# Chapter 10

# SUPPORT TECHNOLOGY

**Introduction**

This chapter provides general considerations for the incorporation of support technologies into IMI, IBI, and IVT instruction. These support technologies can be used in conjunction with the other instructional media to enhance instruction.

The ISD process for IMI, IBI, and IVT resident and non-resident instruction should include the selection and application of these supporting instructional technologies.

**Where to Read About It**

This chapter contains six sections:



**References**

The material in this chapter is based on the following references:

- MIL-PRF-29612, *Training Data Products*
- MIL-HDBK-29612-1, *Department of Defense Handbook, Guide 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 of Training Terms*
- *Distance Learning Curriculum Analysis and Media Selection,* Air University, Maxwell AFB, AL, 4 Feb 1994
- AF Handbook 36-2235, *Information for Designers of Instructional Systems, Volume 4*
- AF Manual 36-2234, *Instructional Systems Development*
- AFDLO Home Page web site: *http://www.au.af.mil/afdlo*

# Section A

## Electronic Testing

**Electronic Testing**

Electronic testing is a support technology for IMI, IBI, and IVT that can be used to gather information from learners and assess their progress before, during and after the learning process. By considering electronic testing during the ISD process, instructional designers can add electronic testing to find out what learners know, how well are they learning during the course and assess what they have learned. These tests can be embedded within the instructional material and/or distributed electronically via email, bulletin boards, student response units, an intranet, or the Internet/WWW.

Applications for electronic testing can be used to:

- Distribute quizzes, tests, and surveys for study aids, diagnostic tests, pre-course skills assessments and course evaluations.
- Administer practice, pre-configured and competency testing
- Administer equipment and system knowledge exams and certifications
- Create self-administered teaching materials
- Provide interactive and instant feedback and responses to learners
- Show learners an analysis of all answers with the percentage of learners choosing each answer.
- Show test scores for all learners who have taken the test
- Arrange jumps or links to other tests
- Determine learner needs and attitudes through questionnaires
- Assess staff members' readiness for certain courses.

**Types of Questions**

Instructional designers can create and design various types of questions electronically. Some of these formats include:

- Multiple choice, in which the learners selects one choice from multiple answers.
- Multiple response, which is similar to multiple choice except learners are limited to choosing one response; they can select none, one or more of the choices offered.
- Text questions, where the learner answers by typing a designated amount of text. The instructional designer should define what is right or wrong in advance by entering a list of acceptable answers. Text questions allow learners to ask questions without prompting possible solutions. This question type also works well when soliciting short opinions or suggestions on a particular subject.
- Selection questions, where a series of statements are presented and the learners can select from a number of items and answers. This question type is ideal for designing matching questions, ranking questions or to present a series of yes/no, true/false or other simple multiple choice questions on the same screen.

Continued on the next page

## Electronic Testing (continued)

**Security**

Special consideration should be given to security issues for electronic testing.

- Questions and answers should be password protected.
- Answers should only be accepted if a password is entered correctly. When using web-based testing, these answers should be held in map files separate from the HTML files the learners see.

## Section B

## Electronic Management Tools

**Electronic Management Tools**

Electronic management tools are computer programs that can aid in the instructional process. These tools can be used as:

- Decision support aids.
- Job aids.
- Tools to support the conduct and administration of instruction.

Two specific types of electronic management tools used to support courses are:

- Computer-Managed Instruction (CMI)
- Computer-Assisted Instruction (CAI)

**Integration of CMI**

CMI can be integrated in IMI and IBI courseware and perform the following course administration and management functions:

- Scheduling of training.
- Recording and tracking individual and group performance data.
- Providing information on performance trends over time.

Automated CMI functions assist the instructor in managing instruction:

- Manage the development of course structures and curricula rapidly and flexibly.
- Provide for management of testing and evaluation of student performance and progress.
- Register and enroll large numbers of learners easily with their associated demographic data.
- Administer and track student's progress in curricula for training administrators.
- Ease the difficulty of student access, enrollment and monitoring of their personal training.
- Provide for automatically collecting and managing student data and eliminating the need for manual data entry.
- Allow user choice and flexibility through system openness.
- Provide rapid and direct feedback to learners, administrators, operating managers.

Continued on the next page

## Electronic Management Tools (continued)

**Integration of CAI**

CAI can be developed to aid in the delivery of classroom instruction, and can provide for the storage and retrieval of information for both the instructor and student.

When integrated with a network system of instructor and student stations in a classroom, the instructor can manage and control the training environment by:

- Observing each student station, and the performance of individual learners. For example, student responses to instructor-generated questions, questions from individual learners to the instructor, student performance on collective exercises, student performance on individual tests, exercises, and problem scenarios, etc.
- Controlling student functions, such as access to courseware, tests, other student stations, access to reference materials, etc.
- Providing assistance to learners from the instructor station. For example, providing real-time help, remediation courseware, tutorial instruction, etc.
- Accessing other electronic media for display in the classroom environment such as Electronic Performance Support Systems (EPSS), and Interactive Electronic Technical Manuals (IETM).

CAI systems can be used to provide:

- Automated instructor guides for directing activities.
- Automated trainee guides that provide learners additional course information and exercises for practice and study.
- Interconnected student and instructor workstations.
- Student response monitoring for summarizing student responses and assignments.
- Instructor controlled multimedia presentations in the classroom using a variety of media formats.

