

# Standards and Competencies for Graduates of Instructional Technology Education Programs

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## **KNOWLEDGE BASE**

These standards have been developed within the context of several years of effort by AECT to define the field of educational technology and to specify the knowledge base for the field. The general curriculum overview is based on *Instructional Technology: The Definition and Domains of the Field* (Seels & Richey, 1994) and *The Knowledge Base of Instructional Technology: A Critical Examination* (Richey, Caffarella, Ely, Molenda, Seels, & Simonson, 1993). The *Instructional Technology* document provides a definition of the field and describes the domains and sub-domains of the field. The *Knowledge Base* document provides an in-depth examination of the knowledge base for each domain.

The current standards are significantly changed from earlier versions that were based upon roles and functions of instructional technology professionals. The new standards are grounded in the research and theory of the field as described in the knowledge base of the field.

The definition of instructional technology prepared by the AECT Definitions and Terminology Committee is as follows:

Instructional Technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning. ... The words Instructional Technology in the definition mean a discipline devoted to techniques or ways to make learning more efficient based on theory but theory in its broadest sense, not just scientific theory. ... Theory consists of concepts, constructs, principles, and propositions that serve as the body of knowledge. Practice is the application of that knowledge to solve problems. Practice can also contribute to the knowledge base through information gained from experience. ... Of design, development, utilization, management, and evaluation ... refer to both areas of the knowledge base and to functions performed by professionals in the field. ... Processes are a series of operations or activities directed towards a particular result. ... Resources are sources of support for learning, including support systems and instructional materials and environments. ... The purpose of instructional technology is to affect and effect learning. (Seels & Richey, 1994, pp. 1-9)

This definition is clearly grounded in the knowledge base of the field of instructional technology.

These standards for the NCATE program review documentation are likewise grounded in the knowledge base of the field. The knowledge base for the field is divided into five interrelated domains: design, development, utilization, management, and evaluation as shown in Figure 1 (Seels & Richey, 1994, p. 21). Within each domain there are sub-domains that serve to describe each domain. For example, evaluation is

divided into problem analysis, criterion-referenced measurement, formative evaluation, and summative evaluation.

The relationship among the domains shown in Figure 1 is not linear, but synergistic. Although research may focus on one specific domain or sub-domain, practice, in reality, combines functions in all or several domains.

For example, a practitioner working in the development domain uses theory from the design domain, such as instructional systems design theory and message design theory. A practitioner working in the design domain uses theory about media characteristics from the development and utilization domains and theory about problem analysis and measurement from the evaluation domain. (Seels & Richey, 1994, p. 25)

Each domain also contributes to the other domains as well as to the research and theory shared by the domains.

An example of shared theory is theory about feedback which is used in some way by each of the domains. Feedback can be included in both an instructional strategy and message design. Feedback loops are used in management systems, and evaluation provides feedback. (Seels & Richey, 1994, pp. 25-26)

