1.0 POLICY/PURPOSE

Santa Barbara Applied Research controls and verifies the design and development of SBAR products and services to ensure that the specified requirements are met. The purpose of this SBAR work instruction (WI) is to define the design and development process for interactive multimedia instruction (IMI) products.

2.0 SCOPE

This WI applies to all SBAR operating units. The WI will be used for all SBAR IMI or computer-based training (CBT) systems, unless otherwise specified by contract.

3.0 REFERENCES AND DEFINITIONS

3.1 References

- ISO 9001: Quality Management Systems-Requirements, Third Edition (2000-12-15)
  - ISO 9001 Element 7.3 Design and Development Control
  - ISO 9001 Element 4.2.3 Control of Documents
- SBAR *Quality Manual*
- SBAR *Control of Quality Records Procedure*
- MIL-HDBK-29612-1, Department of Defense Handbook, *Guidance for Acquisition of Training Data Products and Services*
- MIL-HDBK-29612-2, Department of Defense Handbook, *Instructional Systems Development/Systems Approach to Training and Education*
- MIL-HDBK-29612-3, Department of Defense Handbook, *Development of Interactive Multimedia Instruction (IMI)*
- MIL-HDBK-29612-4, Department of Defense Handbook, *Glossary for Training*
- MIL-PRF-29612A, Department of Defense Performance Specification, *Training Data Products*
- DODI 1322.20, Department of Defense Instruction, *Development and Management of Interactive Courseware (IMI) for Military Training*
- AFH 36-2235 Volume 2, Air Force Handbook, Information for Designers of Instructional Systems, *ISD Automated Tools/What Works*
- AFH 36-2235 Volume 5, Air Force Handbook, Information for Designers of Instructional Systems, *Interactive Courseware (IMI) Design, Development, and Management Guide*

- CNETINST 1500.21A, Chief of Naval Education and Training Instruction, *Development, Acquisition, and Management of Interactive Courseware (IMI) in Support of Instructional Systems within the NAVEDTRACOM*
- OPNAVINST 1500.73, *Development, Acquisition, and Management of Interactive Courseware (IMI) for Navy Training*
- TRADOC PAM 350-70-2, Department of the Army, *Training Multimedia Courseware Development Guide*
- ADVANCED DISTRIBUTED LEARNING INITIATIVE, *Sharable Courseware Object Reference Model (SCORM)*

3.2 Definitions

Attitude (A): The mental state of a person that influences behavior, choices, and expressed opinions.

Authoring: A structured approach to developing all elements of a unit of instruction.

Computer-Based Training (CBT): Instruction delivered with the aid of a computer.

Computer-Managed Instruction (CMI): The use of computers and software to manage the instructional process. CMI functions can include student registration, student performance, course and lesson performance, test monitoring, and other training management functions.

Functional Area Manager (FAM): A senior supervisory individual who is responsible for the leadership, direction, and overall success of an area of the company, such as procurement, specific contracts, logistics, training, quality, safety, engineering, finance, etc.

Instruction: The delivery of information to enable learning. The process by which knowledge and skills are transferred to students. Instruction applies to both training and education.

Instructional Designer (ID): A senior individual who is responsible for the leadership, direction, and overall success of the IMI design, development, and deployment team.

Instructional Strategy: The general concept by which instruction is to be delivered to the student (e.g., programmed learning, traditional learning, exercise learning, small-group learning, whole-group learning, mentor or apprentice learning, etc.).

Instructional Systems Development (ISD): A process for the analysis, design, development, implementation, evaluation, revision, and operation of interrelated training elements. A logical process for effectively and efficiently determining what, where, when, and how tasks should be taught.

Interactive Courseware (ICW): Computer-controlled courseware that relies on trainee input to determine the pace, sequence, and content of training delivery, using more than one type of media to convey the content of instruction. To enhance the learning process, ICW can link a

combination of media, including, but not limited to, programmed instruction, videotapes, slides, film, television, text, graphics, digital audio, animation, and full-motion video.

Interactive Multimedia Instruction (IMI): A term that is applied to a group of predominantly interactive, electronically delivered training and training support products. IMI products include instructional software and software management tools used in support of instructional programs.

Knowledge (K): Specific information required for the student to develop the skills and attitudes for effective accomplishment of the jobs, duties, and tasks.

Learning: The act, process, or experience of acquiring a knowledge, skill, or attitude.

Learning Objective (LO): A statement of the behavior or performance expected of a trainee as a result of a learning experience, expressed in terms of the behavior, the conditions under which it is to be exhibited, and the standards to which it will be performed or demonstrated. LO typically direct a student to acquire a knowledge (K), skill (S), or attitude (A).