Continued on the next page

## Electronic Management Tools (continued)

**Benefits of CAI Integration**

Information technology advances are changing the way DoD personnel operate and maintain equipment. For example:

- IETMs are beginning to be used in the operational environment.
- The same technical manuals are used for classroom training.
- Therefore, DoD schoolhouses must incorporate IETMs into their training curricula to prepare personnel before they are assigned to operating activities.
- CAI can provide an instructor with the capability to access IETMs, and other forms of digital instructional materials.

CAI may consist of only an instructor workstation that supports automated development and delivery, or may be a full suite of student workstations networked to the instructor station.

- CAI provides the instructor with an efficient means for developing and displaying personal course annotations, including related graphics, videos, and other multimedia.
- Instructional treatments for instructor-student interaction, presentation of the course materials, student study, and monitoring student activities are controlled from the instructor workstation.

# Section C

## Electronic Help Desk

**How Electronic Help Desks Can Be Used**

Electronic help desks can be established to provide the following capabilities:

- Provide student schedules and activities.
- Provide a source for student access of ancillary text, graphic, or video course materials.
- Provide a source of electronic reference materials for student download.
- Provide answers to frequently asked questions (FAQ) for student review.
- Provide the capability for a student to send E-mail to the instructor.
- Provide the capability for student to chat with the instructor.
- Provide the capability for the student to share files with the instructor.
- Provide technical support capabilities as required.
- Provide a bulletin board capability for learners to post messages.
- Provide links to other web sites and reference materials.

# Section D

## Electronic Publications

**Electronic Publications**

An electronic publication is a document, prepared in a digital form for display to an end user. Two examples of electronic publications are electronic guides and Interactive Electronic Technical Manuals (IETM).

**Electronic Guides.** Electronic Guides are automated electronic versions of training guides that can be developed to replace the traditional paper-based training guides. Electronic guides can be maintained in a computer-based file, or on a CD-ROM, on the Web or other electronic medium.

- Data can be retrieved for instruction in the classroom, in a learning center, or during on-the job training.
- Data can be provided during performance of a job as an Electronic Job Aid.

To develop an automated guide to aid instruction, ask the following questions:

- What guides are appropriate for automation of instructional presentations?
- How can the materials be automated most effectively and efficiently?
- Are there software tools available to support the development?
- What are the anticipated benefits of this development?
- What impact will this development have on student performance?
- What are the requirements for staff support and training?

Continued on the next page

## Electronic Publications (continued)

**IETM**

An IETM is a technical manual delivered electronically. An IETM possesses the following three characteristics:

- An IETM can be presented either on a desktop workstation or a Portable Electronic Display Device (PEDD).
- The elements of technical data constituting the IETM are so interrelated that a user's access to the information is achievable by a variety of paths.
- The IETM can function to provide procedural guidance, navigational directions, and other technical information required by the user.

Interaction with the surrounding environment is often a critical part of a task that must be trained.

- For real-time interactive training environments must sometimes be simulated.
- Typical applications include aircraft piloting, air traffic control, ship navigation, driving a tank, gunnery, missile control.

**Portable Electronic Display Device (PEDD)**

A PEDD is a small electronic device that has been designed and engineered to facilitate the presentation of an IETM to a technician during maintenance procedures.

# Section E

## E-Mail, Bulletin Boards, and Fax Conferencing

**E-Mail**

E-mail can be used as both an asynchronous and synchronous support technology. Examples include the following:

- Transmit/receive text, graphic, audio, and video files.
- Send instructional materials to learners.
- Provide tests and test results via secure or authenticated mail.
- Correspond with the instructor, ask questions, and provide feedback.
- Submit reports and papers to the instructor.
- Response tool for live courses.

**Bulletin Boards**

Bulletin boards can be used as both an asynchronous and synchronous support technology.

- Learners and instructors can use bulletin boards to post messages, and participate in or instigate class "discussions."
- Messages can be sent to a designated location on a bulletin board, allowing designated class or group members to easily locate them.
- Instructors can use bulletin boards to post schedules and assignments, and notify learners of any changes.
- Information can be provided about the organization and staff.
- Learners can download files containing the most current instructional materials.

**Facsimile (Fax) Conferencing**

Fax conferencing is an asynchronous support technology that can be used during the course to:

- Correspond with other learners/instructors via faxed text and graphics documents.
- Fax copies of written tests and test results.
- Fax attendance rosters for DL courses, seminars, and conferences.

# Section F

## Student Response Units and Audioconferencing Units

**Student Response Units (SRUs) and Audioconferencing Units (ACUs)**

Incorporation of SRUs in classrooms can enhance the interactivity between the student and the instructor and provide enhanced instructor control of the instruction. SRUs can enhance instructor-based presentations by:

- Providing individual interaction with privacy of response; the ACU, however, is an open microphone with no expectation of privacy.
- Providing the instructor with the capability to provide immediate feedback to student responses.
- Providing the instructor with the capability to track individual progress as well as trends.
- Provide instructors with immediate feedback on student performance and ACUs.

SRUs are not a stand-alone medium, and are used in conjunction with other media for presentation of instruction to provide two-way audio or data exchange between the instructor and learners.