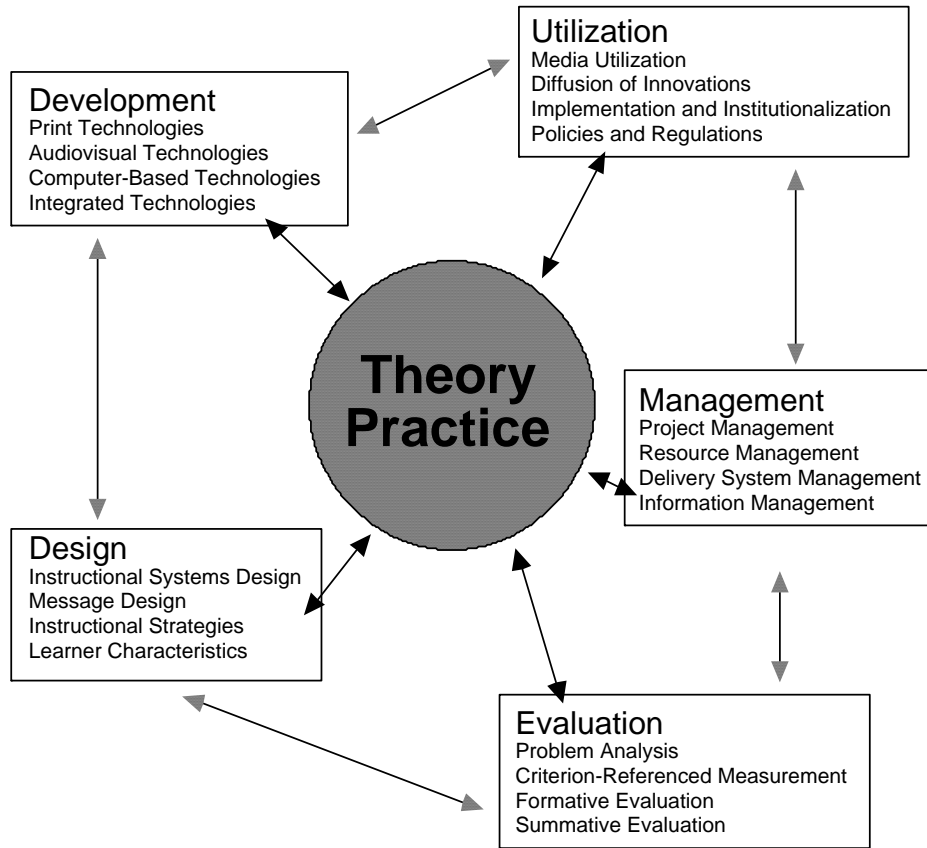


Figure 1 . Domains of the Field

The Definition and Terminology Committee has provided descriptions for each of the domains:

Design refers to the process of specifying conditions for learning. ... Development refers to the process of translating the design specifications into physical form. ... Utilization refers to the use of processes and resources for learning. ... Management refers to processes for controlling instructional technology. ... Evaluation is the process for determining the adequacy of instruction. (Seels & Richey, 1994, pp. 24-43)

The Committee has also provided a description for each of the sub-domains of the knowledge base.

The content for the knowledge base of each domain is provided in a series of papers entitled *The Knowledge Base of Instructional Technology: A Critical Examination* (Richey, Caffarella, Ely, Molenda, Seels, & Simonson, 1993). The key elements of the knowledge base of each domain are described in detail in these papers. Although researchers may concentrate their efforts in only one domain, most SMETS practitioners will be employed in roles that draw upon multiple domains.

## ***Standards and Competencies of Graduates of Instructional Technology***

These standards are concerned primarily with the candidate competencies required for graduates of introductory programs in the area of school media and educational technology specialists (SMETS). Initial SMETS programs are defined as those which represent initial entry into the field. For example, a Baccalaureate or Master's program which prepares individuals for either initial school certification or entry level positions in business or industry may be considered an initial SMETS program.

### **Introduction**

Definitions of educational technology and a discussion of the philosophical basis for training programs are provided in Chapter I of this document and should be reviewed prior to developing program review documentation in response to the initial standards defined in this chapter. Initial program standards are built on the assumption that the institution provides an adequate base of school media services for all educational programs. In addition, NCATE's program standards specify specialized facilities and services deemed necessary to support the development of the competencies required of graduates of the program.

Details of content and organization for initial programs are not specified in the standards. All initial programs should provide for minimal competencies within each domain of the instructional technology knowledge base. The intent of the standards is to provide the maximum degree of flexibility enabling institutions to develop soundly conceived and defined programs. It is not expected that every program will include all standards, since the very nature of a program will provide a focus in one area while not including other areas.

Curricula and candidate performances for the initial preparation of personnel in the fields of school media and educational technology should be grounded in the knowledge base of the field. The domains of the field include design, development, utilization, management, and evaluation. Programs will vary in their concentration on each of the domains.

The complete domains and sub-domains are listed below:

## **Design**

- Instructional Systems Design
- Message Design
- Instructional Strategies
- Learner Characteristics

## **Development**

- Print Technologies
- Audiovisual Technologies
- Computer-Based Technologies
- Integrated Technologies

## **Utilization**

- Media Utilization
- Diffusion of Innovations
- Implementation and Institutionalization
- Policies and Regulations

## **Management**

- Project Management
- Resource Management
- Delivery System Management
- Information Management

## **Evaluation**

- Problem Analysis
- Criterion-Referenced Measurement
- Formative Evaluation
- Summative Evaluation

Within these five domains and twenty sub-domains, the program may be composed of those competencies most appropriate to the intended roles of the candidates.

### ***SPECIAL NOTE:***

As with all indicators within each Standard, candidates are not expected to provide evidence of **every** indicator. Additionally, indicators marked with a "\*" are specifically oriented toward the preparation of school media specialists and have particular relevance to their role.

## **Standard 1: DESIGN**

Candidates demonstrate the knowledge, skills, and dispositions to design conditions for learning by applying principles of instructional systems design, message design, instructional strategies, and learner characteristics.

### ***Supporting Explanations:***

*“Design is the process of specifying conditions for learning”* (Seels & Richey, 1994, p. 30). The domain of design includes four sub-domains of theory and practice: Instructional Systems Design (ISD), Message Design, Instructional Strategies, and Learner Characteristics.

### **1.1 Instructional Systems Design (ISD)**

*“Instructional Systems Design (ISD) is an organized procedure that includes the steps of analyzing, designing, developing, implementing, and evaluating instruction”* (Seels & Richey, 1994, p. 31). Within the application of this definition, ‘design’ is interpreted at both a macro- and micro-level in that it describes the systems approach and is a step within the systems approach. The importance of process, as opposed to product, is emphasized in ISD.