Lesson: A segment of instruction that contains one or more learning objectives, information to be imparted to the student, and may contain an evaluation instrument. The lesson is designed in detail and is the basic building block of all training.

Module: A stand-alone instructional unit that is designed to satisfy one or more learning objectives. A module is a separate component, complete within itself, that can be taught, measured, and evaluated for a change or bypassed as a whole; one that is interchangeable with others, used for assembly into units of differing size, complexity, or function. A module consists of one or more lessons.

Process: A set of interrelated resources and activities that transforms input into output. Specifically, processes are the manner in which SBAR combines resources (e.g., personnel, equipment, and materials) in order to deliver its products and services. Processes include, but are not limited to, program management, contracts management, financial management, quality program, operations and maintenance, corrosion control, logistics, etc.

Record: Document/data that furnishes objective evidence of activities performed or results achieved. Records provide objective evidence of the fulfillment of specified requirements. Records include, but are not limited to, procedures, inspection reports, training records, drawings, etc.

Skill (S): The ability to perform an activity that contributes to the effective completion of a task.

Storyboard: A layout and detailed graphic description of a single frame or series of frames, arranged sequentially. The frames describe the action and content of the IMI and specify all details, such as graphics, text, visuals, video, audio, and special effects. A storyboard is a graphic depiction that shows the IMI presentation.

Subject Matter Expert (SME): An individual who has a thorough knowledge of a job, duties/tasks, or a particular topic.

Task (T): A single unit of specific work behavior, with clear beginning and ending points, that is directly observable or otherwise measurable. A task is performed for its own sake, that is, it is not dependent upon other tasks, although it may be performed in sequence with other tasks in a mission, duty, or job. A task is typically accomplished with a laboratory exercise, simulation, or virtual model.

Training: Instruction and/or applied exercises for the attainment and retention of knowledge, skills, and attitudes.

Work Instruction (WI): Written details that, when appropriate, state what shall be done and by whom; when, where and how it shall be done; what materials, equipment and documents shall be used; and how it shall be controlled and recorded. WIs will normally be used to implement corporate procedures and/or specific contractual requirements.

4.0 RESPONSIBILITIES

4.1 Training Systems Manager

The Training Systems Manager is responsible for implementing this WI.

4.2 Office of Primary Responsibility (OPR)

The OPR is the agency assigned the duty of managing a specific program or completing a specific task. The OPR:

- Implements the requirements of this document.
- Implements a test program to verify compliance.

4.3 Corporate Functional Area Managers

FAMs are responsible for implementing the requirements identified within this WI. FAMs:

- Manage the quality requirements and ensure that the criteria contained herein are incorporated into the design requirements of the IMI.
- Conduct quality audits and design reviews to verify compliance.

4.4 Instructional Designer

The ID is the senior individual who is responsible for the leadership, direction, and overall success of the IMI design, development, and deployment team. The ID:

- Develops instructional strategies, the IMI content, and the design requirements.
- Oversees the IMI and media development team.
- Oversees product testing and directs the overall development process.

4.5 IMI Developers

Unless otherwise directed by the Training Systems Manager in conformance to specific requirements imposed by a contract, each SBAR employee involved in the design and development of IMI or CBT conforms to this WI.

5.0 REQUIREMENTS/PROCEDURES

5.1 General

SBAR believes that IMI can meet or exceed the needs of many training requirements. IMI is essentially an individualized self-paced or group-paced interactive instruction combined with multimedia presentations. In IMI, the computer courseware controls the training content, delivery pace, and learning sequence based on trainee input.

IMI can often be developed at a reduced cost and/or can increase the overall effectiveness of learning as compared to other training solutions. Decreasing overall course length, reducing course bottleneck ratios, reducing instructor burdens, and increasing test scores achieve these benefits. Most importantly, the learning process can be enhanced and more enjoyable for the student. Figure 1 presents the basic components that comprise an IMI.

