

**New Concerns**

Today's concerns include not only classroom instruction, but also instruction that is exported to the job site using new delivery methods and technologies. New automated instructional development tools can make the instructional development more efficient. Building quality in instructional systems is a key concern. Other concerns are the concept of totally integrated training systems and how to do the ISD process in different applications such as systems acquisition, education, aircrew, and technical training programs.

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**Future Requirements**

Principles of ISD have evolved over the past three decades from ISD as a tool for applying behavioral learning principles to classroom instruction, through models of step-by-step procedures designed to enable anyone to develop instruction, to sophisticated models concerned with complex technological as well as cognitive and attitudinal issues that require experienced instructional design experts to sort out.

Today instructional development, updating, and revision require expertise not only in instructional design but in media (e.g., computer hardware and software, video, interactive systems), cognitive learning theory, and vastly complex content areas. The scope of the expertise has gone beyond the capabilities of the single instructional design expert. It now requires a team of experts from any one of several disciplines.

Attempts are being made to use expert system techniques to help both the experts and novice instructional developers cope with contemporary advancements. If successful, these techniques will impact instructional design in fundamental ways, such as by providing ISD expert system tools.

It is clear that any new model of the ISD process should reflect the movement away from rigorously applied procedures and emphasize adaptability to changing environments. These concerns have become cornerstones in the revision of the Air Force's ISD process. Updating the process should allow the Air Force to meet today's need for effective and efficient instructional systems and continue to meet future challenges in instructional systems development.

One of the Air Force's greatest challenges will be to elevate the level of instruction, knowledge, and training which is currently being provided to personnel. It is not enough to enhance the methodology of an ISD system and its principles. Personnel must be trained in the multitude of disciplines and technologies which the Air Force is using and currently examining for future ISD use in order to accomplish the task.

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## Section B

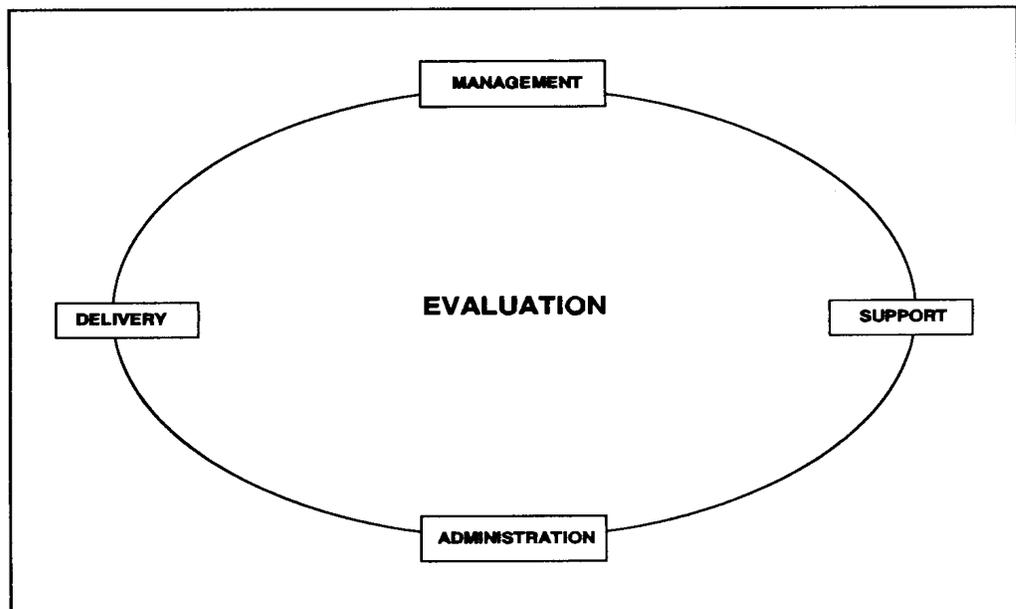
### Total Instructional System

#### Updated Air Force ISD Model

The updated ISD model has been designed to represent simplicity and flexibility so that instructional system developers with varying levels of expertise can understand the model and use it to develop effective, efficient instructional systems. This model depicts the flexibility that instructional developers have to enter or reenter the various stages of the process as necessary. Entry or reentry into a particular stage of the process is determined by the nature and scope of the development, update or revision activity.

#### System Functions

An extension of the systems approach places the ISD process within the functional design of a total instructional system. Figure 2 shows the basic top-level system functions of the instructional system: management, support, administration, delivery, and evaluation.