- 1.1.1 Analyzing: process of defining what is to be learned and the context in which it is to be learned.
- 1.1.2 Designing: process of specifying how it is to be learned.
- 1.1.3 Developing: process of authoring and producing the instructional materials.
- 1.1.4 Implementing: actually using the materials and strategies in context.
- 1.1.5 Evaluating: process of determining the adequacy of the instruction.

### **1.2 Message Design**

*“Message design involves planning for the manipulation of the physical form of the message”* (Seels & Richey, 1994, p. 31). Message design is embedded within learning theories (cognitive, psychomotor, behavioral, perceptual, affective, constructivist) in the application of known principles of attention, perception, and retention which are intended to communicate with the learner. This sub-domain is specific to both the medium selected and the learning task.

### **1.3 Instructional Strategies**

*“Instructional strategies are specifications for selecting and sequencing events and activities within a lesson”* (Seels & Richey, 1994, p. 31). In practice, instructional strategies interact with learning situations. The results of these interactions are often described by instructional models. The appropriate selection of instructional strategies and

instructional models depends upon the learning situation (including learner characteristics), the nature of the content, and the type of learner objective.

#### **1.4 Learner Characteristics**

*“Learner characteristics are those facets of the learner’s experiential background that impact the effectiveness of a learning process”* (Seels & Richey, 1994, p. 32). Learner characteristics impact specific components of instruction during the selection and implementation of instructional strategies. For example, motivation research influences the selection and implementation of instructional strategies based upon identified learner characteristics. Learner characteristics interact with instructional strategies, the learning situation, and the nature of the content.

#### **Performances Indicative of the Design Standard**

Select candidate performances which are applicable to your program. The following indicators are examples of performances related to the design standard. You may wish to identify additional performance indicators related to your program.

### **1.1 Instructional Systems Design**

- 1.1.a Utilize and implement design principles which specify optimal conditions for learning.
- 1.1.b Identify a variety of instructional systems design models and apply at least one model.
- 1.1.c Identify learning theories from which each model is derived and the consequent implications.

#### *1.1.1 Analyzing*

- 1.1.1.a Write appropriate objectives for specific content and outcome levels.
- 1.1.1.b Analyze instructional tasks, content, and context.
- 1.1.1.c Categorize objectives using an appropriate schema or taxonomy.
- 1.1.1.d Compare and contrast curriculum objectives for their area(s) of preparation with federal, state, and/or professional content standards.

#### *1.1.2 Designing*

- 1.1.2.a Create a plan for a topic of a content area (e.g., a thematic unit, a text chapter, an interdisciplinary unit) to demonstrate application of the principles of macro-level design.
- 1.1.2.b Create instructional plans (micro-level design) that address the needs of all learners, including appropriate accommodations for learners with special needs.
- 1.1.2.c\* Integrate information literacy skills into classroom and media center instruction.
- 1.1.2.d Incorporate contemporary instructional technology processes in the development of interactive lessons that promote student learning.
- 1.1.2.e\* Collaborate with teachers on subject-area curriculum teams to ensure that information literacy standards are integrated within the curriculum.

### *1.1.3 Developing*

- 1.1.3.a Produce instructional materials which require the use of multiple media (e.g., computers, video, projection).
- 1.1.3.b Demonstrate personal skill development with at least one: computer authoring application, video tool, or electronic communication application.

### *1.1.4 Implementing*

- 1.1.4.a Use instructional plans and materials which they have produced in contextualized instructional settings (e.g., practica, field experiences, training) that address the needs of all learners, including appropriate accommodations for learners with special needs.
- 1.1.4.b\* Establish a well-organized and professionally managed school media collection based on the principles of cataloging and classification of library media center resources.
- 1.1.4.c\* Organize materials based on the AACR2, MARC, Library of Congress, Sears and other systems as appropriate for the cataloging and classification of school media center resources for efficient access and retrieval by the students, teachers, administrators and community members.

1.1.4.d\* Organize, classify, and maintain bibliographic records within the media center to ensure efficient access to resources for students and teachers.

*1.1.5 Evaluating*

1.1.5.a Utilize a variety of assessment measures to determine the adequacy of learning and instruction.

1.1.5.b Demonstrate the use of formative and summative evaluation within practice and contextualized field experiences.

1.1.5.c Demonstrate congruency among goals/objectives, instructional strategies, and assessment measures.

## **1.2 Message Design**

- 1.2.a Apply principles of educational psychology, communications theory, and visual literacy to the selection of media for macro- and micro-level design of instruction.
- 1.2.b Apply principles of educational psychology, communications theory, and visual literacy to the development of instructional messages specific to the learning task.
- 1.2.c Understand, recognize and apply basic principles of message design in the development of a variety of communications with their learners.