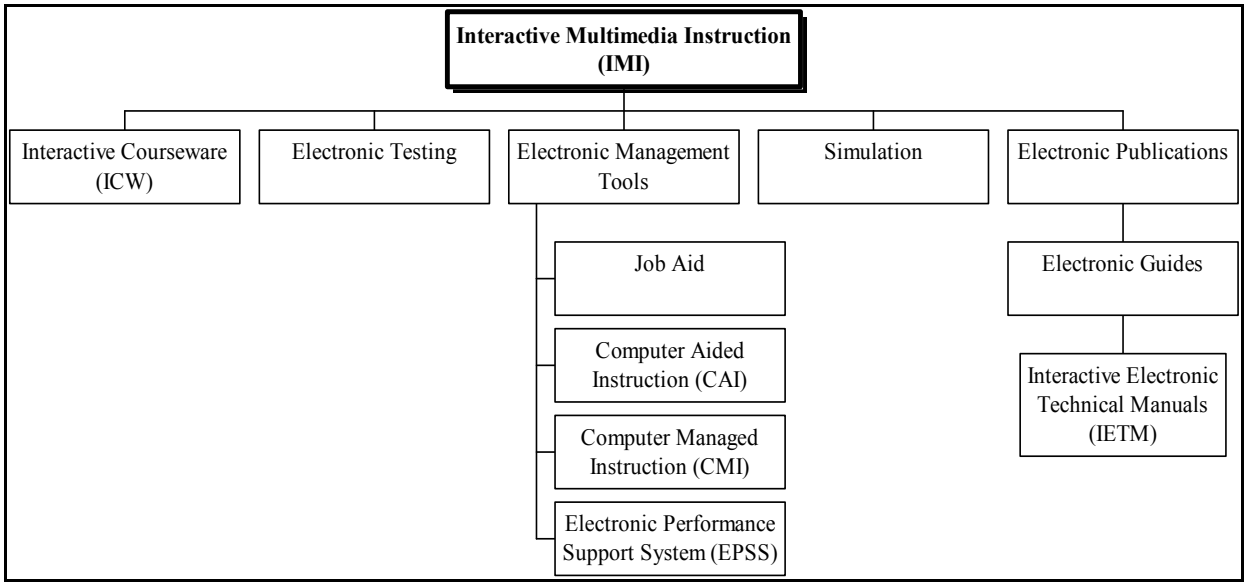

Figure 1. Interactive Multimedia Instruction Element Composition

5.2 IMI Development Process

The SBAR Training Development Team recognizes that many IMI's have unique characteristics that support a more robust learning environment. This section explains the processes and methods that SBAR uses to define, design, develop, and maintain an IMI.

SBAR uses a combination of IMI development processes based on Department of Defense guidelines and successful prior project experience. These enhanced processes are based on the Navy Instructional Systems Development (ISD)/Systems Approach to Training (SAT) and the Department of Defense's approach to IMI development. Figure 2 summarizes the ISD/SAT development cycle that SBAR employs when designing and developing IMI products for Department of Defense clients.

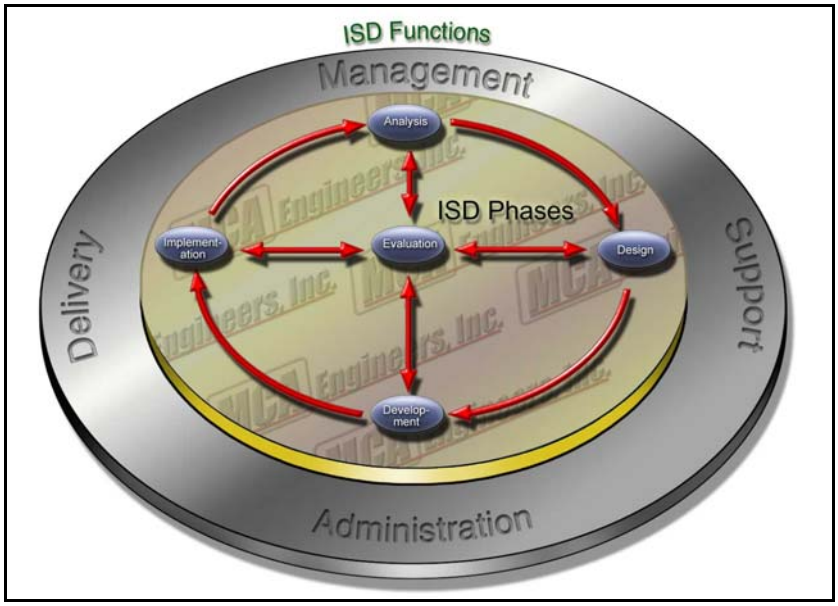

Figure 2. SBAR Instructional Systems Development (ISD) Process

The ISD process utilized by Santa Barbara Applied Research requires ID's to use a phased systems approach to design and develop IMI products. This approach requires IDs to perform six basic steps. These are:

- **STEP 1. Plan** the IMI project. Planning includes consideration of resources, time, funding, etc.
- **STEP 2.** Conduct a courseware **analysis.** The analysis determines what instruction is needed.
- **STEP 3. Design** the courseware. An accurate design meets the need for training.
- **STEP 4. Develop** the courseware. The courseware is designed to support system requirements.
- **STEP 5. Implement** the courseware.
- **STEP 6. Evaluate** the effectiveness of the courseware. Evaluation takes place in every phase to provide continual feedback for the IMI project. ISD is iterative, so that the application varies with the phase of acquisition and the scope of the effort.

