

## Chapter 3

### INSTRUCTIONAL TECHNOLOGIES

#### Overview

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#### Purpose

This chapter provides definitions and descriptions of instructional technologies that can be applied in the delivery of Air Force instruction. It identifies new technologies, as well as the more traditional technologies available to instructional developers. Information relevant to the design and application of these technologies is included in subsequent chapters.

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#### Where to Read About It

This chapter contains six sections:

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## Overview (continued)

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**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>
- Air Force Publications and Forms: <http://AFPUBS.HQ.AF.MIL/>
- American Distance Education Consortium: <http://www.adec.edu/>
- Best Practices in Distance Learning:  
<http://snow.utoronto.ca/best/distance.html>
- Distance Education at a Glance: <http://www.uidaho.edu/evo/distglan.html>
- Distance Education Primer: <http://www.teletrain.com/Primer.html>
- Educational Resources Information Center: <http://www.aspensys.com/eric/>
- US Distance Learning Association: <http://www.usdla.org/>
- WWW Virtual Library - Distance Education:  
<http://www.cisnet.com/~cattales/Dedication.html>
- Federal Government Distance Learning Association: <http://www.fgdla.org/index.htm>

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## Overview (continued)

### Instructional Technologies And Types

The table below lists the six general categories of instructional technologies discussed in this chapter, and the specific types within each category.

Instructional Technology	Types	
Traditional Media	<ul style="list-style-type: none"> <li>• Print</li> <li>• Print and Slide</li> <li>• Print, Audio, and Slide</li> <li>• Audiotape</li> </ul>	<ul style="list-style-type: none"> <li>• Videotape</li> <li>• Audioconferencing</li> <li>• Television and Cable</li> <li>• Models and Mock-ups</li> </ul>
Computer Mediated Communications	<ul style="list-style-type: none"> <li>• Audiographics</li> <li>• Computer Mediated Conferencing/Collaborative Computing</li> </ul>	
Interactive Multimedia Instruction	<ul style="list-style-type: none"> <li>• Interactive Courseware               <ul style="list-style-type: none"> <li>- Computer-Based Instruction / Computer-Based Training</li> <li>- Intelligent Computer Assisted Instruction</li> </ul> </li> <li>• Electronic Performance Support System / Job Performance Aids</li> <li>• Computer Simulation</li> </ul>	
Interactive Video Teletraining	<ul style="list-style-type: none"> <li>• Interactive Television</li> <li>• Video Teleconferencing</li> </ul>	
Internet Based Instruction	<ul style="list-style-type: none"> <li>• Text Only</li> <li>• Multimedia</li> <li>• Virtual Conferencing/Collaborative Conferencing</li> </ul>	
Support Technology	<ul style="list-style-type: none"> <li>• Electronic Testing</li> <li>• Computer Managed Instruction</li> <li>• Advanced Distributed Learning (ADL)</li> <li>• Electronic Help Desk</li> <li>• Electronic Publications               <ul style="list-style-type: none"> <li>- Interactive Electronic Technical Manuals</li> </ul> </li> <li>• E-mail, Bulletin Boards, and Fax Conferencing</li> <li>• Voice Mail</li> <li>• Student Response Units, Audioconferencing Units (ACUs)</li> </ul>	

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## Section A

### Traditional Media

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**Print**

**Definition:** Print media consists of paper-based text and graphics materials.

**Description:** Print materials include documents such as books, manuals, syllabi, training guides, brochures, programmed text, photographic prints and photocopies. These documents usually contain text, diagrams, pictures, or line drawings. These materials may stand-alone or serve as ancillary material that accompanies other instructional media.

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**Slides**

**Definition:** Slides are static photographic images of text and/or graphics that can be displayed by means of a slide projector or integrated into a computer-based program.

**Description:** Slides are usually used in combination with other media, such as self-study guides and/or audiotapes, or are used to support instructor-led training. When integrated into a computer-based program, photographic or graphic images can be used to support training concepts.

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**Audiotape**

**Definition:** Audiotape consists of sounds that are recorded on a digital or analog electronically readable tape.

**Description:** The most common type of audiotape used for instruction is the audiocassette tape that can provide up to 120 minutes of audio recording. Workbooks or readings are usually used to complement audio materials.

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**Videotape**

**Definition:** Videotape is a magnetic tape that can record and play back audio and video. It can also hold electrical signals used in editing and in interactive video applications.