## **1.3 Instructional Strategies**

- 1.3.a Select instructional strategies appropriate for a variety of learner characteristics and learning situations.
- 1.3.b Identify at least one instructional model and demonstrate appropriate contextualized application within practice and field experiences.
- 1.3.c Analyze their selection of instructional strategies and/or models as influenced by the learning situation, nature of the specific content, and type of learner objective.
- 1.3.d Select motivational strategies appropriate for the target learners, task, and learning situation.

## **1.4 Learner Characteristics**

- 1.4.a Identify a broad range of observed and hypothetical learner characteristics for their particular area(s) of preparation.
- 1.4.b Describe and/or document specific learner characteristics which influence the selection of instructional strategies.
- 1.4.c Describe and/or document specific learner characteristics which influence the implementation of instructional strategies.
- 1.4.d\* Describe and/or document specific learner characteristics which influence the selection of instructional strategies and resources within the media center.

1.4.e\* Describe and/or document specific learner characteristics which influence the implementation of instructional strategies and resources within the media center.

## **Standard 2: DEVELOPMENT**

Candidates demonstrate the knowledge, skills, and dispositions to develop instructional materials and experiences using print, audiovisual, computer-based, and integrated technologies.

### ***Supporting Explanation:***

*“Development is the process of translating the design specifications into physical form”* (Seels & Richey, 1994, p. 35). The domain of development includes four sub-domains : Print Technologies, Audiovisual Technologies, Computer-Based Technologies, and Integrated Technologies. Development is tied to other areas of theory, research, design, evaluation, utilization, and management.

### **2.1 Print Technologies**

*“Print technologies are ways to produce or deliver materials, such as books and static visual materials, primarily through mechanical or photographic printing processes”* (Seels & Richey, 1994, p. 37). Print technologies include verbal text materials and visual materials; namely, text, graphic and photographic representation and reproduction. Print and visual materials provide a foundation for the development and utilization of the majority of other instructional materials.

### **2.2 Audiovisual Technologies**

*“Audiovisual technologies are ways to produce or deliver materials by using mechanical devices or electronic machines to present auditory and visual messages”* (Seels & Richey, 1994, p. 38). Audiovisual technologies are generally linear in nature, represent real and abstract ideas, and allow for learner interactivity dependent on teacher application.

### **2.3 Computer-Based Technologies**

*“Computer-based technologies are ways to produce or deliver materials using microprocessor-based resources”* (Seels & Richey, 1994, p. 39). Computer-based technologies represent electronically stored information in the form of digital data. Examples include computer-based instruction(CBI), computer-assisted instruction (CAI), computer-managed instruction (CMI), telecommunications, electronic communications, and global resource/reference access.

### **2.4 Integrated Technologies**

*“Integrated technologies are ways to produce and deliver materials which encompass several forms of media under the control of a computer”* (Seels & Richey, 1994, p. 40). Integrated technologies are typically hypermedia environments which allow for: (a) various levels

of learner control, (b) high levels of interactivity, and (c) the creation of integrated audio, video, and graphic environments. Examples include hypermedia authoring and telecommunications tools such as electronic mail and the World Wide Web.

### **Performances Indicative of the Development Standard**

Select candidate performances which are applicable to your program. The following indicators are examples of performances related to the development standard. You may wish to identify additional performance indicators related to your program.

- 2.0.1 Select appropriate media to produce effective learning environments using technology resources.
- 2.0.2 Use appropriate analog and digital productivity tools to develop instructional and professional products.
- 2.0.3 Apply instructional design principles to select appropriate technological tools for the development of instructional and professional products.
- 2.0.4 Apply appropriate learning and psychological theories to the selection of appropriate technological tools and to the development of instructional and professional products.
- 2.0.5 Apply appropriate evaluation strategies and techniques for assessing effectiveness of instructional and professional products.
- 2.0.6 Use the results of evaluation methods and techniques to revise and update instructional and professional products.
- 2.0.7 Contribute to a professional portfolio by developing and selecting a variety of productions for inclusion in the portfolio.
- 2.0.8\* Develop school media collections focused on curricular needs, including a full range of print, non-print, and electronic resources.

### **2.1 Print Technologies**

- 2.1.1 Develop instructional and professional products using a variety of technological tools to produce text for communicating information.

- 2.1.2 Produce print communications (e.g., flyers, posters, brochures, newsletters) combining words and images/graphics using desktop publishing software.
- 2.1.3 Use presentation application software to produce presentations and supplementary materials for instructional and professional purposes.
- 2.1.4 Produce instructional and professional products using various aspects of integrated application programs.

## **2.2 Audiovisual Technologies**

- 2.2.1 Apply principles of visual and media literacy for the development and production of instructional and professional materials and products.
- 2.2.2 Apply development techniques such as storyboarding and or scriptwriting to plan for the development of audio/video technologies.
- 2.2.3 Use appropriate video equipment (e.g., camcorders, video editing) to prepare effective instructional and professional products.
- 2.2.4 Use a variety of projection devices with appropriate technology tools to facilitate presentations and instruction.

