

Chapter 1

INTRODUCTION

General Information

Purpose of Handbook

This volume provides information and guidance on the application of the Instructional Systems Development (ISD) process for instructional technology in resident instructional systems (technology insertion) and distance learning instructional systems.

Content

This handbook contains the following chapters:

- Chapter 1: Introduction
 - Chapter 2: Instructional Systems Development and Project Management
 - Chapter 3: Instructional Technologies – Definitions and Descriptions
 - Chapter 4: Instructional Technologies – Selection Criteria
 - Chapter 5: Instructional Systems Development Considerations for Traditional Media
 - Chapter 6: Instructional Systems Development Considerations for Computer-Mediated Communication
 - Chapter 7: Instructional Systems Development Considerations for Interactive Multimedia Instruction and Support Technology
 - Chapter 8: Instructional Systems Development Considerations for Interactive Video Teletraining
 - Chapter 9: Instructional Systems Development Considerations for Internet Based Instruction
 - Chapter 10: Support Technology
-

Where to Read About It

This chapter contains three sections:

Section	Title	See Page
A	Instructional Technology	3
B	Technology Insertion	6
C	Distance Learning	8

Continued on the next page

General Information (continued)

- Additional Information**
- 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*
 - AF HDBK 36-2235 *Volume 4, Manager's Guide to New Education and Training Technologies*
-

AFDLO Reference The Air Force Distance Learning Office (AFDLO) Home Page Web site is a source for information and guidance pertaining to Instructional Systems Development (ISD) and distance learning.

<http://www.au.af.mil/afdlo>

Three Key Terms *Instructional Systems Development (ISD)* is an adaptation of the systems engineering process to the process of curriculum development.

- ISD is a systematic approach to developing instructional materials by integrating the processes (phases) of analysis, design, development, implementation, and evaluation.
- The ISD process has been traditionally used for the development of individual-type instructional programs.

Technology Insertion is the use of appropriate instructional technology in resident instructional programs.

Distance Learning is structured learning that takes place without the physical presence of the instructor.

References References are listed in Appendix A.

Section A

Instructional Technology

Introduction

This section identifies the instructional technologies that may be selected for resident instructional programs or employed in the distance learning environment.

Instructional Technologies

Numerous technologies are available for delivering instruction. Most often, these technologies are used in combination with each other to meet education and training requirements at an acceptable cost. The following table lists the instructional technologies that can be utilized in both the resident classroom and for non-resident distance learning.

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

Continued on the next page

Instructional Technology (continued)

Benefits of Incorporating Instructional Technology

Instructional Technology (IT) is more than just applying information technology to the learning environment; it is making use of technology to promote learning by creating interactive, structured, and integrated units of instruction. When appropriately employed, IT can increase the effectiveness and efficiency of instruction.

When inappropriately employed, the insertion of technology in instructional courses can result in:

- Ineffective instruction and substandard learning.
 - Increased learning time.
 - Excessive costs for course development, logistics, and maintenance.
 - Increased personnel requirements.
 - Unacceptable changes in the training organization's operating structure, functions, and resources.
-

A Process for Selection

Instructional designers have long used technology to support learning objectives in:

- General Military Education and Training
- Operations Training
- Professional Continuing Education
- Professional Military Education
- Graduate Education
- Workshops

Appropriate instructional technology choices are made by applying a disciplined process to the selection of the training solution. The use of the Instructional Systems Development (ISD) process helps structure the analysis and design processes to facilitate the selection of the most resource-effective media solution. This means that instructional designers must understand the benefits and costs associated with each technology option, they must understand the learning needs of the students, and they must understand the impact of the learning environment on the selection of presentation media and course design.

Continued on the next page

Instructional Technology (continued)

The Goal

Each instructional situation presents unique challenges. The goal of this handbook is to familiarize the user with the instructional technology options, the strengths and weaknesses of each, and the techniques and processes associated with managing projects that are based on the effective use of alternative media.

There is a wide array of techniques and processes. It is important to recognize that each IT program is unique – each has different requirements and constraints. It is the responsibility of the project manager to tailor the guidance in this handbook to the unique attributes of the given project.