**Figure 2.** System Functions

#### What Are They?

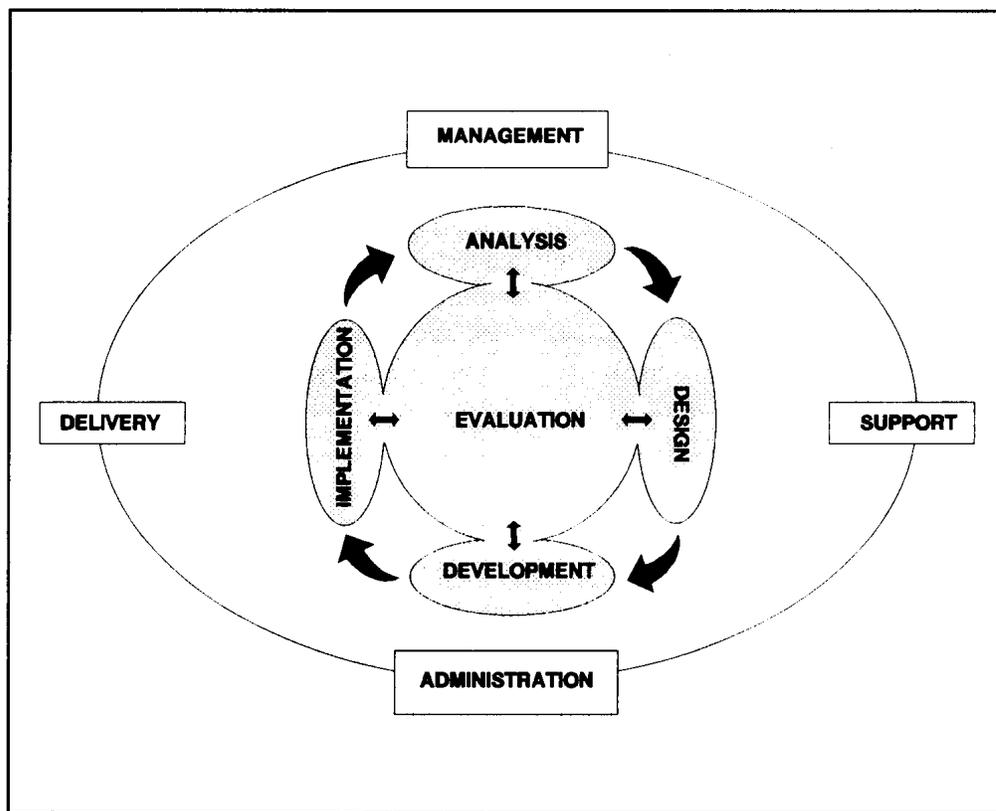
The system functions of the ISD model are as follows.

- **Management**—the function of directing or controlling instructional system development and operations.
- **Support**—the function of maintaining all parts of the system.
- **Administration**—the function of day-to-day processing and record keeping.
- **Delivery**—the function of bringing instruction to students.
- **Evaluation**—the function of gathering feedback data through formative, summative, and operational evaluations to assess system and student performance.

#### Relation to ISD

Using these essential functions to design the overall instructional system architecture and then allocating them to the respective instructional system components, or people responsible, ensures that these functions are operational when the total training system is fielded. ISD products are integrated into the total instructional system, and aspects of the instructional system functions are active throughout all phases of the ISD process.

Figure 3 shows the phases most often used in the systems approach, which are analysis, design, development, and implementation, with the evaluation activities integrated into each phase of the process. The phases are embedded within the system functions. Evaluation is shown as the central feedback "network" for the total system.



**Figure 3. Functions with Phases**

### Relation To ISD (Continued)

The instructional development process, which the model summarizes, calls for instructional developers to:

- **Analyze** and determine what instruction is needed.
- **Design** instruction to meet the need.
- **Develop** instructional materials to support system requirements.
- **Implement** the instructional system.

**Evaluation is a central function that takes place at every phase.**

Symbolically, Figure 3 shows that all phases of the model depend on each of the other phases. The ISD process allows the instructional developer or design team to enter or reenter the various phases of the process as determined by the nature and scope of the development or revision activity. The phases of the updated model are described below.

### Analysis Phase

In courses that tie the content directly to preparing a student to do a job, the instructional developer analyzes the job performance requirements and develops a task list. The developer then analyzes the job tasks and compares them with the skills, knowledge, and abilities of the incoming students. The difference between what they already know and can do and what the job requires them to know and be able to do determines what instruction is necessary. The activities of formative evaluation begin.

**Design Phase**

In the design phase, the instructional developer develops a detailed plan of instruction which includes selecting the instructional methods and media, and determining the instructional strategies. Existing instructional materials are reviewed during this phase to determine their applicability to the specific instruction under development. In this phase, the developers also develop the instructional objectives and test and design the instruction. The implementation plan for the instructional system is developed in this phase and a training information management system is designed, if required. Formative evaluation activities continue in this phase.