The following training system functions are required during each IMI effort:

- **Management** is the function of directing or controlling training system development and operations.
- **Support** is the function of maintaining all parts of the system.
- **Administration** is the function of day-to-day processing and record keeping.
- **Delivery** is the function of bringing instruction to students.

Form CP-00-13004-04-A is a checklist to be used by SBAR personnel during the IMI design and development process.

5.3 STEP 1 – PLAN THE IMI PROJECT

5.3.1 Description

The first step in the delivery of a quality IMI program is to develop a sound project plan. Without a well-developed project plan, not all of the associated IMI team members will know what to expect, when to expect it, or how well it should work. This section describes the activities that are performed during the IMI planning process.

5.3.2 Assign Roles and Responsibilities to the Development Team

The roles and responsibilities of the development team are clearly defined in the IMI management plan.

5.3.3 Develop Preliminary Project Plan

An initial Microsoft Project 98/2000 plan is created at the onset of the project. This plan includes all basic development phases involved with the project. An in-depth project plan is established once the analysis phase has been completed and the scope of the project can be fully determined.

5.4 STEP 2 – CONDUCT A COURSEWARE ANALYSIS

5.4.1 Description

Analysis is the process used to identify critical tasks and identify the standards, conditions, performance measures, and other criteria needed to perform each task. Training is based on the tasks identified in analysis. The results of the analysis phase form the basis for the IMI.

SBAR believes that the analysis phase is the single most important phase of IMI development. An IMI project may not achieve its goal if a proper and objective analysis is not conducted. The analysis phase determines the primary course objectives, ideal instructional strategies, appropriate media mix, and the best-suited delivery platform for the target IMI.

5.4.2 Purpose of the Analysis

The result of the analysis phase is the identification of the Knowledge, Skills, and Attitudes (KSAs) required for the mission/job/task performance. The analyst then compares those KSAs the performer must have with the KSAs already possessed by the incoming students. The difference between what the students already know and can do and what the mission/job/task requires them to know and be able to perform is what the training must achieve.

5.4.3 Identify the Purpose of the IMI

Identifying project requirements begins with determining the purpose of the IMI project. A good purpose statement is both task-oriented and results-oriented.

5.4.4 Define the Project Requirements of the Courseware

The next step in developing an IMI is to identify the requirements of an IMI project to determine the nature and scope of the IMI development effort. Answering the following types of basic questions aids in identifying the project requirements of an IMI:

- Who will use the IMI?
- What are the IMI users' requirements?
- How is the curriculum currently being trained?
- What are the required design and development actions?
- What are the technical requirements?
- What are the resource requirements and limitations?
- When is the training required?

5.4.5 Target Audience

The target audience for each IMI product is established, and is usually based on job performance requirements, educational level, or skill level.

5.4.6 Determine Course and Lesson Objectives

The course and lesson objectives are the foundation for the entire course. Objectives tell designers, and more importantly students, what the expected learning outcomes are; specifically, what knowledge, skill, or attitude is the student expected to acquire after completing the course or a specific lesson.

5.4.7 Define Instructional Strategies and Learning Styles

Students have different styles of learning. One person's style may not be effective for another person. SBAR designs its IMI projects to be flexible and perceptive enough to use various teaching techniques that appeal to more than one learning style. Providing innovative and creative training solutions is the key to creating a successful IMI. There are four common learning styles: concrete, active, reflective, and abstract. Table 1 presents learning retention by learning style combinations.

Table 1. Effect on Retention by Learning Style

Percentage Retained	Applied Learning Styles
20%	Abstract
50%	Abstract and Reflective
70%	Abstract, Reflective, and Concrete
90%	Abstract, Reflective, Concrete, and Active

Source: NAVEDTRA 134 Navy Instructor Manual

Most people have a preferred or dominant learning style, but use all of the basic learning styles to some extent depending on the situation. A brief explanation of each learning style helps to better understand why learning styles are so important.

Concrete learners generally prefer an experience-based approach to learning. These types of people rely on their own feelings and personal judgments. The key to success for this type of learner is to create personal involvement. Concrete learners learn best by imitating others after they have taken part in a role-playing or simulation.

Active learners prefer to learn by becoming involved with the subject and taking an active systematic approach. They learn best from small group discussions, structured exercises, and problem-solving approaches. Active learners prefer a trial-and-error method of learning.