**Description:** The most common type of videotape used in the classroom is the one-half inch, Video Home System (VHS) videocassette tape. The standard T-120 VHS tape can provide up to two hours of recording in the standard play (SP) mode, four hours in the long play (LP) mode, or six hours in the extended play (EP) mode. Study guides are usually used to support video-based training.

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## Traditional Media (continued)

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### Audioconferencing

**Definition:** An audioconference is simply a meeting where people are connected by audio, such as the telephone. Audioconferencing is a structured audioconference used for instruction with specific learning outcomes. When audioconferencing is supported by media, it is called audiographics conferencing.

**Description:** Interactive audioconferencing can be as simple as an interview between the instructor and learner, or as complex as a panel discussion with many sites and learners. Participants in a typical conference call use a speakerphone connected through an audiobridging system, which allows for multiple callers. Depending upon the system used to make the connection, up to 240 sites can be connected simultaneously. Audio media in use today include the radio and real audio over the Web.

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### Television and Cable

**Definition:** In the context of training, television is a device used to present audio and visual instructional information to students at remote sites. The use of cable television expands the number of channels available for training.

**Description:** Instructional television is used as a vehicle for distance learning and in support of resident instruction. It may be used as a synchronous medium used to present programmed instruction at specific times. However, through the use of videotape recorders, programmed instruction can be videotaped and viewed in an asynchronous mode.

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### Models and Mock-ups

**Definition:** 3-D devices which replicate some component (or the entirety) of the system being studied to increase realism and provide students with an opportunity to study specific aspects of the system and/or perform related operation/maintenance tasks.

**Description:** Models and mock-ups can range from a plastic cross-section of the human skull, to support medical training to a cutaway of a diesel engine. Their complexity depends on the nature and criticality of the training tasks supported. They are often used when it is impractical to make an entire system available for training or when only a portion of the system is the subject of training.

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## Section B

### Computer-Mediated Communications

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#### Audiographics

**Definition:** Audiographics is a term that has typically been used to describe two-way computer data and two-way audio communications using computer and telephone networks.

**Description:** Audiographics combines audioconferencing with computer data presentation capabilities, supporting both voice and data transmissions to participating sites. The computer is used for distributing and sharing data such as text and graphics. The instructor normally has the communications lines open for an audio conference, while transmitting on-screen presentations to all student monitors.

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#### Computer-Mediated Conferencing/ Collaborative Computing

**Definition:** Computer-mediated conferencing (also referred to as collaborative computing) is essentially a text-based computer conferencing system with limited graphics capabilities depending upon the amount of available bandwidth and the processing power of each participant computer.

**Description:** Asynchronous computer-mediated conferencing provides instructor-student and student-student discussions and interaction using e-mail and bulletin board systems. The computer provides the primary means for exchanging messages and dialogue, and for accessing information.

Real-time, or synchronous, computer-mediated conferencing is rapidly evolving due to multimedia teleconferencing standards. These standards address Real-Time Data Conferencing (T.120), ISDN Videoconferencing (CH. 320), Audiovisual communication over LANs (H. 323) and High Quality Video and Audio over telephone modem connections (H. 324). T.120 allows for sharing of applications, data, and voice over single line connections. The broader the connection's bandwidth, the smoother and faster the data exchange. The T.120 standard enables all parties to actively contribute annotations and other changes to the materials presented. Developments in the area of video compression are facilitating real-time video computer-mediated conferencing.

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## Section C

### Interactive Multimedia Instruction

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**Definition**

Interactive Multimedia Instruction (IMI) is a term applied to a group of predominantly interactive, electronically-delivered training and training support products.

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**Description**

Text, audio, video, and graphics are commonly used in IMI products and other digital electronic products used in the delivery of instruction. IMI can be presented as a stand-alone, self-paced program, an instructor-led presentation, or a program to support on-the-job training or personal performance enhancement.

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**Interactive Courseware (ICW)**

**Definition:** ICW is computer-controlled courseware that relies on student input to determine the pace, sequence, and content of training delivery. ICW is also referred to as Computer-Based Instruction (CBI) and Computer-Based Training (CBT).

**Description:** ICW can link and present a combination of media including, but not limited to, programmed instruction, videotapes, slides, film, text, graphics, digital audio, animation, and full-motion video to enhance the learning process.

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**Intelligent Computer Assisted Instruction (ICAI)**

**Definition:** ICAI is a type of ICW that includes an intelligent tutor that provides an interactive learning environment, diagnoses student errors, and individualizes instruction based on student responses.