## **2.3 Computer-Based Technologies**

- 2.3.1 Design and produce audio/video instructional materials which use computer-based technologies.
- 2.3.2 Design, produce, and use digital information with computer-based technologies.
- 2.3.3 Use imaging devices (e.g., digital cameras, video cameras, scanners) to produce computer-based instructional materials.
- 2.3.4\* Incorporate the use of the Internet, online catalogs and electronic databases to meet the reference and learning needs of students and teachers.

## **2.4 Integrated Technologies**

- 2.4.1 Use authoring tools to create effective hypermedia/multimedia instructional materials or products.
- 2.4.2 Develop and prepare instructional materials and products for various distance education delivery technologies.
- 2.4.3 Combine electronic and non-electronic media to produce instructional materials, presentations, and products.
- 2.4.4 Use telecommunications tools such as electronic mail and browsing tools for the World Wide Web to develop instructional and professional products.
- 2.4.5 Develop effective Web pages with appropriate links using various technological tools (e.g., print technologies, imaging technologies, and video).
- 2.4.6 Use writable CD-ROMs to record productions using various technological tools.
- 2.4.7 Use appropriate software for capturing Web pages, audio wave files, and video files for developing off-line presentations.
- 2.4.8\* Prepare instructional materials, bibliographies, resource lists for instructional units, and other materials as appropriate to support students and teachers.

### **Standard 3: UTILIZATION**

Candidates demonstrate the knowledge, skills, and dispositions to use processes and resources for learning by applying principles and theories of media utilization, diffusion, implementation, and policy-making.

#### ***Supporting Explanations***

*“Utilization is the act of using processes and resources for learning”* (Seels & Richey, 1994, p. 46). This domain involves matching learners with specific materials and activities, preparing learners for interacting with those materials, providing guidance during engagement, providing assessment of the results, and incorporating this usage into the continuing procedures of the organization.

### **3.1 Media Utilization**

*“Media utilization is the systematic use of resources for learning”* (Seels & Richey, 1994, p. 46). Utilization is the decision-making process of implementation based on instructional design specifications.

### **3.2 Diffusion of Innovations**

*“Diffusion of innovations is the process of communicating through planned strategies for the purpose of gaining adoption”* (Seels & Richey, 1994, p. 46). With an ultimate goal of bringing about change, the process includes stages such as awareness, interest, trial, and adoption.

### **3.3 Implementation and Institutionalization**

*“Implementation is using instructional materials or strategies in real (not simulated) settings. Institutionalization is the continuing, routine use of the instructional innovation in the structure and culture of an organization”* (Seels & Richey, 1994, p. 47). The purpose of implementation is to facilitate appropriate use of the innovation by individuals in the organization. The goal of institutionalization is to integrate the innovation within the structure and behavior of the organization.

### **3.4 Policies and Regulations**

*“Policies and regulations are the rules and actions of society (or its surrogates) that affect the diffusion and use of Instructional Technology”* (Seels & Richey, 1994, p. 47). This includes such areas as web-based instruction, instructional and community television, copyright law, standards for equipment and programs, use policies, and the creation of a system which supports the effective and ethical utilization of instructional technology products and processes.

### **Performances Indicative of the Utilization Standard**

Select candidate performances which are applicable to your program. The following indicators are examples of performances related to the utilization standard. You may wish to identify additional performance indicators related to your program.

3.0.1\* Assess, analyze and design a media facility for optimal use and functionality to support contemporary educational goals of the school media program.

3.0.2\* Use automated processes and technologies related to school media center operations.

### **3.1 Media Utilization**

3.1.1 Identify key factors in selecting and using technologies appropriate for learning situations specified in the instructional design process.

3.1.2 Use educational communications and instructional technology (SMETS) resources in a variety of learning contexts.

3.1.3\* Provide services and resources to all users in all formats that support curriculum needs and recreational reading interests of the students and teachers that are consistent with the mission, goals, and objectives of the local school community.

3.1.4\* Provide accurate and prompt reference information and exhibit strong communication skills when responding to reference inquiries.

3.1.5\* Use interlibrary loan and other resources, such as statewide and/or other electronic gateways, to acquire resources for students and teachers through the school media center.

3.1.6\* Identify collection development resource tools to establish, maintain and evaluate a high quality collection for the media center in a variety of formats that supports standards-based curricula and addresses the information and learning needs of all learners.

### **3.2 Diffusion of Innovations**

3.2.1 Identify strategies for the diffusion, adoption, and dissemination of innovations in learning communities.

3.2.2\* Publicize the value of school media programs within the school, community, and local school district.