Reflective learners like to compare and contrast material before drawing conclusions. This type of person learns best from lectures, films, and reading. Reflective learners prefer to play the role of an impartial observer while watching others.

Abstract learners prefer a theory-based, analytical approach to learning. They learn best from lectures by experts, theoretical reading, case studies, and activities that require solitary thinking. An abstract learner likes to find the "theory" behind the subject matter and analyze the approach to discover what concepts are involved.

5.5 STEP 3 – DESIGN THE COURSEWARE

5.5.1 Description

In the design phase, the ID develops a detailed plan of instruction that includes selecting the instructional methods, media, and determining instructional strategies. Existing instructional materials are reviewed during this phase to determine their applicability to the specific instruction under development. The ID also creates the instructional objectives, testing plan, and the actual instruction.

Figure 3 presents how a basic course is constructed. Figure 4 presents a basic lesson architecture that will be employed.

5.5.2 Prepare the Objective Hierarchies

During the course design phase, the syllabus (if applicable) and course structure are updated. The objective hierarchies are updated and the appropriate instructional media is verified. The objectives hierarchy identifies knowledge and skills that must be learned and mastered (sometimes in a pre-established sequence) before subsequent knowledge/skills can be fully grasped. Frequently, the hierarchy indicates common or similar relationships that have implications for the development of instruction. These same relationships can be used to help identify and shape lessons that are common or similar across related courses.

5.5.3 Developing Lesson Strategies

At this point in the process, the lesson strategy is identified, developed, and included in the lesson worksheet. If an existing design template fits the objective and the overall approach, it is selected as the basis for the lesson. If an appropriate design template is not available, one is created for the lesson and made available for use in similar lessons. Activities that the instructor and student must accomplish prior to the lesson and after class activities are identified in the lesson worksheet.