Section B

Technology Insertion

Application

While the instructor may or may not be present at the time the student is actually using the instructional technology, technology insertion applies **only** to the use of technology to support training programs conducted at the schoolhouse. That is, instructional technologies can be integrated directly into a traditional classroom or laboratory course of instruction, can be used for remediation and self-study to reinforce learning in a resident course, or can be used to augment or refresh training received through a resident program.

Background

Technology insertion is not new. The use of language laboratories where students use headphones to listen to foreign language tapes and then repeat phrases into a microphone so the instructor can monitor their progress represents one example of technology insertion that has been employed for more than 30 years. A more recent example is the use of computer-generated presentations to reinforce learning concepts.

Everything from flip charts to mock-ups to simulators can be used to enhance traditional instruction. As technological options evolve at an ever-increasing rate, project managers, instructional designers, and instructors must understand how these technologies work and how they can help or hinder the learning process. These participants in the development process must understand the roles now assumed (and sometimes funded) by representatives of other organizations; they must understand the infrastructure requirements and how to coordinate the resources necessary to employ the new technologies effectively.

Continued on the next page

Technology Insertion (continued)

Benefits of Technology Insertion

Research indicates that the benefits of technology insertion, appropriately applied, can include:

- An increase in levels of interactivity with instructional materials
 - An effective method of providing performance measurement tools for assessing student progress and mastery of learning objectives
 - An increase in student retention of instruction over time
 - Reduction in training time
 - Reduction in instructor requirements
 - An increase in the transfer of learning to the operational job environment.
-

Impact of Technology Insertion

Technology insertion impacts instructional programs from planning the training project through implementation and evaluation of the course of instruction. Quality technology insertion decisions rely on a structured Instructional Systems Development approach, solid project management, and a thorough understanding of the impact of each media alternative – the impact on learning, on instructional staff, on project development and delivery, and on life cycle cost of the training program.

Section C

Distance Learning

Definition of Distance Learning

Distance learning is structured learning that takes place without the physical presence of an instructor. The following key attributes are essential for any Air Force DL program:

- Physical distance between learner and instructor.
 - Academic institution or functional organization sponsorship.
 - Part of a structured curriculum with stated objectives.
 - Two-way communication and feedback between sponsor and learner.
 - Deployment outside the confines of the resident schoolhouse.
 - Includes process to evaluate program effectiveness.
-

Background

- Distance learning is not new; it has been an effective method of instruction for more than 200 years.
 - The Boston Gazette ran ads for shorthand lessons by mail in 1728.
 - Australia's University of Queensland offered an external degree program in the 1890's.
 - Columbia University offered extension programs in the 1920's, while other schools began using radio for instructional purposes in the 1930's.
-

Effectiveness of Distance Learning

There seems to be an assumption that unless a learner is in a classroom to receive face-to-face instruction, the quality of the learning will be compromised. Exhaustive research overwhelmingly suggests otherwise:

- Analysis of more than 600 courses spanning more than 40 years proves there is no significant difference in learning outcomes for courses offered at a distance when courses are properly designed and the best medium is selected.
- Learning outcomes often *increase* with distance learning because the student is more actively engaged in the learning process.

Thus, there is no direct correlation between face-to-face interactivity and student performance. What is important is the *quality of instruction*, not location.

“The key to success in distance learning is the teacher. If the teacher on the system is good, the technology itself can become almost transparent. Conversely, no technology can overcome poor teaching; poor teaching is actually exacerbated at a distance.” – OTA's *Linking for Learning: A New Course for Education*

Continued on the next page

Distance Learning (continued)

Application

Distance learning programs are packaged into units of instruction and delivered to users at non-resident education and training sites – such sites range from distance learning centers to learners' own homes. The instruction can be delivered to the user by:

- Satellite networks
- Terrestrial networks (e.g., computer networks, telephone lines, modems, cable TV)
- Mail

There are two modes of delivery for distance learning instruction:

- *Synchronous instruction*: consists of real-time interaction and transmission of instruction, and requires simultaneous participation of all students and the instructor.
 - *Asynchronous instruction*: consists of other than real-time interaction and the transmission of “stored” instruction or files that do not require participation of all students and instructors at the same time.
-

Benefits

Existing resident methods for instructing large groups of individuals generate student travel costs and overhead expenses such as facility operating and maintenance costs. The primary objectives of distance learning are to extend the learning environment (instructor and/or instructional media) to the students at their location or remote site, increase learning opportunities, and ensure mission readiness in a cost-effective manner. Downsizing and reductions in military budgets have required the Department of Defense (DoD) to develop cost-effective methods such as distance learning to educate, train, and certify personnel.

Some of the benefits of distance learning are:

- Increased training opportunities.
 - Timely instruction to multiple or individual students at many locations.
 - Real-time access to widely dispersed subject matter experts.
 - Increased flexibility in instructional media and methods.
 - Increased instructor and instructional media resource sharing.
 - Increased productivity by providing instruction at student's work area.
 - Reduced student travel and facility expenses.
-

Continued on the next page

Distance Learning (continued)

Air Force DL Goals Air Force distance learning goals are to:

- Create an environment that recognizes the value of distance learning.
 - Ensure availability of resources to meet education and training requirements.
 - Ensure Total Force interoperability for all distance learning instructional technology.
 - Capitalize on appropriate leading edge technology.
 - Improve educational and training efficiencies where practical and cost effective.
-

Air Force Distance Learning Points of Contact

DL Organizations in the Air Force

Air Force Distance Learning Office: The AFDLO, located at Maxwell AFB, was established as the focal point within the Air Force for implementation of distance learning policy and emerging technology. As the hub for distance learning, the office provides policy and guidance, as well as consultation and support for the planning and development of distance learning programs.

2 AF: 2nd Air Force is tasked with developing and providing operations (technical) training for the Air Force. 2 AF is actively delivering distance learning courses using print materials, videotapes, Interactive Multimedia Instruction (IMI), Interactive Video Teletraining (IVT), and the Internet, as well as converting existing resident courses to distance learning formats.

AFIT: AFIT wears two hats for distance learning: (1) AFIT manages the Center for Distance Education and (2) is also the Program Manager for the Air Technology Network (ATN), a satellite-based education and training network.

AFRC: The Air Force Reserves Command (AFRC) is a proponent of distance learning since it can simplify meeting the training and education needs of reservists. AFRC uses T-Net, a two-way video, satellite broadcast system.

ANG: The Air National Guard is also a big proponent of distance learning for the same reasons as the Reserve. ANG operates the Warrior Network that is identical to ATN and has more than 200 receive sites across the US.

AU: Air University offers a number of PME and Professional Continuing Education (PCE) courses using various distance learning delivery media including paper-based, IMI, IVT, and the Internet.

ECI: The Extension Course Institute has operated the Air Force's oldest distance learning institution for more than 40 years. Today, ECI offers more than 400 courses including career development and other specialized courses.

MAJCOMS: MAJCOMs use distance learning for MAJCOM-unique training.

Functional Organizations: Functional organizations (e.g., SC, SG, and SE) use distance learning to educate and train members on new requirements in career fields.

In This Handbook...

In this handbook, the user is presented with guidance on the processes and tools needed to make informed decisions about instructional technology and distance learning and their application to today's learning needs. While distance learning is not a panacea, it is a viable means to expand the impact of training programs, increase readiness, and develop and maintain critical skills.

Deciding to develop a DL course impacts the traditional development processes. It requires designers to look again at how information is organized. It requires special instructor skills and constant attention to implementation issues. The following chapters, which provide insight into the IT environment with emphasis on distance learning, offer the project manager guidance and best practices to support the IT planning process and discuss each technology as it currently applies to distance learning.

It is important to recognize that technology changes on an almost daily basis. What was just a possibility three years ago is standard practice today. This handbook is designed to provide the user with the framework necessary to ask the right questions as technologies advance and as the role of the instructional developer evolves.
