Audience Report quality checklist and samples.

4.4.4. Evaluation Criteria.

4.4.4.1. Does Target Audience Analysis Report include:

4.4.4.1.1. Age range of majority of students?

4.4.4.1.2. Education level of majority of students?

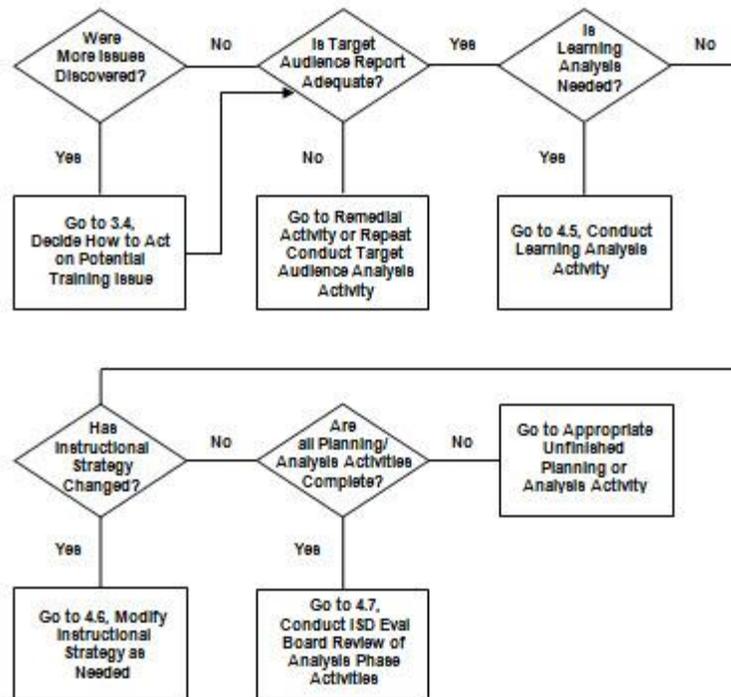
- 4.4.4.1.3. Work center locations of majority of students?
- 4.4.4.1.4. Experience in topics to be covered by this training?
- 4.4.4.1.5. Student attitudes toward topics to be covered by this training?
- 4.4.4.1.6. Estimated size of target population?

4.4.4.2. Has the Target Audience Analysis Report been approved by lead SMEs, subject area program managers, system OPRs, instructors, trainers, etc., for types of learning needed?

4.4.4.3. Are any issues or action items that emerged during this activity documented sufficiently to determine:

- 4.4.4.3.1. Nature of the perceived problem?
- 4.4.4.3.2. Priority of the assignment?
- 4.4.4.3.3. Appropriate organization to handle the tasking request?

Figure 4.3. Decision Tree for Next Activity



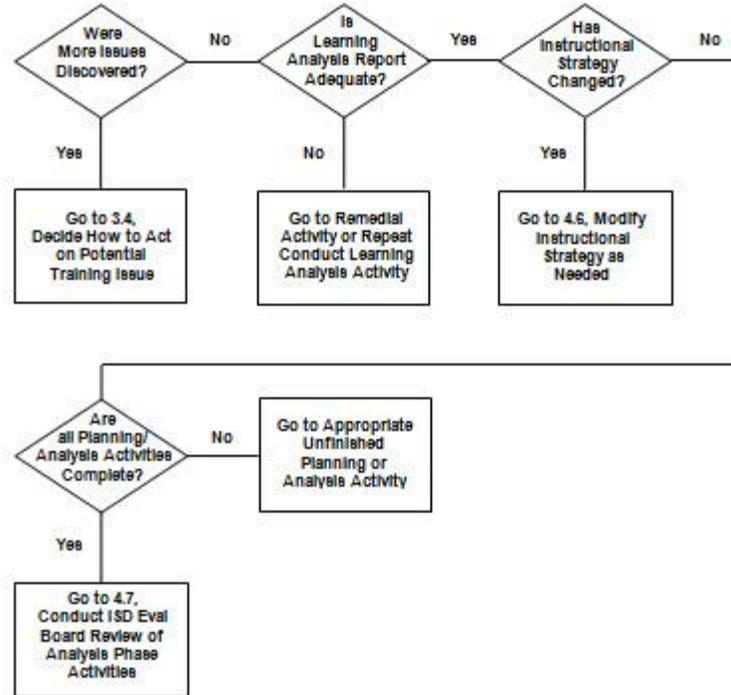
4.5. Conduct a Learning Analysis. In this activity, the courseware developer analyzes the tasks to be taught and the demographics of the target audience in order to describe the types of learning involved, the proficiency levels of learning needed, and any student prerequisites that will be required.

4.5.1. Purpose. This activity ensures that instruction will be effective in resolving the performance deficiency.

4.5.2. Activity Outcomes. Outcomes for this activity are:

- 4.5.2.1. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
- 4.5.2.2. Learning Analysis Report.
- 4.5.2.3. Decision on where to go next in the courseware process.
- 4.5.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:
 - 4.5.3.1. Learning analysis guidance and examples.
 - 4.5.3.2. Learning Analysis Report quality checklist and examples.
- 4.5.4. Evaluation Criteria.
 - 4.5.4.1. Does Learning Analysis Report include:
 - 4.5.4.1.1. A description of the target population demographic?
 - 4.5.4.1.2. A description of learning needed by the target audience?
 - 4.5.4.1.3. Proficiency levels of learning required, based on Bloom's Taxonomy and the AF Proficiency Code Key. (Note: This is usually delivered in the form of a draft Course Training Standard.
 - 4.5.4.1.4. Identification of any course prerequisites and/or follow-ons?
 - 4.5.4.2. Has the Learning Analysis Report been approved by instructors, trainers, etc.?
 - 4.5.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 4.5.4.3.1. Nature of the perceived problem?
 - 4.5.4.3.2. Priority of the assignment?
 - 4.5.4.3.3. Appropriate organization to handle the tasking request?

Figure 4.4. Decision Tree for Next Activity



4.6. Modify Instructional Strategy as Needed. In this activity, the courseware developer validates data from previous Planning Phase activities, integrates information from Analysis Phase activities, and modifies the plan for developing and delivering new or significantly revised courseware.

4.6.1. Purpose. This activity updates the Preliminary Instructional Strategy created during Planning Phase to include more detail about the types of learning and events of instruction that are planned for the course. It also identifies if changes to the courseware project will require any modification to a contract. Finally, this activity provides the lead time necessary to purchase tools and equipment, arrange for instructors and facilities, and obtain other resources needed to deliver the instruction.

4.6.2. Activity Outcomes. Outcomes for this activity are:

4.6.2.1. Instructional Strategy Report approved by the customer.

4.6.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

4.6.2.3. Decision on where to go next in the courseware process.

4.6.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

4.6.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

4.6.3.2. References on applying blended learning to courseware development.

- 4.6.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.
 - 4.6.3.4. References on selecting appropriate evaluation methods/tools and media based on the situation.
 - 4.6.3.5. Delivery resources analysis guidance and examples.
 - 4.6.3.6. Instructional strategy guidance and examples.
 - 4.6.3.7. Instructional Strategy Report instructions, quality checklist, and examples.
- 4.6.4. Evaluation Criteria.
- 4.6.4.1. Does the Instructional Strategy Report identify and justify the following aspects of the instructional plan:
 - 4.6.4.1.1. Proposed delivery method(s)?
 - 4.6.4.1.2. Proposed media?
 - 4.6.4.1.3. Tasks and knowledge topics to be trained?
 - 4.6.4.1.4. Proficiency levels of learning to be attained?
 - 4.6.4.1.5. Planned instructional and evaluation methods?
 - 4.6.4.1.6. Planned instructor and student materials?
 - 4.6.4.1.7. Planned target population?
 - 4.6.4.1.8. Anticipated length of instruction?
 - 4.6.4.1.9. Anticipated location of the instruction?
 - 4.6.4.1.10. Facilities, equipment, tools and materials that will be needed to deliver the instruction?
 - 4.6.4.1.11. Skills (instructors, trainers, facilitators, computer support, etc.) that will be needed to deliver the instruction? Determine what it will cost to get the instructor/trainer/facilitator trained and how long this will take.
 - 4.6.4.1.12. Computer software, automated systems, training regions, licenses, network access, learning management systems, etc. that will be needed to deliver instruction?
 - 4.6.4.1.13. Security clearances, controlled area access, etc., required by students and instructors to deliver instruction?
 - 4.6.4.2. Does the Instructional Strategy Report explain what has changed from the Preliminary Instructional Strategy, and why?
 - 4.6.4.3. Are any changes to the Instructional Strategy explained in enough detail to determine what project activities need to be adjusted, and what contract modifications will be required (if applicable)?
 - 4.6.4.4. Does the justification for delivery method(s) and media address task frequency, task criticality, task learning difficulty, task performance difficulty, and incidence of poor task performance?

4.6.4.5. Are the selected tasks, knowledge topics, instructional methods, evaluation methods, target population and length of instruction based on adequate data from appropriate experts, and is the reasoning documented in the Preliminary Instructional Strategy Report?

4.6.4.6. Does the Instructional Strategy support a blended learning approach to instruction?

4.6.4.7. Did the owning/instructing organization(s) acknowledge responsibility for preparing instructors/trainers/facilitators; arranging for necessary facilities, tools, materials and equipment; and delivering and sustaining this training?

4.6.4.8. Has the instructional strategy been approved by owning/managing organization lead SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc.?

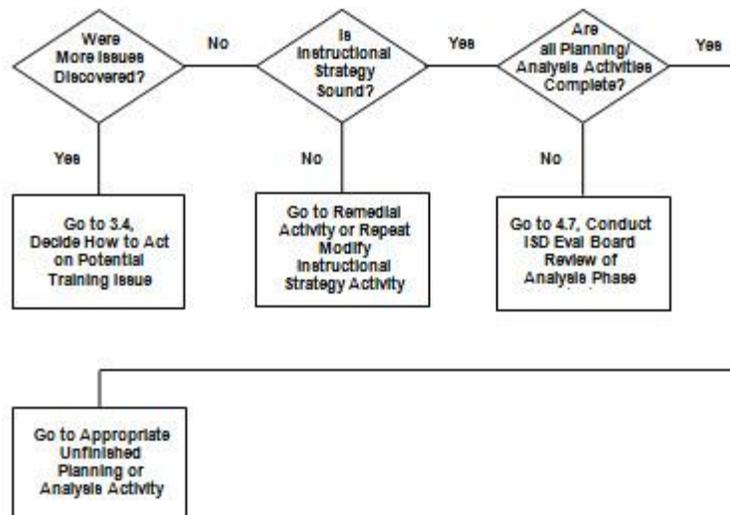
4.6.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:

4.6.4.9.1. Nature of the perceived problem?

4.6.4.9.2. Priority of the assignment?

4.6.4.9.3. Appropriate organization to handle the tasking request?

Figure 4.5. Decision Tree for Next Activity



4.7. Conduct ISD Evaluation Board Review of Analysis Phase Activities. In this activity, at least one ISD Evaluation Board official reviews the activities performed during the Analysis Phase to determine if they meet the intent of the HILL AFB Courseware Development and Management Process and its underlying principles of systems engineering, instructional design, and quality improvement.

4.7.1. Purpose. This activity ensures that the HILL AFB Courseware Development and Management Process is applied so that instruction has a high probability of being relevant, effective and economical to sustain.

4.7.2. Activity Outcomes. Outcomes for this activity are:

4.7.2.1. Decision that appropriate activities in the Analysis Phase have been accomplished to the standards of this handbook, or that corrective actions are needed before the project goes into Design Phase.

4.7.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

4.7.2.3. Decision on where to go next in the courseware process.

4.7.3. Additional Guidance. The basic procedures and sample review worksheets for conducting ISD Evaluation Board reviews are in the AFMC ISD Courseware Resource Site. It also contains items such as:

4.7.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the HILL AFB Courseware Development and Management Process.

4.7.3.2. ISD Evaluation Board review guidance, sample instructions, sample worksheet templates, quality checklists and examples.

4.7.4. Evaluation Criteria.

4.7.4.1. Do the ISD Evaluation Board Notes for the Analysis Phase include:

4.7.4.1.1. Basic information about project, date of ISD review, and participants?

4.7.4.1.2. Documentation and customer approval of changes to the Preliminary Instructional Strategy?

4.7.4.1.3. Observations about compliance or non-compliance of Analysis Phase activities with the standards set forth in this handbook and the AFMC ISD Courseware Resource Site?

4.7.4.1.4. Corrective actions which need to be accomplished with suspense dates, as applicable?

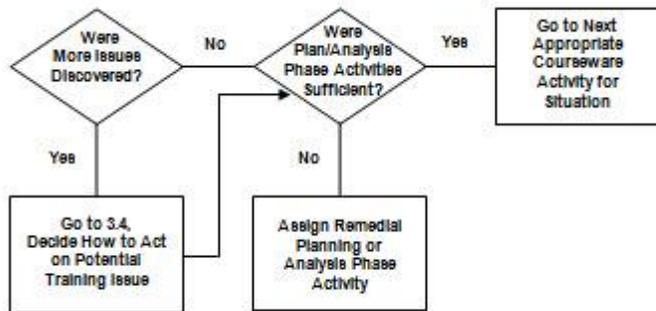
4.7.4.1.5. Analysis Phase review decision?

4.7.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

4.7.4.2.1. Nature of the perceived problem?

4.7.4.2.2. Priority of the assignment?

4.7.4.2.3. Appropriate organization to handle the tasking request?

Figure 4.6. Decision Tree for Next Activity

5. DESIGN PHASE

5.1. Design Phase Defined. Instructional design is similar to architectural design. The courseware developer uses the results of Planning and Analysis Phase activities to create a blueprint of the course or learning aid that shows what instruction, evaluation, and media will be used in each module to meet the defined requirements. For additional information and guidance relating to the Design Phase of the Air Force Instructional System Development (ISD) process, refer to AFH 36-2235, Volume 3.

5.2. Plan Integration of Existing Materials. In this activity, the courseware developer decides how to incorporate any available content (e.g., directives, technical data, working aids, courseware, vendor instruction, etc.) that meets part of the defined instructional requirement into the course or learning aid being developed.

5.2.1. Purpose. This activity saves resources by adopting as much existing material as is practical.

5.2.2. Activity Outcomes. Outcomes for this activity are:

5.2.2.1. Existing Material Integration Plan.

5.2.2.2. Modified Instructional Strategy with customer approval, as needed.

5.2.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.2.2.4. Decision on where to go next in the courseware process.

5.2.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as existing material integration sample documentation and quality checklist.

5.2.4. Evaluation Criteria.

5.2.4.1. Does the existing material integration plan documentation include:

5.2.4.1.1. How existing directives, technical data, working aids, courseware, vendor instruction, etc. will be incorporated into the design of the instruction?

5.2.4.1.2. Why excluded items are not suitable for inclusion in instruction?

5.2.4.2. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

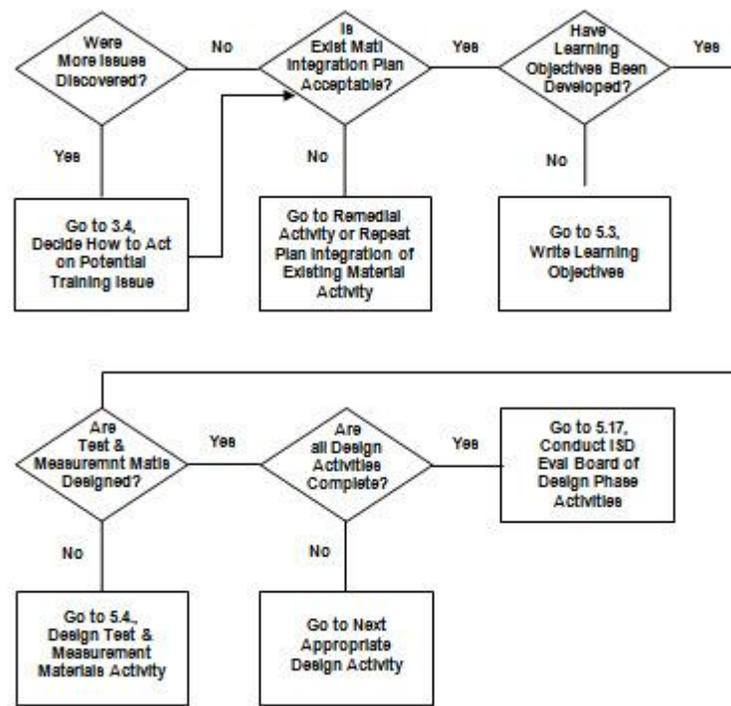
5.2.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.2.4.3.1. Nature of the perceived problem?

5.2.4.3.2. Priority of the assignment?

5.2.4.3.3. Appropriate organization to handle the tasking request?

Figure 5.1. Decision Tree for Next Activity



5.3. Write Learning Objectives. In this activity, the courseware developer writes the learning objectives for the course or learning aid.

5.3.1. Purpose. This activity allows the customer to review the planned topics, tasks, conditions of performance, and standards of performance that will be required of the student for course completion, before any resources are invested in developing instructional and evaluation materials.

5.3.2. Activity Outcomes. Outcomes for this activity are:

5.3.2.1. Learning objectives for the course or learning aid, usually in the form of a draft Plan of Instruction (POI).

5.3.2.2. Modified Instructional Strategy with customer approval, as needed.

5.3.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.3.2.4. Decision on where to go next in the courseware process.

5.3.3. Additional Guidance. Templates, detailed procedures, and quality checklists for preparing on writing criterion-referenced learning objectives are in the AFMC ISD Courseware Resource Site. It also contains items such as samples and tasking worksheets.

5.3.4. Evaluation Criteria.

5.3.4.1. Does each learning objective contain:

5.3.4.1.1. One behavior (knowledge or task)?

5.3.4.1.2. A condition of performance that is closely related to the actual conditions in the work environment?

5.3.4.1.3. A standard of behavior that is criterion-referenced and closely related to the actual standards required in the work environment?

5.3.4.2. Do the knowledge and tasks included in the learning objectives coincide directly with the task statements approved by the customer during knowledge/task analysis in the Analysis Phase?

5.3.4.3. Are the proficiency levels for the learning objectives appropriate for the instructional requirements defined during the Planning and Analysis Phases?

5.3.4.4. Do the objectives use types of learning appropriate for the situation?

5.3.4.5. Did changes to initially planned topics, tasks and proficiency levels occur, and if so, have these changes been approved by the customer and documented in the Instructional Strategy?

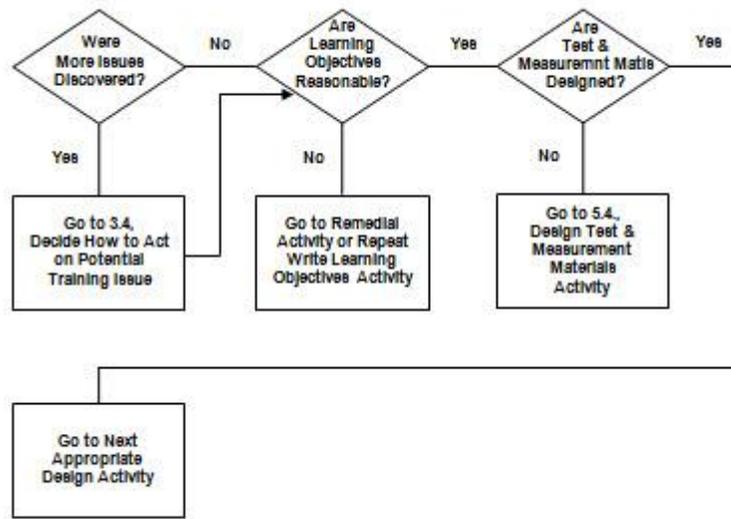
5.3.4.6. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.3.4.6.1. Nature of the perceived problem?

5.3.4.6.2. Priority of the assignment?

5.3.4.6.3. Appropriate organization to handle the tasking request?

Figure 5.2. Decision Tree for Next Activity



5.4. Design Test and Measurement Materials. In this activity, the courseware developer prepares the first draft of materials that will be used to evaluate student progress and attainment of learning objectives.

5.4.1. Purpose. This activity allows the customer and Instructor/Trainer and/or Facilitator to review the planned test and measurement materials before resources are invested in developing the instructional materials that will be based upon them.

5.4.2. Activity Outcomes. Outcomes for this activity are:

5.4.2.1. Draft evaluation materials such as pre-tests, bypass tests, review questions, class exercises/projects, quizzes, post-tests, proficiency evaluations, product/process checklists, etc.

5.4.2.2. Draft guidance for Instructor/Trainer and/or Facilitator on administering evaluation tools.

5.4.2.3. Modified Instructional Strategy with customer approval, as needed.

5.4.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.4.2.5. Decision on where to go next in the courseware process.

5.4.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.4.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

5.4.3.2. References on selecting appropriate student evaluation methods/tools and media based on the situation.

5.4.3.3. References on developing evaluation materials.

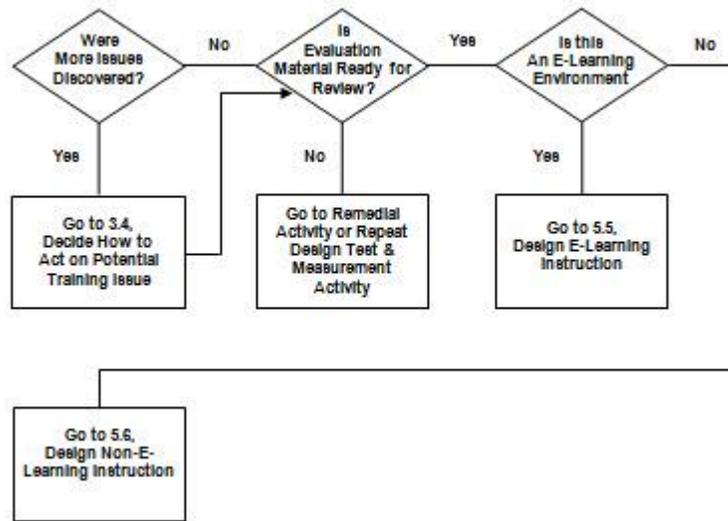
5.4.3.4. References on developing pre-assessment and bypass tests.

- 5.4.3.5. Sample product and process checklists.
- 5.4.3.6. Sample proficiency evaluation checklists.
- 5.4.3.7. References on Section 508 of the Rehabilitation Act.

5.4.4. Evaluation Criteria.

- 5.4.4.1. Do the amount and types of evaluation provide the customer with a high level of confidence that students have attained the proficiency level of learning specified in the learning objectives?
- 5.4.4.2. Do the media and delivery method(s) of student evaluations appear to be the most appropriate for the situation?
- 5.4.4.3. Is the content of the student evaluations directly related to the topics, tasks, conditions and standards specified in the learning objectives?
- 5.4.4.4. Do the evaluation activities emulate the conditions and standards of the work environment as much as is feasible?
- 5.4.4.5. Is the content of the evaluation materials accurate and complete?
- 5.4.4.6. Have widely-accepted instructional concepts been applied when selecting student evaluation activities and creating test and measurement materials?
- 5.4.4.7. Is there enough evaluation guidance for a technically qualified substitute Instructor/Trainer and/or Facilitator to take over the course and administer the exercises, projects and tests consistent with methods used by the lead Instructor/Trainer and/or Facilitator?
- 5.4.4.8. Are all evaluations correctable to 100% so that students will be given immediate feedback and correct answers before completion of the course?
- 5.4.4.9. For pass/fail tests, are there at least two questions/scenarios for each learning objective tested to allow for remedial instruction and test compromise situations?
- 5.4.4.10. Is the content and minimum passing score for pass/fail tests consistent with training mandates (e.g., Occupational Safety and Health Administration regulations, AFI 21-101, etc.) as applicable?
- 5.4.4.11. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?
- 5.4.4.12. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 5.4.4.12.1. Nature of the perceived problem?
 - 5.4.4.12.2. Priority of the assignment?
 - 5.4.4.12.3. Appropriate organization to handle the tasking request?

Figure 5.3. Decision Tree for Next Activity



5.5. Design E-Learning Environment. In this activity, the courseware developer finalizes selection of the content, media, instructional methods/tools, and student evaluation methods/tools that will be used, and creates a detailed outline of the E-Learning Environment or learning aid.

5.5.1. Purpose. This activity prepares the blueprint of instruction that shows the learning objectives, and the types and sequence of instructional and student evaluation activities that will take place, so that the design of the course can be reviewed before extensive resources are invested in producing the detailed content storyboards.

5.5.2. Activity Outcomes. Outcomes for this activity are:

5.5.2.1. A draft POI or flowchart that includes:

5.5.2.2. Instructional and evaluation activities for the course or learning aid, including the pre-assessment test if applicable.

5.5.2.3. Identification of the media that will be used for each instructional and student evaluation activity.

5.5.2.4. A clear description of screen design and student interactivity features.

5.5.2.5. An overview of content that will be included in the instruction.

5.5.2.6. Modified Instructional Strategy with customer approval, as needed.

5.5.2.7. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.5.2.8. Decision on where to go next in the courseware process.

5.5.3. Additional Guidance. Templates, detailed procedures, and quality checklists for preparing a POI are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.5.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

5.5.3.2. References on applying blended learning to courseware development.

5.5.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

5.5.3.4. References on design of E-Learning.

5.5.3.5. References and guidance on documentation (e.g., storyboards, content documentation, interactivity documentation, etc.) associated with E-Learning design/content and the version of SCORM to be used based on what the LMS will support.

5.5.3.6. References on selecting appropriate E-Learning student evaluation methods/tools and based on the situation.

5.5.3.7. References on developing E-Learning evaluation materials.

5.5.3.8. References on developing E-Learning pre-assessment and bypass tests.

5.5.3.9. References on Section 508 of the Rehabilitation Act.

5.5.3.10. Directives, references and guidance on Sharable Content Object Reference Model metadata tagging, and content packaging.

5.5.3.11. Sample POIs.

5.5.4. Evaluation Criteria.

5.5.4.1. Does the design outline for each module contain:

5.5.4.1.1. One or more criterion-referenced learning objectives?

5.5.4.1.2. Presentations, demonstrations, simulations and exhibits that will be used to support each learning objective?

5.5.4.1.3. Student projects, exercises, review sessions, quizzes, tests and proficiency evaluations that will be used to support each learning objective?

5.5.4.1.4. A clear description of screen design and student interactivity features?

5.5.4.1.5. An overview of the content that will support each learning objective?

5.5.4.1.6. The media that will be used for each instructional and student evaluation activity?

5.5.4.2. Does the design outline:

5.5.4.2.1. Show the sequence in which the instruction will be delivered to the students?

5.5.4.2.2. Confirm that the selected delivery method is the most appropriate for the situation?

5.5.4.2.3. Propose instructional and student evaluation events that are appropriate for the situation and support the learning objectives?

5.5.4.2.4. Explain how relevant examples and non-examples in the form of illustrations, diagrams, demonstrations, scenarios, case studies, etc. will be used to apply instructional concepts?

5.5.4.2.5. Support the tasks, conditions and standards of the work environment as much as is feasible?

5.5.4.2.6. Describe any pre-assessment or bypass tests that will be used to determine which modules, if any, the student will be required to take?

5.5.4.3. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

5.5.4.4. Was an appropriate mix of Subject Matter Experts (SMEs), subject area program managers, system Officers of Primary Responsibility (OPRs), instructors, trainers, courseware developers, training managers, etc. involved in the design of this course or learning aid?

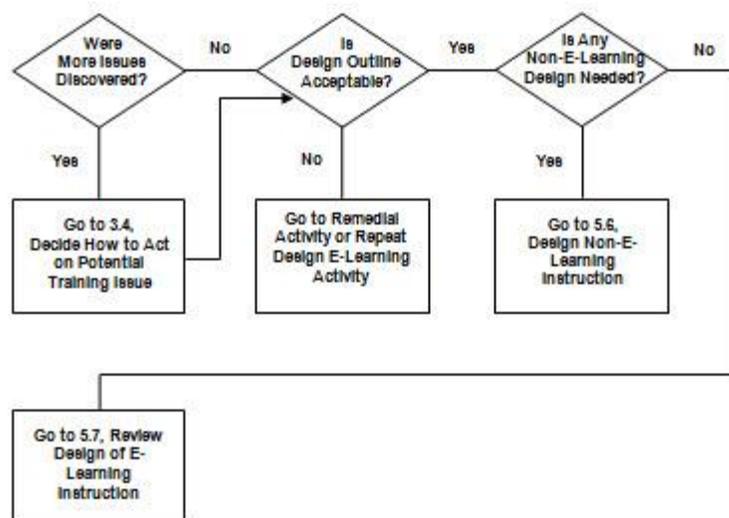
5.5.4.5. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.5.4.5.1. Nature of the perceived problem?

5.5.4.5.2. Priority of the assignment?

5.5.4.5.3. Appropriate organization to handle the tasking request?

Figure 5.4. Decision Tree for Next Activity



5.6. Design Non-E-Learning Instruction. In this activity, the courseware developer finalizes selection of the media, instructional methods/tools, and student evaluation methods/tools that will be used and creates a detailed outline of the course or learning aid.

5.6.1. Purpose. This activity prepares the blueprint of instruction that shows the learning objectives, and the types and sequence of instructional and student evaluation activities that will take place, so that the design of the course can be reviewed before extensive

resources are invested in producing the presentation, generic lesson plan, student handouts, etc.

5.6.2. Activity Outcomes. Outcomes for this activity are:

5.6.2.1. A draft POI or detailed design outline that includes:

5.6.2.1.1. Instructional and evaluation activities for the course or learning aid.

5.6.2.1.2. Identification of the media that will be used for each instructional and student evaluation activity.

5.6.2.1.3. A clear description of facilities, equipment, tools and materials that will be used to delivery the training.

5.6.2.1.4. An overview of content that will be included in the instruction.

5.6.2.2. Modified Instructional Strategy with customer approval, as needed.

5.6.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.6.2.4. Decision on where to go next in the courseware process.

5.6.3. Additional Guidance. Templates, detailed procedures, and quality checklists for preparing a POI are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.6.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

5.6.3.2. References on applying blended learning to courseware development.

5.6.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

5.6.3.4. References on design of Non-E-Learning instruction.

5.6.3.5. References on developing student evaluation materials.

5.6.3.6. References on Section 508 of the Rehabilitation Act.

5.6.3.7. Sample POIs.

5.6.4. Evaluation Criteria.

5.6.4.1. Does the design outline for each module contain:

5.6.4.1.1. One or more criterion-referenced learning objectives?

5.6.4.1.2. Presentations, demonstrations, simulations and exhibits that will be used to support each learning objective?

5.6.4.1.3. Student projects, exercises, review sessions, quizzes, tests and proficiency evaluations that will be used to support each learning objective?

5.6.4.1.4. A clear description of facilities, equipment, tools and materials that will be used to deliver the training?

5.6.4.1.5. An overview of the content that will support each learning objective?

5.6.4.1.6. The media that will be used for each instructional and student evaluation activity?

5.6.4.2. Does the design outline:

5.6.4.2.1. Show the sequence in which the instruction will be delivered to the students?

5.6.4.2.2. Confirm that the selected delivery method is the most appropriate for the situation?

5.6.4.2.3. Propose instructional and student evaluation events that are appropriate for the situation and support the learning objectives?

5.6.4.2.4. Explain how relevant examples and non-examples in the form of illustrations, diagrams, demonstrations, scenarios, case studies, etc. will be used to apply instructional concepts?

5.6.4.2.5. Support the tasks, conditions and standards of the work environment as much as is feasible?

5.6.4.2.6. Describe any pre-assessment or bypass tests that will be used to determine which modules, if any, the student will be required to take?

5.6.4.3. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

5.6.4.4. Was an appropriate mix of SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc. involved in the design of this course or learning aid?

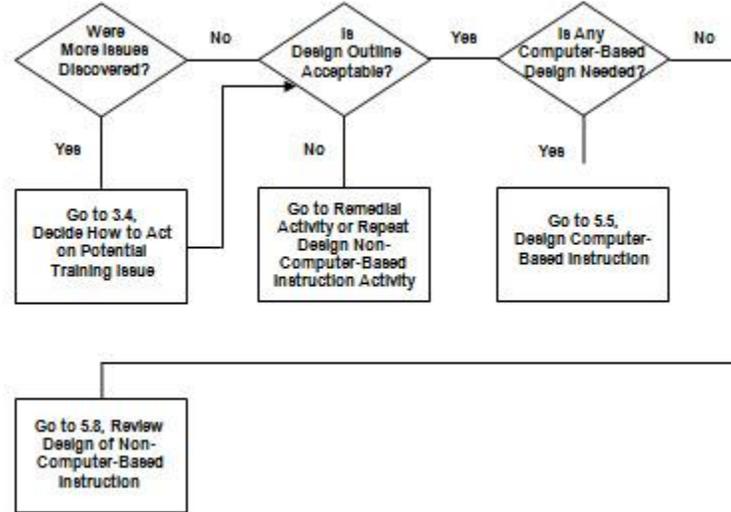
5.6.4.5. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.6.4.5.1. Nature of the perceived problem?

5.6.4.5.2. Priority of the assignment?

5.6.4.5.3. Appropriate organization to handle the tasking request?

Figure 5.5. Decision Tree for Next Activity



5.7. Review Design of E-Learning Environment. In this activity, SMEs, subject area program managers, system OPRs, instructors, courseware developers, information technology experts, etc., review the overall design of the E-Learning Environment and the draft evaluation materials before the content is written for the entire course. *Only minor changes to design of the E-Learning Environment or learning aid are permitted after closeout of Activity 5.7 in Design Phase.*

5.7.1. Purpose. This activity verifies the effectiveness of the design before the self-paced, E-Learning content is written and put in storyboard format.

5.7.2. Activity Outcomes. Outcomes for this activity are:

5.7.2.1. Input from reviewers on design of the course or learning aid.

5.7.2.2. Documentation on changes that will be made to the topics, tasks, delivery methods, and flow of the instruction based on input from experts.

5.7.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.7.2.4. Decision on where to go next in the courseware process.

5.7.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. See the HILL AFB Courseware Resource Site for items such as computer-based instruction review guidance and quality checklists.

5.7.4. Evaluation Criteria.

5.7.4.1. Did appropriate SMEs, training managers, subject area program managers, system OPRs, instructors, etc. review the draft design of the course?

5.7.4.2. Do proposed learning objectives meet the evaluation criteria in paragraph 5.3.?

5.7.4.3. Do proposed student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

5.7.4.4. Does the proposed design of the course meet the evaluation criteria in paragraph 5.5.

5.7.4.5. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

5.7.4.6. Did the courseware developer document why any recommended changes will not be accomplished?

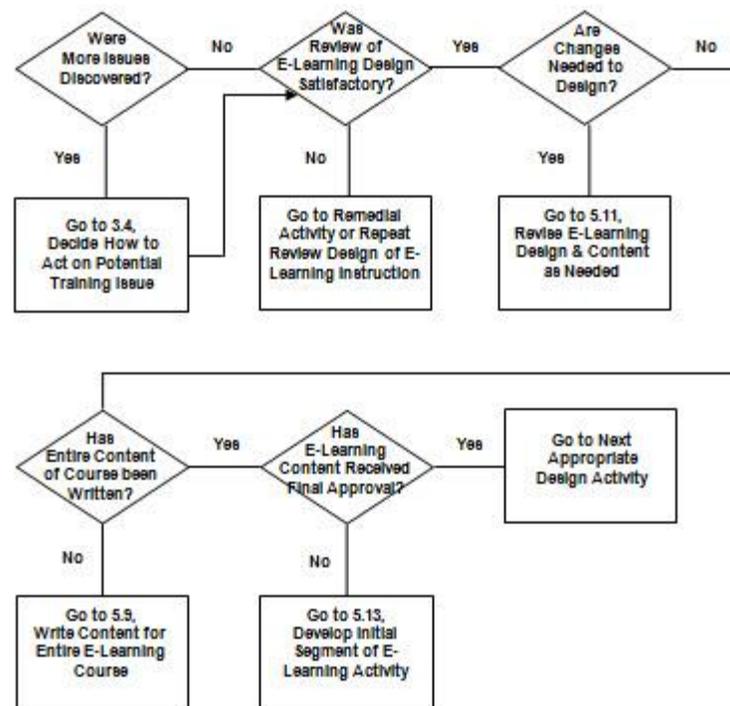
5.7.4.7. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.7.4.7.1. Nature of the perceived problem?

5.7.4.7.2. Priority of the assignment?

5.7.4.7.3. Appropriate organization to handle the tasking request?

Figure 5.6. Decision Tree for Next Activity



5.8. Review Design of Non-E-Learning Instruction. In this activity, SMEs, subject area program managers, system OPRs, instructors, courseware developers, information technology experts, etc., review the overall design of the training and the evaluation materials before the instructional materials are prepared for review in Development Phase.

5.8.1. Purpose. This activity verifies the effectiveness of the design before the content is written and instructional aids are developed.

5.8.2. Activity Outcomes. Outcomes for this activity are:

5.8.2.1. Input from reviewers on design of the course or learning aid.

5.8.2.2. Documentation on changes that will be made to the topics, tasks, delivery methods, evaluation materials and flow of the instruction based on input from experts.

5.8.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.8.2.4. Decision on where to go next in the courseware process.

5.8.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as non-E-Learning Instruction review guidance and quality checklists.

5.8.4. Evaluation Criteria.

5.8.4.1. Did appropriate SMEs, training managers, subject area program managers, system OPRs, instructors, E-Learning experts, etc. review the draft design of the course?

5.8.4.2. Do proposed learning objectives meet the evaluation criteria in paragraph 5.3.?

5.8.4.3. Do proposed student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

5.8.4.4. Does the proposed design of the course meet the evaluation criteria in paragraph 5.6.?

5.8.4.5. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

5.8.4.6. Did the courseware developer document why any recommended changes will not be accomplished?

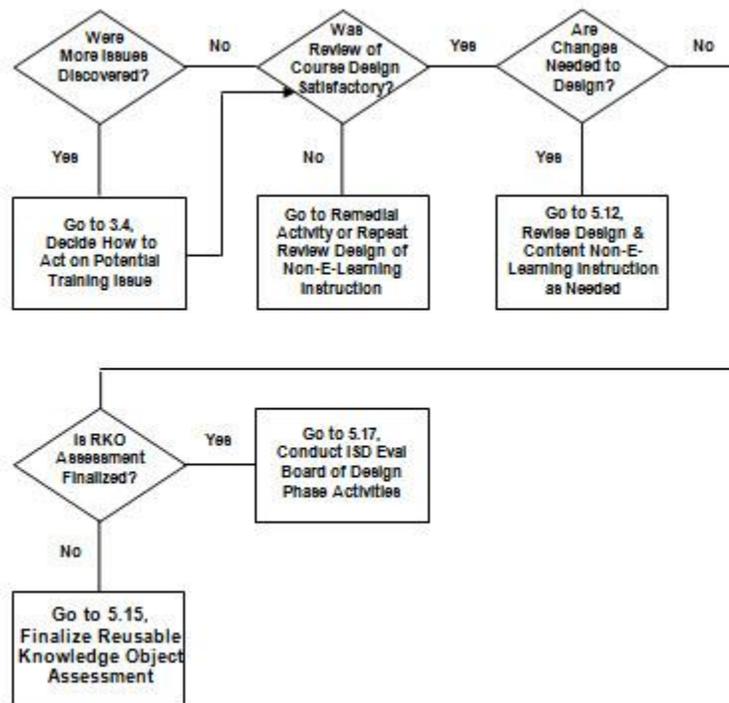
5.8.4.7. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.8.4.7.1. Nature of the perceived problem?