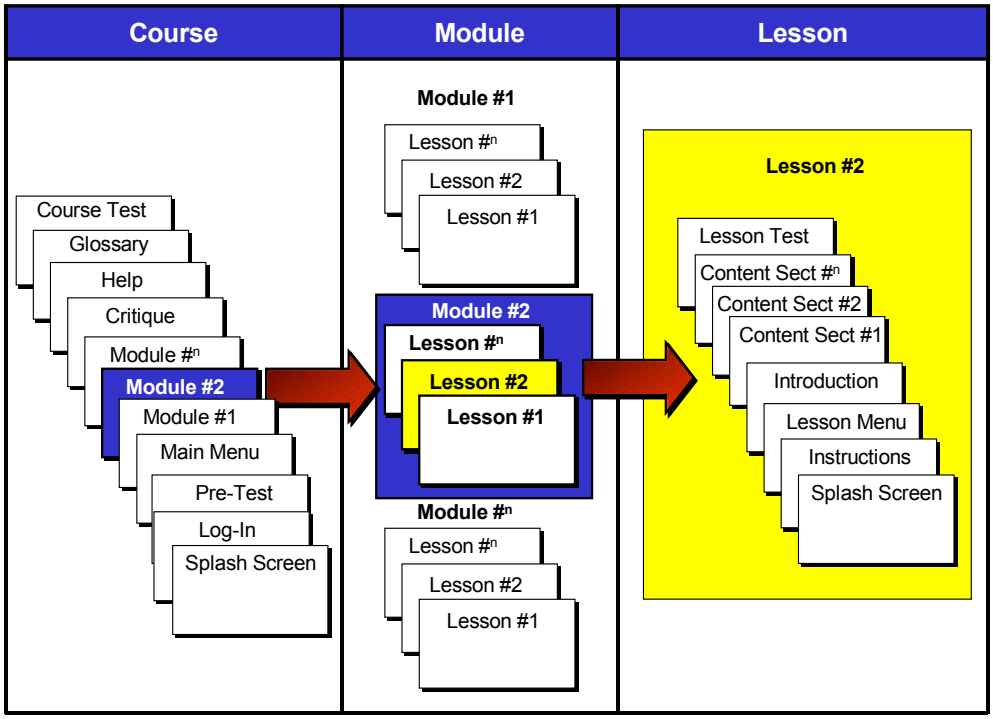

Figure 3. Typical Course Architecture Employment

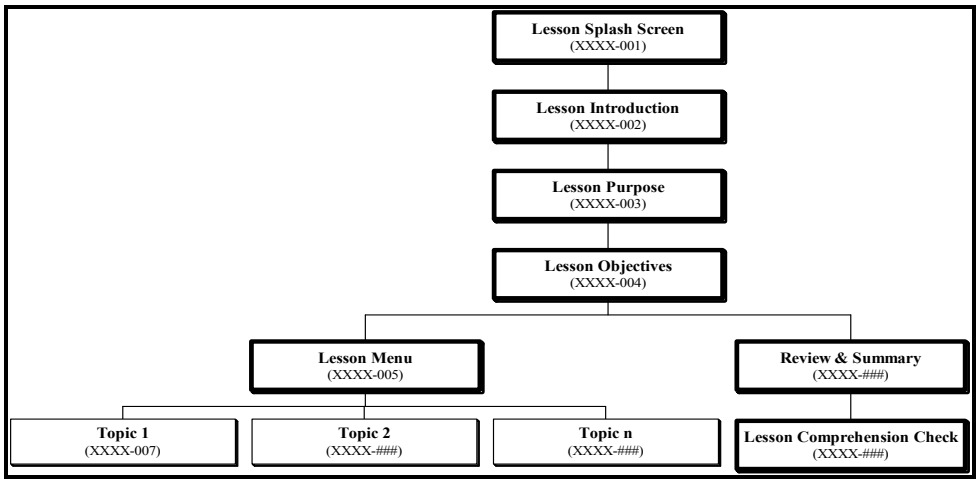

Figure 4. Typical Lesson Architecture Design

5.5.4 Identify Areas for Assessment

The design team identifies areas for student assessment and selects the appropriate assessment method. Possible methods of assessment include scenarios, quizzes, pointer

questions, oral exam, written test, performance event, self-check, role-playing, discussion points, study questions, demonstrations, explanations, and questionnaires.

5.5.5 Identify Instructional Support

Multimedia materials pertinent to specific groupings of content are called out. References to already approved existing multimedia materials are also called out. Visuals that must be created are forwarded to graphic developers or media specialists along with the appropriate lesson reference. Acronyms and special terminology for the lesson are also identified. These instructional support items are included in the lesson worksheet.

5.5.6 Interactivity Levels

Interactivity is the degree of student involvement in the instructional activity. Table 2 provides a brief synopsis of the different levels of interactivity that can be used in an IMI.

Table 2. Levels of Interactivity

Level	Description
Level 1 – Passive	The student acts solely as a receiver of information.
Level 2 – Limited Participation	The student makes simple responses to instructional cues.
Level 3 – Complex Participation	The student makes a variety of responses using varied techniques in response to instructional cues. Simulation is a good example of complex participation.
Level 4 – Real-Time Participation	The student is directly involved in a life-like set of complex cues and responses. Virtual Reality-based simulation is an example of real-time participation.

5.5.7 Define the Student Testing Plan

As utilized by SBAR, IMI can administer realistic performance-oriented, criterion-referenced tests. These tests determine if training objectives have been achieved and measure what trainees actually know or are able to do relative to the standards of the training objective(s). To be effective and efficient, IMI tests must maximize the system's technology.

SBAR designs testing so that each test item provides the best possible indicator of the students' ability to actually perform some aspect of the objective. The test item utilizes the computer's capability to randomly select items or conditions, provide feedback, and determine the trainee's prior knowledge and instruct only needed objectives. Figure 5 presents how a testing and/or feedback section functions.

