Domain of Instructional Development

After the analysis and design phases of an instructional design project are complete, the next step is to make the delivery system a physical reality based on the learning objectives. This reality could be a text book, web site, PowerPoint presentation, video, hardware, software, audiotape or a combination of all the above depending on technology and the underlying theories. The foundation of instructional development is media production, which is not a solitary endeavor because it is interrelated with all other domains in terms of theory, evaluation, utilization and management.

This domain encompasses the content-based message (designed in the previous phases), theory-based instructional strategy, and the physical product. During the development phases, an instructional designer must consider several theories pertaining <u>visual literacy</u>, <u>auditory processing</u>, <u>communications</u>, as well as their application to design principles. Examples of models that can be utilized in the development of instructional materials are Reiser and Gagne (1983) and Kemp, Morrison, and Ross (1994). These are procedural models which can be used to select media and delivery systems. The selection criteria for both models are similar and include: learner, group and task characteristics, feasibility and practicality (Seels & Glasgow, 1998). The instructional designer uses these theories and principles to ensure that the content-based message is presented and communicated to the learners in the most effective way possible.

During the development phase, the instructional designer uses the established learning objectives, outcomes and instructional strategy from the analysis and design steps to create a draft of the instructional materials such as a script or storyboard. Concurrently, the designer will produce the materials, which may entail printing on paper, recording sound bytes or programming software. Once the materials are ready, then a formative evaluation begins. There are several methods of evaluating the instructional materials that can be used including small and large focus groups of learners, one-to-one evaluations and large-scale trials. Then, depending on the results of the evaluations, the materials will either be revised until the learning outcome is achieved, or validated as effective materials that can be used to reach the learning objective and subsequently utilized within the system.

In terms of actual production of the instructional materials, once the formative evaluation is complete, there are four categories of technology media within the instructional development domain: Print, Audiovisual, Computer-Based, and Integrated. As with any form of media there are advantages and disadvantages depending on a variety of factors related to learner needs, cost effectiveness, availability of resources and accessibility (Seels & Richey, 1994).

Print

According to Seels & Richey (1994), print technologies are ways to produce or deliver static materials such as text, graphic and photographic representation and reproduction. The generated product is always in hard copy form. They also serve as a foundation for the other categories of technology, as well as the development and utilization of other materials. Print technologies include both verbal text and visual materials, which are based upon learning, linguistic, human information processing and visual perception theories.

One of the potential disadvantages of using static print technologies is that the communication between learner and material is one-way. Advantages of using this technology include ease of duplication and portability, as well as being relatively inexpensive to produce (Seels & Glasgow, 1998).

Audiovisual

Audiovisual technologies are ways to produce, deliver or present auditory and visual messages such as video, cassette tapes, transparencies and slides. Their development is based on behavioral and cognitive psychology principles and they are primarily characterized by the use of hardware in the teaching/learning process (Seels & Richey, 1994). This form of technology tends to be teacher-centered with low learner interactivity and does not depend solely on the learners' ability to comprehend words.

Relative disadvantages of using audiovisual technologies could include cost and difficulty in reproduction or portability. Advantages include their ability to present dynamic and static visuals, and their ease of usability and comprehension due to a tendency to be linear (Seels & Glasgow, 1998).

Computer-Based

According to Seels and Richey (1994), any type of production or delivery of materials using a computer is referred to as computer-based technology. The distinguishing characteristic of this type of technology is that information is stored electronically. This category includes both hardware and software and may be labeled computer-based instruction (CBI), computer-based training (CBT), web-based training (WBT), computer-assisted instruction (CAI), or computer-managed instruction (CMI). There are four specific types of CBI learning tools including: tutorials, drill and practice, games and simulations, and databases. As with the audiovisual technologies, the theoretical basis of these applications lie within the behavioral and cognitive psychology knowledge areas.

The possible disadvantages of using computer-based technologies are similar to those of audiovisual technologies in that this technology tends to be more expensive and may not be as user-friendly as other mediums. The advantages, on the other hand, are numerous and include the relative versatility of instruction which can is used in random

or linear ways. They can also be primarily learner-centered with a high level of interactivity, as opposed to the print and audiovisual technologies (Seels & Glasgow, 1998).

<u>Integrated</u>

As the name implies, integrated technologies incorporate several forms of media under the control of a computer. One of the primary characteristics of this technology is a high level of learner interactivity which is cognitively-centered and based on constructivist principles (Seels & Richey, 1994). There are also two main types of delivery systems associated with this technology including telecommunications and multimedia systems. Telecommunications or teleconferencing enables interactive learning across distances. Multimedia is the incorporation of other media technologies such as audiovisuals, which are commonly used in asynchronous learning environments. An example of integrated technology is a learning management system (LMS) such as Blackboard Vista, <u>Moodle</u> or <u>Plateau</u>, which enable educators or trainers to facilitate synchronous and/or asynchronous learning online using streaming video, games, simulations, live discussions and virtual materials. The relative advantages and disadvantages of integrated technologies are similar to the computer-based technologies, except that with distance education the learner has control over their educational experience and they can do it from anywhere in the world (Seels & Glasgow, 1998).