5.8.4.7.2. Priority of the assignment?

5.8.4.7.3. Appropriate organization to handle the tasking request?

Figure 5.7. Decision Tree for Next Activity



5.9. Write Content for Entire E-Learning Environment. In this activity, the courseware developer prepares a draft of all course content for the E-Learning Environment or learning aid. *This is the equivalent of developing instructional materials in Development Phase for non-E-Learning instruction.*

5.9.1. Purpose. This activity allows the customer to review all content for accuracy, completeness, and sequence before resources are invested producing the expensive E-Learning materials.

5.9.2. Activity Outcomes. Outcomes for this activity are:

5.9.2.1. Storyboards of each module of the course that include all proposed course content, to include instructional and student evaluation materials.

5.9.2.2. Identification of the instructional activities and media that will be used to present the course content.

5.9.2.3. A clear description of screen design, student interactivity features, and student evaluation activities.

5.9.2.4. Modified Instructional Strategy with customer approval, as needed.

5.9.2.5. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.9.2.6. Decision on where to go next in the courseware process.

5.9.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.9.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

5.9.3.2. References on applying blended learning to courseware development.

5.9.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

5.9.3.4. References on design of E-Learning.

5.9.3.5. References and guidance on documentation (e.g., storyboards, content documentation, interactivity documentation, etc.) associated with E-Learning design/content.

5.9.3.6. References on selecting appropriate E-learning student evaluation methods/tools and based on the situation.

5.9.3.7. References on developing E-Learning evaluation materials.

5.9.3.8. References on developing E-Learning pre-assessment and bypass tests.

5.9.3.9. References on Section 508 of the Rehabilitation Act.

5.9.3.10. Directives, references and guidance on Sharable Content Object Reference Model metadata tagging, and content packaging.

5.9.3.11. Sample instructional materials and course control documents.

5.9.4. Evaluation Criteria.

5.9.4.1. Are the storyboards and the supporting documentation detailed enough for the reviewers to get a clear picture of precisely what content will be presented, how it will be instructed, and how students will be evaluated for attainment of each learning objective?

5.9.4.2. Do the storyboards and supporting documentation describe any pre-assessment or bypass tests that will be used to determine which modules, if any, the student will be required to take?

5.9.4.3. Do the storyboards for each module contain:

5.9.4.3.1. One or more criterion-referenced learning objectives?

5.9.4.3.2. Presentations, demonstrations, and simulations that will be used to support each learning objective?

5.9.4.3.3. Relevant examples and non-examples in the form of illustrations, diagrams, demonstrations, scenarios, case studies, etc. that will be used to support each learning objective?

5.9.4.3.4. Student projects, exercises, review sessions, quizzes, tests and proficiency evaluations that will be used to support each learning objective?

5.9.4.3.5. A clear description of screen design and student interactivity features?

5.9.4.3.6. All of the content that will support each learning objective?

5.9.4.3.7. The media that will be used for each instructional and student

evaluation activity?

5.9.4.3.8. The sequence in which instruction will be delivered to students?

5.9.4.4. Does the content of the course or learning aid adequately address Gagné's Events of Instruction:

5.9.4.4.1. Gaining attention?

5.9.4.4.2. Informing learner of objectives?

5.9.4.4.3. Stimulating recall of prior learning?

5.9.4.4.4. Presenting new material?

5.9.4.4.5. Providing learning guidance?

5.9.4.4.6. Eliciting practice/performance?

5.9.4.4.7. Providing feedback about correctness?

5.9.4.4.8. Assessing performance?

5.9.4.4.9. Enhancing retention and transfer?

5.9.4.5. Are there sufficient instructional materials and activities to support the learning objectives?

5.9.4.6. Have widely-accepted instructional concepts been applied when creating examples, non-examples, illustrations, diagrams, demonstrations, scenarios, case studies, etc.?

5.9.4.7. Is the sequence of the content and learning activities effective?

5.9.4.8. Do the media and delivery method(s) of the instructional materials appear to be the most appropriate for the situation?

5.9.4.9. Is the content of the instructional materials directly related to the topics, tasks, conditions and standards specified in the learning objectives?

5.9.4.10. Are the examples, non-examples, illustrations, diagrams, demonstrations, scenarios, case studies, and other instructional materials and activities relevant to the target audience?

5.9.4.11. Is the content of instructional materials accurate and complete?

5.9.4.12. Is there enough navigational guidance for a student to easily take the course and any bypass pre-test that may be available?

5.9.4.13. Do learning objectives meet the evaluation criteria in paragraph 5.3.?

5.9.4.14. Do student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

5.9.4.15. Does the design of the course meet the evaluation criteria in paragraph 5.5.?

5.9.4.16. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

5.9.4.17. Was an appropriate mix of SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc. involved in the design of this course or learning aid?

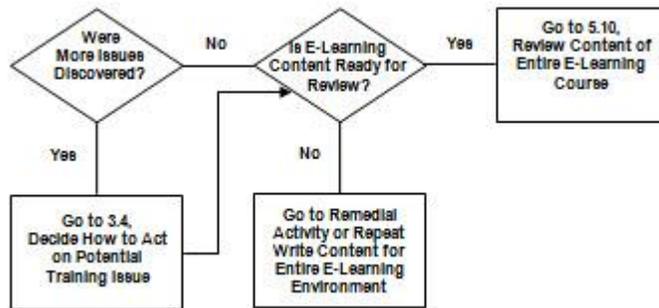
5.9.4.18. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.9.4.18.1. Nature of the perceived problem?

5.9.4.18.2. Priority of the assignment?

5.9.4.18.3. Appropriate organization to handle the tasking request?

Figure 5.8. Decision Tree for Next Activity



5.10. Review Content of Entire E-Learning Environment. In this activity, SMEs, subject area program managers, system OPRs, instructors, courseware developers, information technology experts, etc., review E-Learning sequence, appearance, content and functionality before final modules are sent to production. *Only minor corrections to content of the E-Learning Environment or learning aid are permitted after closeout of Activity 5.10 in Design Phase.*

5.10.1. Purpose. This activity verifies the relevance, accuracy and effectiveness of the content and design before the self-paced, E-Learning goes to production and changes become very expensive. *It is the equivalent of the technical and instructor review activities in the Development Phase for Non-E-Learning Courseware.*

5.10.2. Activity Outcomes. Outcomes for this activity are:

5.10.2.1. Input from reviewers on content of the course or learning aid.

5.10.2.2. Documentation on changes that will be made to the content of instructional activities, evaluation activities, and general presentation of information based on input from experts.

5.10.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.10.2.4. Decision on where to go next in the courseware process.

5.10.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as computer-based instruction review guidance and quality checklists.

5.10.4. Evaluation Criteria.

5.10.4.1. Did appropriate SMEs, training managers, subject area program managers, system OPRs, instructors, E-Learning experts, etc. review the draft materials?

5.10.4.2. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

5.10.4.3. Did the courseware developer document why any recommended changes will not be accomplished?

5.10.4.4. Do learning objectives meet the evaluation criteria in paragraph 5.3.?

5.10.4.5. Do student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

5.10.4.6. Does the design of the course meet the evaluation criteria in paragraph 5.5.?

5.10.4.7. Do instructional materials and activities meet the evaluation criteria in paragraph 5.9.?

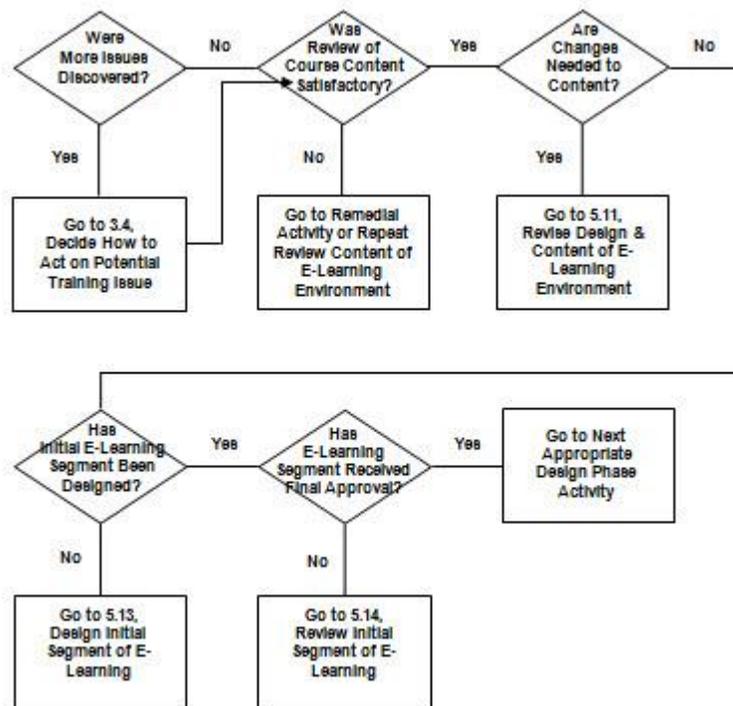
5.10.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.10.4.8.1. Nature of the perceived problem?

5.10.4.8.2. Priority of the assignment?

5.10.4.8.3. Appropriate organization to handle the tasking request?

Figure 5.9. Decision Tree for Next Activity



5.11. Revise Design and Content of E-Learning as Needed. In this activity, the courseware developer makes recommended changes to the proposed content, sequence, instructional activities and student evaluation activities of the E-Learning course or learning aid.

5.11.1. Purpose. This activity accomplishes as much rework as possible before the E-Learning prototype module is produced. The earlier in the process that problems are discovered and corrections are made, the less expensive and time-consuming they are.

5.11.2. Activity Outcomes. Outcomes for this activity are:

5.11.2.1. Changes made to the content, delivery methods, and flow of the instruction based on input from experts.

5.11.2.2. Changes made to course control documents as needed.

5.11.2.3. Modified Instructional Strategy with customer approval, as needed.

5.11.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.11.2.5. Decision on where to go next in the courseware process.

5.11.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.11.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

5.11.3.2. References on applying blended learning to courseware development.

5.11.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

5.11.3.4. References on design of E-Learning.

5.11.3.5. References and guidance on documentation (e.g., storyboards, content documentation, interactivity documentation, etc.) associated with E-Learning design and content.

5.11.3.6. References on selecting appropriate E-Learning student evaluation methods and tools and based on the situation.

5.11.3.7. References on developing E-Learning evaluation materials.

5.11.3.8. References on developing E-Learning pre-assessment and bypass tests.

5.11.3.9. References on Section 508 of the Rehabilitation Act.

5.11.3.10. Directives, references and guidance on Sharable Content Object Reference Model metadata tagging, and content packaging.

5.11.3.11. Sample instructional materials and course control documents.

5.11.4. Evaluation Criteria.

5.11.4.1. Did the courseware developer accomplish planned changes?

5.11.4.2. Did the courseware developer document why any planned changes were not accomplished?

5.11.4.3. Do any revised learning objectives meet the evaluation criteria in paragraph 5.3.?

5.11.4.4. Do any revised student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

5.11.4.5. Does any revision to the design of the course meet the evaluation criteria in paragraph 5.5.?

5.11.4.6. Do any revised instructional materials and activities meet the evaluation criteria in paragraph 5.9.?

5.11.4.7. Has the courseware developer arranged for a follow-on review of the revised materials, if warranted by the situation?

5.11.4.8. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

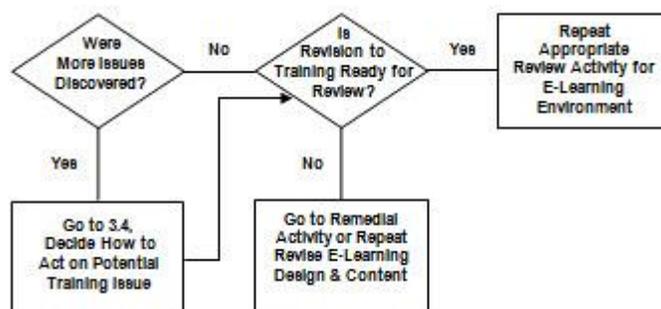
5.11.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.11.4.9.1. Nature of the perceived problem?

5.11.4.9.2. Priority of the assignment?

5.11.4.9.3. Appropriate organization to handle the tasking request?

Figure 5.10. Decision Tree for Next Activity



5.12. Revise Design of Non-E-Learning Instruction as Needed. In this activity, the courseware developer makes recommended changes to the design of the Non-E-Learning Course or learning aid.

5.12.1. Purpose. This activity saves resources by accomplishing as much rework as possible before instructional and evaluation materials are actually created in Development Phase.

5.12.2. Activity Outcomes. Outcomes for this activity are:

5.12.2.1. Changes made to the basic content, delivery methods, and flow of the instruction based on input from experts.

5.12.2.2. Changes made to course control documents as needed

5.12.2.3. Modified Instructional Strategy with customer approval, as needed.

5.12.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.12.2.5. Decision on where to go next in the courseware process.

5.12.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.12.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

5.12.3.2. References on applying blended learning to courseware development.

5.12.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

5.12.3.4. References on design of non-E-Learning instruction.

5.12.3.5. References on developing student evaluation materials.

5.12.3.6. References on Section 508 of the Rehabilitation Act.

5.12.4. Evaluation Criteria.

5.12.4.1. Did the courseware developer accomplish planned changes?

5.12.4.2. Did the courseware developer document why any planned changes were not accomplished?

5.12.4.3. Do any revised learning objectives meet the evaluation criteria in paragraph 5.3.?

5.12.4.4. Do any revised student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

5.12.4.5. Does any revision to the design of the course meet the evaluation criteria in paragraph 5.6.?

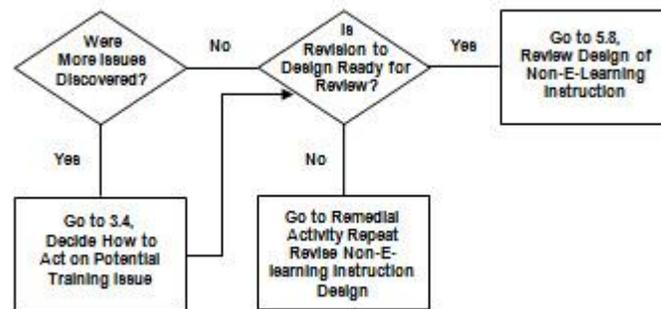
5.12.4.6. Has the courseware developer arranged for a follow-on review of the revised materials, if warranted by the situation?

5.12.4.7. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.12.4.7.1. Nature of the perceived problem?

5.12.4.7.2. Priority of the assignment?

5.12.4.7.3. Appropriate organization to handle the tasking request?

Figure 5.11. Decision Tree for Next Activity

5.13. Design Initial Segment of E-Learning Environment. In this activity, the courseware development team creates a representative segment of the actual instruction that shows how the screens will look, how the content will appear, how the navigational buttons will operate, how the narrator will sound, how the interactivity will work, etc.

5.13.1. Purpose. This activity reduces the risk of complete rework by producing at least one representative module of E-Learning for review by typical students and experts before additional modules are produced. E-Learning material production is expensive, so identifying problems and testing changes or corrections using an initial segment of the actual course or learning aid saves time and money.

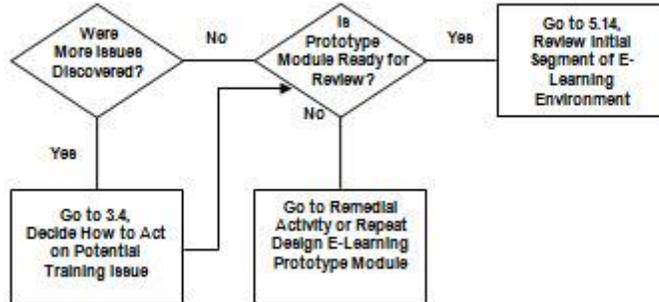
5.13.2. Activity Outcomes. Outcomes for this activity are:

- 5.13.2.1. Segment of one or more modules for review by experts and typical students.
- 5.13.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
- 5.13.2.3. Modified Instructional Strategy with customer approval, as needed.
- 5.13.2.4. Decision on where to go next in the courseware process.

5.13.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

- 5.13.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.
- 5.13.3.2. References on applying blended learning to courseware development.
- 5.13.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.
- 5.13.3.4. References on design of E-Learning.
- 5.13.3.5. References and guidance on documentation (e.g., storyboards, content, interactivity documentation, etc.) associated with E-Learning design/content.
- 5.13.3.6. References on selecting appropriate E-Learning student evaluation methods/tools and based on the situation.

- 5.13.3.7. References on developing E-Learning evaluation materials.
 - 5.13.3.8. References on developing E-Learning pre-assessment and bypass tests.
 - 5.13.3.9. References on Section 508 of the Rehabilitation Act.
 - 5.13.3.10. Directives, references and guidance on Sharable Content Object Reference Model metadata tagging, and content packaging.
 - 5.13.3.11. Sample instructional materials and course control documents.
- 5.13.4. Evaluation Criteria.
- 5.13.4.1. Does the initial E-Learning segment provided for review contain one or more criterion-referenced learning objectives?
 - 5.13.4.2. Does the initial segment contain:
 - 5.13.4.2.1. Content as it will appear in the actual course or learning aid?
 - 5.13.4.2.2. Student projects, pre-assessment tests, exercises, review questions, quizzes, tests and proficiency evaluations that appear and operate as they will in the actual course or learning aid?
 - 5.13.4.2.3. Screens as they will appear in the actual course or learning aid?
 - 5.13.4.2.4. Navigation buttons that appear and operate as they will in the actual course or learning aid?
 - 5.13.4.2.5. Narration as it will sound in the actual course or learning aid?
 - 5.13.4.2.6. Student interactivity that appears and operates as it will in the actual course or learning aid?
 - 5.13.4.3. Are the screen design and navigational features of the segment engaging and easy to use?
 - 5.13.4.4. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?
 - 5.13.4.5. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?
 - 5.13.4.6. Does the design of the course meet the evaluation criteria in paragraph 5.5.?
 - 5.13.4.7. Do instructional materials and activities meet the evaluation criteria in paragraph 5.9.?
 - 5.13.4.8. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?
 - 5.13.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 5.13.4.9.1. Nature of the perceived problem?
 - 5.13.4.9.2. Priority of the assignment?
 - 5.13.4.9.3. Appropriate organization to handle the tasking request?

Figure 5.12. Decision Tree for Next Activity

5.14. Review Initial Segment of E-Learning Environment. In this activity, SMEs, subject area program managers, system OPRs, training managers, E-Learning experts, students from the target population, etc., review a representative segment of the actual instruction to see how the screens will look, the content will appear, the navigational buttons will operate, the narrator will sound, the interactivity will work, etc.

5.14.1. This equates to Development Phase Activity for Non-E-Learning courses and learning aids. (paragraph 6.8.)

5.14.1.1. Only minor corrections to content, appearance and functionality of the E-Learning course or learning aid are permitted after closeout of Activity in Design Phase. (paragraph 5.14.)

5.14.1.2. Purpose. This activity allows experts to visualize the appearance of the final product and test the functionality of the instruction before additional modules of the course or learning aid is produced. Computer-based material production is expensive, so review of this prototype, in combination with the earlier reviews in 5.7, *Review Design of Computer-Based Instruction*, and 5.10, *Review Content of Entire E-Learning Environment* serve as the initial validation of the self-paced course or learning aid before remaining modules are developed and reviewed prior to deployment in the field.

5.14.2. Activity Outcomes. Outcomes for this activity are:

5.14.2.1. Input from reviewers on content, appearance and functionality of the prototype module.

5.14.2.2. Documentation on changes that will be made to the content, appearance, navigation, and interactivity of the instruction based on input from experts.

5.14.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

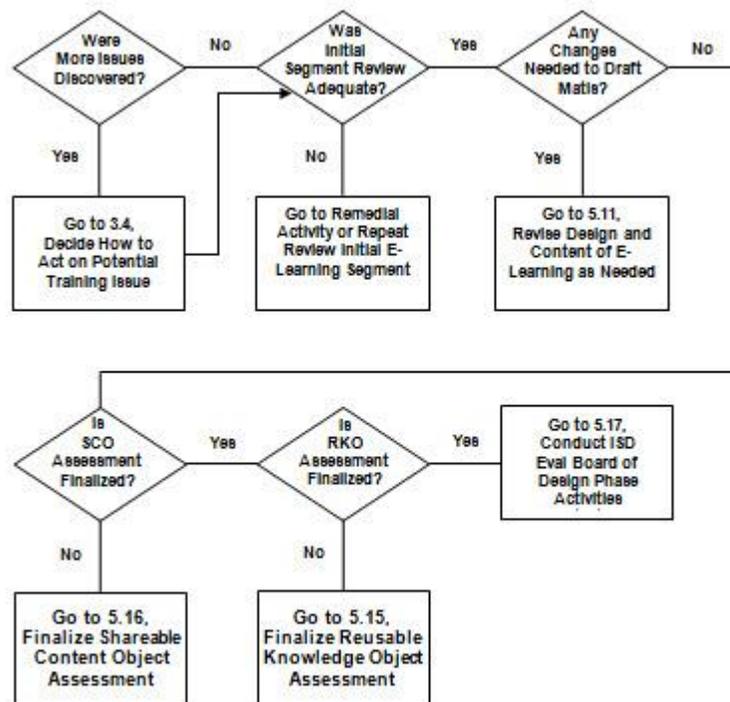
5.14.2.4. Decision on where to go next in the courseware process.

5.14.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as E-Learning review guidance and quality checklists.

5.14.4. Evaluation Criteria.

- 5.14.4.1. Did appropriate SMEs, subject area program managers, system OPRs, training managers, E-Learning experts, students from the target population, etc., review the E-Learning prototype?
- 5.14.4.2. Did the review team verify that the initial segment provided for review contains:
 - 5.14.4.2.1. One or more criterion-referenced learning objectives?
 - 5.14.4.2.2. Content as it will appear in the actual course or learning aid?
 - 5.14.4.2.3. Student projects, pre-assessment tests, exercises, review questions, quizzes, tests and proficiency evaluations that appear and operate as they will in the actual course or learning aid?
 - 5.14.4.2.4. Navigation buttons that appear and operate as they will in the actual course or learning aid?
 - 5.14.4.2.5. Screens as they will appear in the actual course or learning aid?
 - 5.14.4.2.6. Narration as it will sound in the actual course or learning aid?
 - 5.14.4.2.7. Student interactivity that appears and operates as it will in the actual course or learning aid?
- 5.14.4.3. Are the screen design and navigational features of the segment engaging and easy to use?
- 5.14.4.4. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?
- 5.14.4.5. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?
- 5.14.4.6. Does the design of the course meet the evaluation criteria in paragraph 5.5.?
- 5.14.4.7. Do instructional materials and activities meet the evaluation criteria in paragraph 5.9.?
- 5.14.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 5.14.4.8.1. Nature of the perceived problem?
 - 5.14.4.8.2. Priority of the assignment?
 - 5.14.4.8.3. Appropriate organization to handle the tasking request?

Figure 5.13. Decision Tree for Next Activity



5.15. Finalize Reusable Knowledge Object (RKO) Assessment. In this activity, the courseware project manager and courseware developer work together to determine the reusability of components in the instruction being developed or revised.

5.15.1. Purpose. This activity identifies which segments of the course or learning aid is programmed as reusable knowledge objects for rapid search, retrieval and re-use. It may also provide justification for the responsible training function to modify the contract if the preliminary RKO Assessment significantly underestimated the amount of reusable knowledge objects that should be developed.

5.15.2. Activity Outcomes. Outcomes for this activity are:

5.15.2.1. Final RKO assessment documentation.

5.15.2.2. Modified Instructional Strategy with customer approval, as needed.

5.15.2.3. Decision on whether or not a contract needs to be modified to fund development of additional RKOs.

5.15.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.15.2.5. Decision on where to go next in the courseware process.

5.15.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.15.3.1. Guidance on electronic content management and RKOs.

5.15.3.2. Directives, references and guidance on Sharable Content Object Reference Model, Sharable Content Objects, metadata tagging, and content packaging.

5.15.3.3. Directives, references and guidance on contract scope and modifications.

5.15.3.4. RKO assessment documentation recommended format, instructions, quality checklist, and examples.

5.15.4. Evaluation Criteria.

5.15.4.1. Does final RKO assessment documentation include list of objects within the course that will be programmed as RKO's, and how they are expected to be reused?

5.15.4.2. Is the final RKO assessment based on decisions made in the preliminary RKO assessment and follow-on input from those who would have a good idea about the transferability of the content?

5.15.4.3. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

5.15.4.4. Has any decision to significantly increase the amount of RKO's been justified adequately to support a modification to a contract?

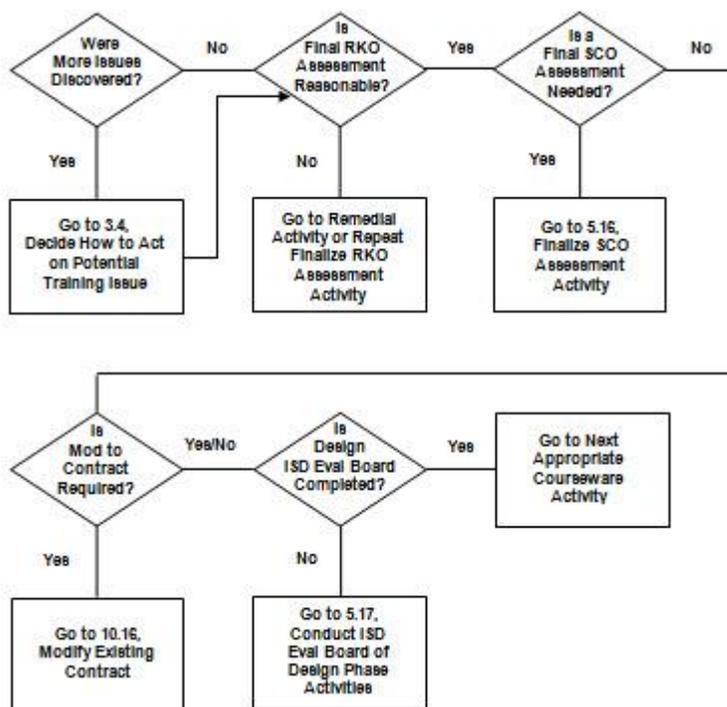
5.15.4.5. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.15.4.5.1. Nature of the perceived problem?

5.15.4.5.2. Priority of the assignment?

5.15.4.5.3. Appropriate organization to handle the tasking request?

Figure 5.14. Decision Tree for Next Activity



5.16. Finalize Sharable Content Object (SCO) Assessment. In this activity, the courseware project manager and courseware developer work together to determine the level of SCO packaging needed to support transportability of instruction to other courses, and to track student progress, test scores and completions for self-paced, E-Learning.

5.16.1. Purpose. This activity identifies the level of SCO granularity for the course or learning aid. It may also provide justification for the responsible training function to modify the contract if the preliminary SCO Assessment significantly underestimated the amount of SCOs that should be developed.

5.16.2. Activity Outcomes. Outcomes for this activity are:

5.16.2.1. Final SCO assessment documentation.

5.16.2.2. Decision on whether or not a contract needs to be modified to fund development of additional SCOs.

5.16.2.3. Modified Instructional Strategy with customer approval, as needed.

5.16.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.16.2.5. Decision on where to go next in the courseware process.

5.16.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.16.3.1. Directives, references and guidance on Sharable Content Object Reference Model, SCOs, metadata tagging, and content packaging.

5.16.3.2. Directives, references and guidance on contract scope and modifications.

5.16.3.3. SCO assessment guidance, worksheets, and examples.

5.16.3.4. SCO assessment documentation sample format, instructions, quality checklist, and examples.

5.16.4. Evaluation Criteria.

5.16.4.1. Does final SCO assessment documentation include a clear description of what segments of the course or learning aid will be programmed as SCOs?

5.16.4.2. Is the final SCO assessment based on decisions made in the preliminary SCO assessment and follow-on input from those who would have a good idea about the transportability of the content and the need to track progress of students during the course?

5.16.4.3. Is the final level of SCO granularity at as high a level as possible in light of anticipated transportability and student tracking requirements? (SCO programming is expensive and should, therefore, be kept to a minimum.)

5.16.4.4. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

5.16.4.5. Has any decision to significantly increase the amount of SCOs been justified adequately to support a modification to a contract?

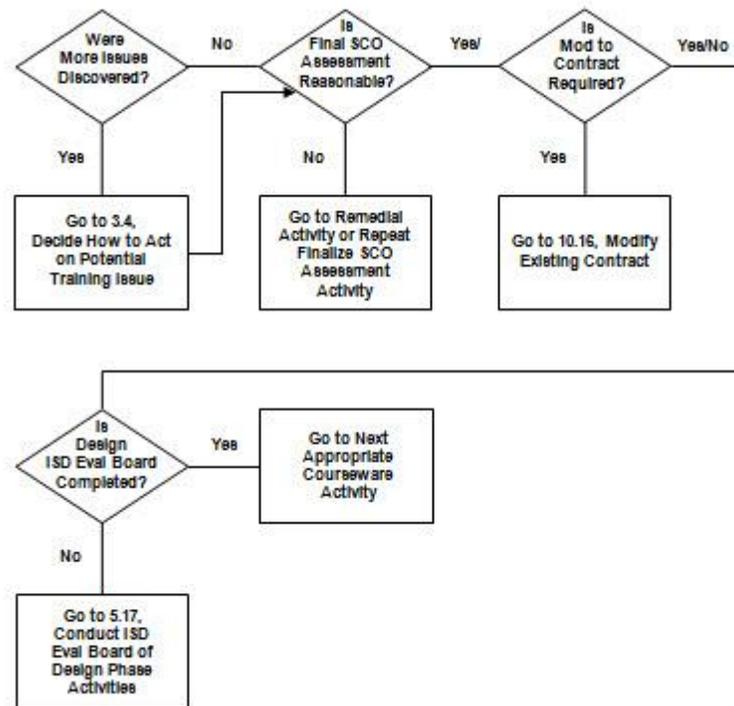
5.16.4.6. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.16.4.6.1. Nature of the perceived problem?

5.16.4.6.2. Priority of the assignment?

5.16.4.6.3. Appropriate organization to handle the tasking request?

Figure 5.15. Decision Tree for Next Activity



5.17. Conduct ISD Evaluation Board Review of Design Phase Activities. In this activity, at least one ISD Evaluation Board official reviews the activities performed during the Design Phase to determine if they meet the intent of the HILL AFB Courseware Development and Management Process and its underlying principles of systems engineering, instructional design, and quality improvement.

5.17.1. Purpose. This activity ensures that the HILL AFB Courseware Development and Management Process is applied so that instruction has a high probability of being relevant, effective and economical to sustain.

5.17.2. Activity Outcomes. Outcomes for this activity are:

5.17.2.1. Decision that appropriate activities in the Design Phase have been accomplished to the standards of this handbook, or that corrective actions are needed before the project goes into Development Phase.

5.17.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

5.17.2.3. Decision on where to go next in the courseware process.

5.17.3. Additional Guidance. The basic procedures and sample review worksheets for conducting ISD Evaluation Board reviews are in the AFMC ISD Courseware Resource Site. It also contains items such as:

5.17.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide

practical instruction on applying the HILL AFB Courseware Development and Management Process.

5.17.3.2. ISD Evaluation Board review guidance, sample instructions, sample worksheet templates, quality checklists and examples.

5.17.4. Evaluation Criteria.

5.17.4.1. Do the ISD Evaluation Board Notes for the Design Phase include:

5.17.4.1.1. Basic information about project, date of ISD review, and participants?

5.17.4.1.2. Observations about compliance/non-compliance of Design Phase activities with the standards set forth in this handbook and the AFMC ISD Courseware Resource Site?

5.17.4.1.3. Documentation and customer approval of changes to the Preliminary Instructional Strategy?

5.17.4.1.4. Corrective actions which need to be accomplished with suspense dates, as applicable?

5.17.4.1.5. Design Phase review decision?

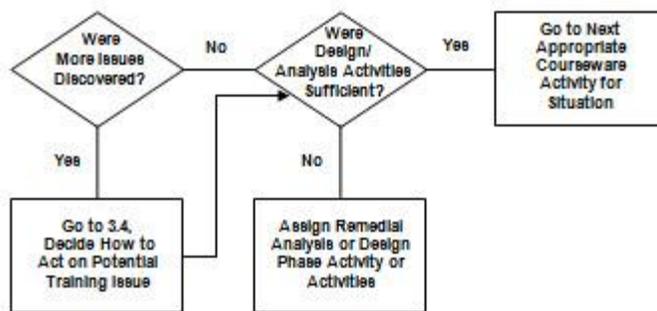
5.17.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

5.17.4.2.1. Nature of the perceived problem?

5.17.4.2.2. Priority of the assignment?

5.17.4.2.3. Appropriate organization to handle the tasking request?

Figure 5.16. Decision Tree for Next Activity



6. DEVELOPMENT PHASE

6.1. Development Phase Defined. During the Development Phase, instructional and evaluation materials are developed, tested, and revised and the instructional system is prepared for full operational tryout in the field. For additional information and guidance relating to the Development Phase of the Air Force Instructional System Development (ISD) process, refer to AFH 36-2235 V4, *Manager's Guide to New Education and Training Technologies*.

6.2. Revise Evaluation Materials as Needed. In this activity, the courseware developer validates the draft version of evaluation materials prepared during Design phase, and makes adjustments as needed.

6.2.1. Purpose. This activity prepares Non-E-Learning evaluation materials for technical and Instructor/Trainer and/or Facilitator review.

6.2.2. Activity Outcomes. Outcomes for this activity are:

6.2.2.1. Evaluation materials such as pre-tests, bypass tests, review questions, class exercises/projects, quizzes, post-tests, proficiency evaluations, product/process checklists, etc.

6.2.2.2. Guidance for Instructor/Trainer and/or Facilitator on how to administer the evaluation tools.

6.2.2.3. Modified Instructional Strategy with customer approval, as needed.

6.2.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.2.2.5. Decision on where to go next in the courseware process.

6.2.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

6.2.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

6.2.3.2. Sample product and process checklists.

6.2.3.3. Sample proficiency evaluation checklists.

6.2.3.4. References on developing pre-assessment and bypass tests.

6.2.3.5. References on selecting appropriate student evaluation methods/tools and media based on the situation.

6.2.3.6. References on Section 508 of the Rehabilitation Act.

6.2.4. Evaluation Criteria.

6.2.4.1. Do the amount and types of evaluation provide the customer with a high level of confidence that students have attained the proficiency level of learning specified in the learning objectives?

6.2.4.2. Do the media and delivery method(s) of student evaluations appear to be the most appropriate for the situation?

6.2.4.3. Is the content of the student evaluations directly related to the topics, tasks, conditions and standards specified in the learning objectives?

6.2.4.4. Do the evaluation activities emulate the conditions and standards of the work environment as much as is feasible?

6.2.4.5. Is the content of the evaluation materials accurate and complete?

6.2.4.6. Have widely-accepted instructional concepts been applied when selecting student evaluation activities and creating test and measurement materials?

6.2.4.7. Is there enough evaluation guidance for a technically qualified substitute Instructor/Trainer and/or Facilitator to take over the course and administer the exercises, projects and tests consistent with methods used by the lead Instructor/Trainer and/or Facilitator?

6.2.4.8. Are evaluations correctable to 100% so that students will be provided feedback and correct answers before completion of the course?

6.2.4.9. For pass/fail tests, are there at least two questions/scenarios for each learning objective tested to allow for remedial instruction situations?

6.2.4.10. Is the content and minimum passing score for pass/fail tests consistent with training mandates (e.g., Occupational Safety and Health Administration regulations, AF, AFMC, etc.) as applicable?

6.2.4.11. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

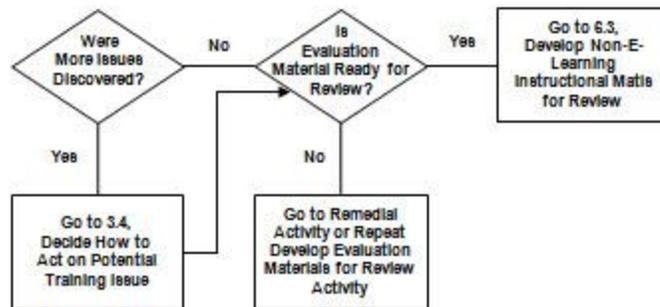
6.2.4.12. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.2.4.12.1. Nature of the perceived problem?

6.2.4.12.2. Priority of the assignment?

6.2.4.12.3. Appropriate organization to handle the tasking request?

Figure 6.1. Decision Tree for Next Activity



6.3. Develop Non-E-Learning Instructional Materials for Review. In this activity, the courseware developer prepares the first draft of presentation materials, learning aids and instructional guidance sufficient for a qualified instructor or trainer to provide consistent and complete instruction time after time. (For E-Learning instruction, this activity begins in Design Phase and is completed in paragraph 6.4. and 6.13.),

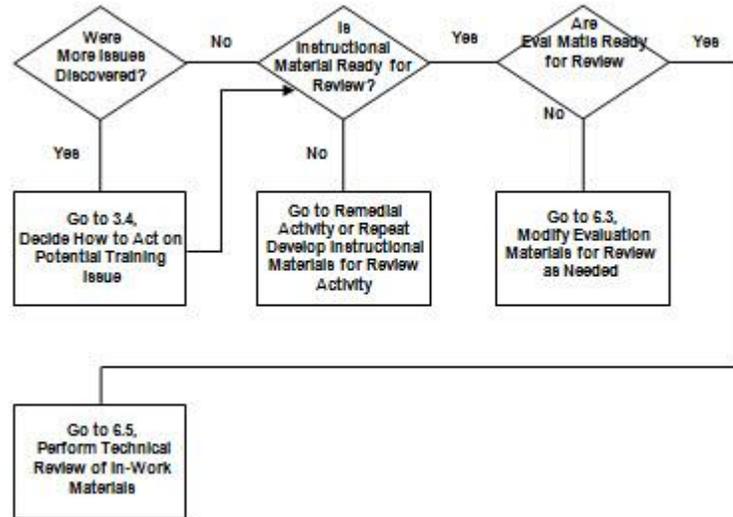
6.3.1. Purpose. This is the activity where Non-E-Learning instruction (presentations, lesson plans, student handouts, etc.) is actually developed.

6.3.2. . Activity Outcomes. Outcomes for this activity are:

- 6.3.2.1. Presentation materials such as charts, videos, demonstration aids, student handouts, student guides/workbooks, etc.
 - 6.3.2.2. Instructor or trainer guidance in the form of Plan of Instruction Part 2, Structured On-the-Job Training guide, and/or generic lesson plan documentation.
 - 6.3.2.3. Course control documents such as a Plan of Instruction (POI), Course Training Standard (CTS), or Course Chart (CC).
 - 6.3.2.4. Modified Instructional Strategy with customer approval, as needed.
 - 6.3.2.5. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
 - 6.3.2.6. Decision on where to go next in the courseware process.
- 6.3.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:
- 6.3.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.
 - 6.3.3.2. References on applying blended learning to courseware development.
 - 6.3.3.3. References on design of Non-E-Learning instruction.
 - 6.3.3.4. References on selecting appropriate instructional methods/tools and media based on the situation.
 - 6.3.3.5. References on Section 508 of the Rehabilitation Act.
 - 6.3.3.6. Sample instructional materials and course control documents.
- 6.3.4. Evaluation Criteria.
- 6.3.4.1. Is the final draft of instructional materials (e.g., course control documents, presentation, generic lesson plan, student handout, etc.) detailed enough for the reviewers to get a clear picture of precisely what content will be presented and how it will be instructed?
 - 6.3.4.2. Does the content of the course or learning aid adequately address Gagné's Events of Instruction:
 - 6.3.4.2.1. Gaining attention?
 - 6.3.4.2.2. Informing learner of objectives?
 - 6.3.4.2.3. Stimulating recall of prior learning?
 - 6.3.4.2.4. Presenting new material?
 - 6.3.4.2.5. Providing learning guidance?
 - 6.3.4.2.6. Eliciting practice/performance?
 - 6.3.4.2.7. Providing feedback about correctness?
 - 6.3.4.2.8. Assessing performance?
 - 6.3.4.2.9. Enhancing retention and transfer?

