Domain of Instructional Design

Design | Development | Utilization | Management | Evaluation

Introduction | About Me | Field of IT | Domains | Competencies
Artifacts | Resume | References | Works Cited | Glossary

Instructional Design is defined as “the process of specifying conditions for learning” (Seels & Richey, 1994, p. 30).

Instructional Design is focused on the systematic process of learning. According to Dick and Carey, a systems point of view of learning is a process in which every component: teacher, learners, materials and learning environment work symbiotically toward the goal of successful learning. A system is simply a “set of interrelated parts, all of which work together toward a defined goal” (Dick & Carey, 2001, p. 2-3). This view takes into consideration that all parts of any given system work together with equal credence toward a common goal. Each part of the system has its own role and is equally as vital to the functioning of the system as whole. There are several models that an Instructional Designer may follow when designing instruction. The models as well as the processes embodied in all of the models are referred to as *Instructional Systems Development* or (ISD). (Dick & Carey, 2001, p. 4)

During the Instructional Design process the designer will ask and answer the following questions:

- What are the important characteristics of the learners, learning environment and learning context?
- What are the goals and objectives that need to be taught?
- What strategies are the most effective for the learners to master the objectives?
- How will the learner be assessed to determine if they mastered the objectives?
- What instructional delivery system will be the most effective for the objectives to be met and are most appropriate to the design project?

Instructional Design is divided into four sub-domains or components that make up the design processes.

The first sub-domain, Instructional System Design, is defined as “an organized procedure that includes the systematic process of analyzing, designing, developing, implementing and evaluating instruction” (Seels & Richey, 1998, p. 31). This step-by-step process of designing instruction can be illustrated in the **A**nalysis, **D**esign **D**evelopment, **I**mplementation, and **E**valuation model as seen in the visual below. The **ADDIE** model provides a general framework, however, for other, more specific, Instructional Design projects instructional designers can choose from various models. While offering new steps and process, the majority of these models demonstrate the systematic processes of designing instruction.

- **A**-Analysis: the process of defining what is to be learned
- **D**-Design: the process of specifying how it is to be learned
- **D**-Development: the process of authoring and producing the materials
- **I**-Implementation: the process of installing the project in the real world context
- **E**-Evaluation: the process of determining the impact of instruction

(Seels, B. & Glasgow, Z., 1998, p. 13).

ADDIE Model

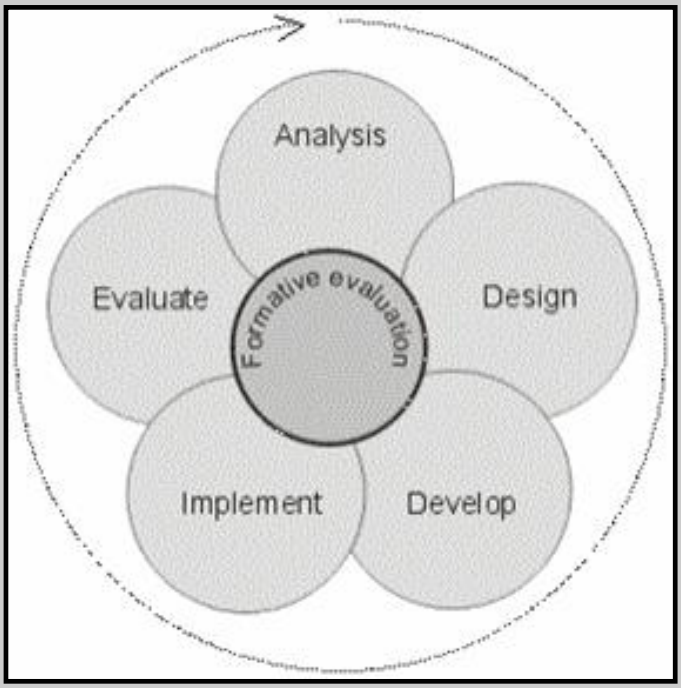

Figure 3: ADDIE Model

Image adopted from:

www.up.ac.za/academic/soba/SAAPAM/vol36n3/clapper.htm

The Instructional design process is systematic and is a result of a comprehensive and thorough analysis. The analysis process will guide every aspect of the design product. Analysis is a crucial phase of the Instructional Design Processes. This phase may also be referred to as a Needs Assessment. During the Needs Assessment or analysis information about the learners, learning context and performance problem will be gathered and analyzed. This analysis information will allow the designer to identify the instructional goals. (Dick & Carey, 2001) The analysis phase consists of a comprehensive set of process and sub-steps in and of itself. However, it is a component of the instructional design process, therefore is a phase that is incorporated in all instructional design models.