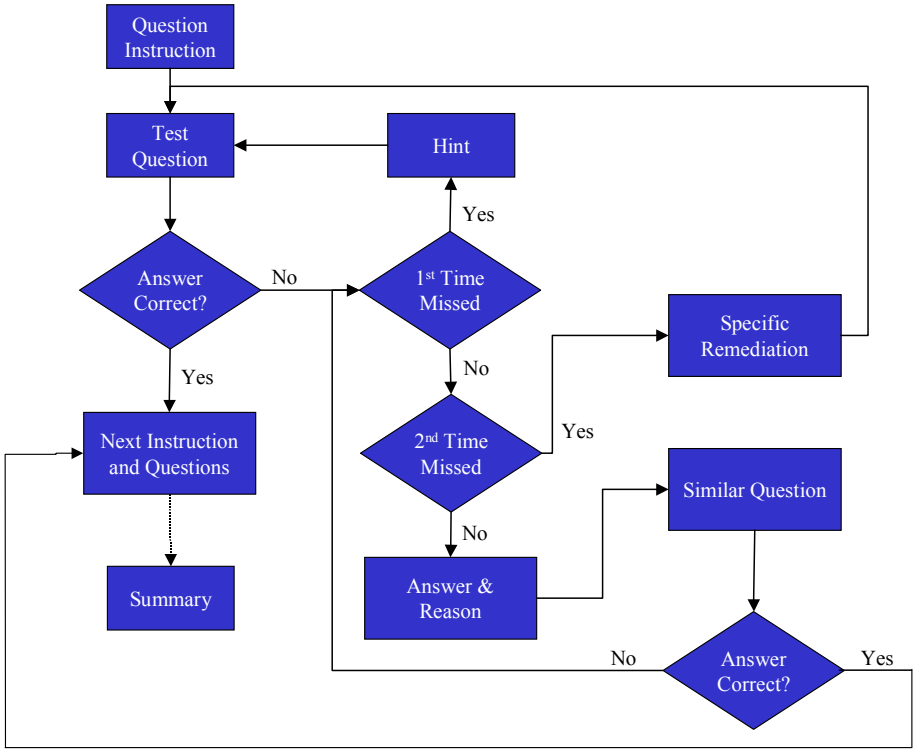

Figure 5. Testing and Feedback Summary Flow Diagram

5.5.8 Define Feedback and Remediation Requirements

Feedback is used to tell the learner about the accuracy of the response. Feedback can be used to address student misconceptions or lack of prerequisite knowledge. Feedback can be utilized to help students learn, enhance retention, and measure how much a student has learned. SBAR believes that the secret to effective feedback is to make it constructive and positive whenever possible.

At the conclusion of testing, the student is provided quality feedback and remediation to maximize learning. The feedback and remediation addresses and corrects student misperceptions and errors, directs training where it is most needed, and helps build student confidence.

Immediately following the scoring of a student's test, feedback and remediation are provided to the student at a global and test item level. At the global level, the student receives a test score and is linked to prescriptive training for those areas where the student failed to meet the established standards (i.e., a passing score).

At the test item level, the student is provided, as a minimum, information on which items were missed and the correct answer to those items. The following additional features are also desirable, although not essential:

- Hyperlinks to the specific training material (e.g., Technical Manual, page, table, and chart) that addresses the area assessed by the test item.
- Remediation tailored to the student's incorrect response.

5.6 STEP 4 – DEVELOP THE COURSEWARE

5.6.1 Description

During the development phase, lesson materials, unit exercises, drills, and other instructional materials are developed. Multimedia are produced based upon the requirements of the storyboard

5.6.2 Develop Storyboards

IMI structure is developed using the storyboard tool. The storyboard furnishes the detailed design and presentation strategy and logical flow upon which lesson development is based. The storyboard also outlines the specific shape and final content of a lesson. Where a suitable template exists for the type of content and learning behavior, it is chosen as the strategy for the lesson in question. A new template is developed if required. Specific details of the storyboard are covered in the IMI Storyboarding WI (CP-00-13004-04-A).

5.6.2.1 Screen Format/Interface Guidelines

The theme of each screen provides a "feeling of the product or service." Backgrounds should consist of blue hues, while all text is white, yellow, and green whenever possible. Interactivity is increased whenever relevant to further enhance the students desire to learn.

The screen format remains consistent throughout the courseware. This promotes the student's learning of the material instead of requiring the student to continually learn the changing screen formats. Standard screen formats could include the lesson screen, main menu, lesson menus, progress checks, tests, etc.

5.6.2.2 Produce Multimedia Elements

Multimedia is constantly evolving in quality and complexity. Selecting the appropriate mix and use of multimedia can be a difficult process. Table 4 demonstrates why multimedia is

such an important component and advantage of an IMI. As the table shows, a student will retain more information by seeing and hearing information.

Table 4. Student Retention of Information

Percentage Retained	Sensory Method
10%	Reading
20%	Hearing
30%	Seeing
50%	Seeing and Hearing

Source: NAVEDTRA 134 Navy Instructor Manual

5.6.2.3 Graphics Guidelines

See Graphics Design, Development, and Implementation WI (CP-00-13004-03) for amplification.

5.6.2.4 Audio Guidelines

The audio content of an IMI follows the guidelines set forth in MIL-HDBK-29612-3, Section 5.2.

5.7 STEP 5 – IMPLEMENT THE COURSEWARE

5.7.1 Description

After the IMI has been designed and developed, it is time to implement the system. The actual authoring of the courseware occurs during this phase. Macromedia Authorware 5.2 (or newer version) and Click-2-Learn ToolBook 8.5 (or newer version) are the designated authoring packages for SBAR IMI projects.

5.7.2 Authoring Considerations

The following subsections explain the important considerations when implementing IMI.

5.7.2.1 Develop Templates or Objects for Recurring Routines.

Many IMI lessons follow the same structure and function in a similar manner. Try to reuse as much code as possible to reduce time. Develop template or interactive objects and reuse them as needed.

5.7.2.2 Develop Object Libraries.

Group recurring screen elements (such as graphics that will appear in many lessons) into object libraries for easy reuse and modification to save time.