- 6.3.4.3. Are there sufficient instructional materials and activities to support the learning objectives?
- 6.3.4.4. Have widely-accepted instructional concepts been applied when creating examples, diagrams, demonstrations, scenarios, case studies, etc.?
- 6.3.4.5. Is the sequence of the content and learning activities effective?
- 6.3.4.6. Do the media and delivery method(s) of the instructional materials appear to be the most appropriate for the situation?
- 6.3.4.7. Is the content of the instructional materials directly related to the topics, tasks, conditions and standards specified in the learning objectives?
- 6.3.4.8. Are examples, non-examples, illustrations, diagrams, demonstrations, and other instructional materials/activities relevant to the target audience?
- 6.3.4.9. Is the content of instructional materials accurate and complete?
- 6.3.4.10. Is there enough instructor guidance for a technically qualified substitute Instructor/Trainer and/or Facilitator to take over the course and deliver the material consistent with methods used by the lead Instructor/Trainer and/or Facilitator?
- 6.3.4.11. Do learning objectives meet the evaluation criteria in paragraph 5.3.?
- 6.3.4.12. Do student evaluation materials and activities embedded in the instructional materials meet the evaluation criteria in paragraph 5.4.?
- 6.3.4.13. Does the design of the course meet the evaluation criteria in paragraph 5.6.?
- 6.3.4.14. If this is a command standard course, does the presentation have placeholder charts for later inclusion of localized information?
- 6.3.4.15. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?
- 6.3.4.16. Was an appropriate mix of SMEs, subject area program managers, system OPRs, instructors, trainers, courseware developers, training managers, etc. involved in the design of this course or learning aid?
- 6.3.4.17. Are any issues/action items that emerged during this activity documented sufficiently to determine:
- 6.3.4.17.1. Nature of the perceived problem?
 - 6.3.4.17.2. Priority of the assignment?
 - 6.3.4.17.3. Appropriate organization to handle the tasking request?

Figure 6.2. Decision Tree for Next Activity



6.4. Develop Remaining E-Learning Segment(s). In Design Phase, the courseware development team created a representative segment of the actual instruction that showed how the screens will look, how the content will appear, how the navigational buttons will operate, how the narrator will sound, how the interactivity will work, etc. In this activity, (having already obtained approval on the design, content and functionality of the course or learning aid), the development team moves on to create the remaining segments for review.

6.4.1. Purpose. By developing E-Learning courseware in segments, problems are identified and changes are tested one segment at a time, greatly reducing the risk of costly rework that occurs when an entire course is reviewed at one time.

6.4.2. Activity Outcomes. Outcomes for this activity are:

- 6.4.2.1. Final review of individual segments by experts and typical students.
- 6.4.2.2. Modified Instructional Strategy with customer approval, as needed.
- 6.4.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
- 6.4.2.4. Decision on where to go next in the courseware process.

6.4.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

- 6.4.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.
- 6.4.3.2. References on applying blended learning to courseware development.
- 6.4.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.
- 6.4.3.4. References on design of E-Learning.

6.4.3.5. References and guidance on documentation (e.g., storyboards, content documentation, interactivity documentation, etc.) associated with E-Learning design and content.

6.4.3.6. References on selecting appropriate E-Learning student evaluation methods and tools based on the situation.

6.4.3.7. References on developing E-Learning evaluation materials.

6.4.3.8. References on developing E-Learning pre-assessment and bypass tests.

6.4.3.9. References on Section 508 of the Rehabilitation Act.

6.4.3.10. Directives, references and guidance on Sharable Content Object Reference Model metadata tagging, and content packaging.

6.4.3.11. Sample instructional materials and course control documents.

6.4.4. Evaluation Criteria.

6.4.4.1. Are the screen design and navigational features of the segment engaging and easy to use?

6.4.4.2. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?

6.4.4.3. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

6.4.4.4. Does the design of the course meet the evaluation criteria in paragraph 5.5.?

6.4.4.5. Do instructional materials and activities meet the evaluation criteria in paragraph 5.9.?

6.4.4.6. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?

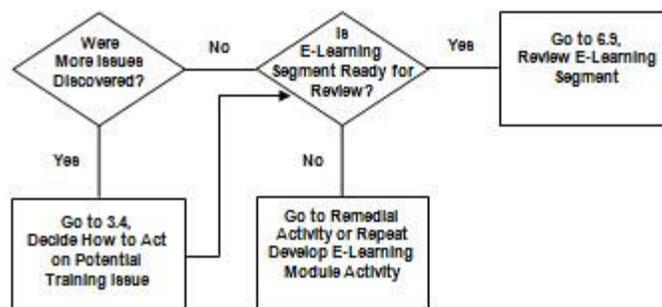
6.4.4.7. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.4.4.7.1. Nature of the perceived problem?

6.4.4.7.2. Priority of the assignment?

6.4.4.7.3. Appropriate organization to handle the tasking request?

Figure 6.3. Decision Tree for Next Activity



6.5. Perform Technical Review of In-Work Materials. In this activity, technical experts review the content of draft instructional and evaluation materials to determine if they are relevant, accurate and complete. This step is usually repeated more than once until technical experts are satisfied with the content and appearance of instruction. Only minor corrections to content and appearance of the course are permitted after technical review final approval in Development Phase. For self-paced, E-Learning, this step was already accomplished in paragraph 5.10. and paragraph 5.14.

6.5.1. Purpose. This activity calls on Subject Matter Experts (SMEs), subject area program managers, system Officers of Primary Responsibility (OPRs), training managers, and other customer representatives to verify that the instruction is relevant to what actually occurs in the workplace of the target population, and that the content of all materials is technically accurate and complete.

6.5.2. Activity Outcomes. Outcomes for this activity are:

6.5.2.1. Input from reviewers on content and appearance of the materials.

6.5.2.2. Documentation on changes that will be made to the instruction based on input from experts.

6.5.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.5.2.4. Decision on where to go next in the courseware process.

6.5.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as Non-E-Learning instruction review guidance and quality checklists.

6.5.4. Evaluation Criteria

6.5.4.1. Did appropriate SMEs, subject area program managers, system OPRs, training managers, and other customer representatives review the materials?

6.5.4.2. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?

6.5.4.3. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

6.5.4.4. Does the design of the course meet the evaluation criteria in paragraph 5.6.?

6.5.4.5. Do instructional materials and activities meet the evaluation criteria in paragraph 6.3.?

6.5.4.6. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

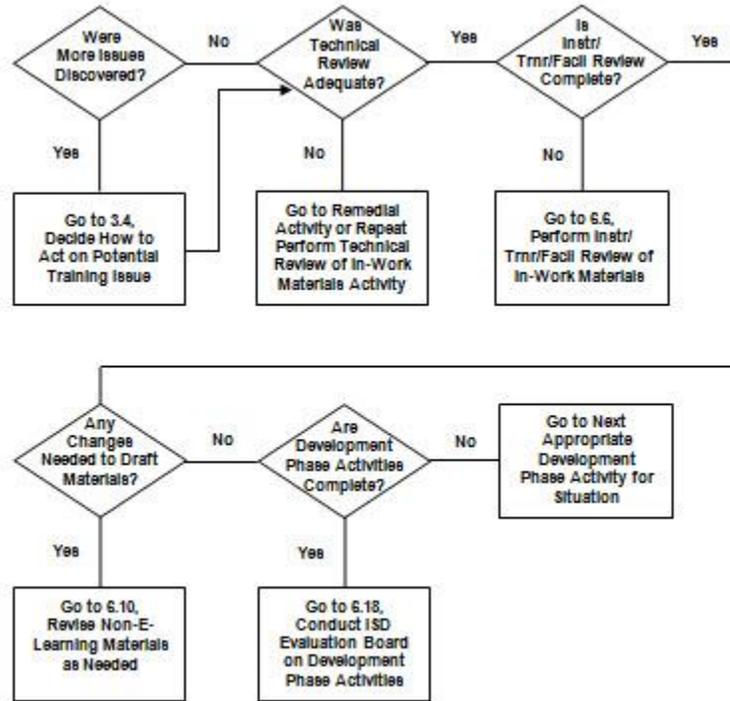
6.5.4.7. Did the courseware developer document why any recommended changes will not be accomplished?

6.5.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.5.4.8.1. Nature of the perceived problem?

6.5.4.8.2. Priority of the assignment?

6.5.4.8.3. Appropriate organization to handle the tasking request?

Figure 6.4. Decision Tree for Next Activity

6.6. Perform Instructor/Trainer and/or Facilitator Review of In-Work Materials. In this activity, instructors/trainers/facilitators, facilitators and independent courseware developers review the draft instruction and evaluation materials to determine if they are effective, efficient and adequately documented. This step is usually repeated more than once until instructional design and delivery experts are satisfied with the presentation and documentation of instruction. Only minor corrections to presentation and documentation of the course are permitted after final Instructor/Trainer and/or Facilitator approval in Development Phase.

6.6.1. Purpose. This activity calls on instructional design and delivery experts to verify that the content is effectively presented and adequately documented so that a qualified Instructor/Trainer and/or Facilitator can provide consistent and complete instruction time after time.

6.6.2. Activity Outcomes. Outcomes for this activity are:

6.6.2.1. Input from reviewers on effectiveness of the presentations, learning aids, evaluation tools, etc., in helping students attain the learning objectives.

6.6.2.2. Documentation on changes that will be made to the instruction based on input from the delivery and instructional design experts.

6.6.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.6.2.4. Decision on where to go next in the courseware process.

6.6.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as Non-E-Learning review guidance and quality checklists.

6.6.4. Evaluation Criteria.

6.6.4.1. Did appropriate instructors/trainers/facilitators/facilitators and courseware developers review the materials?

6.6.4.2. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?

6.6.4.3. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

6.6.4.4. Does the design of the course meet the evaluation criteria in paragraph 5.6.?

6.6.4.5. Do instructional materials and activities meet the evaluation criteria in paragraph 6.3.?

6.6.4.6. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

6.6.4.7. Did the courseware developer document why any recommended changes will not be accomplished?

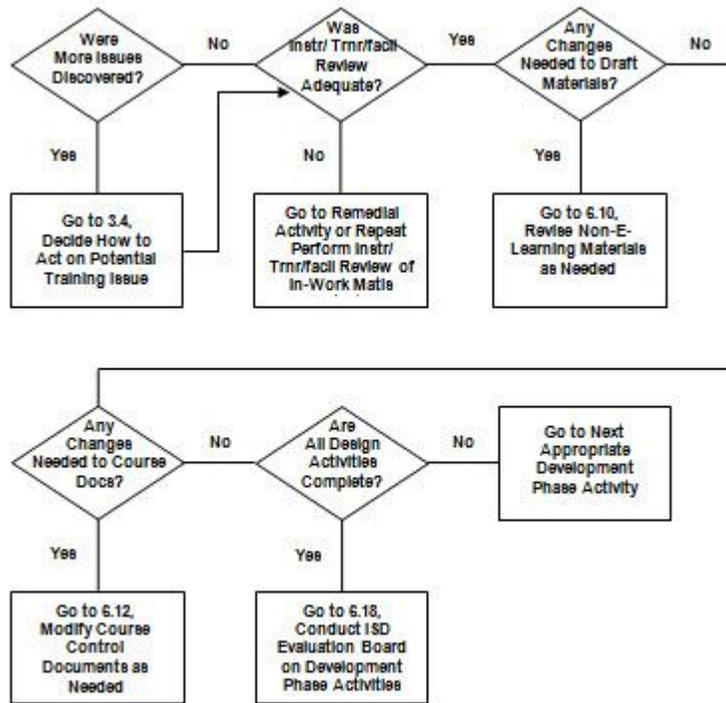
6.6.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.6.4.8.1. Nature of the perceived problem?

6.6.4.8.2. Priority of the assignment?

6.6.4.8.3. Appropriate organization to handle the tasking request?

Figure 6.5. Decision Tree for Next Activity



6.7. Assist in Train-the-Trainer Activities to Qualify Instructors, Trainers and or Facilitators. In this activity, the courseware development team helps prepare instructors/trainers/facilitators to instruct the course by giving them active roles in all review and implementation activities.

6.7.1. Purpose. This activity readies future instructors, trainers and facilitators to deliver the instruction when subject matter is new and they do not yet have experience in presenting the material.

6.7.2. Activity Outcomes. Outcomes for this activity are:

6.7.2.1. Correspondence, meetings, and review sessions that team SMEs with future instructors, trainers and or facilitators for the purpose of discussing and practicing delivery of the new course.

6.7.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.7.2.3. Decision on where to go next in the courseware process.

6.7.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance on train-the-trainer activities and expectations.

6.7.4. Evaluation Criteria.

6.7.4.1. Are future instructors/trainers/facilitators kept actively involved in review and tryout activities for this course?

6.7.4.2. If feasible, will enough tryouts be conducted to allow future instructors/trainers/facilitators to sit through the course presentation at least once, co-teach at least once, and instruct under the observation of SMEs at least once?

6.7.4.3. If numerous tryouts are not feasible, have special arrangements been made for at least one train-the-trainer session with the courseware development team, SMEs, and future instructors, trainers and or facilitators for the purpose of discussing and practicing delivery of the new course?

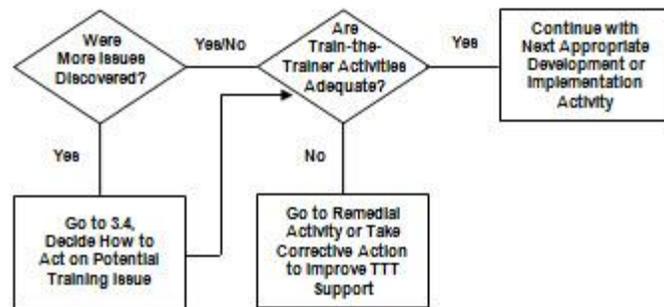
6.7.4.4. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.7.4.4.1. Nature of the perceived problem?

6.7.4.4.2. Priority of the assignment?

6.7.4.4.3. Appropriate organization to handle the tasking request?

Figure 6.6. Decision Tree for Next Activity



6.8. Perform Small Group Tryout of Select Instructional Segments. In this activity, a portion of the course or learning aid is validated under field conditions by selected instructors/trainers/facilitators/facilitators, customer representatives and/or students from the target population to verify effectiveness of instruction.

6.8.1. Purpose. This activity is used when a course is lengthy, only part of an existing course has been revised, when a segment of the training is particularly risky and requires advance feedback, etc., to determine if changes are needed in content or delivery based on pre-testing of a segment of the course under field conditions.

6.8.2. Activity Outcomes. Outcomes for this activity are:

6.8.2.1. Estimate of average segment length (time needed to provide instruction).

6.8.2.2. Input from instructors, trainers and or facilitators, content experts and sample students on content, appearance and delivery methods of the instruction.

6.8.2.3. Documentation on changes that will be made to the content, appearance, and delivery of the instruction based on this early field test of the materials.

6.8.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.8.2.5. Decision on where to go next in the courseware process.

6.8.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as final validation guidance and quality checklists.

6.8.4. Evaluation Criteria.

6.8.4.1. Did this early small group tryout include lead SMEs, lead subject area program manager(s), lead system OPRs, instructors, trainers and or facilitators, assigned ISD Evaluation Board official, lead customer training manager, students from the target population, etc., as appropriate to validate the segment of instruction?

6.8.4.2. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?

6.8.4.3. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

6.8.4.4. Does the design of the course meet the evaluation criteria in paragraph 5.6.?

6.8.4.5. Do instructional materials and activities meet the evaluation criteria in paragraph 6.3.?

6.8.4.6. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

6.8.4.7. Did the courseware developer document why any recommended changes will not be accomplished?

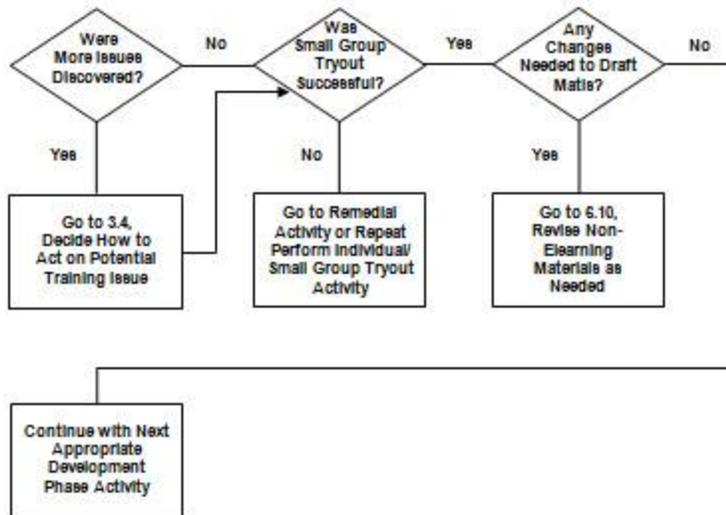
6.8.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.8.4.8.1. Nature of the perceived problem?

6.8.4.8.2. Priority of the assignment?

6.8.4.8.3. Appropriate organization to handle the tasking request?

Figure 6.7. Decision Tree for Next Activity



6.9. Review E-Learning Environment Segment. In this activity, SMEs, subject area program managers, system OPRs, training managers, E-Learning experts, students from the target population, etc., review one or more segments of a self-paced, E-Learning Environment or learning aid to verify relevance, accuracy, completeness and effectiveness of instruction. Only minor corrections to content, appearance and functionality of the E-Learning Environment or learning aid are permitted after closeout of Activity 6.9 in Design Phase.

6.9.1. Purpose. This activity allows experts to review the actual content and appearance of the final product, and test the functionality of the instruction before it is fielded for regular use. The primary review of E-Learning took place in Design Phase: paragraph 5.7., paragraph 5.10., and paragraph 5.14.. This activity serves as final validation of the E-Learning Environment.

6.9.2. Activity Outcomes. Outcomes for this activity are:

6.9.2.1. Input from reviewers on content, design, appearance and functionality of the prototype module.

6.9.2.2. Documentation on changes that will be made to the content, appearance, navigation, and interactivity of the instruction based on input from experts.

6.9.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.9.2.4. Decision on where to go next in the courseware process.

6.9.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as computer-based instruction review guidance and quality checklists.

6.9.4. Evaluation Criteria.

6.9.4.1. Did appropriate SMEs, subject area program managers, system OPRs, training managers, E-Learning experts, students from the target population, etc., review the E-Learning prototype?

6.9.4.2. Are the screen design and navigational features of the segment engaging and easy to use?

6.9.4.3. Do the learning objectives meet the evaluation criteria in paragraph 5.3.?

6.9.4.4. Do the student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?

6.9.4.5. Does the design of the course meet the evaluation criteria in paragraph 5.5.?

6.9.4.6. Do instructional materials and activities meet the evaluation criteria in paragraph 5.9.?

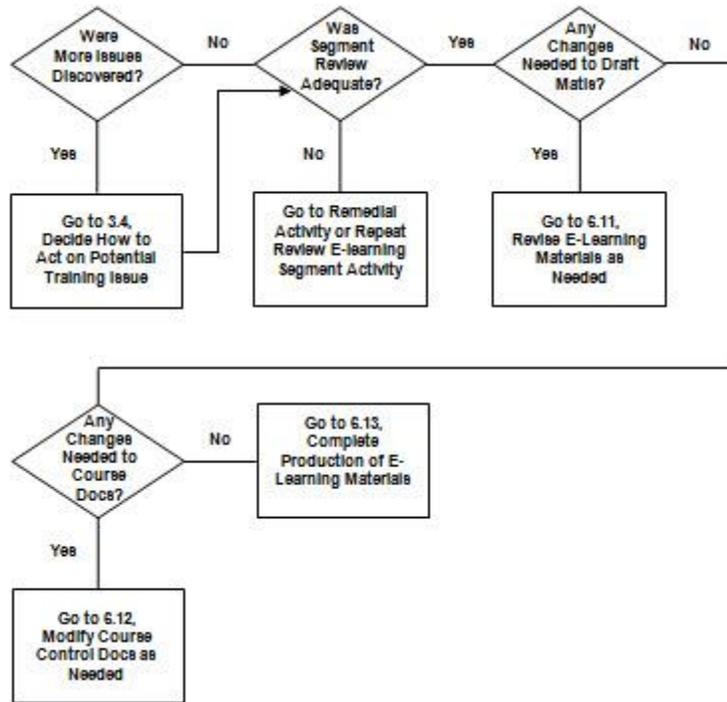
6.9.4.7. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

6.9.4.8. Did the courseware developer document why any recommended changes will not be accomplished?

6.9.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:

- 6.9.4.9.1. Nature of the perceived problem?
- 6.9.4.9.2. Priority of the assignment?
- 6.9.4.9.3. Appropriate organization to handle the tasking request?

Figure 6.8. Decision Tree for Next Activity



6.10. Revise Non-E-Learning Materials as Needed. In this activity, the courseware developer makes requested changes to draft instructional and student evaluation materials.

6.10.1. Purpose. This activity corrects any issues found with content, appearance, delivery methods and documentation of non-E-Learning instruction.

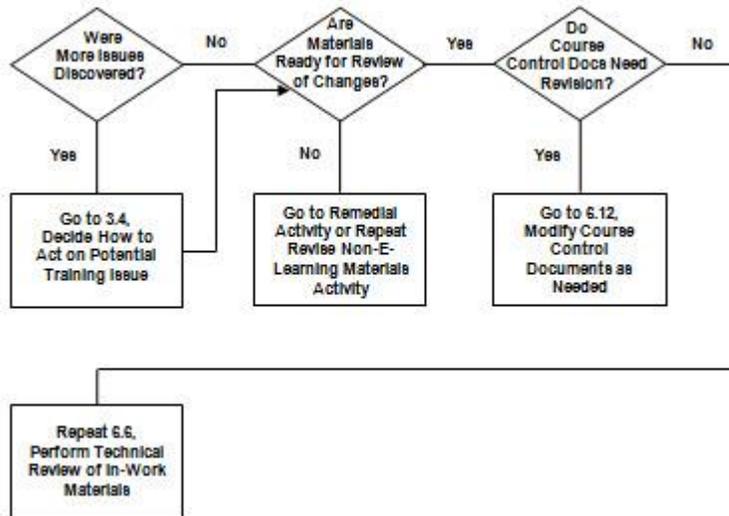
6.10.2. Activity Outcomes. Outcomes for this activity are:

- 6.10.2.1. Changes made to the content, appearance, delivery methods and documentation of the instruction based on input from experts.
- 6.10.2.2. Modified Instructional Strategy with customer approval, as needed.
- 6.10.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
- 6.10.2.4. Decision on where to go next in the courseware process.

6.10.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

- 6.10.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.
- 6.10.3.2. References on applying blended learning to courseware development.
- 6.10.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.
- 6.10.3.4. References on design of non-E-Learning instruction.
- 6.10.3.5. References on developing student evaluation materials.
- 6.10.3.6. References on Section 508 of the Rehabilitation Act.
- 6.10.4. Evaluation Criteria.
 - 6.10.4.1. Did the courseware developer accomplish planned changes?
 - 6.10.4.2. Did the courseware developer document why any planned changes were not accomplished?
 - 6.10.4.3. Do any revised learning objectives meet the evaluation criteria in paragraph 5.3.?
 - 6.10.4.4. Do any revised student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?
 - 6.10.4.5. Does any revision to the design of the course meet the evaluation criteria in paragraph 5.6.?
 - 6.10.4.6. Do instructional materials and activities meet the evaluation criteria in paragraph 6.3.?
 - 6.10.4.7. Has the courseware developer arranged for a follow-on review of the revised materials, if warranted by the situation?
 - 6.10.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 6.10.4.8.1. Nature of the perceived problem?
 - 6.10.4.8.2. Priority of the assignment?
 - 6.10.4.8.3. Appropriate organization to handle the tasking request?

Figure 6.9. Decision Tree for Next Activity



6.11. Revise E-Learning Materials as Needed. In this activity, the courseware developer makes recommended changes to the proposed design and functionality of the instruction based on review of the segment(s) or entire course.

6.11.1. Purpose. This activity accomplishes all identified rework before the entire E-Learning Environment or learning aid is sent to final production.

6.11.2. Activity Outcomes. Outcomes for this activity are:

6.11.2.1. Changes made to the flow of the instruction, appearance, and functionality of the interactive portions of the courseware based on input from experts.

6.11.2.2. Modified Instructional Strategy with customer approval, as needed.

6.11.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.11.2.4. Decision on where to go next in the courseware process.

6.11.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

6.11.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.

6.11.3.2. References on applying blended learning to courseware development.

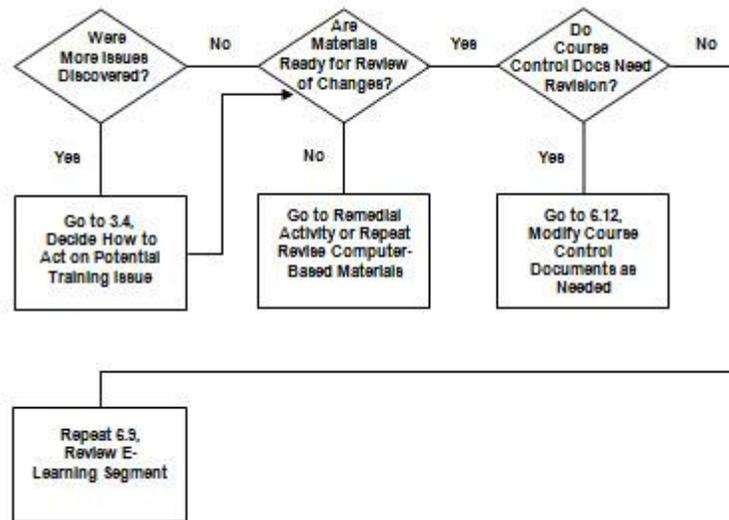
6.11.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.

6.11.3.4. References on design of E-Learning.

6.11.3.5. References and guidance on documentation (e.g., storyboards, content documentation, interactivity documentation, etc.) associated with E-Learning design/content.

- 6.11.3.6. References on selecting appropriate E-Learning student evaluation methods/tools and based on the situation.
- 6.11.3.7. References on developing E-Learning evaluation materials.
- 6.11.3.8. References on developing E-Learning pre-assessment and bypass tests.
- 6.11.3.9. References on Section 508 of the Rehabilitation Act.
- 6.11.3.10. Directives, references and guidance on Sharable Content Object Reference Model, metadata tagging, and content packaging.
- 6.11.3.11. Sample instructional materials and course control documents.
- 6.11.4. Evaluation Criteria.
 - 6.11.4.1. Did the courseware developer accomplish planned changes?
 - 6.11.4.2. Did the courseware developer document why any planned changes were not accomplished?
 - 6.11.4.3. Do any revised learning objectives meet the evaluation criteria in paragraph 5.3.?
 - 6.11.4.4. Do any revised student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?
 - 6.11.4.5. Does any revision to the design of the course meet the evaluation criteria in paragraph 5.5.?
 - 6.11.4.6. Do any revised instructional materials and activities meet the evaluation criteria in paragraph 5.9.?
 - 6.11.4.7. Has the courseware developer arranged for a follow-on review of the revised materials, if warranted by the situation?
 - 6.11.4.8. Did this activity impact the Instructional Strategy and, if so, have these changes been documented, justified and approved by the customer?
 - 6.11.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 6.11.4.9.1. Nature of the perceived problem?
 - 6.11.4.9.2. Priority of the assignment?
 - 6.11.4.9.3. Appropriate organization to handle the tasking request?

Figure 6.10. Decision Tree for Next Activity



6.12. Modify Course Control Documents (CCDs) as Needed. In this activity, the courseware developer makes needed changes to CCDs based on Design and Development Phase activities.

6.12.1. Purpose. This activity corrects the CCDs to match changes in instructional and evaluation materials.

6.12.2. Activity Outcomes. Outcomes for this activity are:

6.12.2.1. Course Chart (CC), Course Training Standard (CTS), Plan of Instruction (POI), Structured On-the-Job Training (SOJT) guide, and/or generic lesson plan that have been revised to match changes in instruction and student evaluation from previous Design and Development Phase activities.

6.12.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.12.2.3. Decision on where to go next in the courseware process.

6.12.3. Additional Guidance. Templates, detailed procedures, and quality checklists for preparing a course chart, CTS, POI, and SOJT guide are in the AFMC ISD Courseware Resource Site. It also contains items such as sample tasking worksheets and sample course control documents.

6.12.4. Evaluation Criteria.

6.12.4.1. Do any revised learning objectives meet the evaluation criteria in paragraph 5.3.?

6.12.4.2. Does the course chart meet the criteria in the quality checklist in the AFMC ISD Courseware Resource Site?

6.12.4.3. Does the CTS meet the criteria in the quality checklist in the AFMC ISD Courseware Resource Site?

6.12.4.4. If this is any type of course or learning aid except an SOJT guide, does the POI meet the criteria in the quality checklist AFMC ISD Courseware Resource Site?

6.12.4.5. If this is an SOJT guide, does it meet the criteria in the quality checklist in the AFMC ISD Courseware Resource Site?

6.12.4.6. Do the CCDs reflect the agreed upon changes to media, instructional methods/tools, and student evaluation methods/tools from earlier Design and Development Phase activities?

6.12.4.7. Did the courseware developer document why any planned changes were not accomplished?

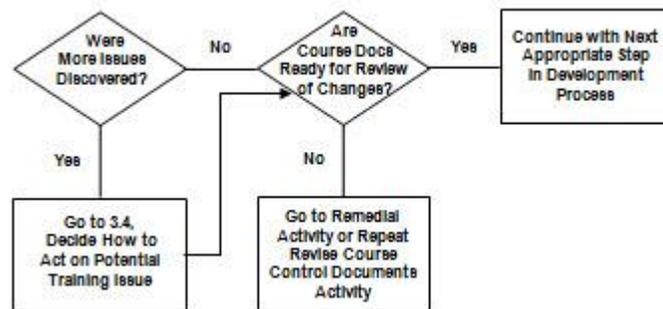
6.12.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.12.4.8.1. Nature of the perceived problem?

6.12.4.8.2. Priority of the assignment?

6.12.4.8.3. Appropriate organization to handle the tasking request?

Figure 6.11. Decision Tree for Next Activity



6.13. Complete Production of E-Learning Materials. In this activity, the courseware development team completes final production of the entire E-Learning Environment or learning aid based on input from experts and student representatives in the previous Design and Development Phase reviews

6.13.1. Purpose. This activity prepares the E-Learning Environment or learning aid for use in the field.

6.13.2. Activity Outcomes. Outcomes for this activity are:

6.13.2.1. E-Learning Environment or learning aid ready for use in the field.

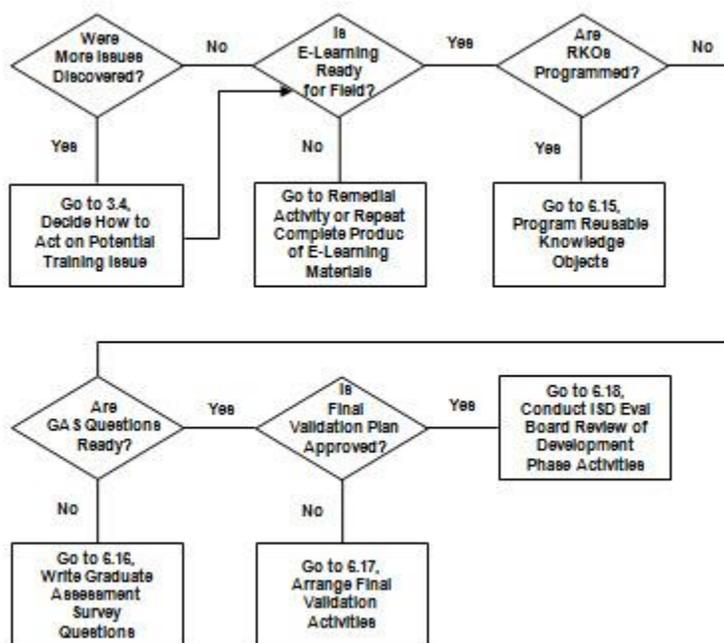
6.13.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.13.2.3. Decision on where to go next in the courseware process.

6.13.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

- 6.13.3.1. References on the theories and principles of learning and various models and methodologies for instructional design.
- 6.13.3.2. References on applying blended learning to courseware development.
- 6.13.3.3. References on selecting appropriate instructional methods/tools and media based on the situation.
- 6.13.3.4. References on developing self-paced E-Learning materials.
- 6.13.3.5. References on Section 508 of the Rehabilitation Act.
- 6.13.3.6. Directives, references and guidance on Sharable Content Object Reference Model (SCORM), metadata tagging, and content packaging.
- 6.13.4. Evaluation Criteria.
 - 6.13.4.1. Does the E-Learning Environment or learning aid contain:
 - 6.13.4.1.1. Final content for all modules ready for use in the field?
 - 6.13.4.1.2. Screens and narration for all modules ready for use in the field?
 - 6.13.4.1.3. Navigational buttons and student interactivity ready for use in the field?
 - 6.13.4.2. Has the E-Learning Environment/learning aid been tested for SCORM conformance using tests specified on the AFMC ISD Courseware Resource Site?
 - 6.13.4.3. Has the E-Learning Environment been tested on the primary command approved learning management system that will host it?
 - 6.13.4.4. Have requested Sharable Content Objects been programmed?
 - 6.13.4.5. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 6.13.4.5.1. Nature of the perceived problem?
 - 6.13.4.5.2. Priority of the assignment?
 - 6.13.4.5.3. Appropriate organization to handle the tasking request?

Figure 6.12. Decision Tree for Next Activity



6.14. Localize Training Materials. In this activity, the courseware developer tailors a command or other standardized training course to meet local needs. AFMC command standard course learning objective behaviors, conditions of performance, and standards of performance may be increased during localization of training materials, but cannot be lessened in any way. Instructional and evaluation materials, including presentations, class exercises and student handouts, may be altered as long as all learning objectives and proficiency levels of the standard course are attained by the student at the completion of training.

6.14.1. Purpose. This activity allows installations, functional areas, work centers, etc., to make instruction more relevant to the target audience without altering the learning objectives or proficiency levels of the course.

6.14.2. Activity Outcomes. Outcomes for this activity are:

6.14.2.1. Draft modifications to instructional and evaluation materials of a standardized course.

6.14.2.2. Possible modifications to course control documents to reflect changes in instructional and evaluation materials.

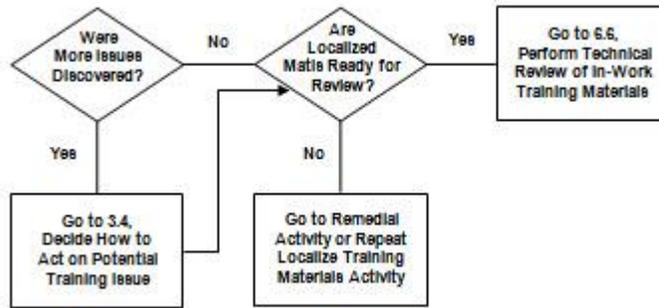
6.14.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.14.2.4. Decision on where to go next in the courseware process.

6.14.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

6.14.3.1. Guidance and quality checklist on localization of command standard courses.

- 6.14.3.2. References on the theories and principles of learning and various models and methodologies for instructional design.
- 6.14.3.3. References on applying blended learning to courseware development.
- 6.14.3.4. References on selecting appropriate instructional methods/tools and media based on the situation.
- 6.14.3.5. References on selecting appropriate student evaluation methods/tools and media based on the situation.
- 6.14.3.6. References on design of E-Learning and Non-E-Learning instruction.
- 6.14.3.7. References on Section 508 of the Rehabilitation Act.
- 6.14.3.8. Directives, references and guidance on Sharable Content Object Reference Model (SCORM), metadata tagging, and content packaging.
- 6.14.4. Evaluation Criteria.
 - 6.14.4.1. Do the modifications made during localization of materials in any way lessen the learning objective behaviors, conditions of performance, or standards of performance of the original standard course? (Credit shall not be given for an AFMC command standard course if any learning objectives or proficiency levels have been removed or lessened.)
 - 6.14.4.2. Do any revised student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?
 - 6.14.4.3. Does any revision to the design of the course meet the evaluation criteria in paragraph 5.6.; paragraph 5.5.; or paragraph 5.9. as applicable?
 - 6.14.4.4. Did the changes to training materials negatively impact the flow or appearance of the course?
 - 6.14.4.5. Are the modifications to the training materials compliant with Section 508 of the Rehabilitation Act?
 - 6.14.4.6. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 6.14.4.6.1. Nature of the perceived problem?
 - 6.14.4.6.2. Priority of the assignment?
 - 6.14.4.6.3. Appropriate organization to handle the tasking request?

Figure 6.13. Decision Tree for Next Activity

6.15. Program Reusable Knowledge Objects (RKO). In this activity, the courseware developer packages planned RKOs.

6.15.1. Purpose. This activity programs RKOs for rapid search, retrieval and re-use.

6.15.2. Activity Outcomes. Outcomes for this activity are:

6.15.2.1. RKOs packaged for re-use.

6.15.2.2. Decision on where to go next in the courseware process.

6.15.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

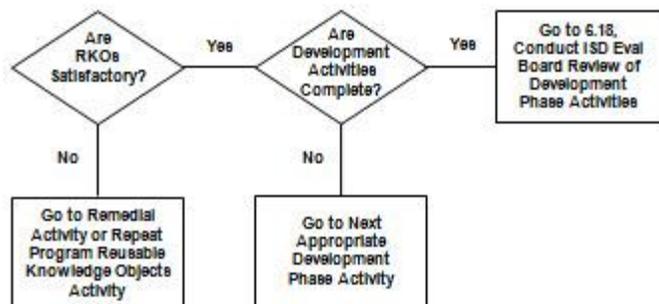
6.15.3.1. Guidance on electronic content management and RKOs.

6.15.3.2. Directives, references and guidance on Sharable Content Object Reference Model, Sharable Content Objects, metadata tagging, and content packaging.

6.15.4. Evaluation Criteria.

6.15.4.1. Were RKOs programmed those identified in final RKO assessment?

6.15.4.2. Has any deviation from the final RKO assessment been documented?

Figure 6.14. Decision Tree for Next Activity

6.16. Write Graduate Assessment Survey (GAS) Questions. In this activity, the courseware developer prepares 3 - 7 questions that ask the employee, and 3 - 7 questions that ask the employee's supervisor, how well the course prepared the graduate to meet Job Performance Requirements (JPRs). Graduate assessment surveys are sent out 30 - 180 days after

completion of the instruction, depending on how long it will take for the average employee to use the learned knowledge and skills in the workplace.

6.16.1. Purpose. This activity evaluates the transfer of learning from the course to the workplace to ensure that the instruction continues to effectively and economically produce graduates who meet established JPRs. It differs from the end-of-course critique which focuses more on the quality of the instruction and opinions of students immediately after course completion.

6.16.2. Activity Outcomes. Outcomes for this activity are:

6.16.2.1. 3 - 7 questions that ask graduates how well the course prepared them to meet JPRs.

6.16.2.2. 3 - 7 questions that ask supervisors how well the course prepared the graduate to meet JPRs.

6.16.2.3. Decision on where to go next in the courseware process.

6.16.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as references, guidance, quality checklist and examples of GAS questions.

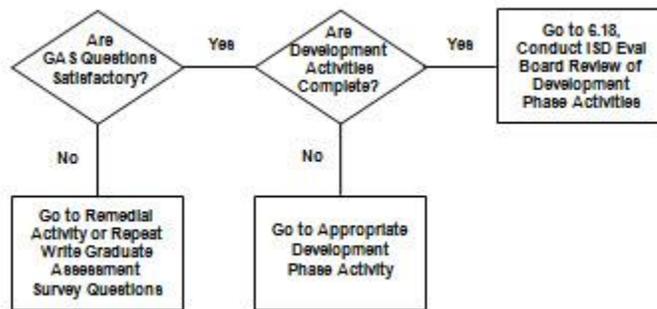
6.16.4. Evaluation Criteria.