### **3.3 Implementation and Institutionalization**

3.3.1 Use appropriate instructional materials and strategies in various learning contexts.

3.3.2 Identify and apply techniques for integrating SMETS innovations in various learning contexts.

3.3.3 Identify strategies to maintain use after initial adoption.

3.3.4\* Understand and apply the principles of management theory to the operations of the school media center.

- 3.3.5\* Use automated processes and technologies related to design, production and implementation of instructional materials and information systems in the operations of the school media program.

### **3.4 Policies and Regulations**

- 3.4.1 Identify and apply standards for the use of instructional technology.
- 3.4.2 Identify and apply policies which incorporate professional ethics within practice.
- 3.4.3 Identify and apply copyright and fair use guidelines within practice.
- 3.4.4 Identify and implement effective policies related to the utilization, application, and integration of instructional technologies.
- 3.4.5 Identify policies and regulations which apply to the utilization, application, and integration of distance delivery technologies.
- 3.4.6\* Identify current local, state, and federal policies and procedures and apply them within the school media program and the operation of the school media center.
- 3.4.7\* Identify and apply contemporary laws related to copyright, fair use, and intellectual freedom in the school media program.
- 3.4.8\* Develop acceptable use policies (AUPs) for Internet use in P-12 settings.
- 3.4.9\* Develop circulation policies and procedures which ensure students and teachers have access to media center resources in all formats.
- 3.4.10\* Develop and use policies and procedures that include collection development/selection, reconsideration of challenged materials, and weeding criteria that are consistent with the ethics of the information profession and with the mission, goals and objectives of the local school district.

## **Standard 4: MANAGEMENT**

Candidates demonstrate knowledge, skills, and dispositions to plan, organize, coordinate, and supervise instructional technology by applying principles of project, resource, delivery system, and information management.

***Supporting Explanations:***

*“Management involves controlling Instructional Technology through planning, organizing, coordinating, and supervising”* (Seels & Richey, 1994, p. 49). The domain of management includes four sub-domains of theory and practice: Project Management, Resource Management, Delivery System Management, and Information Management. Within each of these sub-domains there is a common set of tasks to be accomplished: organization must be assured, personnel hired and supervised, funds planned and accounted for, facilities developed and maintained, and short- and long-term goals established. A manager is a leader who motivates, directs, coaches, supports, monitors performance, delegates, and communicates.

**4.1 Project Management**

*“Project management involves planning, monitoring, and controlling instructional design and development projects”* (Seels & Richey, 1994, p. 50). Project managers negotiate, budget, install information monitoring systems, and evaluate progress.

**4.2 Resource Management**

*“Resource management involves planning, monitoring, and controlling resource support systems and services”* (Seels & Richey, 1994, p. 51). This includes documentation of cost effectiveness and justification of effectiveness or efficiency for learning as well as the resources of personnel, budget, supplies, time, facilities, and instructional resources.

**4.3 Delivery System Management**

*“Delivery system management involves planning, monitoring and controlling ‘the method by which distribution of instructional materials is organized’ . . . [It is] a combination of medium and method of usage that is employed to present instructional information to a learner”* (Seels & Richey, 1994, p. 51). This includes attention to hardware and software requirements, technical support for the users and developers, and process issues such as guidelines for designers, instructors, and SMETS support personnel.

**4.4 Information Management**

*“Information management involves planning, monitoring, and controlling the storage, transfer, or processing of information in order to provide resources for learning”* (Seels & Richey, 1994, p. 51). Information is available in many formats and candidates must be able to access and utilize a variety of information sources for their professional benefit and the benefit of their future learners.

**Performances Indicative of the Management Standard**

Select candidate performances which are applicable to your program. The following indicators are examples of performances related to the management standard. You may wish to identify additional performance indicators related to your program.

- 4.0.1 Demonstrate leadership attributes with individuals and groups (e.g., interpersonal skills, group dynamics, team building).
- 4.0.2\* Establish mission, goals and objectives of the school media program that align with and support those of the local school district and community.
- 4.0.3\* Develop a collaborative working relationship with school administration and staff which results in a strong understanding and widespread use of the school media program.

## **4.1 Project Management**

- 4.1.1 Apply project management techniques in various learning and training contexts.
- 4.1.2\* Use knowledge of school, district, state, regional, and national organizations to support efficient and effective operations in contemporary school media programs.

## **4.2 Resource Management**

- 4.2.1 Apply resource management techniques in various learning and training contexts.
- 4.2.2\* Manage and evaluate qualified personnel and volunteer staff for an effective school media program.
- 4.2.3\* Prepare and justify a budget that supports standards-based curricula and that provides necessary resources to ensure the success of the school media program.
- 4.2.4\* Identify effective school media program services that promote collaborative planning and curriculum development with classroom teachers.
- 4.2.5\* Facilitate collaborative teaching practices among school faculty, staff, curriculum specialists, and teacher aides.