5.7.2.3 Use Built-in Computer-Managed Interface Functions If Possible.

Some IMI authoring systems have built-in CMI functions and routines to track data. Use these features to save time. Make sure the CMI functions keep the CMI data independently of the courseware.

5.7.2.4 Avoid Excessive Use of CMI Capabilities.

If the authoring system does not have built-in CMI features and you must develop your own routines for record keeping and data analysis, you may find that you are using excessive capabilities. Develop CMI to meet the requirements in the storyboard and tailor back the design if your programming system will not easily support it. The minimum data you should collect is test result data, total score, percent score, and whether the student passed or failed according to the training standards.

5.7.2.5 Keep Good Software Documentation.

One of the most important and costly aspects of IMI is maintenance. Detailed and accurate program documentation is critical to lesson maintenance. Keep lists of all program variables used and indicate where they are and what they are used for. Follow standard screen-naming conventions. Clearly identify any libraries used and the specific items within the libraries. Establish controls to keep those items from being modified without coordination. Assign a single person to function as librarian. Configuration management is critical to success.

5.7.2.6 Maintain Master Copies of All Program Data.

Keep the master lesson disks and all lesson specifications in one package.

5.7.2.7 If Programming in an Authoring System's Internal Language, Try to Program Within a Screen

Some authoring systems provide an internal programming language to supplement the basic functions of the authoring tool. If you can program within a screen, you will significantly reduce access times while running the lesson.

5.7.2.8 Ensure the Integrity of Student's Files

SBAR policy requires that students' files are protected to prevent unauthorized access to student records. Files can be password-protected with most IMI software programs.

5.7.2.9 Establish the Browser Through Which the Courseware is Displayed

Courseware may not play through all browsers. Provide either hotlinks to download the browser(s) or put the browser(s) on the CD-ROM or other storage medium for download. Make sure the browser is free. Refer to the IMI Implementing Instructions for the latest browser requirements.

5.7.2.10 Formatively Evaluate the IMI Software Before Programming Within a Screen

Even though most IMI developers/programmers take painstaking efforts to ensure the program's flawless execution, bugs can still exist. Programming flaws that cause unintentional directional flows or unanticipated characters to appear can cause a student to think the entire program is poorly designed. Evaluate the software prior to programming within a screen to ensure that programming flaws are not present.

5.8 STEP 6 – EVALUATE THE EFFECTIVENESS OF THE COURSEWARE

5.8.1 Description

Evaluation is a continuous process that starts during the analysis phase and continues throughout the development and life cycle of the IMI. Feedback from the evaluation process is used to modify the IMI as necessary. Evaluation can be formative, summative, or operational. Each form of evaluation shall be used during the development, update, and revision of instruction, if possible, and if the form of evaluation is applicable. Each form of evaluation is discussed below.

Formative Evaluation consists of process and product evaluations conducted during the analysis and design phases, and validation that is conducted during the development phase. Included are individual and small-group tryouts.

Summative Evaluation consists of operational tryouts conducted once the entire training system is fielded.

Operational Evaluation consists of periodic internal and external evaluation of the operational system during the implementation phase.

The evaluation phase is explained in detail in the following subsections.

5.8.2 Verification

SBAR employs verification to prove that the IMI provides students with the skills, knowledge, and attitudes to meet job performance requirements. If any deficiencies are found in the IMI, they are corrected before it is deployed. Verification consists of a technical accuracy review, individual tryouts, and small-group tryouts.

5.8.3 Validation

SBAR validates the IMI while it is being developed with the intention of improving it. Validation is a repetitive process of development, tryouts, and revisions until evidence shows that the training accomplishes its intended purpose. The IMI discrepancy form CP-00-13004-04-B is used to annotate any discrepancies found in the IMI product.

Validation is an essential step in the development of all training materials. The validation process determines if the instructional material(s) accurately teach the objectives. Therefore, SBAR ensures that IMI is validated before it is duplicated and distributed. The IMI is validated using a sample of the target population and the actual computer equipment to be used to deliver the courseware. Formal validation determines if the instructional and learning objectives of the IMI courseware have been accomplished.

5.8.4 Document Lessons Learned

The IMI development team holds a lesson learned focus meeting at the conclusion of each project. This meeting promotes greater effectiveness and efficiency in future projects.

5.8.5 Archive Working Files and Other Related Data

The project manager ensures that all authoring files, multimedia, text, technical documentation, programming source code, notes, etc. are archived to a CD-ROM at the conclusion of the project in accordance with SBAR Procedure *Control of Quality Records*. Archiving makes courseware maintenance less expensive and more efficient throughout the product's life cycle.

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