6.16.4.1. Will the questions be able to identify unnecessary instruction?

6.16.4.2. Will the questions be able to identify gaps in instruction?

6.16.4.3. Will the questions be able to determine how well students are retaining and applying the learning from the course in the workplace?

Figure 6.15. Decision Tree for Next Activity



6.17. Arrange Final Validation Activities. In this activity, preparations are made to test the final draft of the course or learning aid using the actual methods of delivery. Final validation activities for E-Learning courses and learning aids usually involve only the operational tryout in the field. Final validation activities for Non-E-Learning courses and learning aids usually involve a small group tryout and an operational tryout.

6.17.1. Purpose. This activity arranges the final validation events, invites participants, and clarifies their role in validation.

6.17.2. Activity Outcomes. Outcomes for this activity are:

6.17.2.1. Final validation schedule and invitation messages.

6.17.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.17.2.3. Decision on where to go next in the courseware process.

6.17.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as references, guidance, quality checklist and sample correspondence on final validation activities.

6.17.4. Evaluation Criteria.

6.17.4.1. Do validation plans include key SMEs, lead subject area program managers, lead system OPRs, instructors/trainers/facilitators, assigned ISD Evaluation Board official, customer training manager, students from the target population, etc., as appropriate to validate the training?

6.17.4.2. Is the validation plan appropriate for the situation, and has the plan been documented and justified and in the ISD Evaluation Review Notes

6.17.4.3. Are needed resources (e.g., facility, instructor/trainer/facilitator, equipment, tools, etc. available to support the final validation as planned?

6.17.4.4. If this is a command course, have participants been given at least three weeks notice so that they can make temporary duty arrangements for the small group tryout/final SME review of the course?

6.17.4.5. Has validation been scheduled so as not too conflict with end-of-year holidays, inspections, and traditionally heavy workload periods for the target population?

6.17.4.6. Are participants being given adequate time to review the final draft of training materials before the small group tryout/final SME review of the course?

6.17.4.7. Have participants been advised of their role in validation activities?

6.17.4.8. If there are group activities as part of the instruction, have appropriate numbers of students been included in final validation to permit the evaluation of these activities during full operational tryout?

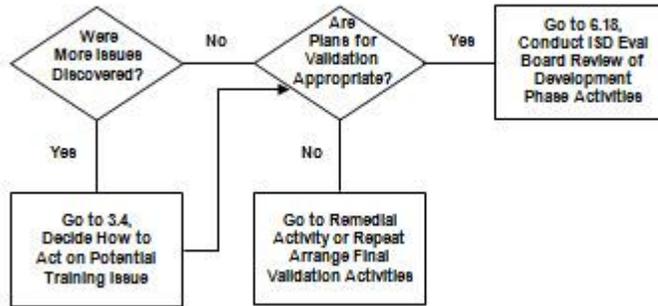
6.17.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.17.4.9.1. Nature of the perceived problem?

6.17.4.9.2. Priority of the assignment?

6.17.4.9.3. Appropriate organization to handle the tasking request?

Figure 6.16. Decision Tree for Next Activity



6.18. Conduct ISD Evaluation Board Review of Development Phase Activities. In this activity, at least one ISD Evaluation Board official reviews the activities performed during the Development Phase to determine if they meet the intent of the HILL AFB Courseware Development and Management Process and its underlying principles of systems engineering, instructional design, and quality improvement.

6.18.1. Purpose. This activity ensures that the HILL AFB Courseware Development and Management Process is applied so that instruction has a high probability of being relevant, effective and economical to sustain.

6.18.2. Activity Outcomes. Outcomes for this activity are:

6.18.2.1. Decision that appropriate activities in the Development Phase have been accomplished to the standards of this handbook, or that corrective actions are needed before the project goes into Implementation Phase.

6.18.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

6.18.2.3. Decision on where to go next in the courseware process.

6.18.3. Additional Guidance. The basic procedures and sample review worksheets for conducting ISD Evaluation Board are in the AFMC ISD Courseware Resource Site. It also contains items such as:

6.18.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the HILL AFB Courseware Development and Management Process.

6.18.3.2. ISD Evaluation Board review guidance, sample instructions, sample worksheet templates, quality checklists and examples.

6.18.3.3. Various tasking worksheets, instructions and examples.

6.18.4. Evaluation Criteria.

6.18.4.1. Do the ISD Evaluation Board Notes for Development Phase include:

6.18.4.1.1. Basic information about project, date of ISD review, and participants?

6.18.4.1.2. Observations about compliance or non-compliance of Development Phase activities with the standards in this handbook and the AFMC ISD Courseware Resource Site?

6.18.4.1.3. Documentation and customer approval of changes to the Instructional Strategy.

6.18.4.1.4. Corrective actions which need to be accomplished with suspense dates, as applicable?

6.18.4.1.5. Development Phase review decision?

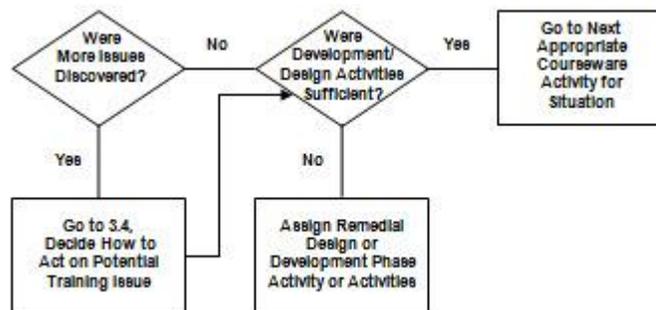
6.18.4.2. 2 Are any issues/action items that emerged during this activity documented sufficiently to determine:

6.18.4.2.1. Nature of the perceived problem?

6.18.4.2.2. Priority of the assignment?

6.18.4.2.3. Appropriate organization to handle the tasking request?

Figure 6.17. Decision Tree for Next Activity



7. IMPLEMENTATION

7.1. Implementation Phase Defined. During Implementation Phase, the instructional system is validated under field conditions, final changes are made to the courseware, the official courseware master file is posted in the appropriate installation functional courseware library, and personalized lesson plans are developed by instructors/trainers/facilitators. At the end of this phase, the course or learning aid is approved by the government and is ready for full operational implementation with personnel targeted for the training. For additional information and guidance relating to the Implementation Phase of the Air Force Instructional System Development (ISD) process, refer to AFH 36-2235, Vol. 5.

7.2. Activate Course and Graduate Assessment Survey (GAS). In this activity, the course and GAS are activated for use.

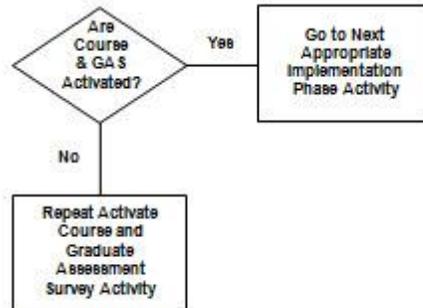
7.2.1. Purpose. This activity allows students to be scheduled for validation and regularly offered classes using the installation's typical scheduling methods.

7.2.2. Activity Outcome. Outcome for this activity is activation of the course on the training survey and programming of the GAS.

7.2.3. Additional Guidance. The local course scheduling office can provide guidance on activating courses and distributing GASs.

7.2.4. Evaluation Criteria. Has the course been activated so that students may be scheduled for training events?

Figure 7.1. Decision Tree for Next Activity



7.3. Perform Final Validation of Course. In this activity, the final draft of the full course or learning aid is validated under field conditions by a group of selected instructors/trainers/facilitators, and customer representatives, depending on the situation. In an ideal world, this is one of the last activities in Development Phase. In the real world, however, developers may not give the Subject Matter Experts (SMEs), instructors and program managers enough time to review the material before validation, the validation may include the wrong people, or the courseware may not meet evaluation criteria. By conducting the Development Phase ISD Evaluation Board review of the courseware and validation plan, risks are minimized, and final validation activities take place that are appropriate for the situation. Command standard courses usually involve a final validation of the material by a group of SMEs, instructors, and training specialists from each installation who will use the course. Those who cannot attend personally are given the opportunity to recommend final changes in writing. Each installation using the command standard course is expected to localize materials to meet their needs, and to conduct full operational tryout of the course at their own centers once the official course is released by the command.

7.3.1. Purpose. This activity is the last chance for experts such as SMEs, subject area program managers, system Officers of Primary Responsibility (OPRs) and instructors/trainers/facilitators to request changes to the course based on minor issues with content and delivery of the instruction that were not obvious during earlier reviews. This activity also helps determine average length of the course.

7.3.2. Activity Outcomes. Outcomes for this activity are:

7.3.2.1. Estimate of average course length (time needed to provide instruction).

7.3.2.2. Input from instructors/trainers/facilitators and content experts on content, appearance and effectiveness of the instruction.

7.3.2.3. Documentation on changes that will be made to the content, appearance, and delivery of the instruction based on this field test of the materials.

7.3.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

7.3.2.5. Decision on where to go next in the courseware process.

7.3.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as final validation guidance and quality checklists.

7.3.4. Evaluation Criteria.

7.3.4.1. Did final validation include key SMEs, subject area program managers, system OPRs, instructors/trainers/facilitators, assigned ISD Evaluation Board official, lead customer training manager, etc., as appropriate to validate the training?

7.3.4.2. Did the courseware developer document input from reviewers, and how recommended changes will be accomplished?

7.3.4.3. Did the courseware developer document why any recommended changes will not be accomplished?

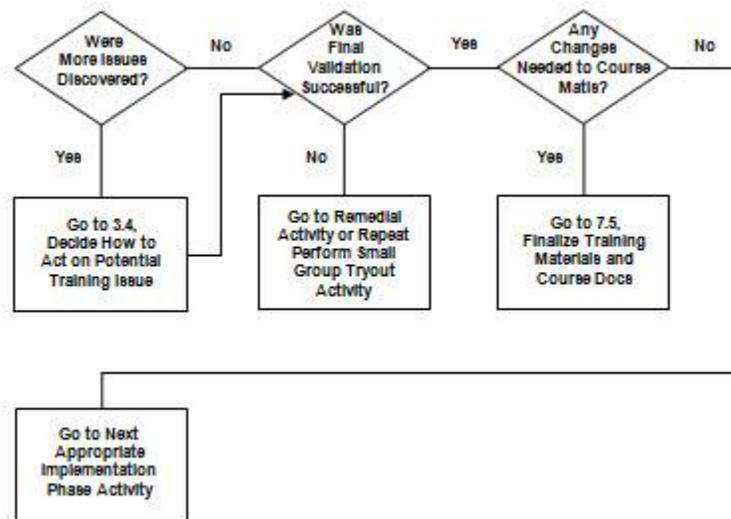
7.3.4.4. Are any issues/action items that emerged during this activity documented sufficiently to determine:

7.3.4.4.1. Nature of the perceived problem?

7.3.4.4.2. Priority of the assignment?

7.3.4.4.3. Appropriate organization to handle the tasking request?

Figure 7.2. Decision Tree for Next Activity



7.4. Perform Operational Tryout of Instruction. In this activity the final draft of the course or learning aid is tested on average students under normal operating conditions. This activity is usually where a self-paced, E-Learning project enters the Implementation Phase.

7.4.1. Purpose. This activity is the final test for courseware before it is finalized for regular use in the field. It evaluates the effectiveness of the instruction on the actual target population.

7.4.2. Activity Outcomes. Outcomes for this activity are:

7.4.2.1. Estimate of average course length (time needed to provide instruction).

7.4.2.2. Input from instructors/trainers/facilitators and average students on content, appearance and delivery methods of the instruction.

7.4.2.3. Documentation on changes that will be made to the content, appearance, and delivery of the instruction based on this final field test of the materials.

7.4.2.4. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

7.4.2.5. Decision on where to go next in the courseware process.

7.4.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as final validation guidance and quality checklists.

7.4.4. Evaluation Criteria.

7.4.4.1. Did operational tryout include students from the target population who were randomly selected through normal scheduling methods?

7.4.4.2. Did the courseware developer document input from the students and Instructor/Trainer and/or Facilitator, and explain how recommended changes will be accomplished?

7.4.4.3. Did the courseware developer document why any recommended changes will not be accomplished?

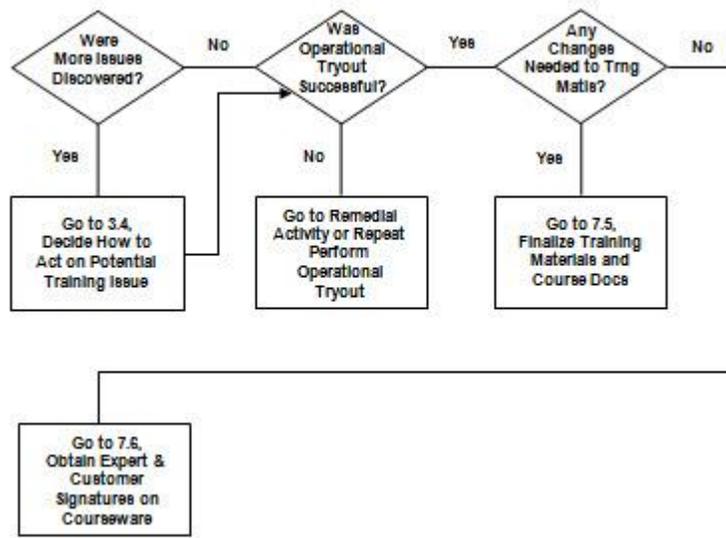
7.4.4.4. Are any issues/action items that emerged during this activity documented sufficiently to determine:

7.4.4.4.1. Nature of the perceived problem?

7.4.4.4.2. Priority of the assignment?

7.4.4.4.3. Appropriate organization to handle the tasking request?

Figure 7.3. Decision Tree for Next Activity



7.5. Finalize Materials and Course Control Documents (CCDs). In this activity, the courseware developer makes requested changes and prepares the final version of materials and CCDs.

7.5.1. Purpose. This activity corrects any issues found with content, appearance, delivery methods and documentation, and prepares the courseware for the official master file.

7.5.2. Activity Outcomes. Outcomes for this activity are:

7.5.2.1. Minor changes made to the content, appearance, and documentation of the instruction based on input during final validation.

7.5.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

7.5.2.3. Decision on where to go next in the courseware process.

7.5.3. Additional Guidance. Templates, detailed procedures, and quality checklists for preparing a course chart, Course Training Standard (CTS), Plan of Instruction (POI), and Structured On-the-Job Training (SOJT) guide are in the AFMC ISD Courseware Resource Site. It also contains items such as sample tasking worksheets, instructional materials, evaluation materials and course control documents.

7.5.4. Evaluation Criteria.

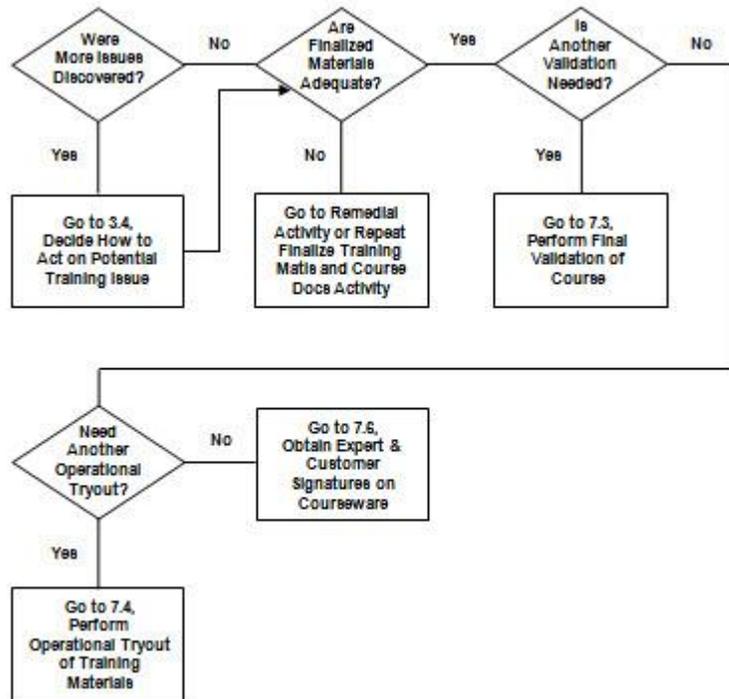
7.5.4.1. Did the courseware developer accomplish planned changes?

7.5.4.2. Did the courseware developer document why any planned changes were not accomplished?

7.5.4.3. Do the CCDs reflect the agreed upon changes to media, instructional methods/tools, and student evaluation methods/tools from the Implementation Phase activities?

- 7.5.4.4. Do course control documents meet the criteria in paragraph 6.12.?
- 7.5.4.5. Do learning objectives meet the evaluation criteria in paragraph 5.3.?
- 7.5.4.6. Do student evaluation materials and activities meet the evaluation criteria in paragraph 5.4.?
- 7.5.4.7. Does design of the course meet the evaluation criteria in paragraph 5.6. or paragraph 5.5.?
- 7.5.4.8. Do instructional materials and activities meet the evaluation criteria in paragraph 5.9. or paragraph 6.3.?
- 7.5.4.9. Has the courseware developer arranged for a follow-on review of the revised materials, if warranted by the situation?
- 7.5.4.10. Are any issues/action items that emerged during this activity documented sufficiently to determine:
 - 7.5.4.10.1. Nature of the perceived problem?
 - 7.5.4.10.2. Priority of the assignment?
 - 7.5.4.10.3. Appropriate organization to handle the tasking request?

Figure 7.4. Decision Tree for Next Activity



7.6. Obtain Content Expert and Customer Signatures on Courseware. In this activity the courseware developer obtains signatures from SMEs, subject area program manager(s), system OPRs, instructors/trainers/facilitators, and other customer representatives who participated in the courseware project. Use Electronic Signatures when possible.

7.6.1. Purpose. This activity documents final approval of the courseware by experts and customer representatives prior to the ISD Evaluation Board review for Implementation Phase, thus providing evidence that customer representatives are satisfied with the product.

7.6.2. Activity Outcomes. Outcomes for this activity are:

7.6.2.1. Signatures of content experts and customer representatives on courseware approval document.

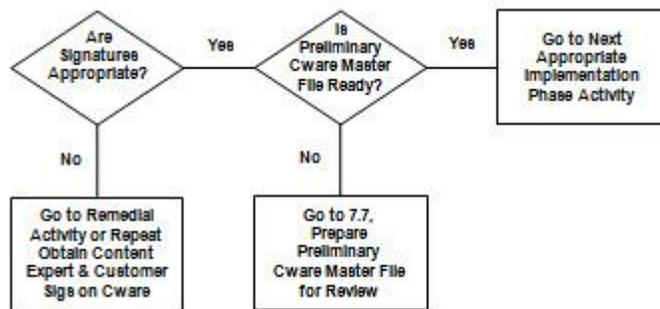
7.6.2.2. Decision on where to go next in the courseware process.

7.6.3. Additional Guidance. Signature page template, instructions and quality checklist are in the AFMC ISD Courseware Resource Site. It also contains items such as signature guidance, processing procedures, and quality checklist.

7.6.4. Evaluation Criteria.

7.6.4.1. Did the signature page meet the quality checklist criteria in the AFMC ISD Courseware Resource Site?

Figure 7.5. Decision Tree for Next Activity



7.7. Prepare Preliminary Courseware Master File for Review. In this activity, the instructional materials, evaluation materials, course control documents and all supporting documentation from the courseware project are organized into a draft master file for review by the ISD Evaluation Board.

7.7.1. Purpose. This activity allows ISD Evaluation Board reviewers to determine if appropriate documents are loaded on the master file before it is distributed to instructors/trainers/facilitators or loaded in the courseware master library.

7.7.2. Activity Outcomes. Outcomes for this activity are:

7.7.2.1. Draft courseware master file with all documentation except signature page and ISD Evaluation Board Implementation Phase notes included.

7.7.2.2. Decision on where to go next in the courseware process.

7.7.3. Additional Guidance. See the AFMC ISD Courseware Resource Site for master file template, instructions and quality checklist.

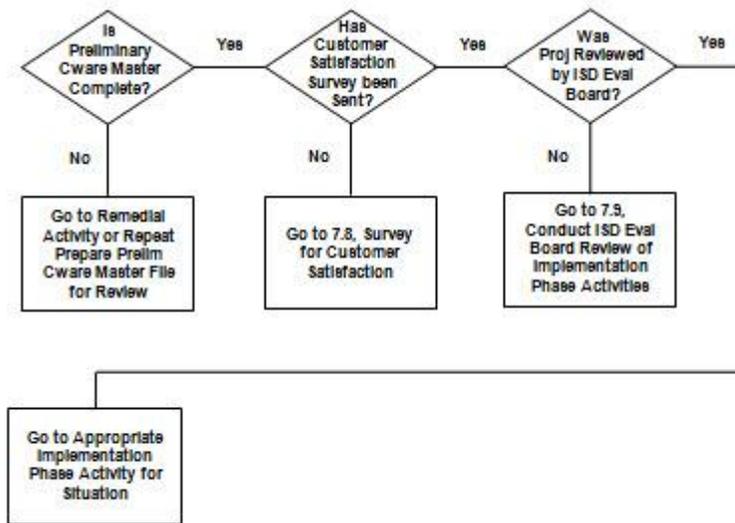
7.7.4. Evaluation Criteria.

7.7.4.1. Does preliminary courseware master file include all appropriate documentation for the course or learning aid that could be useful for implementation, reference or audit purposes except signature page and ISD Evaluation Board Implementation Phase notes?

7.7.4.2. Does preliminary courseware master file comply with the structure and content guidance in the AFMC ISD Courseware Resource Site?

7.7.4.3. Does every document in the courseware master file have a date on it for configuration management, reference and audit purposes? (This is an International Standards Organization 9000, AS9100, etc., requirement.)

Figure 7.6. Decision Tree for Next Activity



7.8. Survey for Customer Satisfaction. In this activity, the courseware developer sends a customer satisfaction survey to SMEs, lead subject area program managers, lead system OPR, instructors/trainers/facilitators, and other customer representatives who participated in the courseware project.

7.8.1. Purpose. This activity evaluates customer satisfaction with the way the activities of the courseware development or revision project were carried out so that the process can be continually improved.

7.8.2. Activity Outcomes. Outcomes for this activity are:

7.8.2.1. Distribution of customer satisfaction survey to customer representatives who participated in the project.

7.8.2.2. Decision on where to go next in the courseware process.

7.8.3. Additional Guidance. See the AFMC ISD Courseware Resource Site for items such as customer survey guidance, sample surveys, and quality checklist.

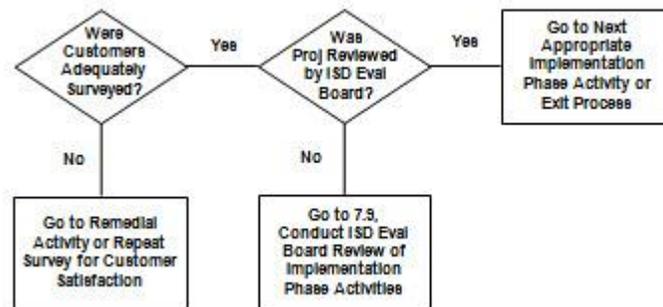
7.8.4. Evaluation Criteria.

7.8.4.1. Did the survey ask suitable questions to determine customer satisfaction with the way courseware project activities were accomplished?

7.8.4.2. Was survey distributed to SMEs, subject area program managers, system OPR, instructors/trainers/facilitators, customer training manager, and other customer representatives who participated in the project?

7.8.4.3. Did the survey request that responses be sent to the ISD Evaluation Board official for consideration, follow-up and corrective actions as needed?

Figure 7.7. Decision Tree for Next Activity



7.9. Conduct ISD Evaluation Board Review of Implementation Phase Activities. In this activity, at least one ISD Evaluation Board official reviews the activities performed during the Implementation Phase to determine if they meet the intent of the HILL AFB Courseware Development and Management Process and its underlying principles of systems engineering, instructional design, and quality improvement.

7.9.1. Purpose. This activity ensures that the HILL AFB Courseware Development and Management Process is applied so that instruction has a high probability of being relevant, effective and economical to sustain.

7.9.2. Activity Outcomes. Outcomes for this activity are:

7.9.2.1. Decision that appropriate activities in the Implementation Phase have been accomplished to the standards of this handbook, or that corrective actions are needed before the project is closed out.

7.9.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

7.9.2.3. Decision on where to go next in the courseware process.

7.9.3. Additional Guidance. The basic procedures and sample review worksheets for conducting ISD Evaluation Board reviews are in the AFMC ISD Courseware Resource Site. It also contains items such as:

7.9.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the HILL AFB Courseware Development and Management Process.

7.9.3.2. ISD Evaluation Board review guidance, sample tasking worksheets sample instructions, sample worksheet templates, quality checklists and examples.

7.9.4. Evaluation Criteria.

7.9.4.1. Do the ISD Evaluation Board Notes for Implementation Phase include:

7.9.4.1.1. Basic information about project, date of ISD review, and participants?

7.9.4.1.2. Observations about compliance or non-compliance of Implementation Phase activities with the standards set forth in this handbook and the AFMC ISD Courseware Resource Site?

7.9.4.1.3. Corrective actions which need to be accomplished with suspense dates, as applicable?

7.9.4.1.4. Implementation Phase review decision?

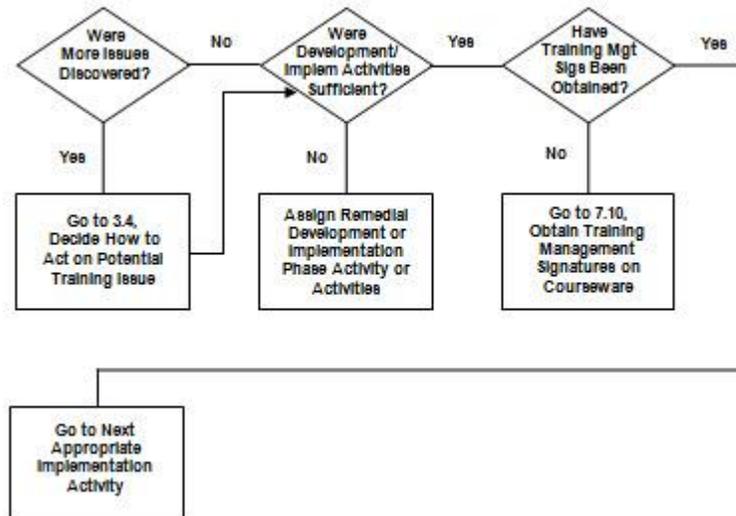
7.9.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

7.9.4.2.1. Nature of the perceived problem?

7.9.4.2.2. Priority of the assignment?

7.9.4.2.3. Appropriate organization to handle the tasking request?

Figure 7.8. Decision Tree for Next Activity



7.10. Obtain Training Management Signatures on Courseware. In this activity, the courseware developer obtains signatures from training managers, courseware managers, the ISD Evaluation Board official, and others who need to approve the courseware after Implementation Phase activities have been reviewed by the ISD Evaluation Board, and before the course is implemented in the field. Use Electronic Signatures when possible.

7.10.1. Purpose. This activity documents final approval of the courseware by Education and Training (E&T) office representatives prior to creation of the official courseware master file and distribution of the materials for regular use in the field.

7.10.2. Activity Outcomes. Outcomes for this activity are:

7.10.2.1. Signatures of appropriate representatives from E&T offices at installations where the instruction will be used.

7.10.2.2. Decision on where to go next in the courseware process.

7.10.3. Additional Guidance. Signature page template, instructions and quality checklist are in the AFMC ISD Courseware Resource Site. It also contains items such as signature guidance, processing procedures, and quality checklists for various functional areas.

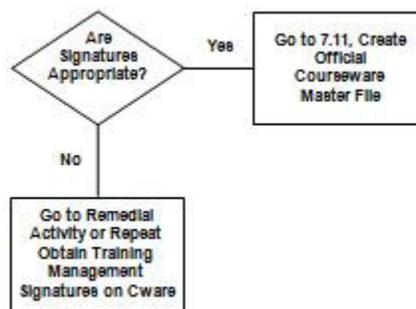
7.10.4. Evaluation Criteria.

7.10.4.1. Did signature page include ISD Evaluation Board Official and appropriate training manager(s), courseware program manager(s), etc. from E&T offices at installations where the instruction will be used?

7.10.4.2. Did the signature page meet the quality checklist criteria in the AFMC ISD Courseware Resource Site?

7.10.4.3. If a representative failed or refused to sign, was documentation on the default approval included in the courseware master file for reference and audit purposes?

Figure 7.9. Decision Tree for Next Activity



7.11. Create Official Courseware Master File. In this activity, the instructional materials, evaluation materials, course control documents and all supporting documentation from the courseware project are organized in an official master file.

7.11.1. Purpose. This activity prepares the official courseware master file for loading into the appropriate installation functional courseware library and distribution for use in the field.

7.11.2. Activity Outcomes. Outcomes for this activity are:

7.11.2.1. Official courseware master file which includes all documentation associated with the course or learning aid.

7.11.2.2. Decision on where to go next in the courseware process.

7.11.3. Additional Guidance. See the AFMC ISD Courseware Resource Site for master file template, instructions and quality checklist. It also contains items such as courseware master file processing guidance, procedures, and quality checklists.

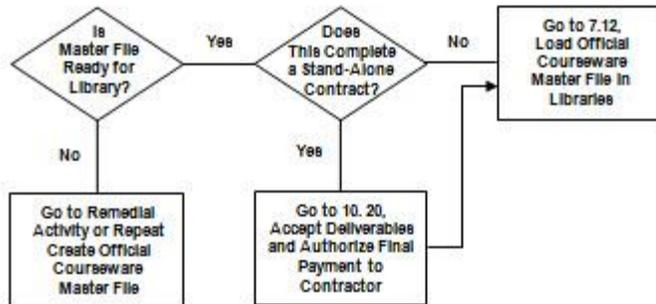
7.11.4. Evaluation Criteria.

7.11.4.1. Does the official courseware master file comply with the structure and content guidance in the AFMC ISD Courseware Resource Site?

7.11.4.2. Does the official courseware master file include all appropriate documentation for the course or learning aid that could be useful for implementation, reference or audit purposes?

7.11.4.3. Does every document in the courseware master file have a date on it for configuration management, reference and audit purposes.

Figure 7.10. Decision Tree for Next Activity



7.12. Load Official Courseware Master File in Appropriate Library. In this activity, the official master file which contains the instructional materials, evaluation materials, course control documents and all supporting documentation from the courseware project is loaded into the appropriate courseware master library.

7.12.1. Purpose. This activity adds the courseware master file to the appropriate electronic and physical repositories for reference, audit and configuration control purposes.

7.12.2. Activity Outcomes. Outcomes for this activity are:

7.12.2.1. Official courseware master file loaded in appropriate courseware libraries.

7.12.2.2. Decision on where to go next in the courseware process.

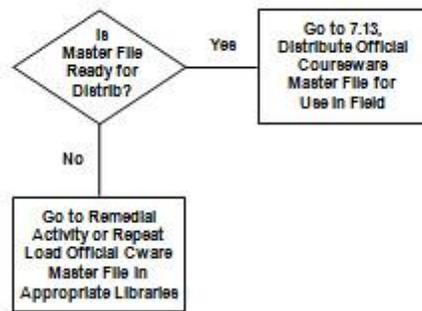
7.12.3. Additional Guidance. See the AFMC ISD Courseware Resource Site for master file template, instructions and quality checklist. It also contains items such as courseware master file processing guidance, procedures, and quality checklists.

7.12.4. Evaluation Criteria.

7.12.4.1. Does the official courseware master file submitted for posting to an official courseware library comply with the structure and content guidance in the AFMC ISD Courseware Resource Site?

7.12.4.2. Does every document in the courseware master file have a date on it for configuration management, reference and audit purposes?

7.12.4.3. Has the official courseware master file been posted in at least two locations, or otherwise backed-up to prevent loss of official data?

Figure 7.11. Decision Tree for Next Activity

7.13. Distribute Official Courseware Master File for Use in Field. In this activity, the official master file which contains the instructional materials, evaluation materials, course control documents and all supporting documentation from the courseware project is distributed to all authorized instructors/trainers/facilitators. Self-paced, E-Learning instruction is sent to organizations that will host the instruction on a command approved Learning Management System (LMS) or standalone computer system using a CD, DVD, or other form of external media.

7.13.1. Purpose. This activity distributes the most current version of instruction and all supporting documentation to those who will implement it in the field.

7.13.2. Activity Outcomes. Outcomes for this activity are:

7.13.2.1. Official courseware master file distributed to those implementing it in the field.

7.13.2.2. Decision on where to go next in the courseware process.

7.13.3. Additional Guidance. See the AFMC ISD Courseware Resource Site for items such as courseware master file distribution guidance, procedures, quality checklist.

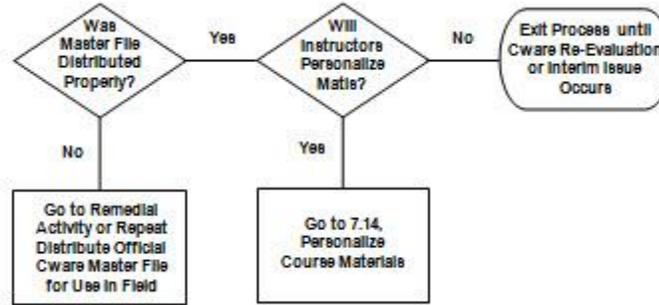
7.13.4. Evaluation Criteria.

7.13.4.1. For traditional instruction, has the official courseware master file been distributed to all instructors/trainers/facilitators authorized to teach the course?

7.13.4.2. For self-paced E-Learning, has the official courseware master file been distributed to all organizations that will host the instruction on a command approved LMS, courseware database and content library?

7.13.4.3. Has a record been made of all personnel and organizations that received a copy of the courseware master file so that they can be notified of Interim Changes and revisions?

7.13.4.4. Has master file distribution been documented in appropriate functional courseware library?

Figure 7.12. Decision Tree for Next Activity

7.14. Personalize Course Materials. In this activity, instructors, trainers and or facilitators add introductory slides, personal examples, notes, reminders, etc. to the final version of the course.

7.14.1. Purpose. This activity allows the instructors, trainers and or facilitators to make the instructional materials fit their personal style of delivery, which in turn makes the instruction more engaging, relevant and effective.

7.14.2. Activity Outcomes. Outcomes for this activity are:

7.14.2.1. Personal examples, notes, reminders, and other enhancements made to the generic materials by authorized instructors and trainers.

7.14.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

7.14.2.3. Approval of personalized materials by instructor supervisor, training manager, ISD Evaluation Board official, or others, depending on local guidance.

7.14.2.4. Decision on where to go next in the courseware process.

7.14.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

7.14.3.1. Courseware personalization guidance and quality checklists.

7.14.3.2. References on Section 508 of the Rehabilitation Act.

7.14.4. Evaluation Criteria.

7.14.4.1. Do the modifications made during personalization of materials in any way lessen the learning objective behaviors, conditions of performance, or standards of performance of the original standard course? (*Instructors, trainers or facilitators may not change the design, instructional events/materials, or evaluation events/materials as part of personalization of the course.*)

7.14.4.2. Did instructor supervisor, training manager, or ISD Evaluation Board official approve personalized materials, depending on local guidance?

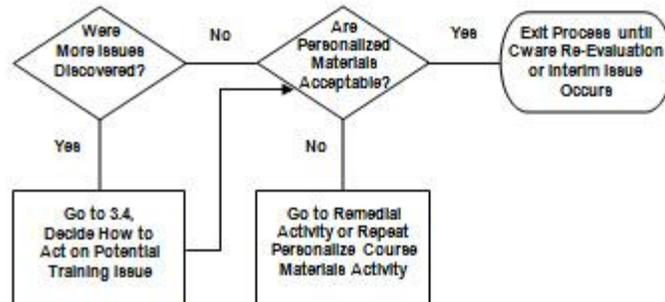
7.14.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

7.14.4.3.1. Nature of the perceived problem?

7.14.4.3.2. Priority of the assignment?

7.14.4.3.3. Appropriate organization to handle the tasking request?

Figure 7.13. Decision Tree for Next Activity



8. COURSEWARE RE-EVALUATION

8.1. Courseware Re-Evaluation Defined. During this re-evaluation, a “periodic review” of an existing course or learning aid is conducted by a training specialist. Experts are interviewed and courseware is evaluated to determine if revisions are needed to make the instruction accurate, effective, and compliant with applicable directives. If only minor corrections are needed, the course control documents are updated, any materials needing changes are quickly corrected, and the courseware is revalidated. If more analysis or major revision is needed, the activities of the follow-on project are defined during this phase.

8.1.1. Differences between Periodic Review, Interim Change, and Pen and Ink Change. The periodic review is a well-documented evaluation of courseware to determine what fixes are needed to update the content and make the training more effective. An Interim Change is an official correction made to a course in between formal revalidations or revisions. An Interim Change is documented in the courseware master file and all instructors/trainers/facilitators are advised if it impacts the delivery of the course. A pen and ink change is a minor correction made to courseware by an instructor or trainer without updating the courseware master file. Neither an Interim Change nor a Pen and Ink change fulfills the requirement for a Periodic Review.

8.1.2. Directives Requiring Periodic Courseware Review. AFMCI 36-201 Education and Training requires a biennial review for command courseware for effectiveness in meeting instructional needs. AFI 36-2232 AFMC SUP 1 Maintenance Training has authorized a triennial review for maintenance based courses. Certain safety courses such as explosive safety require annual review in accordance with applicable safety regulations.

8.2. Conduct Preliminary Research on Courseware Status. In this activity, the evaluator conducts research to determine if the course or learning aid is still needed. At this point, establish if the course in review is a command or local course. If the course is a command course, contacting other installation base or wing training managers should be done by your base or wing training managers. This communication is important to ensure all applicable

training managers, training offices and organizations are aware that the course is under review and may require updating.

8.2.1. Purpose. This activity saves resources by deciding if the courseware is a candidate for archival before resources are spent gathering materials and reviewing the design and content of the instruction.

8.2.2. Activity Outcomes. Outcomes for this activity are:

8.2.2.1. Decision to archive the courseware or continue with the courseware re-evaluation (periodic review).

8.2.2.2. Documentation on the status of the courseware sufficient to justify decision to archive or continue with periodic review.

8.2.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.2.2.4. Decision on where to go next in the courseware process.

8.2.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as: detailed guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on formal courseware re-evaluation.

8.2.4. Evaluation Criteria.

8.2.4.1. Did the evaluator:

8.2.4.1.1. Obtain recent student completion data on the course?

8.2.4.1.2. Search the Education and Training Management System (ETMS) and/or other similar functionally-specific system, to verify which organizations still require the course?

8.2.4.1.3. Determine if the course is on any Career Field Education and Training Plan or civilian equivalent (Civilian Training Plans, Occupational Training Templates, etc.)?

8.2.4.1.4. Ask the installation Education and Training (E&T) office if the course is on any formal training plan?

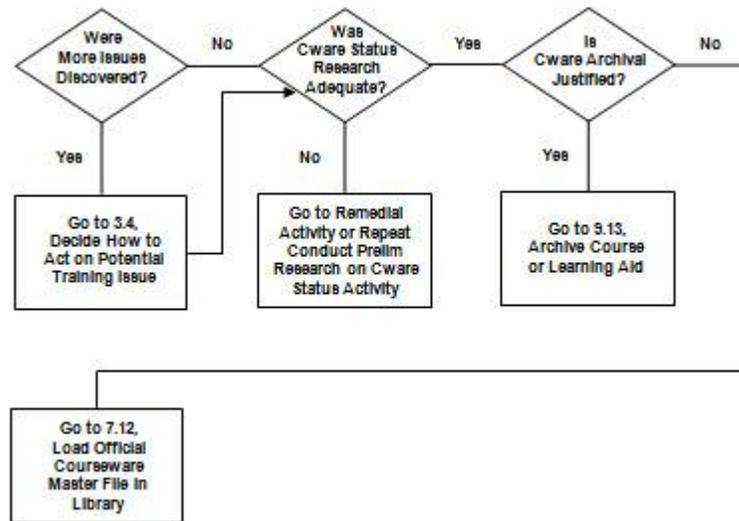
8.2.4.2. Was documentation on research activities and status of the courseware sufficient to support the recommendation to archive the course or continue with the periodic review?