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**Development Phase**

In the development phase, both the student and instructor lesson materials are developed. If the media selected in the design phase included items such as videotapes, sound/slides, interactive courseware (ICW), and training devices, these are developed. If a training information management system was developed for the instructional system, it is installed in this phase. As a final step in this phase, the implementation plan is updated. During this phase, instructional developers also validate each unit/module of instruction and its associated instructional materials as they are developed. They correct any deficiencies that may be identified. Validation includes:

- Internal review of the instruction and materials for accuracy
  - Individual and small-group tryouts
  - Operational tryouts of the "whole" system
- Revision of units/modules occurs as they are validated, based on feedback from formative and summative evaluation activities. The final step in this phase is to finalize all training materials.
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**Implementation Phase**

The instructional system has been designed and developed, and it is now time for the actual system to become operational. In this phase, the instructional system is fielded under operational conditions. The activities of operational evaluation provide feedback from the field on the graduate's performance.

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**Evaluation**

Evaluation is a continuous process beginning during the analysis phase and continuing throughout the life cycle of the instructional system. Evaluation consists of:

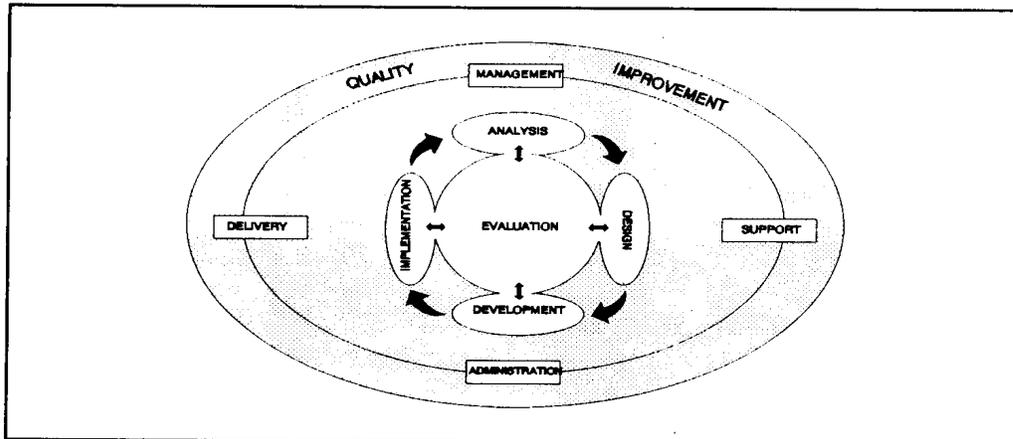
- Formative Evaluation**, consisting of process and product evaluations conducted during the analysis and design phases, and validation which is conducted during the development phase. Included are individual and small group tryouts.
- Summative Evaluation**, consisting of operational tryouts conducted as the last step of validation in the development phase.
- Operational Evaluation**, consisting of periodic internal and external evaluation of the operational system during the implementation phase.

Each form of evaluation should be used during development, update, and revision of instruction, if possible, and if the form of evaluation is applicable.

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## Updated AF ISD Model

Figure 4 depicts the completed ISD model. This completed figure shows the system functions and ISD phases embedded within the quality improvement (QI) process.



**Figure 4.** Updated AF ISD Model

The updated model graphically illustrates that:

- Evaluation is the "centerpiece" of the ISD process.
- ISD is a continuous process with the flexibility to enter and reenter the various phases, as necessary, to develop, update, or revise instruction.
- All ISD activities take place within and are dependent on the system functions.
- Teamwork is required between personnel performing system functions and those designing, developing, and implementing instructional systems.
- All ISD activities and system functions focus on continuous quality improvements in the system.

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## Section C Quality Improvement

### Introduction

The Air Force goal of continuous quality improvement is achieved in the ISD process. As can be seen in Figure 4, the entire ISD process takes place within the sphere of quality improvement. Throughout the process, each ISD activity and product is continuously covered in order to improve quality.

### What It Is

**Quality improvement (QI)** is the continuous, organized creation of beneficial change to the system. The objective of quality improvement is to foster continuous improvement in the products and processes.

All of the principles of quality are implemented in the ISD process. The ISD process ensures total quality in the education and training environment by continuously evaluating the process and products. The relationship between the key concepts of QI can be easily seen in the ISD process. For example:

- Customers define quality. ISD emphasizes criterion-based instruction. The criteria are directly linked to performance requirements in the field. Field representatives identify education and training requirements which instruction providers such as Air Education and Training Command (AETC) or other training organizations are then under "contract" to satisfy. All evaluations are focused on the graduate's actual job performance.