**Description:** ICAI, sometimes referred to as Intelligent Tutoring Systems (ITS), incorporates expert knowledge into an instructional model designed to emulate the behavior of an experienced teacher. ICAI systems can present challenging scenarios, monitor and evaluate student actions, provide feedback in response to student actions, respond to requests for information, provide hints, and tailor the training program based on a student's demonstrated strengths and weaknesses. Some development systems (XAIIDA) are also considered under the ICAI umbrella.

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**Interactive Multimedia Instruction (continued)**

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**Electronic  
Performance  
Support System  
(EPSS) /Job  
Performance Aid  
(JPA)**

**Definition:** An EPSS or JPA is an integrated, on-demand, processor-based performance aid that enables the user to gain rapid on-line access to large amounts of information about a specific task area. EPSSs are frequently employed to provide on-line assistance to individuals so they can perform their job tasks with minimal support and intervention by others. An on-line help system for a word processing system is an example of an EPSS.

**Description:** EPSSs can be used to support training or actual task performance. On-the-job, they provide immediate access to integrated information and expert consultation. A maintenance technician, for example, might use an EPSS/JPA to help troubleshoot a system problem, either as part of or after completing formal training. As life-long learning gains acceptance, EPSS will play an increasingly important role.

EPSSs are also known as Interactive Performance Systems (IPS), Performance Support Systems (PSS), Performance Support Tools (PST), and On-line Help Systems.

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**Computer  
Simulation**

**Definition:** Computer simulation is an artificially generated representation of reality that provides an interactive educational or training experience. It is typically based on the actual job environment. It allows the learner to practice procedures and solve problems in life-like situations. War-gaming simulation to teach combat decision-making is an example of this instructional approach.

**Description:** Simulations are effective when teaching hazardous tasks and decision-making skills or when costs of hands-on-training are prohibited. Computer simulations allow learners to try alternative solutions to a problem without worrying about physical consequences. Computer simulations vary widely in sophistication; they can be presented as games, as on-line replications of real job situations, or as full-motion, video-enhanced trainers (e.g., flight simulators).

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## Section D

### Interactive Video Teletraining

#### Overview

IVT consists of:

- Interactive Television (ITV) (one-way video; 2-way audio)
- Video Teleconferencing (VTC) (2-way video; 2-way audio)

Two types of IVT video imagery can be delivered to students at the local sites:

- Pre-produced moving images with audio (e.g., film and videotape)
- Real-time moving images combined with audio conferencing

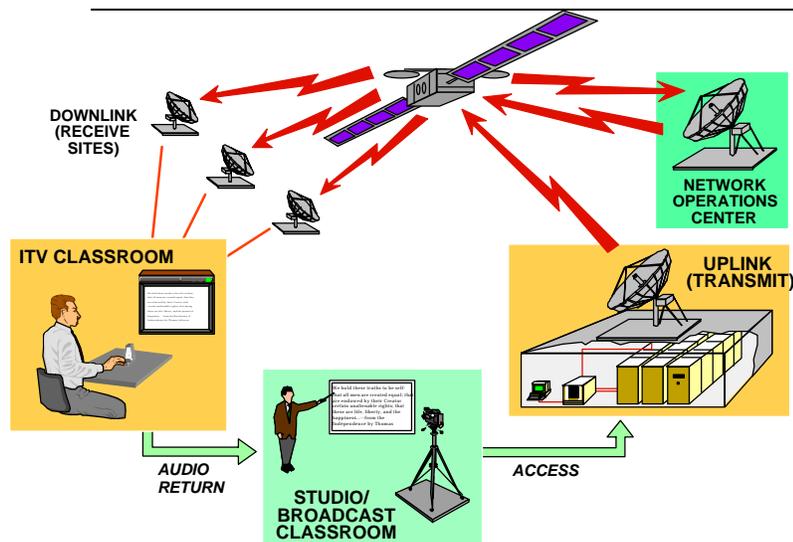
#### Interactive Video Teletraining (IVT)

**Definition:** IVT provides for one- or two-way video, and two-way audio telecommunications between the instructor and students over broadcast television networks (satellite and/or terrestrial) and telephone networks. It comprises both Interactive Television and Videoteleconferencing.

#### Interactive Television (ITV)

**Definition:** IVT technology that employs one-way video with two-way audio communications is called Interactive Television or ITV. ITV is known commercially as *Business Television*.

**Description:** ITV provides one-way, site-to-site or site-to-multiple site transmission of audio and video instruction from a studio or broadcast classroom via an uplink to ITV classrooms at downlink receive sites equipped with television monitors and student response units. The audioconferencing units provide audio feedback via telephone networks.