8.2.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

8.2.4.3.1. Nature of the perceived problem?

8.2.4.3.2. Priority of the assignment?

8.2.4.3.3. Appropriate organization to handle the tasking request?

Figure 8.1. Decision Tree for Next Activity

8.3. Gather Materials and Contact Review Team. In this activity, the courseware evaluator gathers the materials needed to conduct the formal courseware re-evaluation, and contacts experts to participate in the review.

8.3.1. Purpose. This activity sets the stage for an efficient periodic review of a course or learning aid.

8.3.2. Activity Outcomes. Outcomes for this activity are:

8.3.2.1. All available instructional and evaluation materials and supporting documentation on the course or learning aid.

8.3.2.2. Identification of experts who have agreed to participate in the courseware review.

8.3.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.3.2.4. Decision on where to go next in the courseware process.

8.3.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on formal courseware re-evaluation.

8.3.4. Evaluation Criteria.

8.3.4.1. Did the evaluator gather:

8.3.4.1.1. The official courseware master file from the appropriate installation courseware library?

8.3.4.1.2. Results of course critiques?

8.3.4.1.3. Results of graduate assessment surveys?

8.3.4.1.4. Personalized materials, notes, and pen-and-ink changes from

instructors/ trainers in organizations delivering the course?

8.3.4.1.5. Any recent correspondence related to the course from the Functional Area and/or E&T Office?

8.3.4.2. Did the evaluator contact:

8.3.4.2.1. The functional area home office or quality function to request inspection and staff assistance findings, recent and proposed changes in regulations and policies, process improvement initiatives, performance issues, etc., related to the subject matter of the course?

8.3.4.2.2. Supervisors of all instructors, trainers, and or facilitators of the course, to request their participation in the review?

8.3.4.2.3. SMEs from work centers in the target population, to request their participation in the review of the course?

8.3.4.2.4. System OPRs to request their participation in the review of the course, if this course involves an automated information system (e.g., Depot Maintenance Accounting Production System, Stock Control System, etc.)?

8.3.4.2.5. Subject area program managers (e.g., safety, security, personnel, acquisition, finance, quality assurance, etc.) for primary topics included in the course, to request their participation in the review?

8.3.4.2.6. Training managers from the organizations where the target population resides, to request their participation in the review of the course?

8.3.4.2.7. A courseware developer or other ISD design expert, to request their assistance in reviewing the course or learning aid for ISD compliance, if the courseware evaluator is not an expert in instructional design?

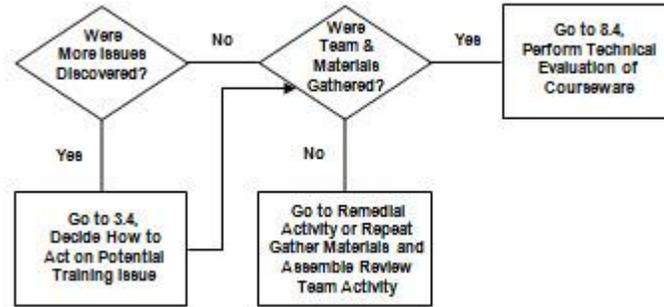
8.3.4.2.8. Experts from all centers/bases, to request their participation in the review if this is a command course?

8.3.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

8.3.4.3.1. Nature of the perceived problem?

8.3.4.3.2. Priority of the assignment?

8.3.4.3.3. Appropriate organization to handle the tasking request?

Figure 8.2. Decision Tree for Next Activity

8.4. Perform Technical Re-Evaluation of Courseware. In this activity, technical experts review the content of the instructional and evaluation materials to determine if they are still relevant, accurate and complete.

8.4.1. Purpose. This activity calls on SMEs, subject area program managers, system OPRs, training managers, and other customer representatives to verify that the instruction is relevant to what actually occurs in the workplace of the target population, and that the content of all materials is technically accurate and complete.

8.4.2. Activity Outcomes. Outcomes for this activity are:

8.4.2.1. Input from reviewers on content, appearance and design of the materials.

8.4.2.2. Documentation on changes that should be made to the content, appearance, and design of the instruction to make it more effective.

8.4.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.4.2.4. Decision on where to go next in the courseware process.

8.4.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on formal courseware re-evaluation.

8.4.4. Evaluation Criteria.

8.4.4.1. Did appropriate SMEs, subject area program managers, system OPRs, training managers, and other customer representatives review the materials?

8.4.4.2. Did the review team consider the following when evaluating the design of the course:

8.4.4.2.1. Is the sequence of the content and course activities effective?

8.4.4.2.2. Do learning objectives contain conditions of performance and standards of behavior that are closely related to the actual conditions and performance standards in the work environment?

8.4.4.2.3. Do the media and delivery method(s) of the instruction appear to be the most appropriate for the situation?

8.4.4.3. Did the review team consider the following when evaluating the instructional materials (e.g., presentation, SOJT Guide, student handouts, etc.)?

8.4.4.3.1. Are there sufficient instructional materials and activities (e.g. examples, non-examples, illustrations, diagrams, demonstrations, scenarios, case studies, etc.) to support the learning objectives?

8.4.4.3.2. Are the examples, non-examples, illustrations, diagrams, demonstrations, scenarios, case studies, and other instructional materials and activities relevant to the target audience?

8.4.4.3.3. Is the content of instructional materials accurate and complete?

8.4.4.4. Did the review team consider the following when assessing the student evaluation materials (e.g., progress checks, written tests, proficiency evaluations, etc.)?

8.4.4.4.1. Do the amount and types of evaluation provide a high level of confidence that students have attained the proficiency level of learning specified in the learning objectives?

8.4.4.4.2. Do the evaluation activities emulate the conditions and standards of the work environment as much as is feasible?

8.4.4.4.3. Is the content of the evaluation materials accurate and complete?

8.4.4.4.4. Is the content and minimum passing score for pass/fail tests consistent with training mandates (e.g., Occupational Safety and Health Administration regulations, AFI 21-101, etc.) as applicable?

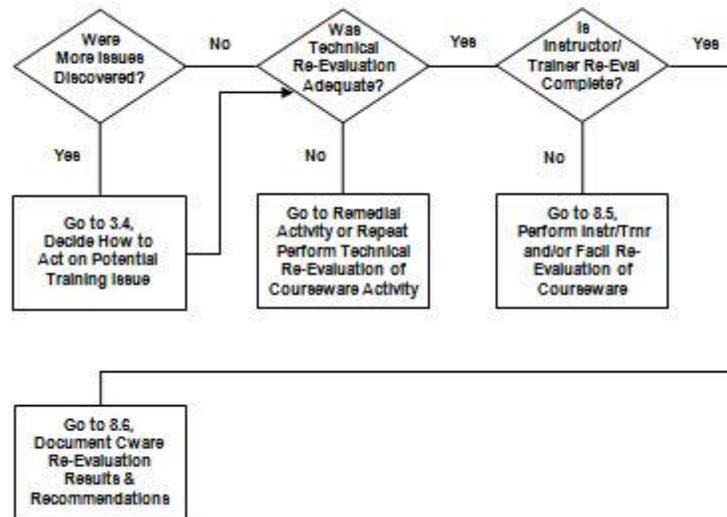
8.4.4.5. Did the courseware evaluator document recommended changes and other input from reviewers?

8.4.4.6. Are any issues/action items that emerged during this activity documented sufficiently to determine:

8.4.4.6.1. Nature of the perceived problem?

8.4.4.6.2. Priority of the assignment?

8.4.4.6.3. Appropriate organization to handle the tasking request?

Figure 8.3. Decision Tree for Next Activity

8.5. Perform Instructor, Trainer and or Facilitator Re-Evaluation of Courseware. In this activity, instructors/trainers/facilitators and instructional design experts review the content, appearance and design of existing training to determine if it is effective, efficient and adequately documented.

8.5.1. Purpose. This activity calls on instructional design and delivery experts to verify that the instructional materials, interactivity, and evaluation tools of the course meet the defined objectives and proficiency levels of learning. These experts also review the course to make sure that the sequencing of segments and events of instruction are effective for teaching, and that instructional and evaluation guidance is adequately documented.

8.5.2. Activity Outcomes. Outcomes for this activity are:

8.5.2.1. Input from reviewers on content, appearance and design of the materials.

8.5.2.2. Documentation on changes that should be made to the content, appearance, and design of the instruction to make it more effective.

8.5.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.5.2.4. Decision on where to go next in the courseware process.

8.5.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on formal courseware re-evaluation.

8.5.4. Evaluation Criteria.

8.5.4.1. Did appropriate instructor(s)/trainer(s) and courseware design specialist(s) review the course?

8.5.4.2. When evaluating the design of the course, did the review team determine what changes need to be made to the structure or sequence of the training so that it will meet the criteria in paragraph 5.6. or paragraph 5.5. as applicable?

8.5.4.3. When evaluating the design of the course, did the review team determine what changes need to be made to the learning objectives so that will they meet the evaluation criteria in paragraph 5.3.?

8.5.4.4. When evaluating the instructional materials and activities, did the review team determine what changes need to be made to the examples, non-examples, illustrations, diagrams, demonstrations, scenarios, case studies, etc. so that they will meet the evaluation criteria in paragraph 5.9. or paragraph 6.3.?

8.5.4.5. When assessing the student evaluation materials and activities, did the review team determine what changes need to be made to the class exercises, tests, review questions, bypass tests, proficiency evaluations, etc. so that they will meet the evaluation criteria in paragraph 5.4.?

8.5.4.6. When evaluating the documentation of the course, did the review team determine what changes need to be made to the course control documents so that they will meet the criteria in paragraph 6.12.?

8.5.4.7. Did the courseware evaluator document recommended changes and other input from reviewers?

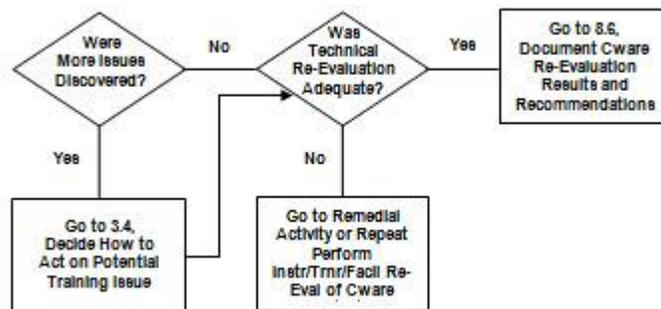
8.5.4.8. Are any issues/action items that emerged during this activity documented sufficiently to determine:

8.5.4.8.1. Nature of the perceived problem?

8.5.4.8.2. Priority of the assignment?

8.5.4.8.3. Appropriate organization to handle the tasking request

Figure 8.4. Decision Tree for Next Activity



8.6. Document Courseware Re-Evaluation Results and Recommendations. In this activity, the results of the research and review activities performed thus far in support of courseware re-evaluation are documented, and recommendations are made on how to proceed.

8.6.1. Purpose. This activity organizes findings and recommendations of the courseware evaluator and the review team so that sound decisions can be made about how to proceed with the courseware project.

8.6.2. Activity Outcomes. Outcomes for this activity are:

8.6.2.1. Documentation on courseware re-evaluation activities.

8.6.2.2. Recommendations from courseware evaluator on how to proceed with the project.

8.6.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.6.2.4. Decision on where to go next in the courseware process.

8.6.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on formal courseware re-evaluation.

8.6.4. Evaluation Criteria.

8.6.4.1. Does the documentation of courseware re-evaluation include:

8.6.4.1.1. Basic information about the project, dates of reviews, and participants?

8.6.4.1.2. Status of the courseware (e.g., student completions, links to training plans, critique and Graduate Assessment Survey results, etc.)?

8.6.4.1.3. Input from technical reviewers on relevance, accuracy and completeness of course content?

8.6.4.1.4. Input from instructors, trainers, facilitators and instructional design experts on changes needed to content and design of the training materials and activities so they better meet customer requirements and the quality standards of this handbook?

8.6.4.1.5. Recommendations on courseware activities and corrective actions which should be accomplished to fix the courseware?

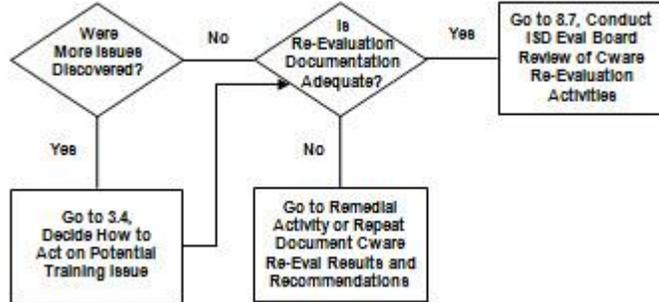
8.6.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

8.6.4.2.1. Nature of the perceived problem?

8.6.4.2.2. Priority of the assignment?

8.6.4.2.3. Appropriate organization to handle the tasking request?

Figure 8.5. Decision Tree for Next Activity



8.7. Conduct ISD Evaluation Board Review of Formal Courseware Re-Evaluation Activities. In this activity, at least one ISD Evaluation Board official reviews the activities performed thus far in the Formal Courseware Re-Evaluation Phase to determine if they meet the intent of the HILL AFB Courseware Development and Management Process and its underlying principles of systems engineering, instructional design, and quality improvement.

8.7.1. Purpose. This activity ensures that the HILL AFB Courseware Development and Management Process is applied so that instruction has a high probability of being relevant, effective and economical to sustain.

8.7.2. Activity Outcomes. Outcomes for this activity are:

8.7.2.1. Decision that appropriate activities in the Courseware Re-Evaluation Phase have been accomplished to the standards of this handbook, or that corrective actions are needed before the follow-on archival, revision or revalidation project is inserted into the courseware process.

8.7.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.7.2.3. Decision on where to go next in the courseware process

8.7.3. Additional Guidance. The basic procedures and sample review worksheets for conducting ISD Evaluation Board reviews are in the AFMC ISD Courseware Resource Site. It also contains items such as:

8.7.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the HILL AFB Courseware Development and Management Process.

8.7.3.2. ISD Evaluation Board review guidance, sample instructions, sample worksheet templates, tasking worksheets, quality checklists and examples.

8.7.4. Evaluation Criteria.

8.7.4.1. Do the ISD Evaluation Board Notes for Courseware Re-Evaluation include:

8.7.4.1.1. Basic information about project, date of the ISD review, and participants?

8.7.4.1.2. Reasons typical Courseware Re-Evaluation tasks were skipped, if applicable?

8.7.4.1.3. Observations about compliance/non-compliance of Courseware Re-Evaluation activities with the standards set forth in this handbook and the AFMC ISD Courseware Resource Site?

8.7.4.1.4. Explanations of waivers and adjustments of standards for Courseware Re-Evaluation activities, if applicable?

8.7.4.1.5. Corrective actions which need to be accomplished with suspense dates, as applicable?

8.7.4.1.6. Courseware Re-Evaluation review decision?

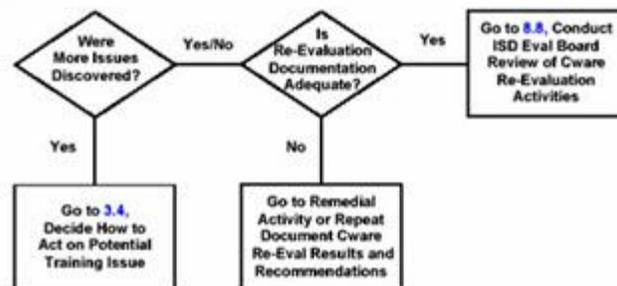
8.7.4.2. Are any issues/action items that emerged during this activity documented sufficiently to determine:

8.7.4.2.1. Nature of the perceived problem?

8.7.4.2.2. Priority of the assignment?

8.7.4.2.3. Appropriate organization to handle the tasking request?

Figure 8.6. Decision Tree for Next Activity



8.8. Define Revision or Revalidation Activities. In this activity, an experienced courseware project manager or courseware developer defines the activities, deliverables and resources needed to accomplish a follow-on courseware revision or revalidation project, and decides where the project should re-enter the courseware process.

8.8.1. Purpose. This step identifies the activities that should be performed in the follow-on project so that information gathered during the periodic review is put to good use. It allows the revision or revalidation project to be accomplished by another team with no duplication of effort.

8.8.2. Activity Outcomes. Outcomes for this activity are:

8.8.2.1.1. Courseware Project Definition Summary (PDS) suitable for assigning a follow-on revision or revalidation project to organic or level-of-effort contractor personnel.

8.8.2.1.2. Decision on where the follow-on project should re-enter the courseware development and management process.

8.8.2.1.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

8.8.2.1.3.1. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

8.8.2.1.3.1.1. Guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on formal courseware re-evaluation.

8.8.2.1.3.2. PDS guidance, sample template, instructions, quality checklist, and examples of.

8.8.3. Courseware estimate guidance, worksheets, quality checklist, and examples.

8.8.4. Evaluation Criteria.

8.8.4.1. Does the PDS have a Project Description section that (*as appropriate for the situation*) includes:

8.8.4.1.1. Reason for the project (e.g., to revise existing courseware, to revalidate course, etc.)?

8.8.4.1.2. Area of project applicability (e.g., USAF, HILL AFB, Robins AFB, etc.)?

8.8.4.1.3. Primary delivery method (e.g., instructor-led; self-paced, Web-based; computer-aided instruction; etc.) of the courseware?

8.8.4.1.4. Target population (e.g., equipment specialists, Air Force spray painters, C-130 electricians, etc.) of the instruction?

8.8.4.1.5. Highest level of learning proficiency (e.g., B/2b, C/3c, etc.) required in the instruction?

8.8.4.1.6. Estimated length of the proposed course or learning aid in terms of hours of instruction?

8.8.4.1.7. Initial tasks and knowledge topics that are planned to be covered?

8.8.4.1.8. Course presentations, student handouts, reference guides and other support documents needed?

8.8.4.1.9. Whether specific types of evaluation (e.g., written test, proficiency evaluation, etc.) are required?

8.8.4.2. Does the PDS have a Basic Courseware Activities and Outcomes section that (as appropriate for the situation):

8.8.4.2.1. Describes each courseware activity (e.g., conduct knowledge/task analysis, develop learning objectives, etc.) that is required to accomplish this project?

8.8.4.2.2. Specifies the outcome documentation associated with each courseware activity?

8.8.4.2.3. Identifies the evaluation standards (e.g., directive, this handbook, an ISD Evaluation Board checklist, etc.) for each courseware activity?

8.8.4.3. Does the PDS have an Estimate of Resources Needed section that (as appropriate for the situation):

8.8.4.3.1. Estimates the amount of hours needed to accomplish the tasks of the project in a worst case scenario (i.e., inexperienced organic courseware developer performing the work)?

8.8.4.3.2. Explains the basic formula and adjustment factors used for determining the rough order of magnitude of resources needed for the proposed courseware project?

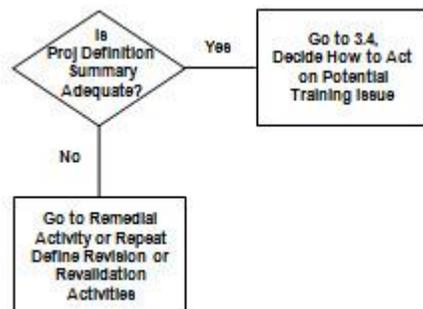
8.8.4.4. Does the PDS have attachments that include (as applicable) any Planning Phase activities documentation from any Formal Courseware Re-Evaluation Phase or Planning Phase activities performed when researching issues with the existing training?

8.8.4.5. Did an experienced courseware program/project manager oversee the formulas and adjustment factors used to determine the Rough Order of Magnitude (ROM) of resources needed to accomplish the project?

8.8.4.6. Did the information in the PDS come from the results of earlier planning and periodic review activities, and not from assumptions and incomplete data?

8.8.4.7. Is the decision on where the follow-on project should first re-enter the courseware process documented in the Project Definition Summary?

Figure 8.7. Decision Tree for Next Activity



8.9. Obtain Training Management signatures for PDS and Course Direction. In this activity, the courseware developer obtains signatures from training managers, courseware managers, the ISD Evaluation Board official, and others who need to approve the courseware specifications after Planning Phase activities have been reviewed by the ISD Evaluation Board, and before designing and developing the course. Use Electronic Signatures when possible.

8.9.1. Purpose. This activity documents initial approval of the courseware specifications by Education and Training (E&T) office representatives prior to creation of the course materials.

8.9.2. Activity Outcomes. Outcomes for this activity are:

8.9.2.1. Signatures of appropriate representatives from E&T offices at installations where the instruction will be used.

8.9.2.2. Decision on where to go next in the courseware process.

8.9.3. Additional Guidance. Signature page template, instructions and quality checklist are in the AFMC ISD Courseware Resource Site. It also contains items such as signature guidance, processing procedures, and quality checklists for various functional areas.

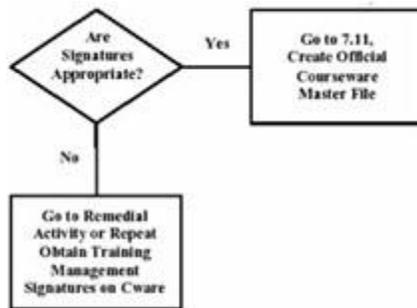
8.9.4. Evaluation Criteria.

8.9.4.1. Did signature page include ISD Evaluation Board Official and appropriate training manager(s), courseware program manager(s), etc., from E&T offices at installations where the instruction will be used?

8.9.4.2. Did the signature page meet the quality checklist criteria in this manual?

8.9.4.3. If a representative failed or refused to sign, was documentation on the default approval included in the courseware master file for reference and audit purposes?

Figure 8.8. Decision Tree for Next Activity



9. COURSEWARE MANAGEMENT FUNCTION

9.1. Courseware Management Function Defined. The Courseware Management Function involves the management, support, and administration of courseware through policies, programs, standardized procedures, and working aids. It includes the following types of activities in support of courseware development and sustainment:

9.1.1. Establishing courseware policies programs, procedures and working aids.

9.1.2. Planning, obtaining, distributing and managing resources.

9.1.3. Promoting standardization and re-use of instructional materials.

9.1.4. Monitoring, assessing and reporting on the health of courseware.

9.1.5. Implementing quality improvement measures.

9.1.6. Controlling Interim Changes.

9.1.7. Distribution of instructional materials.

9.2. Establish Local Courseware Policies and Tools as Needed. Education and Training (E&T) offices at all levels are responsible for establishing their own policies, procedures and tools, as needed, to support courseware activities within their span of control.

9.2.1. Purpose. This activity efficiently implements the HILL AFB Courseware Development and Management Process at each installation so that maximum benefits can be realized.

9.2.2. Activity Outcomes. Outcomes for this activity are:

9.2.2.1. Local supplements and operating instructions as desired.

9.2.2.2. Local guidance, worksheets, forms, templates, quality checklists, samples and other working aids related to courseware development and management.

9.2.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

9.2.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

9.2.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the AFMC Courseware Development and Management Process.

9.2.3.2. Links to existing directives related to courseware.

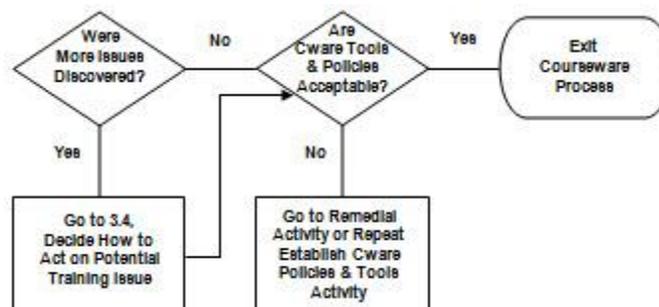
9.2.4. Evaluation Criteria.

9.2.4.1. Do the policies, procedures, or tools established contradict this handbook or any other equal or higher level directive?

9.2.4.2. Have the policies, procedures, or tools been posted for easy access by courseware process participants?

9.2.4.3. Depending on local procedures, were the proposed policies, procedures, or tools in support of this activity reviewed by a courseware management supervisor, courseware program manager, or Instructional System Development (ISD) Evaluation Board official to verify that they meet the recommendations of this handbook and other applicable E&T directives?

Figure 9.1. Decision Tree for Next Activity



9.3. Promote Standardization of Instruction. E&T offices at all levels are responsible for promoting the standardization of instructional requirements and materials, to include use of command and installation standard courseware whenever prescribed or practical, creating and adopting Reusable Knowledge Objects (RKO) and reusable learning objects whenever feasible, and sharing information on planned and in-work courseware activities with other organizations and agencies.

9.3.1. Purpose. This activity promotes consistency of instruction across organizations and installations, which saves resources by preventing duplicate courseware and capitalizing on existing materials.

9.3.2. Activity Outcomes. Outcomes for this activity are:

9.3.2.1. Use of command and installation standard courseware whenever prescribed or practical.

9.3.2.2. Creation and adoption of RKO and reusable learning objects whenever feasible. (See 3.15. and 5.12. for details on RKO assessments and 3.16. and 5.13. for details on Sharable Content Object (SCO) assessments.)

9.3.2.3. Sharing of information on planned and in-work courseware activities with other organizations and agencies.

9.3.2.4. Policies, procedures and guidance on standardization of instruction as needed.

9.3.3. Additional Guidance. Sample tasking worksheets are the AFMC ISD Courseware Resource Site. It also contains items such as:

9.3.3.1. Instructional materials from the *AFMC Instructional System Development Theory*, *AFMC Functional Courseware Management*, and *AFMC Functional Courseware Development Procedures* courses, which were designed to provide practical instruction on applying the HILL AFB Courseware Development and Management Process.

9.3.3.2. Guidance on electronic content management and RKO.

9.3.3.3. Directives, references and guidance on Sharable Content Object Reference Model, SCOs, metadata tagging, and content packaging.

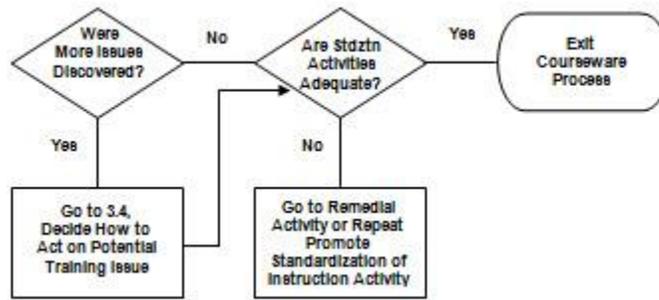
9.3.3.4. Links to existing directives related to courseware.

9.3.4. Evaluation Criteria.

9.3.4.1. Do any established policies, procedures, or tools contradict this handbook or any other equal or higher level directive?

9.3.4.2. Have policies, procedures, or tools been posted for easy access by courseware process participants?

9.3.4.3. Depending on local procedures, were the results of this activity reviewed by a courseware management supervisor, courseware program manager, or ISD Evaluation Board official to verify that standardization of instruction activities meet the requirements in this handbook and other HILL AFB E&T directives?

Figure 9.2. Decision Tree for Next Activity

9.4. Establish Formal Courseware Re-Evaluation Program. Installation E&T offices are responsible for establishing their own procedures for managing the required periodic review of courses and learning aids for which they are responsible. (See paragraph 8.1.2.)

9.4.1. Purpose. This activity ensures that courseware is re-evaluated as prescribed by applicable directives.

9.4.2. Activity Outcomes. Outcomes for this activity are local procedures, guidance and working aids for managing periodic courseware reviews.

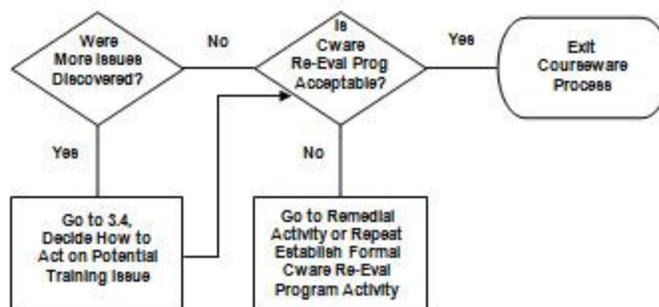
9.4.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as detailed guidance, worksheets, instructions, sample correspondence, sample documentation, and quality checklists on all aspects of formal courseware re-evaluation.

9.4.4. Evaluation Criteria.

9.4.4.1. Do established procedures, guidance or tools contradict mandated directives or any other equal or higher level directive?

9.4.4.2. Have the program management procedures, guidance and tools been posted for easy access by courseware process participants?

9.4.4.3. Depending on local procedures, were the results of this activity reviewed by a courseware management supervisor, courseware program manager, or ISD Evaluation Board official to verify that the proposed courseware re-evaluation program management meets the intent of this handbook?

Figure 9.3. Decision Tree for Next Activity

9.5. Establish Courseware Assessment Program. Installation-level E&T offices are responsible for implementing a comprehensive courseware assessment program for their center/base that includes, at a minimum, end-of-course student critiques, Graduate Assessment Surveys (GASs), and periodic evaluation of local processes and programs which impact courseware development and management. In addition, HILL AFB functional organizations must ensure that a biennial (every two years) curriculum review for all command courses is accomplished (per AFMCI 36-201). AFI 36-2232 AFMC SUP 1 Maintenance Training has authorized a triennial (every three years) review for maintenance based courses.

9.5.1. Purpose. This activity ensures that courseware is re-evaluated as prescribed by applicable directives.

9.5.2. Activity Outcomes. Outcomes for this activity are local procedures, guidance and working aids for managing assessment of courseware.

9.5.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as:

9.5.3.1. References and general guidance on the evaluation of processes and programs which impact courseware development and management.

9.5.3.2. References and general guidance on GASs and end-of-course critiques.

9.5.3.3. GAS question worksheets, sample format, quality checklist, and examples. (See 6.16, *Write Graduate Assessment Survey Questions* for more information.)

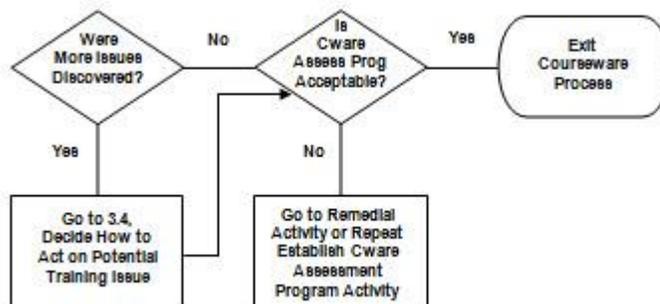
9.5.4. Evaluation Criteria.

9.5.4.1. Do the procedures, guidance or tools established contradict mandated directives or any other equal or higher level directive?

9.5.4.2. Have the program management procedures, guidance and tools been posted for easy access by courseware process participants?

9.5.4.3. Depending on local procedures, were the results of this activity reviewed by a courseware management supervisor, courseware program manager, or ISD Evaluation Board official to verify that the proposed courseware assessment program management measures meet the recommendations of this handbook?

Figure 9.4. Decision Tree for Next Activity



9.6. Maintain Installation Electronic Courseware Master Library (ECML). Center/base-level E&T offices are responsible for maintaining an ECML which contains (at a minimum) copies of all formal functional courses and learning aids used at the installation. Both local and HILL AFB command standard courses shall be included.

9.6.1. Purpose. This activity creates a complete inventory of formal training used at an installation and enables the courseware to be searched, distributed and managed electronically.

9.6.2. Activity Outcomes. Outcomes for this activity are:

9.6.2.1. Official courseware master files loaded in an installation ECML.

9.6.2.2. Local procedures, guidance and working aids for managing the installation ECML.

9.6.3. Additional Guidance. See the AFMC ISD Courseware Resource Site, *HILL AFB Courseware Master File Structure* for master file template, instructions and quality checklist. It also contains items such as courseware master file library guidance, tips, and quality checklists.

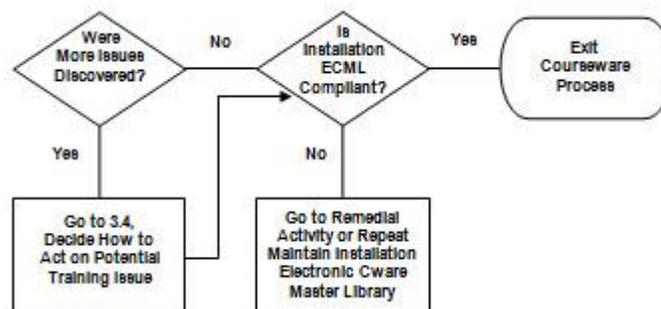
9.6.4. Evaluation Criteria.

9.6.4.1. Do the official courseware master files submitted for posting to appropriate headquarters/installation libraries comply with the structure and content guidance outlined in the AFMC ISD Courseware Resource Site?

9.6.4.2. Do the procedures, guidance or tools established contradict mandated directives or any other equal or higher level directive?

9.6.4.3. Depending on local procedures, were the results of this activity reviewed by a courseware management supervisor, courseware program manager, or other education and training official to verify that the proposed courseware installation ECML measures meet the intent of this handbook?

Figure 9.5. Decision Tree for Next Activity



9.7. Budget for Courseware Sustainment Activities. In this activity, courseware program or project managers estimate the resources needed to sustain a course or learning aid based on historical factors, courseware revalidation formulas and input from technical experts.

9.7.1. Purpose. This activity allows organizations to plan for the manpower/funding needed to accomplish formal courseware re-evaluation and revalidation tasks.

9.7.2. Activity Outcomes. Outcomes for this activity are:

9.7.2.1. Estimate of personnel hours needed to re-evaluate and revalidate the course or learning aid each time formal review is required during next four years.

9.7.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

9.7.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance and formulas for determining resources needed to sustain existing courseware.

9.7.4. Evaluation Criteria.

9.7.4.1. Does courseware sustainment budget include:

9.7.4.1.1. Estimate of the hours needed to accomplish anticipated courseware formal re-evaluation and revalidation tasks in a worst case scenario (i.e., inexperienced organic courseware developer performing the work)?

9.7.4.1.2. Identification of months when formal courseware re-evaluation and revalidation will be due. (See paragraph 8.1.2.)

9.7.4.1.3. Explanation of the basic formula and adjustment factors used for determining the rough order of magnitude of resources needed for sustainment of the course or learning aid?

9.7.4.2. Was the resource estimate prepared or validated by a courseware manager or developer experienced in determining rough order of magnitude of resources needed for Air Force courseware activities and projects?

9.7.4.3. Were the adjustment factors for the courseware sustainment estimate based on courseware master file references and discussions with instructors/Subject Matter Experts (SMEs), rather than on assumptions and incomplete data?

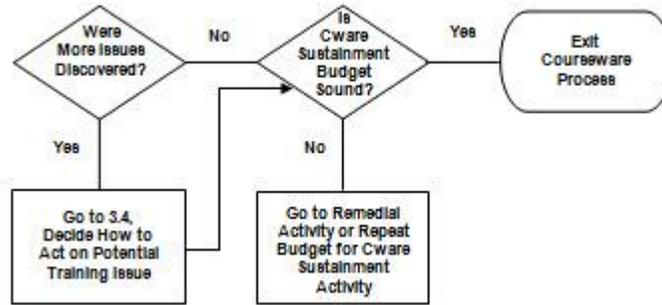
9.7.4.4. Depending on local procedures, were the results of this activity reviewed by a courseware management supervisor, courseware program manager, or ISD Evaluation Board official to verify that courseware sustainment budget documentation meets the guidance in this handbook and on the AFMC ISD Courseware Resource Site?

9.7.4.5. Are any issues/action items that emerged during this activity documented sufficiently to determine:

9.7.4.5.1. Nature of the perceived problem?

9.7.4.5.2. Priority of the assignment?

9.7.4.5.3. Appropriate organization to handle the tasking request?

Figure 9.6. Decision Tree for Next Activity

9.8. Distribute Courseware upon Request. In this activity, items from the official master file are released to authorized individuals upon request.

9.8.1. Purpose. This activity distributes the most current version of courseware to individuals in the federal government who wish to review or adopt it for use at their installations. Individuals outside of the federal government who are not developing instruction for government use may only be given courseware at the approval of the appropriate HQ HILL AFB Courseware Manager.

9.8.2. Activity Outcomes. Outcomes for this activity are:

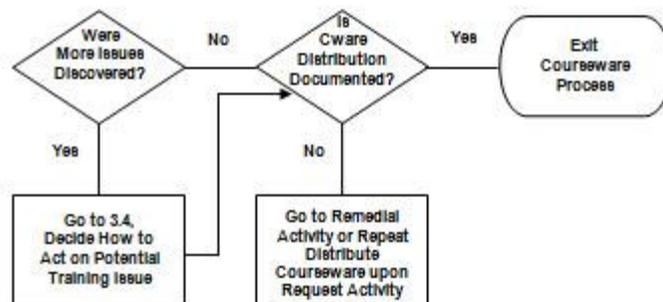
9.8.2.1. Courseware distributed to authorized individual.

9.8.2.2. Documentation in courseware master file or courseware management system of individuals and organizations that received a copy of the courseware instructional and evaluation materials, and not just course control documents.

9.8.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. It also contains items such as guidance and quality checklist on courseware master file distribution

9.8.4. Evaluation Criteria.

9.8.4.1. Has a record been made of all personnel and organizations that received a copy of the courseware master file so that they can be notified of Interim Changes and revisions?

Figure 9.7. Decision Tree for Next Activity

9.9. Determine Instruction Equivalency. In this activity, a courseware specialist or training manager determines the equivalency of instruction between two courses.

9.9.1. Purpose. This activity documents the decision on whether or not a training course is equivalent in scope and proficiency level of learning to other courses. This allows credit to be given for instruction already received at the same or higher level in a subject area, and prevents employees from being required to attend repetitive courses.

9.9.2. Activity Outcomes. Outcomes for this activity are:

9.9.2.1. Documentation in courseware master file or courseware management system of courses considered to be equivalent to the subject course.

9.9.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

9.9.3. Additional Guidance. It also contains items such as guidance and quality checklist on determining equivalency.

9.9.4. Evaluation Criteria.

9.9.4.1. Does any course that has been deemed equivalent have the same or higher proficiency level of learning and cover the same or greater scope of objectives?

9.9.4.2. Depending on local procedures, were the results of this activity reviewed by a courseware management supervisor, courseware program manager, or ISD Evaluation Board official to verify that instruction equivalency meets the guidance in this handbook and on the AFMC ISD Courseware Resource Site?

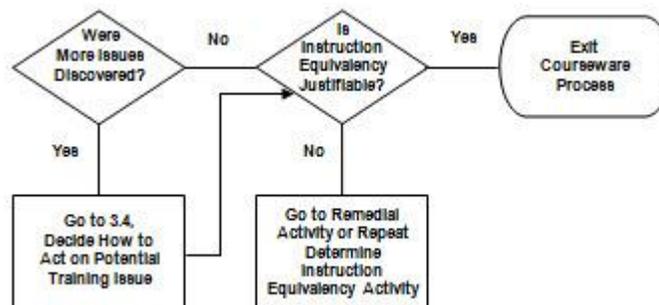
9.9.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

9.9.4.3.1. Nature of the perceived problem?

9.9.4.3.2. Priority of the assignment?

9.9.4.3.3. Appropriate organization to handle the tasking request?

Figure 9.8. Decision Tree for Next Activity



9.10. Process Interim Change (IC). In this activity, a significant change to a course or learning aid that occurs in between official revalidation or revision of the courseware is distributed to all courseware users for immediate implementation.