- 4.2.6\* Mentor and empower students, teachers, administrators and community members in their use of the school media center.

### **4.3 Delivery System Management**

- 4.3.1 Apply delivery system management techniques in various learning and training contexts.

#### *4.4 Information Management*

- 4.4.1 Apply information management techniques in various learning and training contexts.

- 4.4.2\* Apply a planning process for the development of school media programs using tools such as flowcharts and timelines.

## **Standard 5: EVALUATION**

Candidates demonstrate knowledge, skills, and dispositions to evaluate the adequacy of instruction and learning by applying principles of problem analysis, criterion-referenced measurement, formative and summative evaluation, and long-range planning.

### ***Supporting Explanations:***

*“Evaluation is the process of determining the adequacy of instruction and learning”* (Seels & Richey, 1994, p. 54). SMETS candidates demonstrate their understanding of the domain of evaluation through a variety of activities including problem analysis, criterion-referenced measurement, formative evaluation, and summative evaluation.

### **5.1 Problem Analysis**

*“Problem analysis involves determining the nature and parameters of the problem by using information-gathering and decision-making strategies”* (Seels & Richey, 1994, p. 56). SMETS candidates exhibit technology competencies defined in the knowledge base. Candidates collect, analyze, and interpret data to modify and improve instruction and SMETS projects.

### **5.2 Criterion-Referenced Measurement**

*“Criterion-referenced measurement involves techniques for determining learner mastery of pre-specified content”* (Seels & Richey, 1994, p. 56). SMETS candidates utilize criterion-referenced performance indicators in the assessment of instruction and SMETS projects.

### **5.3 Formative and Summative Evaluation**

*“Formative evaluation involves gathering information on adequacy and using this information as a basis for further development. Summative evaluation involves gathering information on adequacy and using this information to make decisions about utilization”* (Seels & Richey, 1994, p. 57). SMETS candidates integrate formative and summative evaluation strategies and analyses into the development and modification of instruction, SMETS projects, and SMETS programs.

### **5.4 Long-Range Planning**

*Long-range planning that focuses on the organization as a whole is strategic planning....Long-range is usually defined as a future period of about three to five years or longer. During strategic planning, managers are trying to decide in the present what must be done to ensure organizational success in the future.”* (Certo et al., 1990, p. 168). SMETS candidates demonstrate formal efforts to address the future of this highly dynamic field including the systematic review and implementation of current SMET developments and innovations.

### **Performances Indicative of the Evaluation Standard**

Select candidate performances which are applicable to your program. The following indicators are examples of performances related to the evaluation standard. You may wish to identify additional performance indicators related to your program.

#### **5.1 Problem Analysis**

5.1.1 Identify and apply problem analysis skills in appropriate school media and educational technology (SMET) contexts (e.g., conduct needs assessments, identify and define problems, identify constraints, identify resources, define learner characteristics, define goals and objectives in instructional systems design, media development and utilization, program management, and evaluation).

5.1.2\* Apply knowledge of current trends and issues in the field of school media.

#### **5.2 Criterion-Referenced Measurement**

5.2.1 Develop and apply criterion-referenced measures in a variety of SMET contexts.

5.2.2\* Identify and collect appropriate data to support decision-making, short- and long-term, for the school media program.

### **5.3 Formative and Summative Evaluation**

5.3.1 Develop and apply formative and summative evaluation strategies in a variety of SMET contexts.

5.3.2\* Develop and implement a school media program evaluation process.

5.3.3\* Use a variety of summative and formative assessment techniques for the evaluation of the school media center and for the school media program.

#### **5.4 Long-Range Planning**

5.4.1 Develop a long-range strategic plan related to any of the domains or sub-domains.

5.4.2\* Develop and update a long-range strategic school media program plan.

## ***HISTORY OF THE FIELD***

Today, the field is fascinated with the instructional possibilities presented by the computer as a medium of communication and as a tool for integrating a variety of media into a single piece of instruction. Video has replaced the educational film, and television can be two-way and interactive.

At the turn of this century a number of technological inventions and developments were made that provided new, and in some cases, more efficient means of communication. In the 1920s, the motion picture passed through the stage of being a mere curiosity to a serious medium of expression, paralleling live theater. Its usefulness and influence on learning was explored. This educational research continued into the 1930s, when new instructional projects such as teaching by radio were implemented. Within 20 years both film and radio became pervasive communication systems, providing both entertainment and information to the average citizen.

The advent of World War II created many demands for a new skilled workforce. Media took a prominent place in educational and training systems attempting to fill such needs, and much research centered on the use of these media in a wide variety of teaching and learning situations. Media were among the innovations that made possible the changes and growth in the industrial complex that were so essential to the defense of the western world.