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## Interactive Video Teletraining (continued)

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### **Video Teleconferencing (VTC)**

**Definition:** IVT technology that employs two-way video and audio communications and is called Video Teleconferencing or VTC. VTC is also referred to as *video teletraining* (VTT) and *videoconferencing*.

**Description:** VTC provides two-way site-to-site or site-to-multiple site video and audio instruction, simultaneously transmitted over the satellite television network from the studio/VTC classrooms. Typically, a VTC classroom is equipped with two monitors that can selectively display the individual speaking, other sites, or supporting graphics, etc., as desired.

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## Interactive Video Teletraining Networks

The following table identifies the current status of IVT networks. Throughout the DoD, several satellite network systems can be used to support IVT instruction. Following are descriptions of the existing DoD IVT networks.

<b>Air Technology Network (ATN)</b>	<p>ATN is a satellite-based delivery system that supports one-way video and two-way audio communications.</p> <ul style="list-style-type: none"> <li>• There are four active duty uplink facilities and 72 downlink facilities at Air Force bases throughout the United States. A fifth studio is planned for Randolph Air Force Base.</li> <li>• When it becomes cost-effective, bases in the Pacific will be connected to ATN.</li> </ul>
<b>ANG Warrior Network</b>	<p>The Air National Guard (ANG) uses the Warrior Network satellite delivery ITV system to provide part of the required Enlisted Professional Military Education (EPME) course of instruction. The Warrior Network:</p> <ul style="list-style-type: none"> <li>• Has 3 broadcast studios and 208 downlink sites throughout the United States.</li> <li>• Uses the same satellite system as SEN and ATN, and is completely compatible.</li> </ul>
<b>Satellite Education Network (SEN)</b>	<p>The US Army SEN network matches the US Air Force ITV network and uses the same satellite.</p> <ul style="list-style-type: none"> <li>• SEN uses four broadcast sites at Fort Lee, VA, and has 79 downlink sites.</li> <li>• SEN is completely interoperable with the ATN network.</li> </ul>
<b>T-Net</b>	<p>The US Army Training and Doctrine Command's (TRADOC) T-Net is a terrestrial-based, near full-motion, two-way video and two-way audio teleconferencing system.</p> <ul style="list-style-type: none"> <li>• T-Net is used to reach 118 Army sites, as well as 47 Air Force Reserve (AFRC) downlink sites throughout the country.</li> <li>• T-Net operates from a different satellite system than the ATN. ATN can connect to and transmit over T-Net using special arrangements through SEN.</li> <li>• The Total Army Distance Learning Program includes a plan to expand network capability to over 500 sites.</li> </ul>
<b>Government Education and Training Network (GETN)</b>	<p>To increase interactivity and sharing of program facilities, the GETN was established as a single government-wide ITV network used by approximately 20 government agencies. Created by the AFIT, GETN incorporates the Air Force ATN, ANG Warrior Network, and the Army SEN. GETN has a total of 950 interoperable downlink sites and 14 uplink sites throughout the United States.</p>

## Section E

### Internet-Based Instruction

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#### Overview

**Definition:** Internet-Based Instruction (IBI) is instruction that makes use of internet technologies and provides a platform for the integration and distribution of multimedia instructional components.

**Description:** IBI is the term used to encompass a full range of instruction and data provided over the Internet/WWW – from simple text-based files and applications, to interactive multimedia instruction and virtual conferencing. IBI consists of digital text, audio, video, and graphics, and makes use of Internet technologies such as:

- Usenet and listserv
- File Transfer Protocol
- E-mail
- Threaded discussion
- Chat room
- Bulletin board
- TCP/IP browsers
- Browser plug-ins
- HTML
- Virtual shared white boards

IBI provides a platform that allows for the integration and distribution of multimedia instructional components.

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## Internet-Based Instruction (continued)

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### Types of IBI Instruction

There are three general types of IBI:

**Text.** This basic type of IBI consists primarily of text-based files and tutorial instruction (with limited graphics). Most text instruction is asynchronous (not real-time) and ancillary to other modes of instruction. Text-based IBI can be effective for dissemination of information and research applications.

**Multimedia.** IBI incorporates the use of graphical browsers such as Netscape Navigator™ and Microsoft Explorer™. These browsers provide a friendly user interface with multimedia instructional materials.