9.10.1. Purpose. This activity allows corrections and updates to courseware in between formal revalidation or revision. It tracks corrections and modifications to the instruction so that all instructors/trainers/facilitators are using the most recent version of materials.

9.10.2. Activity Outcomes. Outcomes for this activity are:

9.10.2.1. Interim Change Memo (ICM) distributed to those who use the courseware in the field.

9.10.2.2. Decision on where to go next in the courseware process.

9.10.3. Additional Guidance. ICM template, instructions, sample and quality checklist are in the AFMC ISD Courseware Resource Site. It also contains items such as ICM distribution guidance and quality checklist.

9.10.4. Evaluation Criteria.

9.10.4.1. Does the ICM content and format comply with the quality checklist in the AFMC ISD Courseware Resource Site?

9.10.4.2. Has the ICM been added to the courseware master file in all appropriate courseware master libraries and in the Courseware Management Database (CMD)?

9.10.4.3. Have claimed accomplished changes actually been accomplished?

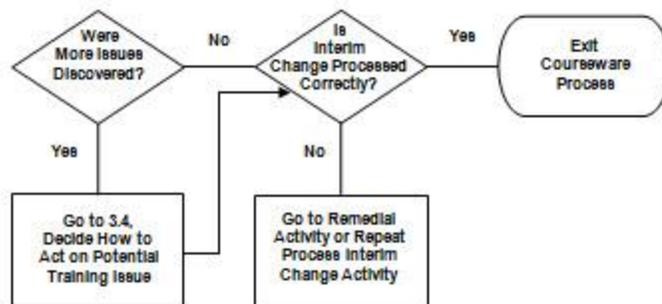
9.10.4.4. Are any issues/action items that emerged during this activity documented sufficiently to determine:

9.10.4.4.1. Nature of the perceived problem?

9.10.4.4.2. Priority of the assignment?

9.10.4.4.3. Appropriate organization to handle the tasking request?

Figure 9.9. Decision Tree for Next Activity



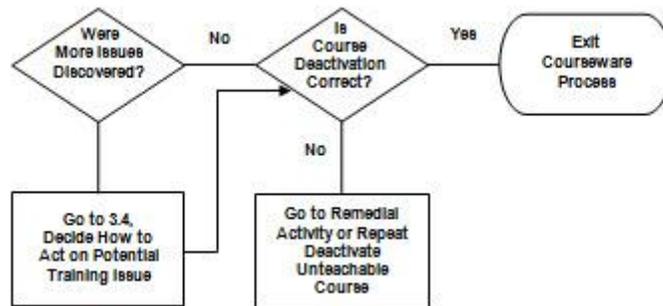
9.11. Deactivate Unteachable Course. In this activity, a course that is no longer teachable or a learning aid that is no longer usable is temporarily deactivated *pending revision or replacement*.

9.11.1. Purpose. This activity removes the course or learning aid from the list of available instruction so that students are not scheduled for training that is outdated and awaiting correction.

9.11.2. Activity Outcomes. Outcomes for this activity are:

- 9.11.2.1. Course “deactivation” status entered into the CMD.
- 9.11.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
- 9.11.3. Additional Guidance. It also contains items such as deactivation guidance and quality checklist.
- 9.11.4. Evaluation Criteria.
- 9.11.4.1. Should this course have been archived rather than deactivated?
- 9.11.4.2. Has deactivation status been entered into the CMD?
- 9.11.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:
- 9.11.4.3.1. Nature of the perceived problem?
- 9.11.4.3.2. Priority of the assignment?
- 9.11.4.3.3. Appropriate organization to handle the tasking request?

Figure 9.10. Decision Tree for Next Activity



9.12. Reactivate Course or Learning Aid. In this activity, a course that is in “in-work” or “archive” status is reactivated so that students can be scheduled to take the instruction.

- 9.12.1. Purpose. This activity allows archived courses that have become needed again, or courses that were temporarily inactive during development or revision to be placed in active status for scheduling and instruction purposes.
- 9.12.2. Activity Outcomes. Outcomes for this activity are:
- 9.12.2.1. Course “reactivation” status entered in appropriate automated information systems such as ETMS and the CMD.
- 9.12.2.2. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.
- 9.12.3. Additional Guidance. It also contains items such as reactivation guidance and quality checklist.
- 9.12.4. Evaluation Criteria.
- 9.12.4.1. Is the course teachable?

9.12.4.2. Has reactivation status been entered in appropriate automated information systems such as ETMS and the CMD?

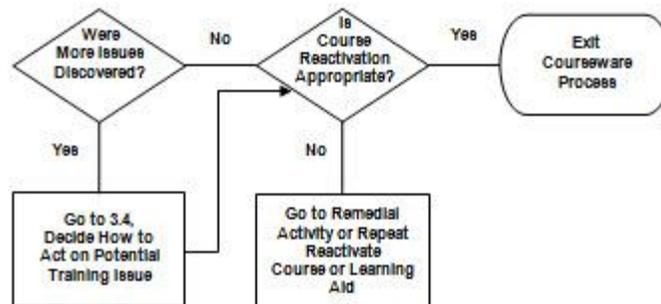
9.12.4.3. Are any issues/action items that emerged during this activity documented sufficiently to determine:

9.12.4.3.1. Nature of the perceived problem?

9.12.4.3.2. Priority of the assignment?

9.12.4.3.3. Appropriate organization to handle the tasking request?

Figure 9.11. Decision Tree for Next Activity



9.13. Archive Course or Learning Aid. In this activity, a course that is no longer needed is officially archived.

9.13.1. Purpose. This activity documents the reasons that a course or learning aid is no longer needed and places it in archive status.

9.13.2. Activity Outcomes. Outcomes for this activity are:

9.13.2.1. Course "archive" status entered into the CMD.

9.13.2.2. Reason for archive added to courseware master file.

9.13.2.3. Possible tasking worksheets on training issues, courseware issues, training gaps, or non-training issues submitted to appropriate organization for action.

9.13.3. Additional Guidance. Sample tasking worksheets are in the AFMC ISD Courseware Resource Site. See AFMC ISD Courseware Resource Site for archived master file template, instructions and quality checklist. It also contains items such as archival guidance and quality checklist.

9.13.4. Evaluation Criteria.

9.13.4.1. Should this course have been deactivated rather than archived?

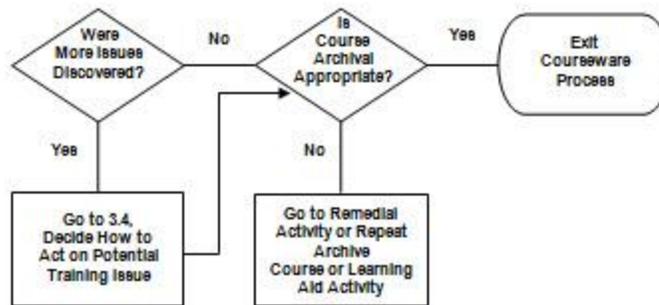
9.13.4.2. Is this course a prerequisite to any other course or learning aid?

9.13.4.3. Is this course a requirement on any civilian Career Field Education and Training Plan, Civilian Training Plan, Career Development Plan, or Occupational Training Template?

9.13.4.4. Is this course a requirement on any formal training plan?

- 9.13.4.5. Does the justification for the archive seem reasonable?
- 9.13.4.6. Did appropriate instructors, program managers and training managers from all organizations that use the course or learning aid approve the archival?
- 9.13.4.7. Has the archive justification been added to the courseware master file?
- 9.13.4.8. Has archive status been entered into the CMD?
- 9.13.4.9. Are any issues/action items that emerged during this activity documented sufficiently to determine:
- 9.13.4.9.1. Nature of the perceived problem?
 - 9.13.4.9.2. Priority of the assignment?
 - 9.13.4.9.3. Appropriate organization to handle the tasking request?

Figure 9.12. Decision Tree for Next Activity



9.14. Outsource Courseware Services as Needed. In this activity, a courseware specialist or training manager works with the installation contracting office to contract out courseware development or management services.

9.14.1. Purpose. This is a reminder of the primary activities involved, and the important issues to remember, when outsourcing courseware services.

9.14.2. Activity Outcomes. Outcomes for this activity vary with the outsourcing task being performed and the circumstances of the particular situation. See the AFMC ISD Courseware Resource Site for guidance.

9.14.3. Additional Guidance. *Specific guidance on acquisition topics are best provided by the local contracting function at each installation.* See the AFMC ISD Courseware Resource Site for items such as:

9.14.3.1. AFI 63-124, *Performance-Based Services Acquisition* and links to applicable Federal Acquisition Regulations.

9.14.3.2. Information on the three phases of acquisition, contract types, extent of competition, contract vehicles and acquisition strategy.

9.14.3.3. Guidance on communicating with contractors, considering a contractor's unsolicited proposal, and conducting advanced market research.

- 9.14.3.4. Tips on preparing a contract requirements document, processing a contract requirements package, preparing a performance plan, and participating in source selection.
- 9.14.3.5. Guidance on monitoring post-award progress of a contract, accepting deliverables, and closing out the contract.
- 9.14.3.6. Tips on reporting contractor deficiencies, modifying contracts, and terminating contract when necessary.
- 9.14.4. Evaluation Criteria. Evaluation criteria for this activity vary with the outsourcing task being performed and the circumstances of the particular situation. See the AFMC ISD Courseware Resource Site for guidance.
- 9.14.5. Decision Tree for Next Activity. Decision trees for this activity vary with the outsourcing task being performed and the circumstances of the particular situation. See the AFMC ISD Courseware Resource Site for guidance.

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

The documents listed below are references commonly used in the Air Force and HILL AFB relevant to education and training and the application of Instructional System Development (ISD) methodology to the development and management of courseware. The Air Force E-Publishing Site can be used to access these publications: <http://www.e-publishing.af.mil/>.

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Vol 13, *Information For Designers Of Instructional Systems For Basic Military Training*, 6 August 2003

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Abbreviations and Acronyms

ADDIE—Analysis, Design, Development, Implementation, Evaluation

ADL—Advanced Distributed Learning

ADL—R —Advanced Distributed Learning Repository

AETC—Air Education and Training Command

AF—Air Force

AFB—Air Force Base

AFPD—Air Force Policy Directive

AFH—Air Force Handbook

AFI—Air Force Instruction

AFIADL—Air Force Institute for Advanced Distributed Learning
AFMAN—Air Force Manual
AFMC—Air Force Materiel Command
AFMCMAN—Air Force Materiel Command Manual
AFSC—Air Force Specialty Code
AMARG—Aerospace Maintenance and Regeneration Group
ARCS—Attention, Relevance, Confidence & Satisfaction
CAI—Computer Assisted Instruction
CAM—Content Aggregation Model
CBI—Computer-Based Instruction
CBT—Computer-Based Training
CCD—Course Control Document
CD—ROM —Compact Disc-Read Only Memory
CFETP—Career Field Education and Training Plan
CMD—Courseware Management Database
COTS—Commercial-Off-The-Shelf
CTP—Civilian Training Plan
CTS—Course Training Standard
DCMI—Dublin Core Metadata Initiative
DL—Distance Learning
DMAG—Depot Maintenance Activity Group
DMAPS—Depot Maintenance Accounting and Production System
DoD—Department of Defense
DoDI—Department of Defense Instruction
DSN—Defense Switched Network
DVD—Digital Video Disk
E&T—Education and Training
ECML—Electronic Courseware Master Library
EPSS—Electronic Performance Support System
ETMS—Education and Training Management System
FAR—Federal Acquisition Regulation
FSU—Florida State University

GAS—Graduate Assessment Survey
GS—General Schedule
HILLAFB—Hill Air Force Base
HQ AFMC—Headquarters Air Force Materiel Command
HPT—Human Performance Technology
HRD—Human Resources Development
HTML—Hypertext Mark-up Language
IC—Interim Change
ICM—Interim Change Memo
ICMS—Interactive Course Management System
ICW—Interactive Courseware
ID—Instructional Design
IEEE—Institute for Electrical and Electronics Engineers
IMI—Interactive Multimedia Instruction
ISD—Instructional System Development
ISDD—Instructional Systems Design and Development
ISO—International Standards Organization
J&A—Justification and Authority
JPR—Job Performance Requirement
LMS—Learning Management System
LOM—Learning Object Metadata
MIL—HDBK —Military Handbook
O&M—Operations and Maintenance
OC—ALC —Oklahoma City Air Logistics Center
OO—ALC —Ogden Air Logistics Center
OJT—On-the-Job Training
OPR—Office/Officer of Primary Responsibility
OSHA—Occupational Safety and Health Administration
OSTP—Office of Science Technology Policy
PAC—Production Acceptance Certification
PACSS—Production Acceptance Certification Standard System
PADDIE—Planning, Analysis, Design, Development, Implementation, Evaluation

PDS—Project Definition Summary
POC—Point of Contact
POI—Plan of Instruction
PWS—Performance Work Statement
QI—Quality Improvement
RAFB—Robins Air Force Base
RKO—Reusable Knowledge Object
RTE—Run Time Environment
SAT—Systems Approach to Training
SCO—Sharable Content Object
SCORM—Sharable Content Object Reference Model
SCS—Stock Control System
SGTO—Small Group Try-Out
SME—Subject Matter Expert
SN—Sequencing and Navigation
SOJT—Structured On-the-Job Training Guide
SOW—Statement of Work
TAFB—Tinker Air Force Base
TDY—Temporary Duty Worker
TO—Technical Order
USAF—United States Air Force
WPAFB—Wright-Patterson Air Force Base
WG—Wage Grade
WR—ALC —Warner-Robins Air Logistics Center
WWW—World Wide Web

Terms

A-76—See OMB Circular A-76.

Acoustic Memory—Short-term memory uses three processes to store and organize information selectively chosen from the sensory memory: iconic memory, acoustic memory, and working memory processes. Acoustic memory holds sounds, or acoustic representations, from 3-20 seconds before discarding or transferring them to long-term memory. Also see Memory, Miller's Magic Number, Short-Term Memory.

Acquisition—Process by which the federal government contracts to acquire supplies or services for its use.

Acquisition Method—Way of procuring goods and services. For Education and Training there are three methods of acquisition: (1) DD Form 1556, *Request, Authorization, Agreement, Certification of Training and Reimbursement*; (2) government credit card; and (3) a contract and AF Form 9, *Request for Purchase*.

Acquisition Strategy—Activity in which the Education and Training office and the contracting office work together to determine the best contract type, extent of competition, and contract vehicle for obtaining quality services at reasonable prices (while at the same time considering efficiency of proposal preparation, proposal evaluation, negotiation, and contract award). See local contracting office for more information.

Action Verb—A word that conveys action/behaviors and reflects the type of performance that is to occur (i.e., place, cut, drive, open, hold). Action verbs reflect behaviors that are measurable, observable, verifiable, and reliable.

Activate—To make active.

Active Learning—A method in which the student learns by participating, practicing, and performing. Some common techniques used in active learning are group projects, role playing, case studies, ice-breakers, simulations, games, and in-basket exercises.

Activity—For purposes of the HILL AFB Courseware Development and Management Process, an activity is a set of tasks with a clear performance objective.

Activity Outcome—A product, service, or decision that results from an activity in the HILL AFB Courseware Development and Management Process.

ADDIE Instructional Design (ID) Model—A flexible and interactive approach to analyzing the instructional requirements, designing the instructional system, developing the courseware, implementing the instruction, and evaluating the effectiveness of the instructional system. Its Analysis, Design, Development, Implementation, and Evaluation Phases can be entered at any point depending on the specific situation. It is the basis of nearly all ID methodologies in use today. HILL AFB's closely related Production, Analysis, Design, Development, Implementation, Evaluation model separates the analysis activities into a Planning and an Analysis Phase.

Administration Function—This Instructional System Development function is responsible for the day-to-day operations of the instructional system throughout its life cycle. Some of the basic administration activities are: preparing documentation such as instructional materials, course control documents, plans and reports; maintaining records such as courseware master files, rosters, test scores, student completions, budgets, and contracts; providing staff support such as processing personnel actions, and maintaining employee development programs; scheduling resources such as personnel, equipment and facilities; implementing and maintaining automated information management systems and other tools to support instructional system activities; administering funds and contracts; etc. Also see Delivery, Function, Management Function, Support Function.

Adult Learning Theory—Adults differ from children in how they learn. Adult learning theory contends that mature learners want to know why they are being taught something; want to participate and control their learning experience; prefer active rather than passive learning experiences; have a greater repository of experience to which the new learning can be related, and therefore bring greater diversity to learning situations; prefer to set their own pace for

learning; have a greater need for feedback on their learning; are more task-oriented; prefer a variety of instructional methods; and like to determine the place and time of learning. Also see Andragogy.

Advanced Distributed Learning (ADL) Initiative—The DoD and the White House Office of Science and Technology Policy launched the ADL Initiative in November 1997. The mission of the ADL Initiative is to provide access to the highest quality education and training that is tailored to individual needs, and can be delivered cost-effectively, anytime and anywhere. This initiative aims to accelerate large-scale development of dynamic and cost-effective learning software and systems and to stimulate the market for these products. This will help meet the expanding E&T needs of government, academia and industry. Also see Asset, Distance Learning, Learning Object Metadata, SCORM, Shareable Content Object (SCO), Training Object Repository, Web-Based Instruction.

Advanced Distributed Learning Repository (ADL-R)—The DoD registry for Sharable Content Objects (SCOs), assets, and repositories. It is the “Yellow Pages” of what DoD repositories are out there and what is in each repository. See Asset, Learning Object Metadata, SCORM, Shareable Content Object (SCO), Training Object Repository, Web-Based Instruction.

Affective Domain—It is widely believed that our brains learn in three distinct ways, by using three mental processors (cognitive, psychomotor, and affective) to encode any information that we receive into stored mental images (memory). In the training world these three domains (types) of learning are usually called knowledge, skills and attitude. The affective domain processes incoming information in terms of feelings and emotions, which impacts our attitude in dealing with something. Bloom’s Taxonomy lists five progressive levels of learning using the affective domain: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing values.

AFMC ISD Courseware Resource Site— This site contains Tools, References and Contacts related to courseware development. (<https://opoc4jsi.hill.af.mil/tor-web/crs/index.html>)

Air Force Institute for Advanced Distributed Learning (AFIADL)—The office of primary responsibility for implementation of Distance Learning (DL) policy and emerging DL technologies within the Air Force.

Air Force Proficiency Code Key—See Proficiency Code, Proficiency Level of Learning.

Air Force Specialty—A grouping of jobs in the Air Force military service that have similar duties and require common qualifications. Each group of jobs is assigned an Air Force Specialty Code and title (2A7X3, Aircraft Structural Maintenance; etc). See Occupational Series.

Algo-Heuristic Theory—This learning theory model identifies mental processes, especially unconscious processes, which underlie expert learning, thinking and performance. It includes a system of techniques for asking the right questions of experts, which allows analysts to uncover the processes involved in their behavior, and to capture their expert knowledge. It contends that students ought to be taught not only knowledge but the algorithms and heuristics of experts as well.

Analysis—Bloom’s Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Analysis is

dividing information into simpler objects and ideas and then seeing how these parts are organized and relate to one another.

Analysis Phase—Instructional System Development phase in which the training requirements are analyzed to determine precisely what should be included in the instruction, the types of learning involved, the proficiency level of learning needed for the target audience, and any prerequisite or follow-on instruction required.

Anchored Instruction—This instructional design theory contends that instruction should be designed around an anchor, or focal point, which should be a case study or problem situation, and that instructional materials should allow exploration by the learner, such as interactive Web-based instruction or other information repository. Also See Instructional Design Theory.

Andragogy—This Greek term is widely used by adult educators to describe the theory of adult learning. It is an alternative to pedagogy (educating children). The andragogic model addresses the following five issues in formal learning:

- 1) Letting learners know why something is important to learn the need to know.
- 2) Showing learners how to direct themselves through information - the need to be self directing.
- 3) Relating the topic to the learner's experiences - greater volume and quality of experience.
- 4) People will not learn until ready and motivated to learn - readiness to learn.
- 5) A need to have a life centered, task centered, or problem centered orientation. Often this requires helping them overcome inhibitions, behaviors, and beliefs about learning. Also see Adult Learning Theory.

Application—Bloom's Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Application is adapting knowledge to actual situations.

Archive—A place where public records or other historical documents are kept.

ARCS—See Attention, Relevance, Confidence and Satisfaction (ARCS) Model of Motivation.

Articulation—The psychomotor domain processes incoming information in terms of physical movement and coordination, which result in a physical skill. The R.H.Dave model lists five progressive levels of learning using the psychomotor domain: imitation, manipulation, precision, articulation, and naturalization. Articulation is arranging a sequence of actions to achieve harmony and consistency.

Assessment—Measures a student's transfer of knowledge and attainment of learning objectives. Assessment is a major element of blended and electronic learning because it allows students to test out of content that they already know and take only the parts of the instruction that they need.

Asset—Electronic learning content in its most basic form. Assets are electronic representations of media, text, images, sound, Web pages, assessment objects or other pieces of data that can be delivered to a Web client. See ADL Repository, Object Repository, Reusable Knowledge Object, Sharable Content Object, Sharable Content Object Reference Model.

Association—An idea, feeling, image, etc., (response) connected with incoming information (stimulus).

Asynchronous Learning Event—Instruction in which a subject matter expert or facilitator responds to questions and comments from students at remote locations, but with a delay. This means that the facilitator does not have to be on-line when students are taking electronic learning or at a help desk when students are taking correspondence courses, videotaped courses, etc. Asynchronous means not real-time.

Attention—Getting and holding the learner’s interest. This is one of the four tenants of John Keller’s ARCS Model of Motivation, which uses Attention, Relevance, Confidence and Satisfaction to create interesting and effective instruction so that optimal learning will take place. Starting the class with an icebreaker activity such as telling a joke or story, polling students with a thought-provoking question, etc., engages the students and prepares them for learning.

Attention, Relevance, Confidence and Satisfaction (ARCS) Model of Motivation—John Keller’s ARCS model of motivation is a proven approach to developing interesting and effective instruction. It focuses on keeping the learner engaged in the instruction so that optimal learning can take place.

Attention Step—Segment of a lesson introduction in which an instructor gains the attention of the students and focuses upon the subject to be taught.

Attitude—Feelings or emotions that influence an individual’s desire to perform a particular task. Fear of failure, discomfort with change, complacency about dangers in the work environment, etc., are examples of attitudes that cause performance problems which may be corrected with properly designed instruction and workplace reinforcement.

Authoring System—Computer program designed specifically to assist in creating Electronic Learning.

Bandwidth—Capacity of a communications channel to transmit a signal without excessive distortion. It is one of the biggest constraints of Web-based instruction.

Behavior—A knowledge, skill or attitude that is observable and objectively measurable. Students are expected to demonstrate defined behaviors following instruction.

Behavioral Learning Theory—A theory based on the idea that learning takes place when students make an association between a stimulus (cue) and the desired response (behavior). In behavioral learning, students are taught how to recognize cues and respond with actions, and their learning is reinforced through instructor feedback on successful performance. This stimulus-response-reinforcement method is an effective means of training personnel to perform procedural tasks. However, the mental processes and hidden behaviors that occur within the learner are not addressed as part of the learning process with behavioral learning theories, so it has only limited application to the instruction of intellectual skills and attitudes. Also see Behaviorism, Learning Theory.

Behavioral Objective—See Objective.

Behaviorism—The leading school of thought in the early 1900s, behaviorism declares that the only subjects worth psychological study are observable behaviors.

Biennial Review—See Periodic Review, Formal Courseware Re-Evaluation.

Blended Learning Theory—An instructional design (ID) approach that combines several different instructional delivery methods such as live events, self-paced learning, collaboration,

assessment, and performance support materials. Blended Learning Theory combines the traditional theories and models of Benjamin Bloom, Robert Gagné, Walter Dick, Lou Carey, David Merrill, John Keller, Tom Gilbert, Gloria Gery, etc., to create situational ID that effectively meets the needs of a particular target audience.

Bloom's Taxonomy—In the 1950s, Benjamin Bloom chaired a committee that created an easy to understand taxonomy of learning behavior that is still the most widely used today. The Bloom Taxonomy consists of three domains of learning behavior: cognitive (mental skills or knowledge), affective (attitude, or growth in feelings or emotional areas), and psychomotor (manual or physical skills). Within those domains, there are typical levels of understanding that the learner experiences:

—Cognitive Domain

— 1) Knowledge

— 2) Comprehension

— 3) Application

— 4) Analysis

— 5) Synthesis

— 6) Evaluation

—Affective Domain:

— 1) Receiving Phenomena

— 2) Responding to Phenomena

— 3) Valuing

— 4) Organizing

— 5) Internalizing Values (Characterization)

—Psychomotor Domain (R.H. Dave's Model):

— 1) Imitation

— 2) Manipulation

— 3) Precision

— 4) Articulation

— 5) Naturalization

Body—Major section of a lesson in which learning is developed through support material and various teaching exercises to achieve learning objectives, preceded by an introduction and followed by a conclusion. Also see Introduction, Conclusion.

Broadcast Media—Means of communication that includes television, interactive television and radio.

Bypass Test—A proficiency test that, when passed, gives students equivalency credit for a course. Bypass tests are assigned separate course numbers and are tracked in employee education and training records as course completions.

Career Field Education and Training Plan (CFETP)—Comprehensive core training document that identifies life-cycle education and training requirements, training support resources, and minimum core task requirements for a specialty. It serves as a training roadmap for military members. Also see Occupational Training Template, Civilian Training Plan.

Carey, Lou—See Dick and Carey Model for Instructional Design.

Case Study—A teaching method in which students encounter a real-life or fictional situation under the guidance of an instructor in order to achieve an instructional objective.

Characterization—Bloom’s Taxonomy lists five progressive levels of learning using the affective domain: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing values (characterization). Characterization is applying an internal, personal value system which results in consistent, predictable behavior that is “characteristic” of the learner.

Charting—This is an instructional technique that strengthens comprehension and increases learning transfer by having student fill in the blanks on a skeletal version of a flow chart or similar diagram.

Civilian Training Plan (CTP)—Comprehensive core training document that identifies life-cycle education and training requirements, training support resources, and minimum core task requirements for an occupational series. It serves as a training roadmap for civilian employees. Also see Occupational Training Template, Career Field Education and Training Plan.

Clarification Support—Type of instructional material used in the body of a lesson to develop learning and clarify ideas. It includes definitions, examples, non-examples, comparisons, statistics, testimony from experts, etc. Also see Body, Proof Support

Classroom Instruction/Training—See Non-Electronic Learning

Closure—The final segment of a lesson conclusion during which instruction is appropriately ended. Also see Conclusion.

Coaching—Providing one-to-one support on a particular project or task. When this is accomplished primarily via the internet, it is called e-coaching. Also see Mentoring and Tutoring.

Cognition—The mental process of knowing, including both awareness and judgment.

Cognitive Domain—It is widely believed that our brains learn in three distinct ways, by using three mental processors (cognitive, psychomotor, and affective) to encode any information that we receive into stored mental images (memory). In the training world these three domains (types) of learning are usually called knowledge, skills and attitude. The cognitive domain processes incoming information in terms of facts, procedural patterns, and concepts. Bloom’s Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation.

Cognitive Flexibility Theory—A constructivist learning theory based on the premise that effective learning is dependent on context, so instruction needs to be very specific and learners must be allowed to develop their own personal interpretations of information in order to learn. It

is flexible in that the learner is assumed to restructure knowledge and adapt responses (ideas, decisions, judgments, behaviors, etc.) to changing situations.

Cognitive Learning Theory—A theory based on cognitive psychology, which focuses on mental processes that occur in the student’s mind during learning. It assumes that learning is an active, constructive process and that learning can be designed based on the cognitive processes, hierarchies, and representations which occur within students’ minds to create organized and retrievable knowledge, skills, and attitudes that can later be transferred to real world situations. This acquisition-storage-retrieval approach is an effective means of instructing personnel to retain and transfer knowledge. Also see Constructivism, Learning Theory.

Cognitive Load Theory—A learning theory popularized by John Sweller that describes learning structures in terms of an information processing system involving long term memory and working memory. It is based on the premise that instruction is more effective if the role and limitations of working memory are considered during instructional design.

Cognitive Processes—See Intellectual Skills.

Cognitive Strategies—(1) The capability of people to control their own learning, remembering, and thinking behavior. (2) The ability of people to create strategic and tactical decisions and judgments based on previous knowledge and incoming situational information.

Cognitive System—Robert Marzano’s theory describes how our brains learn by passing incoming information through four thought operating systems: self-system, meta-cognitive system, cognitive system, and the knowledge domain. The cognitive system is the third operating system, which processes the information needed to learn tasks and solve problems. It enters and retrieves knowledge in the permanent memory repository of the brain. The cognitive system is used to adapt knowledge to solve problems, accomplish tasks and communicate with others.

Collaboration—This is a major element of blended learning. Communities of practice, on-line chat rooms, threaded discussions, and e-mail are examples of collaborative environments in which learners can communicate with subject matter experts, coaches, mentors, and one another to reinforce learning

Command Standard Course—A course used at more than one installation in AFMC.

Component Display Theory—David Merrill established this situational instructional design theory that assumes for every learning situation, (e.g., facts, concepts, procedures, principals, processes), there are corresponding instructional treatments (rules, examples, recall exercises, practice, prerequisites, mnemonics, feedback, etc.) that should be used.

Comprehension—Bloom’s Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Comprehension is grasping the meaning of information.

Computer-Assisted Instruction (CAI)—The use of computer learning aids to assist in the delivery of classroom instruction. Computer-based exercises, training simulations of live systems, and computer-hosted tutorials are examples of using computers to aid in instructor-led training events.

Computer-Hosted Instruction—The use of computers to distribute instructional material via CD ROM, DVD, an organizational intranet, or the internet.

Computer-Managed Instruction (CMI)—Computer-based or Web-based courseware that contains programming which tracks student progress and completion activities such as registration, pre-testing, progress testing, post-testing, and graduation. See Computer-Based Instruction, Course Management System, Web-Based Instruction.

Conclusion—A major section of a lesson that follows an introduction and body. It contains a summary, remotivation, and closure.

Condition—Element of a learning objective that describes the situation (e.g., equipment, tools, materials, assistance, etc.) under which a student is expected to demonstrate a behavior.

Conference—Information-exchange events which usually include presentations, keynote sessions, and workshops. Although they are not designed as instructional systems with defined learning objectives based on workplace performance requirements, conferences provide attendees with valuable learning experiences. They are often incorporated into a blended learning, human resource development or human performance technology approach to improving employee attitudes and performance.

Confidence—Expectation that one will attain an objective. This is one of the four tenants of John Keller's ARCS Model of Motivation, which uses Attention, Relevance, Confidence and Satisfaction to create interesting and effective instruction so that optimal learning will take place. When learners have confidence in their ability to attain the instructed skills and knowledge, they stay motivated and want to learn more. Clearly explaining learning objectives and expectations, providing immediate feedback on student responses, providing distributed practice sessions for rehearsing new skills, etc., allows students to experience incremental success during a learning event, which builds confidence.

Configuration Control—Managing changes to a document so that everyone is using the latest version.

Constraints—Limiting conditions or factors, such as regulatory mandates and policy, funding, deadlines, facilities, equipment and tools, materials, skilled personnel, etc.

Constructivism—A doctrine based on the premise that learners construct their own knowledge by using their prior knowledge and experience to create possible approaches and solutions to the unknown, applying their prior knowledge and experience to the new situation, and then integrating their newly learned information into their prior knowledge and experience. Constructivism relies on learners' active participation in analyzing and resolving problems presented to them as learning activities which they find relevant and engaging.

Content Aggregation Model (CAM)—How to put learning content together so it can be moved and reused. See Sharable Content Object Reference Model.

Content Packaging—In electronic learning, provides a standardized way to exchange digital learning resources between different systems or tools. Content packaging can also define the structure (content organization) and the intended behavior of a collection of learning resources. See Sharable Content Object Reference Model.

Context—A set of circumstances that surround a particular event and influence its meaning. The context in which something is learned determines not only what is learned but how it can be used in the real world.

Contract—A legally binding relationship obligating the seller to furnish the supplies or services and the buyer to pay for them.

Contract Requirements Document—Document such as a Statement of Work, PWS, task order, etc., which identifies specific requirements for products and/or services and defines the criteria by which the contractor's performance will be evaluated. The contracts requirements document is prepared by the functional area. See Contract Requirements Package.

Contract Requirements Package—Package that is submitted by the functional area to the contracting office in order to acquire commercial products or services. It contains a contracts requirements document, government cost estimate, certification of available funds, approvals, and other agency or installation required documentation.

Cooperative Learning—Use of small groups to facilitate instruction by placing students in groups whose primary goal is to provide each member of the group the support, encouragement and assistance needed to attain learning objectives. Cooperative learning results in higher achievement, more positive relationships among students, and stronger retention of subject matter.

Course—Logically sequenced instruction on a subject, designed to achieve predefined learning objectives.

Course Chart—A course control document that contains basic information such as course title, number, length, description, target audience, prerequisites, follow-ons, training locations, lead center, and other basic catalog data. When developing instruction for HILL AFB audiences, AFMC Form 853, Course Chart is used. Instructions for preparing a course chart are in the AFMC ISD Courseware Resource Site.

Course Control Documents (CCDs)—Set of documents used to organize, conduct, and control the quality of a formal course or learning aid. The course chart; course training standard; plan of instruction, or structured-on-the-job-training guide; and course signature page are the typical course documents at HILL AFB.

Course Critique—Evaluation of a course by the student immediately after completion of the instruction. Also see Courseware Assessment Program, Graduate Assessment Survey.

Course Length—Average time needed to provide instruction.

Course Management System—See Internet Course Management System

Course Training Standard (CTS)—A course control document that identifies each behavior and proficiency level of learning that the student is required to attain by the completion of the instruction. It is based on the Air Force Proficiency Code Key found in AFI 36-2201, Vol. 5, Attachment 4, Fig. 4.3. HILL AFB format for the CTS is in the AFMC ISD Courseware Resource Site.

Courseware—Course control documents, instructional materials, evaluation materials, and supporting documentation which make up an instructional system. Examples of courseware items are course charts, course training standards, plans of instruction, instructional presentations, training manuals, training simulation programs, student exercises, product/process checklists, written tests, training requirements analysis reports, source code and authoring files, correspondence, decision documentation, etc.

Courseware Acquisition and Contract Oversight Function—Instructional System Development function in which appropriate acquisition method and funding are determined; contract type and vehicle are chosen, contract requirements packages are prepared and processed; best value contractors are selected; post-award contractor activities are monitored; corrective actions on contracts are taken as needed; and contract deliverables are accepted.

Courseware Assessment Program—Installation-level Education and Training offices are responsible for implementing a comprehensive courseware assessment program for their center that includes, at a minimum, end-of-course student critiques, graduate assessment surveys, and periodic evaluation of local processes and programs which impact courseware development and management. See Course Critique, Graduate Assessment Survey.

Courseware Developer—Individual responsible for creating relevant, engaging, and effective instruction in an efficient and low-risk manner. The developer performs most of the tasks in the Analysis, Design, and Development Phases. See paragraph 1.5. for courseware developer qualifications. Also called instructional designer, instructional system designer.

Courseware Development/Authoring Tools—See Authoring Tools.

Courseware Development Resource Site—A website that hosts the most current version of checklists, worksheets, templates, examples and other working aids that support the activities of the HILL AFB Courseware Development and Management Process. It also contains references, points of contact, and links to information about Instructional System Development, educational technology, and other topics related to the development and management of instructional systems.

Courseware Documentation Manager—Individual responsible for maintaining configuration control of courseware master files. See Paragraph 1.5. for details on courseware documentation manager responsibilities.

Courseware Evaluator—Individual responsible for performing formal courseware re-evaluation on a course or learning aid. See Chapter 8.

Courseware Foreword and Signature Page—See Signature Page

Courseware Issue—Perceived deficiency in existing courseware. See Deficiency, Training Gap.

Courseware Issue Analysis—Activity in which a courseware project manager or courseware developer works with the customer to better define and analyze a perceived courseware deficiency and to determine the nature and scope of the fix.

Courseware Issue Worksheet—Used when an individual, group, or organization determines that existing courseware is not adequate in resolving a performance deficiency. It documents basic information about the instructional requirements and the weaknesses in the courseware sufficient to determine the scope and priority of the assignment, and to decide which training function should receive the tasking. Also see Non-Training Issue Worksheet, Training Gap Worksheet, Training Issue Worksheet. The AFMC ISD Courseware Resource Site has a template of the AFMC Courseware Issue Worksheet.

Courseware Management Function—Instructional System Development function that involves the management, support, and administration of courseware through policies, programs, standardized procedures and working aids. It includes establishing courseware policies, programs, procedures and working aids; planning, obtaining, distributing and managing

resources; promoting standardization and re-use of instructional materials; monitoring, assessing and reporting on the health of courseware; implementing quality improvement measures; and controlling Interim Changes and distribution of instructional materials.

Courseware Master File—Place where all instructional materials, evaluation materials, course control documents and supporting documentation from the courseware project are organized and maintained during the life cycle of the course or learning aid.

Courseware Program Manager—Individual responsible for applying the Instructional System Development methodology and the HILL AFB Courseware Development and Management Process for a functional area or installation. The primary role is to serve as a liaison between their area of responsibility and higher training offices on issues related to courseware development and management.

Courseware Project Manager—Individual responsible for monitoring the progress of assigned courseware projects, assisting the courseware development team in removing obstacles that threaten the timeline or budget of the project, and reporting on project status to Education and Training office and customer reps. The courseware project manager performs most of the tasks in the Planning Phase to identify and prioritize training requirements, and estimate the resources needed to accomplish development and revision of courseware. See Paragraph 1.5. for courseware project manager qualifications.

Courseware Re-Evaluation—Activity in which technical experts, instructors, and instructional design experts review the content of instructional and evaluation materials to determine if they are still relevant, accurate, complete, and effective in meeting defined objectives.

Courseware Revalidation—Activity in which the courseware developer updates course control documents and makes any cosmetic changes and minor corrections to instructional and student evaluation materials based on reviews by technical experts and instructors/ trainers. It is performed at least every two years.

Courseware Signature Page—See Signature Page.

Courseware Specialist—A courseware program manager, courseware project manager, courseware developer, or other individual knowledgeable in Instructional System Development and skilled in applying the HILL AFB Courseware Development and Management Process.

Courseware Sustainment—The maintenance of a course or learning aid after development to keep it current, relevant, and effective. It includes periodic re-evaluation, revision and revalidation activities.

Critical Attributes—Necessary characteristics for determining class membership in a concept.

Criterion—The standard by which something is measured.

Criterion-Referenced—Based on a measurable (objective) standard. Also see Norm-Referenced Test.

Criterion-Referenced Objective—See Objective.

Criterion-Referenced Test—A test to evaluate, as objectively as possible, a student's achievement in relation to standards specified in criterion-referenced learning objectives. Also see Norm-Referenced Test.

Cuing—An instructional technique that prepares a student mentally for what they are about to learn by capturing attention with a headline or a preview of what is to come. Presentation slides, video clips, exhibits, demonstrations, instructor questions, etc., are commonly used to “cue” students on what they are about to learn by helping them to reference an abstract topic to something they already know.

Curriculum Developer—See Courseware Developer.

Deactivate—To render inoperative by causing it to be inactive.

Deficiency—The difference between “what is” and “what should be.” In education and training, the gap between desired knowledge/performance and the actual knowledge/performance. Also called a need or a discrepancy.

Deliverables Format Analysis—Activity in which a courseware project manager or courseware developer decides if any of the deliverables need to be in a particular electronic format (e.g., an Adobe application, a Microsoft Office application, etc.) for easy maintenance and reusability. It ensures that the deliverables will be in a government-approved format (see AFMC ISD Courseware Resource Site for most recent listing), so that the government has organic capability to deliver and maintain courseware without buying additional software applications, licenses, training, etc.