After the war, schools and industry alike attempted to settle back into the old, familiar methods of operation. Within a few years, however, the increase in the birth rate and public school enrollment forced a re-evaluation of the older and slower approaches to education. Again, media were employed, this time to upgrade the curriculum of the public schools.

With the late 1940s and early 1950s came considerable experimentation with television as an instructional tool. Industry was expanding and began to develop its own in-house educational systems. Simultaneously, a search was begun for more efficient and effective means by which such education could be accomplished.

Concurrent with the introduction and development of the study of instructional media, the notion of a science of instruction was evolving. The educational psychologists provided a theoretical foundation which focused on those variables which influenced learning and instruction. The nature of the learner and the learning process took precedence over the nature of the delivery media.

Some of the early audiovisual professionals referred to the work of Watson, Thorndike, Guthrie, Tolman, and Hull. But it was not until the appearance of Skinner's

(1954) work with teaching machines and programmed learning that professionals in the field felt that they had a psychological base. Skinner's work in behavioral psychology, popularized by Mager (1961), brought a new and apparently more respectable rationale for the field. Lumsdaine (1964) illustrated the relationship of behavioral psychology to the field, and Wiman and Meierhenry (1969) edited the first major work that summarized the relationship of learning psychology to the emerging field of instructional technology. Bruner (1966) offered new insights that eventually led to broader participation of cognitive psychologists like Glaser (1965) and Gagné (1985). Today, the field not only seems convinced of the importance of the various aspects of cognitive processing of information, but is placing new emphasis upon the role of instructional context, and the unique perceptions and views of the individual learner.

Perhaps one of the most profound changes in instructional technology has come in the expansion of the arenas in which it is typically practiced. From its beginnings in elementary and secondary education, the field was later heavily influenced by military training, adult education, post-secondary education, and much of today's activity is in the area of private sector employee training. Consequently, there is increased concentration on issues such as organizational change, performance improvement, school reform, and cost benefits.

Use of the principles, products, and procedures of instructional technology, however, continue to be vital to school effectiveness, especially in times of school restructuring. In addition, the new technologies and new delivery media offer expanded ways of meeting the special needs of learners and schools.

Instructional technology and instructional design procedures in particular, are also becoming more common in health care education, training, and non-formal educational settings. Each of these instructional contexts highlights the diverse needs of learners of many ages and interests, and of organizations with many goals. The many settings also provide laboratories for experimenting with and perfecting the use of the new technologies.

However, the disparate contexts also highlight a wide range of organizational, cultural, and personal values and attitudes. Cultures vary among the different communities, creating new issues and possibilities for new avenues of disciplinary growth and development.

The historical context which has surrounded the development of the field has implications that reach beyond the actual events themselves. This is equally true of the development of modern technology responsible for an increasing number of new media and new uses for existing media. Such developments have redirected the energies of many people, causing today's society to be much broader and richer than was ever contemplated in the early 1900s.

Prior to the twentieth century, the only formal means of widespread communication was the printing press. The technological developments since then have provided many different modes of expression, enabling ideas, concepts, and information gained from experience to be conveyed in ways and with contextual richness never before possible.

The unique means of expression that have expanded with each new medium have added new dimensions through which creative talents can be applied. For example, the photographic and cinematographic media have long been accepted as legitimate avenues for creative work in the arts, and television has provided new avenues for expanding views of society.

Still photography, motion picture photography, television, and the computer have proved to be excellent tools for a variety of academic endeavors. Historians consider film coverage of public events to be important primary documentation. Psychologists now use film, computers, and interactive video to control experiences and to collect data on a wide variety of problems in human behavior. Medical researchers employ both color photography and color television in their studies. In fact, it would be difficult for modern scholars to maintain a position of leadership in their fields of investigation without the assistance from media that present day technology makes possible. Further, the future of humanity's understanding of the universe and the pursuit of greater self knowledge depends upon increasingly sophisticated applications and utilizations of these technologies.

Alternative modes for teaching and learning are most important in today's educational environment. Opportunities for self-directed learning should be provided by institutions of higher education. Other forms of alternative teaching and learning patterns which require increased student involvement and higher levels of learning (application, synthesis, evaluation) also rely upon media as an invaluable tool in the preparation of students.

Teaching and communication, though not synonymous, are related. Much of what the teacher does involves communication. From the spoken word to the viewing of the real world, directly or by means of some technological invention, communication permeates instructional activities.

Media, materials, and interactive technologies, though not the exclusive ingredients in learning, are an integral part of almost every learning experience. The raw materials for scholarship increasingly reside in these means. The scholarly experiences for the student can often be afforded only through these options. The young scholar, the college student, is a deprived scholar without access to these learning tools.

The scholar must have available all that modern technology can provide. Media, materials, and interactive technologies have a crucial role to play in any teacher education program if that program hopes to meet the needs of our dynamic, sophisticated world.