- *Multimedia IBI.* This type of IBI is similar to ICW in that it is generally self-paced (allowing for student control and pacing), interactive, and uses multimedia for presentation of the instructional material on a PC. However, unlike stand-alone ICW, multimedia IBI uses the Internet/WWW to deliver the instruction on-line.

**Virtual conferencing.** Virtual conferencing, also referred to as collaborative conferencing, is a term that applies to the application and integration of all synchronous and asynchronous “chat” modes for instructional purposes. It may be integrated with other instructional and support IBI technologies into a multiple media, virtual “classroom” environment.

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## Internet-Based Instruction (continued)

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### Delivery of IBI

IBI is delivered via the Internet/WWW and can be accessed using web browsers and plug-in controls. IBI uses transport protocols and provides hypertext links to WWW pages and files. IBI uses Hypertext Markup Language (HTML) which is the source language for WWW “pages”. HTML is a special formatting language that tells the web browser how to display the delivered content.

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### Transport Protocols

Below are some of the key standard protocols for IBI that allow different computers to communicate with each other:

- *TCP/IP (Transport Control Protocol/Internet Protocol)* is a network protocol designed for alphanumeric data transmission.
  - *UDP (Universal Data Packet) protocol* sacrifices lost data in favor of maintaining a continuous flow. UDP can dynamically adjust data output to the client’s minute-to-minute reception bandwidth.
  - *FTP (File Transfer Protocol)* is the protocol used to access and download files that are stored on a remote computer.
  - *HTTP (Hypertext Transport Protocol)* is a client/server-based protocol used to create hypertext links in WWW documents; a necessity for any document display on the Web.
  - *SMTP (Simple Mail Transfer Protocol)* is the protocol used by Internet mail programs that allows the client to talk to the server and exchange messages.
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### WWW Technologies

Some of the key WWW technologies that are employed for IBI include:

*Digital video and audio files.* Audio and video images are converted to a digital file format or real-time streaming format that can be stored, copied, transmitted, or broadcast over the Internet/WWW. Digital video and audio can be played back on a computer.

*Coder/Decoder (Codec).* An encoding process that compresses data into a file that requires only 1/2 to 1/200 of the original storage space. Compression minimizes the space a computer needs to represent the data in a file, and allows you to store and transmit files more efficiently.

*Virtual Reality Modeling Language (VRML).* VRML has become the standard format for distributing 3-dimensional images over the Internet/WWW. It is a text-based language used by developers to implement interactive 3D graphics/objects and multimedia content. VRML 2.0 is an international standard.

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## Internet-Based Instruction (continued)

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### Emerging Standards

*XML.* Extensible Markup Language (XML) is a much more powerful language than HTML, but will be able to work with it. For DoD and the Air Force, it will become important for entering metadata into HTML-based documents. This will make it possible to quickly find precisely what you are searching for and will also be essential for automating the management of course and student data.

*DHTML.* Dynamic HTML is not so much a language as it is a combination of Java Script, Cascading Style Sheets and distributed object model (DOM). It will allow the manipulation of text and objects on the Web page after it is displayed. Microsoft and Netscape are not entirely compatible in how they support DHTML. However, there are sites on the Internet that offer guidance and tips on developing pages that will display correctly in both of these browsers.

*Java.* Java is a programming language that allows the creation of small, independent applications (applets) that can perform operations on the server or on the client machine. On the client's machine, it is possible to create interactive web pages, and to provide applications to the user that are not on the client's machine. There are ongoing security issues with Java, but these may eventually be overcome.

*Java Script.* Java Script is not Java, but will allow you to perform operations to create interactive web pages as with Java, but not applets. Java Script is often used instead to perform Java-type functions. This assures security but does sacrifice power.

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### New Enhancements

There are many additions that are being developed to make HTML-based documents much more flexible and powerful. Please check the AFDLO Homepage for update information and guidance.

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## Section F

### Support Technology Media

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**Electronic Testing**

**Definition:** Electronic testing is a general term used to encompass all methods for applying computers in the assessment and reporting of human knowledge, skills, and attitudes. It is also known as Computer Adaptive Testing (CAT).

**Description:** Computer-based electronic testing and polling can:

- Adapt the sequence, content, or difficulty of test items according to the responses of the person being tested.
  - Present test items in response to individual actions.
  - Branch to predetermined test items based on individual answers to previous test items.
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**Computer-Managed Instruction (CMI)**

**Definition:** CMI is software for course administration and management that provides information concerning performance trends, records individual and group performance data, schedules training, and provides support for other training management functions. The instructor has responsibility to diagnose, to identify performance deficiencies, and to prescribe the next level of instruction.