Delivery Function—This Instructional System Development function provides the instruction to students throughout its life cycle. Some of the basic delivery activities are providing an infrastructure for Distance Learning including an on-line course management system, equipment, and facilities; supplying skilled personnel to instruct courses; and maintaining current, effective and appealing courseware. Also see Administration Function, Management Function, Support Function.

Delivery Method—See Instructional Method.

Delivery Resources Analysis—Activity in which a courseware developer identifies the resources (e.g., equipment, automated systems, training regions, instructor skills, facilities, tools, etc.) that will be needed to implement the instruction. It provides the lead time necessary to purchase tools and equipment, arrange for instructors and facilities, and obtain other necessary resources.

Demographics—Statistical data about a population, such as average age, education level, occupation, gender, etc.

Demonstration-Performance—A teaching method in which students observe and then practice a sequence of events designed to teach a procedure, technique, or operation. It combines oral explanation with the operation or handling of systems, equipment, or materials.

Design Phase—Instructional System Development phase in which the courseware developer uses the results of Planning and Analysis Phase activities to create a blueprint of the course or learning aid that shows what instruction, evaluation, and media will be used in each module to meet the training requirements.

Desktop Conferencing— A means of two-way electronic communication accomplished with a personal computer. This one-on-one communication allows instructors, coaches, and tutors to focus on the student’s individual issues without the embarrassment that might be experienced in

a group setting. This form of communication is often used remedially to help a student understand particular material with which they are having difficulty.

Desktop Reference Guide (DRG)—Self-paced, stand-alone reference and learning aid that meets a defined training objective.

Development Phase—Instructional System Development phase in which instructional and evaluation materials are developed, tested, and revised and the instructional system is prepared for full operational tryout in the field.

Diagnostic Test—Tool used to evaluate attainment of supporting skills and knowledge necessary to attain an objective. Diagnostic tests are designed to search for the specific source of learning deficiencies and errors so that weaknesses in instruction can be identified and corrected.

Dick and Cary Model for Instructional Design—In their authoritative book *The Systematic Design of Instruction*, Walter Dick and Lou Carey popularized their systems approach to courseware development that builds on Robert Gagné's learning theory and the ADDIE model. The Dick and Cary model is the basis of the current Systems Approach to Training and Instructional System Development. It adapts the systems engineering process to provide a means for sound decision making, and integrates art and technology with the scientific principles of psychology, sociology, and anthropology to ensure quality of instruction. It is a practical and flexible approach for developing and delivering instruction that promotes transfer of learning from the instructional setting to the workplace. Also see Gagne Learning Theory, Instructional System Development.

Directive—Publication, regulation, official policy, technical data specification, operating instruction, process order, etc., that prescribes standards, activities or procedures.

Discrepancy—See Deficiency.

Discrimination—The process of perceiving incoming information, discerning the differences between varying situations, and then making decisions on how to respond appropriately.

Distance Learning—Instruction that is exported to students in geographically separate locations, either electronically or by standard mail. Also called distributed learning, or ADL . See Electronic Learning and Web-Based Instruction.

Distance Learning Classroom—See Learning Center.

Distributed Electronic Media—Means of communication used in Distance Learning which include CD-ROM, DVD, videotapes, audio CDs, audio cassettes, etc.

Distributed Practice—An instructional technique that increases the student's ability to perform newly learned skills, including intellectual skills such as problem-solving. According to studies performed by C. L. Hull, when practice periods are spaced apart, performance is superior to what it is when practice periods are close together. Also, when learners are given a rest break or a diversion from the topic to be practiced in between practice periods, they will attain a higher level of learning than those who practice without an intervening diversion.

Distributed Printed Media—Means of communication used in distance and blended learning which include trade publications and magazines, newspapers and newsletters, workbooks and manuals, text and reference books, journals and learning magazines, etc.

Dublin Core Metadata Initiative (DCMI)—The DCMI provides simple standards to facilitate the finding, sharing and management of information by developing and maintaining international standards for describing resources, supporting a worldwide community of users and developers, and promoting widespread use of Dublin Core solutions.

Duty—Arrangement of related work tasks assigned to an individual.

E-Coaching—See Coaching.

Education—Instruction that helps a learner acquire new knowledge disciplines, skill sets, and viewpoints that are not based on the performance requirements of the learner's current job. Education prepares the learner for non-specific future requirements, while functional training instructs the learner how to perform based on known (current or upcoming) job requirements. The effectiveness of education cannot be fully evaluated until the employee is on a job that requires performance related to the educational learning objectives.

Education and Training Management System (ETMS)—ETMS implements AFMC's training management processes; requirements identification, resource identification, resource management and class management.

Education and Training (E&T) Office—The organization (at installation level or higher) which is responsible for military and civilian E&T as described in AFI 36-401, Employee Training and Development and AFI 36-2201, *Air Force Training Program*. An installation may have more than one organization performing E&T office duties, based on local needs, competitive outsourcing studies, etc.

Educational Technology—Using technological means (e.g., computers, simulators, teleconferencing, satellite, etc.) to support learning. Also called instructional technology.

E-Learning (Electronic Learning or EL)—An internet-based teaching system. E-learning is essentially the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.

Electronic Learning (EL) Segment—A representative model of the instruction that shows how the screens will look, how the navigational buttons will operate, how the narrator will sound, how the interactivity will work, etc. Creating a prototype module or segment of the actual instruction reduces the risk of complete rework by producing at least one representative example of the proposed CBI for review by typical students and experts before the whole course or learning aid is produced. See Rapid Prototyping Design.

Electronic Courseware Master Library (ECML)—The ECML is a complete inventory in digital format of formal training used at an installation which can be searched, distributed and managed electronically. Center-level Education and Training offices are responsible for maintaining an ECML which contains (at a minimum) copies of all formal functional courses and learning aids used at the installation. Both local and AFMC command standard courses are included.

Electronic Mail (E-mail)—Mail or communications sent and received through electronic methods using a computer intranet or internet vehicle.

Electronic Performance Support System (EPSS)—A system of on-line working aids, reference guides, training materials, advice/lessons learned, information systems, and other support tools designed to assist users with job performance and learning at the moment they need it. The most effective help systems are based on Gloria Gery's situated cognition approach, which emphasizes a user-defined and flexible structure populated with easy-to-access support tools for performing day-to-day tasks. The biggest challenge is to teach employees how to use an EPSS and its tools efficiently.

Embedded Training—A training capability which is designed into or added on to operational systems and equipment.

E-Mentoring—See Mentoring.

Emotion—The grouping of thoughts and feelings that an individual associates with something.

Employee Development Instruction—Instruction that focuses on the growth of the individual rather than the performance of a job. While it may indirectly help the mission by increasing the promotion potential of employees or improving their perspective or morale, employee development instruction does not directly relate to specific job tasks. The effectiveness of employee development learning events cannot be fully evaluated because they do not have performance-based learning objectives.

Enabling Objective—See Objective.

Enterprise Theory—An enterprise is a complex process or project that involves numerous decisions and tasks. Gagné and Merrill established a method that develops learning activities which consider all of the learning objectives of a course and the comprehensive set of knowledge, tasks and attitudes needed to attain them. By incorporating techniques such as “denoting” (identifying an object and explaining its physical and functional characteristics), “manifesting” (showing others the steps in a task), and “discovering” (creative problem solving), an instructor or trainer can integrate multiple objectives into each learning activity. This approach has the added advantage of providing the learner with metaskills (understanding based on multiple learning hierarchies) which increases retention and learning transfer.

Environment—The physical conditions and surroundings in which a job is performed, or in which learning takes place, including tools, equipment, and job aids.

Equivalent Course—Any bypass test or instruction that covers the same material at the same or higher proficiency level of learning and can be considered a substitute for the subject course.

E-Tutoring—See Tutoring.

Evaluation—(1) One of the primary functions of the Instructional System Development (ISD) methodology, evaluation is the bridge between the quality improvement infrastructure and the system phases of the ISD process. It is a continual measurement of activity outcomes against defined performance requirements, and is part of every step in the ISD process. It gathers feedback to assess instructional system and student performance. Activities include formative, summative and operational evaluation. (2) Bloom's Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis,

and evaluation. Evaluation is making judgments based on incoming information and previously-learned definitions, concepts, principles, formulas, etc.

Evaluation Materials—Materials used to measure a student's attainment of learning objectives, such as class exercises, progress checks, written tests, process and product checklists, etc.

Example—An instructional tool that strengthens comprehension and increases learning transfer and is essential to effective learning. Stories, short videos, pictures, demonstrations, etc. that provide both positive and negative examples create strong mental images for learners. Examples enable students to transfer their learning by showing them how they can adapt new information to make it work for them in real-world situations.

Existing Content Research and Evaluation—Activity in which a courseware specialist searches for any available materials (e.g., directives, technical data, working aids, courseware, vendor instruction, etc.) that might meet all or part of the defined requirement and evaluates its suitability. A decision is made as to what can be easily adopted and what remaining courseware development (if any) is needed. This saves resources by adopting as much existing courseware and vendor instruction as is practical.

Expectancy—An individual's perception or confidence that they can perform or succeed at a given task.

Exportable Instruction/Training—See Distance Learning.

External Evaluation—See Evaluation, Operational Evaluation.

Facilitator—Individual who does not have technical expertise in the content of the training, but assists students in progressing through the instructional material so that they can attain learning objectives more efficiently. Learning centers often employ a facilitator who assists novices with the electronic technology of self-paced training and Electronic Performance Support Systems.

Federal Acquisition Regulation (FAR) System—Directives which provide standard policies and procedures for acquisition of products and services. FAR Part 11, Describing Agency Needs; FAR Part 37, Service Contracting; and FAR Part 46, Quality Assurance are the sections that directly relate to the outsourcing of courseware development and management services.

Feedback—Information provided back in response to an action. According to B.F. Skinner, lack of immediate feedback on a student's action, especially when that action is wrong, invites the student to learn a wrong response. These wrong responses then have to be unlearned before the correct behavior can be learned, which wastes valuable time. Immediate feedback is critical to efficient learning.

Feeling—The state of mind at a particular moment. Groups of thoughts and feelings become emotions.

Fidelity—The degree to which a task, equipment, or training device in an instructional system represents the actual work center operational task, equipment, or device in terms of performance, characteristics, and environment.

Field Tryout—See Operational Evaluation.

Field Unit—See Functional Area.

Field Validation—See Operational Evaluation.

Final Validation—See Small Group Tryout, Operational Evaluation.

Follow-on Course—Any course proficiency evaluation for which subject course is a prerequisite. Follow-on data prevents the accidental archival or temporary deactivation of a course that is a prerequisite for some other course. A substitute prerequisite course must be established, or an Interim Change removing the prerequisite from the follow-on course must be implemented, before a course with follow-ons can be deactivated or archived.

Formal Courseware Re-Evaluation Phase—Instructional System Development phase in which experts are interviewed and courseware is evaluated to determine what changes are needed to make the instruction accurate, effective, and compliant with applicable directives. If only minor corrections are needed, the course control documents are updated, any materials needing changes are quickly fixed, and the courseware is revalidated. Also see Courseware Re-Evaluation, Courseware Revalidation.

Formal Training—An organized learning experience that has at least one defined learning objective and is documented in employee training records upon completion. It enables the instructor/trainer to provide accurate, complete and consistent information at the same proficiency level of learning time after time. Coaching, tutoring, and informal on-the-job training that is based entirely on the variables of the situation (e.g., actual workload, prior experience of the employee, background of the trainer, etc.) and therefore cannot be predicted or repeated is not considered formal training.

Formative Evaluation—Gathers feedback from subject matter experts, instructors, customer reps, etc., about the effectiveness of products and processes as they are being developed, or formed. It is performed periodically from Planning through Development Phase and includes technical accuracy reviews and individual or small-group tryouts of instructional modules or features. The objective of formative evaluation is to identify deficiencies early, when revision is least expensive. Also see Evaluation.

Full Instructional System Analysis—See Instructional System Analysis.

Full Operational Tryout—See Operational Tryout, Summative Evaluation.

Function—A category of activities (e.g., management, evaluation, technical support, etc.) that support various phases or segments of a process. Phases are usually sequential in nature, while function activities are performed during the entire process.

Functional Area—Organization or work center where the target population of the training resides (e.g., logistics, depot maintenance training, acquisition, civil engineering, etc.).

Functional Area Supervisor—Individual who is ultimately responsible for training, qualification and certification of assigned personnel. From a courseware standpoint, the supervisor is responsible to work with the appropriate Education and Training office to identify work center training requirements based on regulatory guidance and work center tasks, provide subject matter experts and students as requested in support of courseware development and management activities, and provide graduate assessment survey feedback to evaluate the relevancy and effectiveness of courses and learning aids.

Functional Training—Instruction that helps employees to learn how to perform specific work processes so that they can efficiently and economically accomplish the mission. It differs from education and employee development instruction which focus on learning for the growth of the

individual rather than immediate support of the mission. Soft skills such as teambuilding, change management, communication, etc., are considered functional training for purposes of this guide if they are implemented to support performance in the workplace. See Training.

Functional Training Manager—Position responsible for identifying and arranging training for employees assigned to a particular functional organization or mission area, such as logistics, depot maintenance training, acquisition, civil engineering, etc.

Gagné Conditions of Learning Model—Robert Gagné established a fundamental model on the conditions of learning that combines five types of learning and nine events of instruction. His theories on learning are a basic element in nearly all instructional design models in use today.

—Gagné's Types of Learning:

- 1) Intellectual skills
- 2) Cognitive strategies
- 3) Verbal information
- 4) Motor skills
- 5) Attitudes

—Gagné's Events of Instruction:

- 1) Gaining attention
- 2) Informing learner of objectives
- 3) Stimulating recall of prior learning
- 4) Presenting new material
- 5) Providing learning guidance
- 7) Providing feedback about correctness
- 8) Assessing performance
- 9) Enhancing retention and transfer

Generalization—Learning to respond to new information that is similar, but not identical, to that presented during original learning. For example, during learning a student calls an F-15 or C-130 an “aircraft.” A student who has generalized would later respond “aircraft” when presented with a B-2.

Graduate Assessment Survey (GAS)—Questions that ask the student and the student's supervisor how well the course prepared the graduate to meet job performance requirements (JPRs). GASs are sent out between 30 and 180 days after completion of the instruction, depending on how long it will take for the average employee to use the learned knowledge and skills in the workplace. They evaluate the transfer of learning from the course to the workplace to ensure that the instruction continues to effectively and economically produce graduates who meet established JPRs. Also see Course Critique, External Evaluation.

Group Lock-Step Instruction—Students are given the instruction and pass through the sequence of the course at a predetermined pace, completing the instructional sequence on

schedule, regardless of the ability and need of the group. It is useful when facility, equipment, instructor and student conflicts require the instruction to remain on schedule to avoid conflicts.

Group-Paced Instruction—Students are given the instruction and pass through the sequence of the course as a group, at the same rate. Depending on the ability and need of the group, an instructional event may progress faster or slower than the predetermined course length.

Guided Discussion—A training method in which the instructor leads a focused discussion that involves participation by all students through a variety of exercises such as case study and role-playing. It is highly effective for analyzing, debating, exploring a topic, value, or attitude.

Human Performance Technology (HPT)—Tom Gilbert’s blend of systems theory, various learning and management theories, and various technologies with focus on achieving productive human performance in the workplace. HPT requires high participation of the customer (work center) and its support organizations (human resources and training, information technology, quality control, etc.) and is driven by research and analysis of data. HPT:

- 1) Analyzes performance to identify the “as-is” situation;
- 2) Consults with supervisors, subject matter experts, support organizations, etc., to identify the “should-be” performance;
- 3) Conducts root cause analysis to determine reasons for discrepancies/gaps between actual and optimum performance levels;
- 4) Devises suitable, cost-effective strategies for correcting deficiencies and closing gaps; and
- 5) Assesses the pro/con impact on the entire work environment for implementing these solutions.

Human Resource Development—An organized approach to learning that integrates training, development, and education.

Hypertext Mark-up Language (HTML)—A language of internet Web pages that enables authors to create text and graphics and link to other Web pages.

Iconic Memory—Short-term memory uses three processes to store and organize information selectively chosen from the sensory memory: iconic memory, acoustic memory, and working memory processes. Iconic memory holds visual images, or icons, from 3-20 seconds before discarding or transferring them to long-term memory. Also see Memory, Miller’s Magic Number, Short-Term Memory.

Imitation—The psychomotor domain processes incoming information in terms of physical movement and coordination, which result in a physical skill. The R.H. Dave model lists five progressive levels of learning using the psychomotor domain: imitation, manipulation, precision, articulation, and naturalization. Imitation is observing and copying behavior after someone else.

Implementation Phase—Instructional System Development Phase in which the instructional system is validated under field conditions, final changes are made to the courseware, the official courseware master file is posted in electronic libraries, and personalized lesson plans are developed by instructors/trainers. At the end of this phase, the course or learning aid is fully operational and ready for use in the field.

Individual Tryout—See Small Group Tryout.

Informal Training—A learning experience that is not documented in employee training records upon completion. It does not have defined learning objectives or evaluation methods. It includes coaching, mentoring, job shadowing, tutoring, informal on-the-job training, etc., that is based entirely on the variables of the situation such as the day-to-day workload, background of the employee, background of the trainer, etc., and cannot be predicted or repeated. Also see Formal Training.

Instructing Organization—Organization authorized to teach a particular course. Instructing organizations are responsible to keep the owning organization informed of possible problems with accuracy and completeness of course materials and to participate in any courseware activities associated with courses they teach.

Instruction—Instruction is information provided in a structured manner for education, employee development and training purposes. See Education, Employee Development, Functional Training, Training.

Instructional Briefing—A regularly presented briefing which has an established learning objective and is developed using the Air Force Instructional System Development process. It is often presented by a facilitator who may not have technical expertise in the subject matter. An instructional briefing is considered formal training and is tracked in employee records.

Instructional Design (ID)—A systematic approach to planning, creating and implementing relevant, efficient and effective instructional materials. See Instructional System Development.

Instructional Design Theory—A set of principles that describe how to facilitate learning of knowledge, skills and attitudes. See ADDIE Instructional Design Model, Anchored Instruction, ARCS Model of Motivation, Component Display Theory, Dick and Carey Model for Instructional Design, Enterprise Theory, Gagné Conditions of Learning Model, Human Performance Technology, Human Resource Development, Instructional System Development, Minimalism Instructional Design Theory, Planning, Analysis, Design, Development, Implementation and Evaluation Instructional Design Model, Rapid Prototyping Design, System Approach to Training.

Instructional Designer—See Courseware Developer.

Instructional Guidance—Information for the instructor or trainer designed to assist them in teaching the content of the course in an efficient and effective manner. While there is no standardized format for instructional guidance, it must be sufficient for a technically qualified substitute instructor to step in halfway through a course and teach the material that supports the learning objectives in a manner consistent with that of the primary instructor. Instructional guidance includes lessons learned, teaching steps, points to emphasize, tips on use of instructional materials, etc. It is most often found in Part 2 of the AFMC Form 852, *Plan of Instruction*; notes pages on presentation charts; instructor guides; Structured On-the-Job Training guides; or generic lesson plans.

Instructional Materials—Items used to instruct, such as a course control documents, lesson plans, slide presentations, learning aids, computer-based simulations, student handouts, class exercises, instructional guidance, etc.

Instructional Method—Manner in which training is delivered to the student, such as instructor-led classroom, computer assisted instruction, Structured On-the-Job Training, self-paced Web-based training, etc.

Instructional Objective—See Objective.

Instructional Strategy—Activity in which a courseware project manager or courseware developer analyzes data from previous Planning Phase activities and tentatively selects the primary delivery method (e.g., instructor-led, computer-based, etc.), instructional/ evaluation methods and tools (e.g., presentations, student handouts, proficiency evaluations, etc.) and media (e.g., video, graphics, text, lecture, etc.) that will likely be included in the course or learning aid. In AFMC, it also includes a Delivery Resources Analysis to plan for the instruction. Also see Delivery Resources Analysis, Project Definition Summary.

Instructional System—An organized combination of procedures, techniques, and resources (e.g., instructors, students, courseware, equipment, tools, facilities, etc.) used to attain specified learning objectives.

Instructional System Analysis—Activity in which a courseware project manager or courseware developer analyzes all courses and learning aids within an entire instructional system for a particular work process, program, system, or subject area. It is performed in order to identify training gaps and duplication, and to decide if existing courses and learning aids within the system are effective in meeting the defined training requirements (from initial awareness through refresher) for all target populations.

Instructional System Designer/Developer—See Courseware Developer.

Instructional System Development (ISD)—A practical and flexible approach for developing and delivering training that promotes transfer of learning from the instructional setting to the workplace. It adapts the systems engineering process to provide a means for sound decision making, and integrates art and technology with the scientific principles of psychology, sociology, and anthropology to ensure quality of instruction. ISD produces relevant, effective and economical instructional systems. See Chapter 2, Overview of AFMC ISD Process for more information. Also see Dick and Carey Model for Instructional Design.

Instructional System Development Evaluation Board—See ISD Evaluation Review Board.

Instructional Technology—See Educational Technology.

Instructor—Individual who applies the principles of learning and instruction by delivering knowledge to students in a systematic manner. In the courseware process, the instructor serves as an expert on the effectiveness of instructional materials, learning activities and evaluation methods in meeting their intended Purpose. See Paragraph 1.5. for details on instructor responsibilities.

Instructor-Led Lab Training—Hands-on, skills-focused instruction that is group-paced and led by an instructor who is technically qualified in the subject matter. It takes place in a laboratory setting with workstations set up with tools, equipment, materials, technical data, etc. that simulate the actual work environment.

Instructor-Led Training—A delivery method in which an instructor provides knowledge to learners in a systematic manner in a classroom or laboratory setting. It is used when a large group must be taught the same thing, or when instructor skills, equipment, tools and facilities

needed to teach the objectives would significantly deter production if training were conducted at the worksite. Also called classroom instruction/training, lecture, stand-up instruction.

Instructor/Trainer Review of Courseware—Activity in which courseware developers and instructors or trainers review the draft instruction and evaluation materials to determine if they are effective, efficient and adequately documented so that consistent and complete instruction can be provided time after time. This step is usually repeated more than once until instructional design and delivery experts are satisfied with the presentation and documentation of instruction.

Intellectual Skills—Cognitive skills that involve identifying, classifying, categorizing, using rules, solving problems, thinking, reasoning, analyzing, discriminating, evaluating, and judging. Also called cognitive processes, mental skills.

Intelligent Computer-Assisted Instruction—A component in interactive courseware that serves diagnoses student performance and individualizes instruction.

Interactive Courseware—Computer-controlled training designed to allow the student to control the learning environment through input devices such as a mouse, keyboard, joystick or light pen. The student's decisions and inputs to the computer determine the level, order, pace and content of instruction delivered. See Computer-Based Instruction (CBI)Complexity Level.

Interactive Multimedia—See Multimedia.

Interim Change Memo (ICM)—Explains any significant change (i.e., impacts content or delivery method) made to a course or learning aid in between formal revalidations or revisions. It tracks corrections and modifications to the instruction so that all instructors/trainers are using the most recent version of materials. A course number change, correction to content, change in prerequisites, etc., are examples of changes that require an ICM.

Interim Change (IC) Number—Shows the official tracking number of an IC. Example: CHPMAS0001900SU_IC-03. It consists of: the 15-character AFMC course number of the item being changed, followed by an underscore “_”, followed by “IC” for Interim Change, followed by a two digit sequential number that is one number higher than the previous IC number for the subject courseware.

Internal Evaluation—See Evaluation, Formative Evaluation, Summative Evaluation, Operational Evaluation.

Internalizing Values—See Characterization.

Internet-Based Instruction/Training—See Electronic Learning, Web-Based Instruction.

Internet Course Management System (ICMS)—Presentation interface that provides the direct interaction between the student and the courseware. The ICMS supports registration, hosting, navigation, automated remediation, evaluation, tracking, and command approved LMS, courseware database and content library interface procedures within a computer-based course. Also called course management system, command approved LMS, courseware database and content library.

Introduction—Major section of a lesson designed to establish a common ground between the instructor and students, designed to capture and hold attention, to outline the lesson and relate it to the overall course, to point out benefits to the students, and to lead the students into the body

of the lesson. It usually contains attention, motivation, and overview steps. Also see Body, Conclusion.

ISD Courseware Resource Site—See the AFMC ISD Courseware Resource Site.

ISD Evaluation Board—A panel of experts on ISD and the HILL AFB Courseware Development and Management process who evaluate services, products and decisions for compliance with prescribed HILL AFB standards and formats. At a minimum, the ISD Evaluation Board reviews courseware projects at the end of Planning, Analysis, Design, Development, Implementation and Formal Courseware Re-evaluation Phases. Concept of operations, basic procedures and sample worksheets for ISD Evaluation Board review of courseware projects are in the AFMC ISD Courseware Resource Site.

Job—The duties, tasks, and sub-tasks performed by an individual.

Job Aid—See Performance Support Materials, Electronic Performance Support System.

Job Analysis—See Knowledge/Task Analysis.

Job Performance Order—Method of sequencing instruction to match the order in which the tasks and subtasks are performed on the job.

Job Performance Requirement (JPR)—The tasks required of employees, the conditions under which these tasks may be performed, and the quality standards for acceptable performance. JPRs describe what people should do to perform their jobs.

Knowledge—(1) Ability to recall facts, identify concepts, apply rules or principles, solve problems, and think creatively using cognitive (mental) processes. (2) Bloom's Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Knowledge is remembering previously learned information. (3) Information required to develop the skills and attitudes for effective accomplishment of a step, task, or job.

Knowledge Domain—Robert Marzano's theory describes how our brains learn by passing incoming information through four thought operating systems: self-system, meta-cognitive system, cognitive system, and the knowledge domain. The knowledge domain consists of information, mental processes, and psychomotor processes. It is the mental library in our brains that organizes vocabulary, facts, time sequences, cause/effect sequences, episodes, generalizations, principles, and concepts.

Knowledge/Task Analysis—Traditional task analysis concentrates only on observable behavior; while knowledge and task analysis goes on to examine the critical decisions and mental processes that separate the expert from the novice, thus identifying all of the elements of successful performance. In this activity, the courseware developer identifies precisely those tasks and subtasks which require instruction, the conditions under which they are performed, the performance standard that must be achieved in the workplace, and the strategies used by experts at critical decision points. Also called job analysis, cognitive task analysis. See Objectives, Job Performance Requirements.

Knowledge Test—Evaluation which determines if the student has learned information that supports tasks, such as safety, security, or basic knowledge needed to perform the task.

Knowledge Transfer—A process of decision making in which individuals decide whether learned knowledge should be applied to a particular situation. It involves understanding how and when to apply learned information in the real world.

Lead Center—Installation appointed by HQ AFMC to provide technical guidance to centers/bases, HQ AFMC and other organizations on issues related to the assigned subject area. The lead center serves as liaison between centers/bases, ensuring that representatives from appropriate installations and organizations are involved in decisions related to the assigned training. The lead center is responsible for development, review, revision and revalidation of command courseware, and for providing train-the-trainer assistance when applicable.

Learning—Knowledge, attitude or skilled acquired which changes the way the learner behaves in some way. The new behavior can be a different way of thinking, reacting or doing, and may be overt (visible) or covert (hidden).

Learning Activity—A means of instructing through direct experience rather than through text study or lecture. It actively engages the student learning.

Learning Aid—Device that makes it easier for a student to learn. A formal learning aid is a stand-alone video, computer-based simulation aid, desktop reference guide, training manual, etc. that is used for instruction but which is not linked to one particular course. It is stored in a separate master file in the courseware library for rapid retrieval and reference.

Learning Analysis—Activity in which a courseware developer analyzes the tasks to be taught and the demographics of the target audience in order to describe the types of learning involved, the proficiency levels of learning needed, and any student prerequisites that will be required. This ensures that training will be effective in resolving the performance deficiency.

Learning Center—Facility in which learners can take self-paced instruction such as computer-based courses away from the distractions of the work environment. Learning centers are popular in functional areas such as depot maintenance, where not all employees have ready access to a computer workstation.

Learning Management System—An automated interface for administering training activities of an organization, such as managing curriculum and courses, scheduling/registering of instructors/students for training events, launching computer-based and Web-based instruction, tracking and reporting student progress and completions, evaluating generating metrics and reports, etc. Also see Internet Course Management System.

Learning Object—Per Robert Reiser, a learning object is any piece of information (e.g., text, sound, video clip, etc.) that is used for instructional purposes. Per David Wiley, The main idea of learning objects is to break educational content down into small chunks that can be reused in various learning environments.

Learning Objective—See Objective.

Learning Object Metadata—A metadata schema established by the Institute for Electrical and Electronics Engineers for implementing Sharable Content Object Reference Model (SCORM) that contains categories that make it valuable to the education and training community. It is the metadata.

Learning Theory—A set of principles that describe how students learn knowledge, skills and attitudes. Learning theories themselves do not offer guidance on how to instruct, they only

describe what is going on inside the learners' heads as they process incoming information. However, it is important for courseware developers, instructors and trainers to fully understand the learning theories that are the basis of instructional design theories and models used to facilitate and accelerate learning. The two major categories of learning theories are "behavioral" and "cognitive." See Adult Learning theory, Algo-Heuristic Theory, Blended Learning Theory, Behavioral Learning Theories, Behaviorism, Bloom's Taxonomy, Cognitive Flexibility Theory, Cognitive Learning Theory, Cognitive Load Theory, Constructivism, Gagné Conditions of Learning Model, Meta-Cognitive System.

Lecture—See Instructor-Led Training.

Lesson Plan—An approved plan for instruction that provides specific definition and direction to the instructor on terminal and enabling learning objectives, equipment, training devices, instructional media requirements, and conduct of an education or training component of the instructional system. Lesson plans are a principal component of curriculum materials in that they sequence the presentation of learning experiences and program the use of supporting instructional materials, devices, and equipment.

Level of Learning—The degree to which a student is expected to internalize (master) a mental subject, values, or ability to perform psychomotor skills.

Live Events—This is a major element of blended learning. A live event is led by an instructor or facilitator and all students participate at the same time, either in a traditional or virtual classroom setting.

Live Simulation—A simulation involving real people operating real systems.

Localized Training Materials—A command or other standardized training course tailored to meet local needs. AFMC command standard course learning objective behaviors, conditions of performance, and standards of performance may be increased during localization of training materials, but cannot be lessened in any way. Instructional and evaluation materials may be altered as long as all learning objectives and proficiency levels of the standard course are attained by the student at the completion of training.

Lock-Step Instruction—Everyone proceeds at the same pace, such as occurs with typical classroom training events. It is also called group-paced instruction.

Logical Order—Combination of job-performance order and psychological order using the whole-part-whole concept: showing the whole, breaking it down into parts, then back to the whole. Also see Cognitive Load Theory.

Long-Term Memory—Memory is usually divided into three progressive levels: sensory, short-term, and long-term. In order to transfer information from short-term memory to long-term memory the brain must consolidate, organize and encode the incoming data for future retrieval. Long-term memory is our relatively permanent and unlimited repository of knowledge. Information is stored here on the basis of relevance and meaning, which is why it is so important to make instruction relevant and meaningful to the learner. If knowledge does not make it to the long-term memory repository it cannot be transferred to future real world situations. Also see Acoustic Memory, Iconic Memory, Memory, Miller's Magic Number, Working Memory.

Management Function—This Instructional System Development function directs, monitors and controls all activities associated with the instructional system throughout its life cycle. Various

participants (supervisors, instructors, courseware developers, etc.) can perform management roles. Some of the basic management activities are planning for instructional system activities arranging resources such as skills, facilities, equipment, funding, etc., needed to accomplish planned activities in support of the instructional system; and reporting on the status of instructional system elements and activities. Also see Administration Function, Delivery Function, Support Function.

Manipulation—The psychomotor domain processes incoming information in terms of physical movement and coordination, which result in a physical skill. The R.H. Dave model lists five progressive levels of learning using the psychomotor domain: imitation, manipulation, precision, articulation, and naturalization. Manipulation is performing certain actions by following instructions and practicing.

Market Research—Activity in which the government seeks information on the availability of commercial products and services and current market practices before making decisions about acquisition strategy. See 10.9, Conduct Advanced Market Research if Needed. Advanced market research includes a sources sought synopsis, meetings with industry/academia, or other information exchanges appropriate to the circumstances.

Mastery—A learner's proficiency plus retention equate to mastery of a behavior.

Materials—See Evaluation Materials, Instructional Materials.

Media—Media is the plural of medium, which is the means of communicating information to another. Media are not the messages themselves, but are only the methods in which they are conveyed. However, because messages must be received and understood before learning can take place, media are just as critical to instruction as the information itself. In the blended learning approach, several types of media (e.g., verbal lectures and discussions, visual presentations and illustrations, video and photographs, written materials, on-line information searchable repositories and chat rooms, demonstration and performance exercises, etc.) are used to effectively deliver the message to individuals with different learning styles and motivations.

Memory—Ability to retain and recall mental images and impressions. Memory is usually divided into three progressive levels: sensory, short-term, and long-term. Also see Long-Term Memory, Miller's Magic Number, Sensory Memory, Short-Term Memory.

Mental Skills—See Intellectual Skills.

Mentoring—A supervisor, co-worker, subject matter expert or consultant monitors employee performance and provides guidance, feedback, and direction to assure successful job performance. A mentor is a one-on-one trainer who uses real tasks, issues and variables to help the learner become more proficient on the job. When this is accomplished primarily via the internet, it is called e-mentoring. Also see Coaching and Tutoring.

Meta-Cognitive System—Robert Marzano's theory describes how our brains learn by passing incoming information through four thought operating systems: self-system, meta-cognitive system, cognitive system, and the knowledge domain. The meta-cognitive system is the second operating system, which we use to plan strategies for accomplishing goals. It is also the system we use to apply insight into our own learning strengths and weaknesses, evaluate the demands of our current learning task, and self-regulate our progress in attaining our learning goal.

Metadata—Metadata is data about data. Description of how, when and by whom a particular set of data was collected, and how the data is formatted. Metadata is essential for organizing information stored in electronic repositories. Learning resources that are described with metadata can be systematically sought and retrieved for use and reuse. See Content Packaging, Sharable Content Object Reference Model.

Metadata Tags—Coding at the front of a Shareable Content Object (SCO) that contains descriptive data about the content of the object independent of the larger structure (presentation, module, course, etc.) in which the SCO resides. See Sharable Content Object Reference Model, Sharable Content Object (SCO), SCO Metadata.

Metaskill—Knowledge or skill based on multiple learning hierarchies, which increases retention and learning transfer. Metaskills also include mechanisms for error detection and avoidance. Attaining a metaskill results in the ability to perform cognitive and psychomotor skills associated with a subject in a variety of situations.

Methodology—A system of procedures, principles and rules. In the scientific field of learning, it is the analysis of the subjects and students to be taught and the study of the methods for instructing them.

Metrics—Measurement tools used for assessing the qualitative and quantitative progress of instructional development with respect to the development standards specified.

Miller’s Magic Number—George Miller discovered that the amount of information which can be remembered during one exposure is between five and nine items, depending on the information. The number seven is the average number of items which can be held in short-term memory at any one time, so “7” became known as Miller’s Magic Number. Also see Memory, Short-Term Memory.

Minimalism Instructional Design Theory—J.M. Carroll established this theory which is often used when designing Computer-Based Instruction. It contends that (1) all learning tasks should be meaningful, stand-alone activities, (2) learners should be given relevant, realistic projects as quickly as possible, (3) instruction should allow self-directed reasoning and adaptation with numerous learning activities, (4) instructional materials and activities should provide immediate feedback and remediation, and (5) there should be a close relationship between the training and actual performance.

Mnemonics—Techniques used to assist in retaining memory.

Model—A graphic representation of information that is often used as an instructional tool to increase learning transfer by presenting information in a visual manner rather than through speech or the written word. A model can be an illustration (e.g., diagram, chart, drawing, map, etc.) or a three-dimensional exhibit.

Module—A module of training is one or more objectives that present a logically divided portion, or lesson, of instruction.

Motor Skill—Physical actions required to perform a specific task.

Motivation—A belief or value about something that prompts an individual to act.

Motivation Step—The segment of a lesson introduction in which the instructor provides specific reasons why students need to learn whatever they are about to learn. Also see Introduction.

Multimedia—Programs that use a combination of data, graphics, video, and sound to disseminate information. Multimedia facilitates transfer of knowledge and skills because it stimulates more than one type learning (see Bloom’s Taxonomy). Multimedia is considered interactive when the individual in the audience has some control over the presentation.

Naturalization—The psychomotor domain processes incoming information in terms of physical movement and coordination, which result in a physical skill. The R.H. Dave model lists five progressive levels of learning using the psychomotor domain: imitation, manipulation, precision, articulation, and naturalization. Naturalization is when high level performance becomes automatic or natural.

Need—See Deficiency.

Network Bandwidth—See Bandwidth.

Non-Electronic Learning— See E-Learning.

Non-Example—People, objects, events, ideas, symbols, or actions that lack one or more critical attributes of a particular concept and which should not be called by that concept name. A close-in non-example is a non-example that is missing only one critical attribute. For instance, a close-in non-example of a chair is a stool.

Non-Training Issue Worksheet—Worksheet used to capture preliminary information when an individual, group, or organization is performing a training activity and discovers that there is a significant issue that impacts the effectiveness of training, but that issue falls outside the scope of the training function. Examples are requirement for a desk audit on a position, a position management study, repair to a non-training facility, streamlining of a process, etc. the AFMC ISD Courseware Resource Site has a template of this worksheet.

Norm-Referenced Test—Process of determining a student’s achievement in relation to other students. Grading on a curve is an example of norm-referenced testing. Criterion-referenced testing is used in most Air Force instruction, as norm-referenced testing is seldom appropriate.

Object Repository—Storage area for assets, Shareable Content Objects (SCOs) and content packages. Also see ADL-R, Asset, and Shareable Content Object (SCO).

Objective—A statement of what a student will be able to do at the completion of instruction. In functional training, learning objectives are criterion-referenced and are expressed in terms of the behavior to be attained, the conditions under which it is to be exhibited, and the specific standards to which it will be demonstrated. Also called behavioral objective, criterion-referenced objective, enabling objective, training objective. Also see Terminal Training Objective. Paragraph 5.8.2., Learning Objectives in AFMC Courseware Resource Site provides basic guidance on writing criterion-referenced learning objectives.

Occupational Series—A grouping of jobs in the federal civilian service that have similar duties and require common qualifications. Each group of jobs is assigned the same pay plan and occupational series code, (e.g., WG-3703, Welder; GS-1670, Equipment Specialist, etc.) although titles and grade levels may vary. Also see Air Force Specialty.

Occupational Training Analysis—Activity which consolidates several other courseware activities to identify the training needed for an occupation from entry level through advanced journeyman. Occupational training analysis is performed in support of civilian Career Field Education and Training Plans or occupational template development. It helps supervisors and

training specialists develop individual and occupational training plans for employees, and assists developers by identifying training requirements and target populations. Military occupational training analysis is addressed in AFI36-2201V5, *Air Force Training Program, Career Field Education and Training*.

Occupational Training Template—Comprehensive core training document that identifies life-cycle education and training requirements, training support resources, and minimum core task requirements for an occupational series. It serves as a training roadmap for civilian employees. Also see Civilian Training Plan, Career Field Education and Training Plan.

OMB Circular A—76, Performance of Commercial Activities —This 1983 circular, which was heavily modified in 1999, establishes federal policy regarding the performance of commercial activities (i.e., a product or service that can be obtained from a commercial source) and prescribes procedures for determining whether commercial activities should be performed under contract with commercial providers, or in-house using organic (government) facilities, equipment and personnel. The decision is based on comparison of a Most Efficient Organization (MEO) government proposal and the proposals of commercial sources. Many education and training functions are bound by A-76 arrangements.

Online Collaborative Learning—Methods of electronic communication with others for the purpose of learning. Involves a community of learners using asynchronous (not real-time) media such as e-mail and electronic bulletin boards, and synchronous media such as chat rooms, audio/video conferencing, application sharing, virtual classrooms, etc., to communicate with one another.

On-the-Job Training (OJT)—Over-the shoulder, practical instruction on tasks required for job performance. It differs from structured-on-the-job training in that it is based entirely on the variables of the situation such as the day-to-day workload, background of the employee, background of the trainer, etc., does not have defined learning objectives, and cannot be predicted or repeated. Also see Formal Training, Informal Training, Structured-on-the-Job-Training.

Operational Evaluation—Evaluates effectiveness of the instructional system during full-scale operations. Gathers feedback from students, supervisors, customer reps, etc., about whether graduates are meeting established job performance requirements (external evaluation). Gathers feedback from instructors, subject matter experts, customer reps, etc., about the currency, relevance, efficiency and effectiveness of the courseware (internal evaluation). Operational evaluation continues throughout the life cycle of the instructional system. Also called field evaluation. See Evaluation.

Operational Tryout— A review in which instructional materials are presented under normal operating conditions to the actual target audience (average students selected using typical scheduling procedures) to identify deficiencies. Also called a field tryout or full operational tryout. See Evaluation, Summative Evaluation.

Optimals—Desired knowledge, skill or attitude behaviors.

Organizing—Bloom's Taxonomy lists five progressive levels of learning using the affective domain: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing values (characterization). Organizing is comparing different values resolving conflicts between them, arranging values into priorities, and then structuring a personal, internal value system.

Other Prerequisite—Any skill, qualification, experience, grade level, etc., which cannot be expressed in terms of a simple course number, that students are required to have before they can be scheduled for a course or proficiency evaluation.

Outcome—See Activity Outcome.

Overview—Segment of a lesson introduction in which the instructor provides clear and concise explanation of the lesson objective, subject matter, and teaching method to be used.

Owning Organization—The organization responsible for the sustainment (i.e., periodic review and update) of the courseware, and the delivery of the course. Other organizations may teach the course only with the owning organization's permission.

Planning, Analysis, Design, Development, Implementation and Evaluation (PADDIE) Instructional Design Model—PADDIE model for courseware development. See ADDIE Design Model.

Perceptual Skill—See Discrimination.

Performance—Part of a criterion objective that describes the observable student behavior (or the product of that behavior) that is acceptable to the instructor as proof that learning has occurred. Also, see Behavior.

Performance Issue—A gap or deficiency between desired knowledge/performance and the actual knowledge/performance.

Performance Plan—Government plan for evaluating contractor performance to ensure that the terms and conditions of the contract are met. Formerly called a Quality Assurance Surveillance Plan.

Performance Root Cause Analysis (PRCA)—Activity in which a training function or customer organization examines a performance deficiency, analyzes the underlying causes, and determines the solution. It replaces the “training needs assessment” or “training needs analysis,” which do not fully analyze the shortcomings of the customer's entire work environment. Performance root cause analysis looks not only at the lack of skills or knowledge, but also considers other factors that might contribute to the performance deficiency. It then proposes holistic solutions for improving performance which may or may not include a training intervention.

Performance Support Materials—This is a major element of blended learning. It includes any materials provided to reinforce retention of learning and enhance job performance, such as desktop reference guides, copies of instructional materials from live events, flow charts, diagrams, checklists, templates, examples, procedural guides, decision tables, worksheets, algorithms, etc. Also called job aids. See Electronic Performance Support System.

Performance Test—Evaluation in which the student actually performs the skill required by the learning objective. Tasks are performed to show proficiency of the skill. When a skill is to recall information or solve a problem, a written performance test is appropriate. When a skill is to perform a physical task, a physical performance test is appropriate.

Performance Work Statement (PWS)—A contract requirements document that defines services needed in terms of outcomes and the standard of acceptable performance for those outcomes. The emphasis is on performance - what is to be done and not how it is to be done. It is

also called a Performance-based Work Statement. See Contract Requirements Document, Contract Requirements Package, Statement of Work.

Periodic Review—AFMC requires that courses and learning aids be reviewed every two years for accuracy, completeness and effectiveness. This periodic re-evaluation of courseware is sometimes called periodic review. Also see Courseware Re-Evaluation, Courseware Revalidation, Formal Courseware Re-Evaluation Phase.

Personalized System of Instruction—Fred Keller developed this type of instruction in which there are occasional motivational lectures, a text-based course divided into small units with a study guide, review questions, and unit tests. A proctor scores the test, provides feedback, and asks probing questions to see if the learner really understands the material. The learner must score at least a 90 percent before moving on to the next unit, and there is no penalty for failing a unit test. Those that do are coached, given remedial assignments, and then retested until they pass. Once all units have been passed, the learner is granted a completion.

Phase—A group of activities that support a major segment of a process. Phases are usually sequential in nature, while functions are types of activities that are performed during the entire process.

Placeholder Charts—Reminder charts included in standardized training to cue installations or organizations to enter their localized information. The placeholder charts are hidden or replaced by localized charts before the presentation is used in the field.

Plan of Instruction (POI)—A course control document used for planning, organizing, and conducting instruction. The POI is organized by units or modules of instruction with each module containing such information as instructional method, evaluation method, time allocations, learning objectives, description of student instructional materials, list of training support equipment, etc. When developing instruction for AFMC audiences, AFMC Form 852 is used. See AFMC Courseware Resource Site for guidance on completing a POI.

Post-Award Phase of Acquisition—This phase of the acquisition process ensures that the contractor meets the work statements and product specifications of the contract requirements document (e.g., Statement of Work, performance work statement, task order, etc.). The Instructional System Development Evaluation Board is the primary method of overseeing contractor performance of courseware development and management tasks. This phase ends with the government's acceptance of deliverables and final payment for the contractor's performance.

Post-Test—A criterion-referenced test designed to measure student performance on objectives taught during a module or course of instruction.

Pre-Assessment Test—A criterion-referenced test designed to measure student attainment of learning objectives prior to the start of a course. It is often used in Computer-Based Instruction to tailor the learning so that students only take the modules that they need and not the entire course.

Precision—The psychomotor domain processes incoming information in terms of physical movement and coordination, which result in a physical skill. The R.H. Dave model lists five progressive levels of learning using the psychomotor domain: imitation, manipulation, precision, articulation, and naturalization. Precision is refining actions to make them more exact and correct.

Predictive Test—If a learning objective behavior cannot be demonstrated during the instructional event because it is too costly, too dangerous, impractical, etc., a predictive test is used to test critical parts of the learning objective behavior. If a student can define the steps in a procedure, or perform certain key tasks, it is predictable that the student will be able to perform the actual learning objective skill.

Preliminary Reusable Knowledge Object (RKO) Assessment—See RKO Assessment.

Preliminary Sharable Content Object (SCO) Assessment—See SCO Assessment.

Prerequisite—Prior knowledge or experience.

Prerequisite Course—Any course that students are required to have before they can be scheduled for subject course or proficiency evaluation.

Pre-Solicitation Phase of Acquisition—This phase of the acquisition process includes identification of the need by the functional area; preparation and processing of a contracts requirements package, development of contractor performance evaluation criteria, and planning of an acquisition strategy. See Contract Requirements Package.

Primary Customer Organization—Organization in which primary segments of the target audience reside. Primary customer organizations coordinate on any courseware reviews, revisions, de-activations, archives, or new courseware developments associated with courses they use.

Priority—The priority for an activity or project is determined with input from the primary customer organizations, primary instructors, appropriate program managers, and Education and Training office representatives as appropriate. A priority ranking set for a particular activity is relative to all of the other activities competing for attention at the same time.

Process Checklist—Performance tests, which require the student to perform a task, typically use a checklist to document student proficiency. When the series in which steps are performed is more critical than the end product, a process checklist that corresponds to the steps or activities of the task being performed is used to annotate the evaluator's observations as the student performs the task.

Product Checklist—Performance tests, which require the student to perform a task, typically use a checklist to document student proficiency. When the end product is more important than the series in which steps are performed, a product checklist that corresponds to criteria required for the end product is used to annotate the evaluator's observations as the student performs the task.

Production Acceptance Certification (PAC)—Program used in the AFMC depot maintenance community to document employees' training, qualifications, and certifications to perform and certify assigned work.

Production Acceptance Certification Standard System (PACSS)—A comprehensive relational computer database system used in the AFMC depot maintenance community that documents training, proficiency demonstration, and other qualification actions.

Proficiency Code—Codes used to describe the level of knowledge or performance that the student is required to attain at the completion of instruction. Air Force proficiency codes are in the Air Force Proficiency Code Key in the AFMC Courseware Resource Site. .

Proficiency Evaluation—Performance test that requires the student to perform the task while being observed by an evaluator (typically an instructor or trainer).

Proficiency Level of Learning—Level of knowledge or performance that the student must attain in order to accomplish a learning objective. Proficiency levels are defined in the Air Force Proficiency Code Key in the AFMC Courseware Resource Site.

Program Manager—See Courseware Program Manager, Subject Area Program Manager.

Program Object Memorandum (POM)—DoD program proposal used to submit budgets constraints and priorities for military forces, modernization, readiness and sustainability and supporting business processes and infrastructure activities. It is the link between strategic planning and programming.

Programmed Learning—Sidney Pressey developed and B.F Skinner modernized this approach to learning which is commonly used today when developing computer-based and Web-based instruction. Learners are given small amounts of information and proceed at their own pace from one slide/screen to the next. They then answer questions about the information presented and receive immediate feedback on correct and incorrect responses. If they are incorrect, they are directed to remedial information, depending on the mistake they made.

Project Definition Summary (PDS)—Document which defines the activities, deliverables and resources needed to accomplish a courseware project. It prepares a courseware project for assignment or outsourcing and allows organizations to plan for the manpower/funding needed to accomplish the required tasks. See 3.18.4. for details on content.

Project Kickoff Meeting—Activity in which the courseware project manager hosts a meeting with primary participants in the project to verify roles and responsibilities and review the proposed project plan. It clarifies for all key participants in the project what role each of them will have and the planned project activities and timelines. This reduces misunderstandings and allows the government to emphasize the importance of subject matter expert, subject area program manager, system Officer of Primary Responsibilities OPRs, instructor/trainer, courseware program manager, Instructional System Development Evaluation Board official, customer training manager, etc., involvement in the project.

Proof Support—A type of instructional material used during the body of a lesson that provides hard data or expert testimony in support of an assertion. Also see Body, Clarification Support.

Prototype—A representative model. See Computer-Based Instruction Prototype Module, Rapid Prototyping Design.

Psychological Order—Method of sequencing instruction based on ease of learning. Students are taught the easiest tasks first, then progress to the more complex tasks.

Psychomotor Domain—It is widely believed that our brains learn in three distinct ways, by using three mental processors (cognitive, psychomotor, and affective) to encode any information that we receive into stored mental images (memory). In the training world these three domains (types) of learning are usually called knowledge, skills and attitude. The psychomotor domain processes incoming information in terms of physical movement and coordination, which result in a physical skill. The R.H. Dave model lists five progressive levels of learning using the psychomotor domain: imitation, manipulation, precision, articulation, and naturalization. Also see Bloom's Taxonomy.

Quality Improvement (QI)—Organized creation of beneficial change; improvements made in products procedures, learning, etc. The phases and functions of the Instructional System Development model are embedded in, and held together by, an overarching QI process. It continually generates refinements to the instructional system based on the evaluation of activity outcomes against defined performance requirements.

Qualitative Data—Information that is subjective in nature because it is based on opinions or concepts rather than measurable facts.

Quantitative Data—Information that is objective in nature because it is based on observable behavior that can be translated into numbers suitable for analysis and measurement.

Rapid Prototyping Design—Instructional design model which deviates somewhat from ADDIE in that a sample module is quickly developed during Design Phase that can be tested with the target population. This rapid prototyping allows students to try out the instruction early in the process, when changes in media, instructional methods, and design are easier and less expensive to implement. It is appropriate when the subject or technology is new and few similar training programs have been built. It has been used most extensively with computer-based and Web-based instruction, when emerging technologies are initially incorporated into instructional systems.

Ratification—Act of approving an unauthorized commitment, by an official who has the authority to do so. Even when a ratification action is approved, the commander of the individual who entered into the unauthorized commitment must prepare a statement about disciplinary action taken, if any, and step taken to prevent any further occurrence. If ratification action is not approved, the contracting officer notifies the contractor of the government's decision and the contractor is then free to seek reimbursement (through courts or other available methods) from the person who committed the act.

Receiving Phenomena—Bloom's Taxonomy lists five progressive levels of learning using the affective domain: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing values (characterization). Receiving phenomena is accepting input of information.

Rehabilitation Act Section 508—Section 508 of the Rehabilitation Act, as amended by the Workforce Investment Act of 1998, requires that when federal agencies develop, procure, maintain, or use electronic and information technology, they shall ensure that the electronic and information technology allows federal employees with disabilities to have access to and use of information and data that is comparable to the access to and use of information and data by federal employees who are not individuals with disabilities, unless an undue burden would be imposed on the agency. See the AFMC Courseware Resource Site for guidance on how this applies to education and training products and services.

Relevance—This is one of the four tenants of John Keller's ARCS Model of Motivation, which uses Attention, Relevance, Confidence and Satisfaction to create interesting and effective instruction so that optimal learning will take place. When learners believe that the instruction is relevant to their personal situation they stay focused and interested. Examples, discussions, stories, and other means of helping the student to relate to the material and transfer their learning to the real world is incorporating relevance into the instruction.

Reliability—(1) The degree to which a test instrument can be expected to yield the same result upon repeated administration to the same population. (2) The capability of a device, equipment item, or system to operate effectively for a period of time without a failure or breakdown.

Re-motivation—Segment of a lesson conclusion during which the instructor explains how students can use the information presented and challenges the students to use what they have learned. Also see Conclusion.

Repository—A collection of large quantities of digitized data that are kept and maintained in a database. Content and the relationships among its components are stored in the repository for retrieval. Also called a digital library.

Responding to Phenomena—Bloom’s Taxonomy lists five progressive levels of learning using the affective domain: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing values (characterization). Responding to phenomena is reacting to incoming information. Also called active participation.

Retention—The act of remembering things. Also see Memory, Sensory Memory, Long-Term Memory, Short-Term Memory.

Reusable Knowledge Object (RKO)—A slide, video clip, photograph, chart, text, or other piece of information that has high potential for being useful in future instruction or management activities, and is coded as metadata and stored in an electronic repository for rapid search, retrieval and re-use.

Reusable Knowledge Object (RKO) Assessment—Activity in which a courseware project manager or courseware developer determines the reusability of courseware components. This activity estimates the amount of RKOs that will likely be of value in later performance support activities (e.g., instruction, quality, process improvement, etc.) so that the labor involved in coding the objects with metadata tags can be calculated. A knowledge object that can be re-used saves the time and effort of creating a new item, promotes consistency in information provided to the workforce, and reinforces the retention of knowledge. See paragraph 3.15.4. and paragraph 5.12.4. for details.

Reusable Learning Object (RLO)—See Reusable Knowledge Object, Sharable Content Object.

Revalidation—See Courseware Revalidation.

Revision Date—Date that courseware was last formally revalidated (i.e., reviewed, updated and signed again). For newly developed courseware, it is the date of original development. It is NOT the date of the most recent Interim Change (IC), as an IC does not require full review of courseware effectiveness or a new signature page. The revision date information is taken directly from the “Revision Date” block on the course chart.

Root Cause Analysis—See Performance Root Cause Analysis.

Run Time Environment—How content is launched and the learner's progress is tracked and reported back. See Sharable Content Object Reference Model.

Satellite Instruction—Video-based instruction over satellite broadcast television networks. Composed of video teleconferencing and interactive television.

Satisfaction—This is one of the four tenants of John Keller’s ARCS Model of Motivation, which uses Attention, Relevance, Confidence and Satisfaction to create interesting and effective instruction so that optimal learning will take place. Learners are more likely to retain and apply their knowledge and skills to real world situations if they are satisfied with the results of their learning experience. Preparing learners to transfer their knowledge by simulating work environments, explaining how the knowledge and skills learned in the training event will integrate with follow-on learning events, providing the learner with post-event support such as on-line reference and job aids, etc., makes the instructional experience rewarding and complete.

Schema—Intellectual skills that are integrated into existing knowledge to be remembered and recalled. They contain well-understood features of an object or event. When encountering new information, the student refines the features or fills in the blanks of their schema.

Section 508—See Rehabilitation Act Section 508.

Segment—A logical division of instruction which contains one or more modules. Most courses do not need tracking of blocked modules of instruction, and so the segment number is the same as the learning module number. However, when a course is especially lengthy, learning sessions are separated over several days/weeks, more than one instructor is needed to present material, etc., the segment number can be a useful tool for organizing the course.

Self-Paced, Computer-Hosted Course—A self-paced course that is taken via a computer by the student, but is not designed to connect to a command approved LMS, courseware database and content library, which tracks employee progress and automatically documents student completions. This category of delivery is used for PowerPoint presentations, videos, etc., that are not designed to be hosted on the Web and taken via an automated . Computer-Based Training that can either be hosted on a stand-alone computer or can be taken via a command approved LMS on the Web is categorized as Web-based training.

Self-Paced Instruction—This is a major element of blended learning. It is learning that is attained independently by the student, who controls the timing, pace, and (in the case of interactive courseware) the content of instruction within certain parameters. Computer-based and Web-based instruction and correspondence self-study are examples of self-paced learning.

Self-Paced, Web-Based Course—A self-paced course that is taken via a computer and a Web-based command approved LMS, which tracks employee progress and automatically documents student completions. The training is usually taken at the employee’s workstation or in a learning center environment away from the work center.

Self-System—Robert Marzano’s theory describes how our brains learn by passing incoming information through four thought operating systems: self-system, meta-cognitive system, cognitive system, and the knowledge domain. Self-system is the first filter in which we decide if the incoming information has value to us. If it does, our brain will put effort into further processing it.

Seminar—See Conference.

Sensory Memory—Memory is usually divided into three progressive levels: sensory, short-term, and long-term. Sensory memory retains an exact copy of what is seen or heard. It lasts for only a second or two. It has unlimited capacity. Also see Memory.

Service Contract—Federal Acquisition Regulation (FAR) 2.101 and FAR 37.101 define a service contract as one which directly engages the time and effort of a contractor whose primary purpose is to perform an identifiable task rather than to furnish an end item of supply. Courseware development and management are considered services because the deliverables are not furnished off-the-shelf, but are a result of numerous tasks, or activities, that must be performed to the standards of this manual and other specifications.

Services Summary—Section of the PWS which states the criteria for determining compliance with the standards for required services. It is also called a Performance Requirements Summary.

Sharable Content Object (SCO)—A self-contained package of knowledge objects (i.e., images, shapes, text, etc.) that can be tracked electronically by a command approved LMS. It includes a specific launchable asset that utilizes the Sharable Content Object Reference Model (SCORM) Run-Time Environment to communicate with a command approved LMS, courseware database and content library. A SCO represents the lowest level of granularity of learning resources that can be tracked by a command approved LMS using the SCORM Run-Time Environment.

Sharable Content Object (SCO) Assessment—Activity in which a courseware project manager or courseware developer determines the level of SCO packaging needed to support transportability of training to other courses, and to track student progress, test scores and completions for self-paced, Computer-Based Instruction. It predicts the level of SCO granularity needed so that the labor involved in coding the objects with metadata tags and launch assets can be roughly estimated. See paragraph 3.16.4. and paragraph 5.13.4. for details.

Sharable Content Object Reference Model (SCORM)—The ADL Initiative established the SCORM to define the technical foundations of a Web-based learning environment. It is a model that references a set of interrelated technical standards, specifications and guidelines designed to meet high-level requirements for learning content and systems. SCORM defines a Web-based learning “CAM” and “Run-time Environment” for learning objects. Refer to the AFMC ISD Courseware Resource Site for a link to the most recent version of SCORM requirements. See ADL Initiative, Sharable Content Object, SCORM CAM, SCORM Run-Time Environment Data Model, Web-Based Training.

Sharable Content Object Reference Model (SCORM) Content Aggregation Model—Provides a common means for composing learning content from searchable, reusable, sharable and interoperable sources. Defines what metadata SCORM requires and how to package content. Refer to the AFMC ISD Courseware Resource Site for a link to the most recent version of SCORM requirements

Sharable Content Object Reference Model (SCORM) Run-Time Environment Data Model—A standard set of data elements used to define the information being communicated, such as the status of the learning resource. In its simplest form, the data model defines elements that both the command approved LMS, courseware database, content library and Sharable Content Object are expected to “know about.” The command approved LMS, courseware database and content library must maintain the state of required data elements across sessions, and the learning content must utilize only these predefined data elements if reuse across multiple systems is to occur. Refer to the AFMC ISD Courseware Resource Site for a link to the most recent version of SCORM requirements.

Sharable Content Object Reference Model (SCORM) Sequencing and Navigation—Rules that a command approved LMS, courseware database and content library. must follow in order to present a specific learning experience. The content developer is responsible for defining the rules to which a command approved LMS, courseware database and content library must adhere. These rules are expressed within content structure and encoded in the organization section of content packaging. Through this means, the intended behavior of a collection of learning resources may be moved with a package from one command approved LMS, courseware database and content library environment to another. Refer to the AFMC ISD Courseware Resource Site for a link to the most recent version of SCORM requirements.

Short-Term Memory (STM)—Memory is usually divided into three progressive levels: sensory, short-term, and long-term. Short-term memory uses three processes to store and organize information selectively chosen from the sensory memory: iconic memory (which holds visual images); acoustic memory (which holds sounds) and working memory (which holds a thought for immediate use). Short-term memory last from 3 – 20 seconds. It is limited in capacity to about seven items and is quite vulnerable to interruption or interference. Also see Acoustic Memory, Iconic Memory, Memory, Miller’s Magic Number, Working Memory.

Signature Page—A course control document that records acceptance of new, revised, and revalidated courseware by authorized officials. For courses used at more than one AFMC installation, a standardized format has been designed to document command-wide approval of the instructional system. Instructions for preparing a signature page are in the AFMC Courseware Resource Site. .

Simulation—A technique whereby job environment phenomena are mimicked for learning purposes. Simulation can save time, reduce costs, eliminate the need to interfere with production while instructing, and eliminate potential dangers of the workplace. The simulation usually focuses on a small subset of the features of the actual job environment which are complex, risky or expensive to perform in the workplace.

Skill—The ability to perform a job-related activity that contributes to the effective performance of a task. Skills involve physical or manipulative activities, often requiring knowledge for their execution. All skills are actions having specific requirements for speed, accuracy, or coordination. Also see Attitude, Knowledge.

Skill Transfer—A process of decision making in which individuals decide whether learned skills should be applied to a particular situation. It involves understanding how and when to apply learned skills in the real world.

Small Group Tryout—(1) A portion of a course or learning aid is validated under field conditions by selected instructors/trainers, customer representatives and/or students from the target population to verify effectiveness of instruction. This type of small group tryout is used when a course is lengthy, only part of an existing course has been revised, when a segment of the training is particularly risky and requires advance feedback, etc., to determine if changes are needed in content or delivery based on pre-testing of a segment of the course under field conditions. (2) The final draft of the course or learning aid is validated under field conditions by instructors/trainers, customer representatives and students from the target population. This type of small group/individual tryout often reveals minor issues with content and delivery of the instruction that were not obvious during earlier technical and instructor/trainer reviews, and

helps to determine the average length of the course. It is often called final validation. See Evaluation, Formative Evaluation, Operational Tryout.

Soft Skills—Soft skills address feelings, emotions and attitudes, which are part of the affective domain of learning. Instruction on teambuilding, change management and customer service are examples of soft skills training. Soft skills courses are considered functional training for purposes of this guide if they are implemented to support performance in the workplace.

Solicitation and Award Phase of Acquisition—This phase of the acquisition process begins when the contract requirements document is submitted to the contracting office for processing. A contractor is then selected by the contracting officer with the assistance of the functional area representative. This phase ends with the award of the contract.

Source Selection—Activity in Solicitation and Award Phase of acquisition in which the proposals (bids) of prospective contractors (sources) are evaluated to determine best value for the government. The contract is awarded to the bidder who ranks highest against the source selection criteria.

Standard—Defines the criteria for acceptable performance by the student. It is stated in terms such as accuracy requirements, technical specifications, time constraints, performance rates, completeness, and qualitative requirements. It identifies the proficiency that the students are expected to achieve when they perform the behavior under the specified conditions. See Behavior, Objective, Condition.

Stand-Up Instruction—See Instructor-Led Training.

Statement of Work (SOW)—A contract requirements document that describes services and products needed in terms of how they are to be performed or produced and criteria for determining whether these requirements have been met. It differs from the PWS in which the emphasis is on performance - what is to be done and not how it is to be done. See Contract Requirements Document, Contract Requirements Package, Performance Work Statement.

Storyboard—Panels on which a sequence of sketches depicts the significant changes in action, appearance, or student interactivity in planned Computer-Based Instruction and videos.

Structured On-the-Job Training (SOJT)—Over-the shoulder, practical instruction on tasks required for job performance. It differs from informal on-the-job training in that it has documented procedures for delivering accurate and complete instruction in a consistent manner.

Structured On-the-Job Training (SOJT) Guide—A course control document that replaces the plan of instruction for SOJT courses. It includes learning objectives, evaluation methods, instructional guidance, required materials and equipment, etc. that assist the trainer in providing quality instruction at the worksite. A quality checklist for an SOJT Guide is in the AFMC Courseware Resource Site.

Student Frequency—How often an employee is required to take a particular course or proficiency evaluation in accordance with training mandates.

Subject Area Program Manager—Individual responsible for implementing a program that crosses functional areas, such as environmental management, safety, occupational health, security, personnel, acquisition, finance, quality assurance, etc. In the courseware process, the subject area program manager serves as an expert on program training requirements. See Paragraph 1.5. for details on subject area program manager responsibilities.

Subject Matter Expert (SME)—An individual who has high level knowledge and skill in a particular topic, task, system or process. The SME is responsible for the accuracy and completeness of course content. See Paragraph 1.5. for details on SME responsibilities.

Subtask—Performance steps that, when combined, make up a task.

Summary—Segment of a lesson conclusion during which the instructor reiterates key points of lesson content (knowledge level) or reviews and expands on key material and develops relationships that lead to generalizations (comprehension level). Also see Conclusion.

Summative Evaluation—Gathers feedback from students, instructors, customer reps, etc., about the effectiveness of instruction at the summation of development activities. It is used to try out the instruction on the target audience (average students) in an operational environment. Summative evaluation is the final step in the validation process. The objective is to ensure that the instructional system is fully integrated and achieves desired outcomes. Also called operational tryout or field validation. See Evaluation, Operational Tryout.

Superseded Course—Course or learning aid that has been replaced.

Support Function—This Instructional System Development function involves long-range and day-to-day tasks that are performed in order to implement and maintain the instructional system throughout its life cycle. Some of the basic support activities are providing funding, facilities, manpower authorizations, and services in support of learning activities; supplying equipment, skilled personnel, courseware and instructional aids; and maintaining facilities, equipment, skilled personnel, courseware and instructional aids. Also see Administration Function, Delivery Function, Management Function.

Supporting Documentation—Items such as Instructional System Development Evaluation Board review notes, correspondence, monthly status reports, authoring files for computer-based courses and sophisticated learning aids, Interim Change Memos, graduate assessment surveys, etc., that could be useful when revalidating or revising the course next time or which justify decisions made about existing course format, content or delivery.

Symposium—See Conference.

Synchronous Training—Training in which a facilitator responds real-time to questions and comments from students. See Asynchronous Training.

Synthesis—Bloom's Taxonomy lists six progressive levels of learning using the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Synthesis is building a structure or pattern from diverse elements, putting parts together to form a whole which has a new meaning to the learner.

System Approach to Training (SAT)—Procedures used by instructional system developers to develop instruction. Each phase requires input from the prior phase and provides input to the next phase. Evaluation provides feedback which is used to revise instruction. Also see Instructional System Development.

System Architecture—Design and interaction of hardware and/or software components in a computer system. Developing a common architecture ensures interoperability of models and simulations in collective training. Open architecture refers to the ability of devices to be easily connected to programs made by different manufacturers. Closed or proprietary architecture makes connecting to the system difficult and is in direct conflict with ADL Initiative goals. Open

architectures use COTS hardware and software and conform to approved standards. See Sharable Content Object Reference Model.

System OPR (Officer of Primary Responsibility)—Individual responsible for implementing an AFMC-approved automated management system that supports one or more functional areas. In the courseware process, the system Officer of Primary Responsibility OPR serves as an expert on system training requirements. See Paragraph 1.5. for details on system OPR responsibilities.

Target Audience/Population—Students for whom an instructional system is intended.

Target Audience Analysis—Activity in which a courseware developer analyzes the characteristics (e.g., age, experience, education, location, attitudes, etc.) of the target audience. It helps the developer decide what types of instructional methods, media, examples, exercises, and evaluation techniques will be most effective in gaining and holding the students' attention.

Task—An observable and measurable unit of work activity that forms a significant part of a job. It constitutes a necessary step in performance, and has a logical beginning and end.

Task Analysis—See Knowledge/Task Analysis.

Tasking—A formal request to address an issue.

Tasking Worksheet—Used when an individual, group, or organization determines that there is a significant issue that requires the attention of an Education and Training office. The tasking worksheet defines basic information about the issue sufficient to determine the scope and priority of the assignment, and to decide which function should receive the tasking. See the AFMC Courseware Resource Site. for sample tasking worksheet templates.

Teaching Guide—See Lesson Plan.

Technical Accuracy Review—Activity in which subject matter experts, system Officers of Primary Responsibilities (OPRs), subject area program managers, and other customer representatives review the content of draft instructional and evaluation materials to determine if they are relevant, accurate and complete. This step is usually repeated more than once until technical experts are satisfied with the content and appearance of instruction. Also called SME review. See Formative Evaluation, Periodic Courseware Review.

Technical Re-Evaluation of Courseware—Activity in which Subject Matter Experts (SMEs), system Officer of Primary Responsibilities (OPRs), subject area program managers, and other customer representatives review the content of the instructional and evaluation materials to determine if they are still relevant, accurate and complete. It is also called Periodic Review and is performed at least every two years.

Terminal Training Objective—The overall objective that the student is expected to attain upon completion of instruction. It is made up of subordinate, enabling, or learning objectives within the modules of the course. Also see Objective.

Test Validity—The degree to which a criterion test actually measures what it is intended to measure.

Train-the-Trainer Activities to Qualify Instructors—The courseware development team helps prepare instructors/trainers to instruct the course by giving them active roles in all review and implementation activities. This readies future instructors/trainers to deliver the instruction when

subject matter is new and instructors/trainers do not yet have experience in presenting the material.

Trainer—Individual with subject matter expertise who provides task training to students, often at the worksite using actual equipment, tools, automated systems and technical data. In the courseware process the trainer serves as an expert on the effectiveness of instructional materials, learning activities and evaluation methods in meeting their intended Purpose. See Paragraph 1.5. for details on trainer responsibilities.

Training—A set of events or activities presented in a structured or planned manner, through one or more media, for the attainment and retention of skills, knowledge, and attitudes required to meet job performance requirements. See Functional Training, Instruction.

Training Aid—See Learning Aid.

Training Category—Shows the locally designated subject matter category of the courseware item.

Training Function—Organization with training administration responsibilities. It does not need to be a stand-alone training office. Most functional areas (logistics, depot maintenance training, acquisition, civil engineering, etc.) have a training function. The installation Education and Training Office prescribed by AFMCI 36-401 is also considered a training function.

Training Gap—See Training Need.

Training Gap Analysis—Activity in which a courseware project manager or courseware developer works with the customer to better define and analyze a perceived training need and determine the nature and scope of the fix.

Training Gap Worksheet—Used when an individual, group, or organization determines that a lack of knowledge or proficiency requires formal training (i.e., documented instruction with defined learning objectives), but no such training is currently in place. It defines basic information about the training gap sufficient to determine the scope and priority of the assignment, and to decide which training function should receive the tasking. The AFMC Courseware Resource Site. has a template of this worksheet. Also see Courseware Issue Worksheet, Non-Training Issue Worksheet, Training Issue Worksheet.

Training Issue Worksheet—Used when an individual, group, or organization determines that there is a training issue that needs to be addressed, but the Training Gap Identification and Courseware Issue Identification Worksheets do not seem to apply. This worksheet defines basic information about the training issue sufficient to determine the scope and priority of the assignment, and to decide which training function should receive the tasking. The AFMC Courseware Resource Site. has a template of this worksheet. Also see Courseware Issue Worksheet, Non-Training Issue Worksheet, Training Gap Worksheet.

Training Lead Center—Organization or installation designated as the manager of training issues associated with a particular subject matter area, system, or occupation. An AFMC Training Lead Center serves as liaison between centers/bases, HQ AFMC and other organizations on issues related to assigned command training; ensures that representatives from all centers/bases are involved in decisions related to the assigned training; periodically reviews assigned command training and associated courseware; develops, distributes and maintains

command courseware to support assigned training; and provides train-the-trainer assistance when applicable. Also called lead center or training lead.

Training Manager—Individual with a full or part-time training manager role who is responsible for ensuring that the AFMC Courseware Development and Management Process is used to develop relevant, effective and economical instructional systems within their span of control. A training manager may be a supervisor in a training function, or a designated training specialist in any organization. See Paragraph 1.5. for details on training manager responsibilities. Note: Education officers and employee development managers perform the same role as the training manager for education and employee development courseware.

Training Mandate—Directive (e.g., regulation, instruction, supplemental instruction, operating instruction, etc.) that specifically mandates the existence of the course. Technical data and regulations that govern the material of the course do not necessarily require that the course exist. Only a directive that requires training to exist is a training mandate for courseware management purposes.

Training Manual—Self-paced, stand-alone instructional system that meets a defined learning objective using text and graphics media.

Training Method—See Instructional Method, Media.

Training Need—The difference between what “is being taught” and what “should be taught.” See Deficiency.

Training Needs Assessment (TNA)—Systematic process of identifying a deficiency or gap between what “is being taught” and what “should be taught.” See Deficiency, Courseware Issue Analysis, Performance Root Cause Analysis, Training Gap Analysis, Training Issue Analysis, Training Mandate Analysis, Training Requirements Analysis.

Training Objective—See Objective.

Training Planning Team (TPT)—An action group composed of representatives from all pertinent functional areas, disciplines, and interests involved in the life cycle design, development, acquisition, support, modification, funding, and management of a specific occupation or subject matter area.

Training Region—Isolated section of an automated system that simulates the characteristics and functionality of the live system, but which is used only for training purposes. Also called a training instance.

Training Requirement—The skills, knowledge, and attitudes that are needed to satisfy the job performance requirements, and that are not already in the trainee's incoming repertoire.

Training Requirements Analysis (TRA)—Systematic process of identifying a deficiency or gap between what “is being taught” and what “should be taught.” In AFMC, this is the term commonly used to describe Planning Phase activities, in which a performance issue, training gap or courseware deficiency is analyzed to define a courseware project. See Deficiency, Courseware Issue Analysis, Performance Root Cause Analysis, Training Gap Analysis, Training Issue Analysis, Training Mandate Analysis.

Training Requirements Matrix—Outcome from Training Mandate Requirements Analysis activity. See 3.8.4. for details on content.

Training Specialist—An individual who understands the training process and is assigned either training administration, instruction, or courseware development/ management responsibilities. See Paragraph 1.5. for common roles performed by training specialists in the courseware process.

Training Standardization Assessment—Activity in which a training specialist determines if proposed training development or revision can be expanded to include other organizations, installations or agencies. It promotes consistency of instruction across organizations and saves resources by preventing duplicate courseware.

Training Strategy—See Instructional Strategy.

Training System—See Instructional System.

Transfer of Learning—Extent to which a student successfully applies what is learned to real world situations. It is the result of genuine understanding, not just memorization. Barriers to learning transfer include: instruction is not relevant to actual job performance; instruction is inadequate for the real world situation; students are not given adequate time to incorporate what they have learned into their job tasks; organization contradicts or does not support what was instructed.

Transition—Statements used by the instructor to move from the introduction of a lesson to the body, between main points, between sub-points within each main point, and from the body to the conclusion of the lesson. These statements show a logical relationship between the lesson segments they connect.

Tutorial—A session of intensive one-on-one instruction. It can be an on-line program or provided face-to-face by a qualified subject matter expert.

Tutoring—Providing one-to-one subject matter instruction to a learner. When this is accomplished primarily via the internet, it is called e-tutoring. Also see Coaching and Mentoring.

Unauthorized Commitment—An agreement that is not binding solely because the government representative who made it lacked the authority to enter into that agreement on behalf of the government. Only certain individuals in the installation Education and Training (E&T) office and the installation contracting function have the authority to enter into agreements with contractors for education, employee development and training support. Functional area E&T offices may obtain quotes from contractors, but may NEVER negotiate any deals. This would be an unauthorized commitment that would result in the need for ratification action.

Unfair Competitive Advantage—Information that might give one contractor a better chance over another contractor of being awarded a future contract, such as information about spend plans or budgets, plans for outsourcing services, clarification of a contract requirements document during Solicitation and Award Phase, etc. These are unacceptable communications that could lead to protests from other contractors.

Unsolicited Proposal—Document submitted by a contractor to suggest a solution to a perceived deficiency or to recommend an improvement to government products and services. It is unsolicited because it is not in response to an advertised request for proposals. In the education and training community, a training manager or other qualified individual considers the unsolicited proposal and decides how to proceed.

Validation—The process of conducting technical accuracy reviews, small group tryouts and operational tryouts to evaluate the quality and effectiveness of courseware before it is approved and fielded under normal operating conditions. It involves a repetitive cycle of development, tryouts, and revision until evidence shows that the instructional intent has been achieved. See Evaluation, Operational Tryout, Small Group Tryout, Summative Evaluation, Technical Accuracy Review.

Validity—The degree to which an activity, tool, program, etc., achieves its desired result.

Value—The worth assigned by an individual to an object or outcome. See Attitude, Bloom's Taxonomy.

Valuing—Bloom's Taxonomy lists five progressive levels of learning using the affective domain: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing values (characterization). Valuing is attaching worth or value to a particular object, phenomenon, or behavior. Values range from acceptance to a state of commitment.

Vendor Training—Training purchased from a commercial source, or vendor. The vendor company uses its own off-the-shelf courseware and instructs the course either on-site or off-site.

Virtual Classroom—Classroom where students and instructors are not physically collocated. See Learning Center.

Web-Based Training (WBT)—An approach to ADL in which Computer-Based Training is delivered using internet technologies. This self-paced instruction is also called electronic learning, e-learning, on-line learning, networked learning, enterprise learning, Internet distance learning (IDL), and ADL. See Computer-Based Training, ADL Initiative.

Workbook—Student handout that includes activities and exercises to reinforce the learning concepts.

Workshop—See Conference.

Working Memory—Short-term memory uses three processes to store and organize information selectively chosen from the sensory memory: iconic memory, acoustic memory, and working memory processes. Working memory holds a process (dialing a particular phone number, etc.) for 3- 20 seconds until it is put to use (think of a phone number you'll repeat to yourself until you can dial it on the phone). The purpose of working memory is only to hold, quickly use, and discard, and is not to transfer the information to long-term memory. Also see Memory, Miller's Magic Number, Short-Term Memory.

World Wide Web (WWW)—A system for sharing many different kinds of information over the internet. Designed in 1989 by researchers at CERN in Switzerland, the Web is accessed by browsers such as Microsoft Internet Explorer or Netscape Navigator. Also called the internet or the Web.