**Description:** The functions of CMI include:

- A management information system to track student performance over a period of time.
  - A system to provide information concerning student performance trends.
  - A system to record individual and group performance data.
  - A system for generation recommendations for study path (learning prescription).
  - A system to schedule training.
  - A system to provide support for other education and training management functions (e.g., data collection to support inputs to student training records).
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**Support Technology Media (continued)**

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**CMI Type:  
Advanced  
Distributed  
Learning (ADL)  
and Instructional  
Management  
System Project**

ADL is a DoD initiative to promote widespread collaboration, exploit Internet technologies, develop next generation learning technologies and create reusable content, and lower costs, with object-based tools. ADL will rely on an Instructional Management System (IMS) to tag and manage the learning objects produced as a result of ADL. One of the goals is to develop an automated management system that will perform CMI functions by keying on the IMS indexing.

IMS is a non-proprietary, Internet-based Instructional Management System that provides the means to customize and manage the instructional process and to integrate content from multiple publishers in distributed or virtual learning environments.

The IMS Project is developing and promoting open specifications for facilitating on-line activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. These specifications will increase the range of distributed learning opportunities and they will promote the creativity and productivity of both teachers and learners in this new environment.

Check the AFDLO Homepage for information.

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**Support Technology Media (continued)**

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**Electronic Help Desk**

**Definition:** Typically, an Electronic Help Desk is an on-line repository of pertinent information, both technical and general, that users can access.

**Description:** Help desks may incorporate a knowledge base, as well as synchronous and asynchronous communication with technical experts to answer questions and provide support.

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**Electronic Technical Manuals**

**Definition:** Interactive Electronic Technical Manual (IETM), as defined in DoD IETM specifications, is a package of information required for the diagnosis and maintenance of a weapons system, optimally arranged and formatted for interactive screen presentation to the end-user.

**Description:** IETMs are in digital form (electronic media) and are designed for interactive display to the maintenance technician or system operator end user by means of a computer-controlled electronic screen display system. An IETM is more than an on-line technical manual; it has the following three characteristics:

- The information is designed and formatted for screen presentation to enhance comprehension.
  - The elements of technical data making up the technical manual are interrelated.
  - The computer-controlled technical manual display device functions interactively (as a result of user requests and information input) to provide procedural guidance, navigational directions, and supplemental information.
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**E-mail**

**Definition:** An electronic delivery system used to send digital messages over the Internet/Intranet to contact and collaborate with other individuals.

**Description:** Computers are used to send E-mail (text-based) messages to selected electronic “mailboxes”. Users can attach documents, files, or links to web pages to the message, providing another method of distributing instructional materials.

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**Support Technology Media (continued)**

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**Bulletin Boards**

**Definition:** An on-line electronic repository used to provide information and announcements to students. The information is accessed by means of asynchronous communications.

**Description:** On-line bulletin board systems are generally used for course administration, communications, and interaction to:

- Post messages, new ideas, questions, opinions, or requests to the group.
  - Read what others have written and respond to the author.
  - Upload and download files.
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**Fax Conferencing**

**Definition:** Electronic data transfers between individuals over telephone networks using facsimile equipment or over the Internet using fax modems.

**Description:** The fax can be used to support instruction by providing a method to exchange printed materials such as text, charts, graphics, etc. For example, it can be used with IVT and other conferencing technologies as a way to distribute handouts to remote sites or as a way for students to pose questions and comments to the instructor.

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**Voice Mail**

**Definition:** Asynchronous means of voice communication using the telephone, computer, and/or voice mail device to store and play back voice messages.

**Description:** Voice mail systems enable callers to leave voice messages which are later retrieved by recipients. Typically, voice mail systems are accessed by telephone. However, some on-line systems enable individuals to send and retrieve voice messages by computer; these systems require the users to have special software, microphones, and other peripheral equipment. Passwords are usually built into the systems to prevent unauthorized users from retrieving messages.

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**Student Response Unit (SRU),  
Audioconferencing Unit (ACU)**

**Definition:** SRUs are devices that provide a means for the student to provide verbal feedback or response data to the instructor. An Audioconferencing Unit (ACU) is a stand-alone microphone; an SRU is a keypad unit that provides response data to the instructor.

**Description:** SRUs may consist of a personal microphone and/or key pad, located at each student's desk, that is connected via a telephone or computer network to the instructor's station or location. SRUs are normally used in conjunction with other instructional delivery systems such as ITV.

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