There are many models that a designer may utilize to guide his/her analysis. A designer may choose a model to follow while considering: the specifics of the performance problem, the context of problem, the learners and any other pertinent information that may impact the development process. There are some differences evident among various instructional design models. However, in comparing and contrasting

various phases it is apparent that the primary steps are consistent across all Instructional analysis models.

Figures 4, 5 and 6 are examples of Instructional Design models:

Reiser & Dick ISD Model

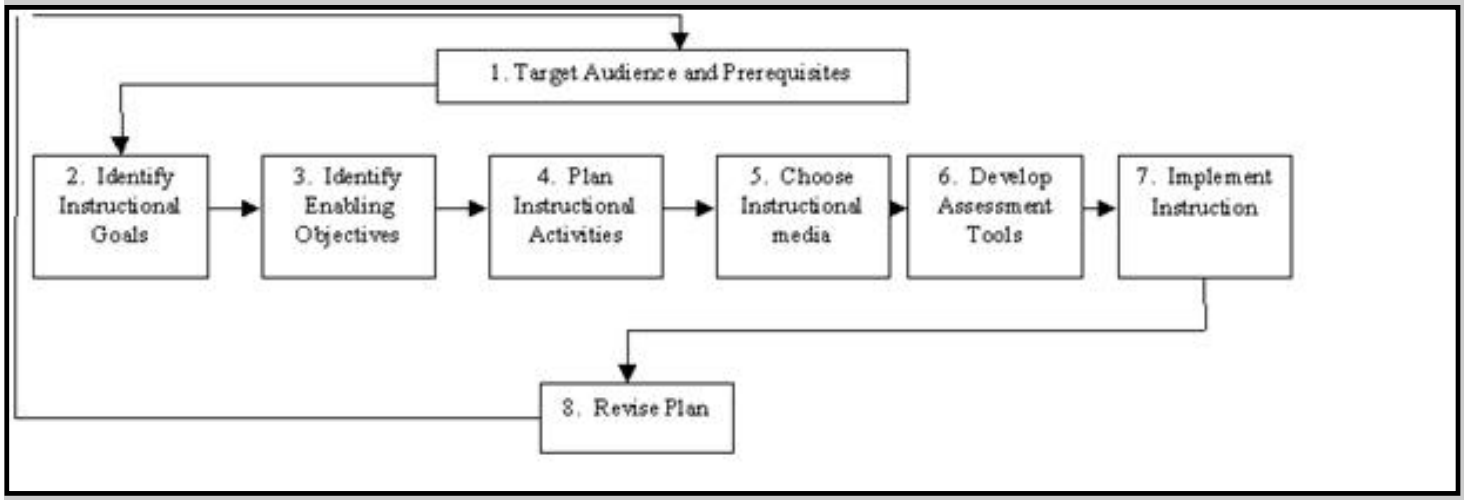

Figure 4: Reiser & Dick ISD Model

Image adopted from Reiser and Dick:

http://www.ic.arizona.edu/ic/edp511/fig1_isd.gif

Smith & Ragan ISD Model

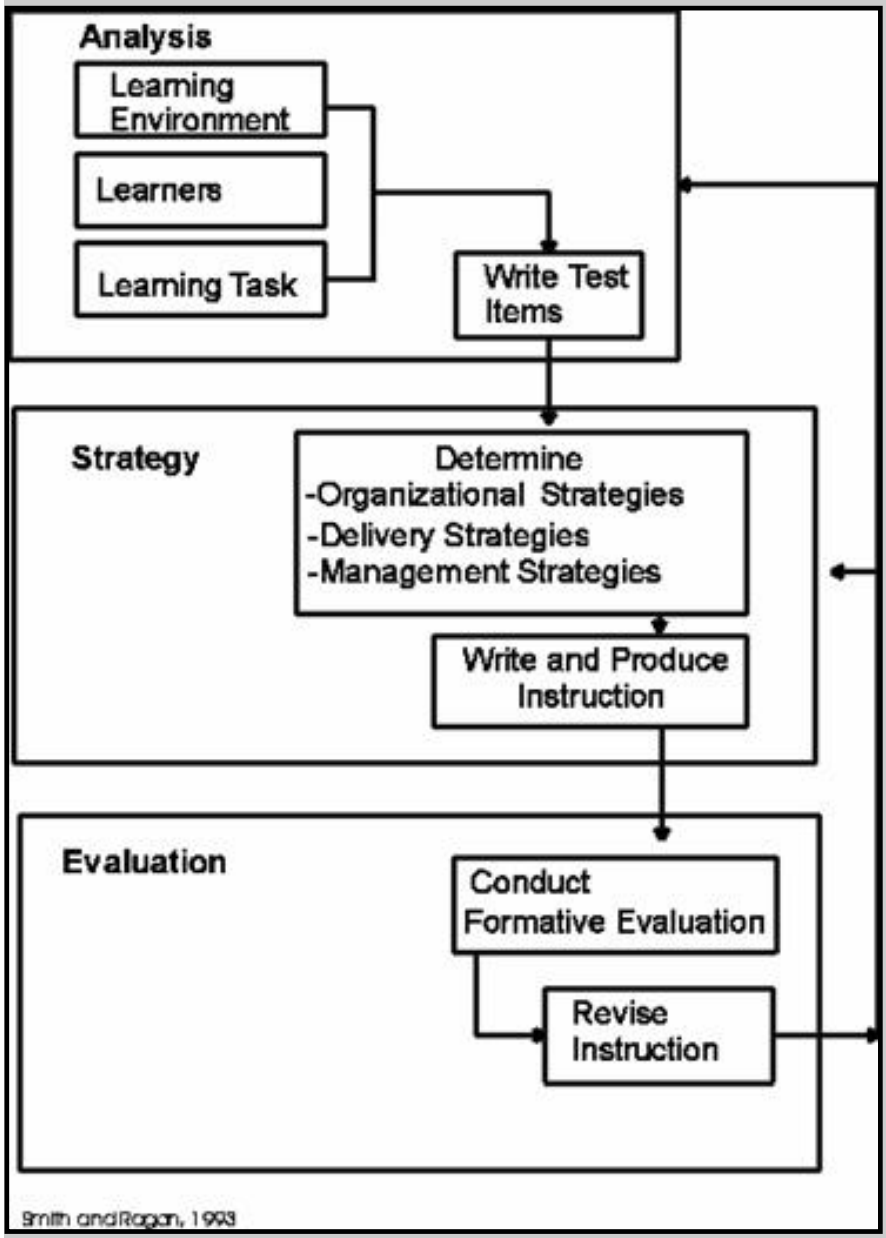

Figure 5: Smith & Ragan ISD Model

Image adopted from Smith and Ragan:

http://www.acs.ucalgary.ca/~edtech/688/getstart.htm

Seels & Glasgow ISD Model

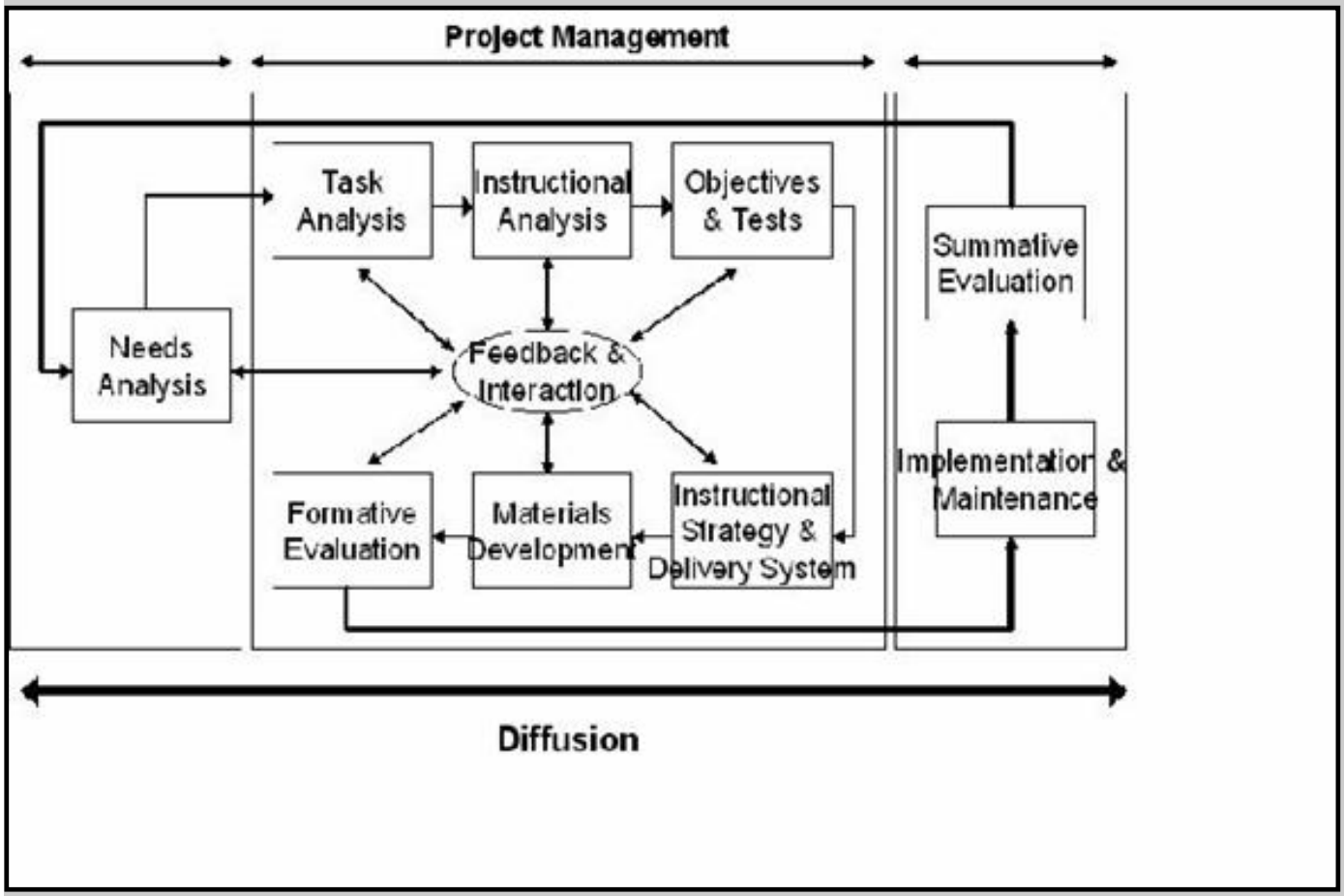

Figure 6: Seels & Glasgow ISD Model
Image adopted from Seels and Glasgow:

http://en.wikibooks.org/wiki/Instructional_Technology/Seels_and_Glasgow_Model_II

A widely accepted and implemented Instructional Systems Design Models is the Dick and Carey model of Instructional Design. An important part of this model is analysis phase in which the designer identifies goals, conducts instructional analysis which consists of learner, environmental and task analysis and generates learning or performance objectives for the instructional design phase.

Dick & Carey Design Model

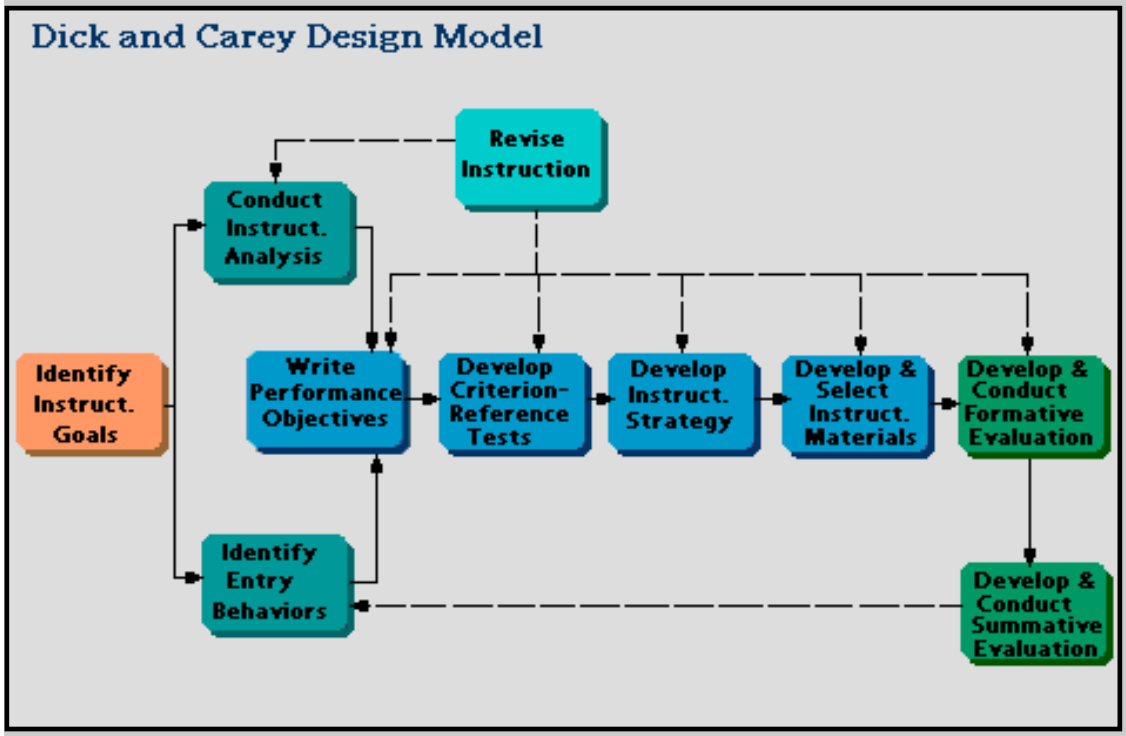

Figure 7: Dick & Carey ISD Model

Image adopted from:

http://www.dean.usma.edu/math/activities/cape/Instructional_Models/dc_design.html

As seen in Figure 7, the Dick and Carey model demonstrates that Instructional Designers engage in analysis prior to: designing and developing instruction, evaluating, revising, implementing and evaluating the instruction again. Similar to other Instructional Design models, the Dick and Carey model follows the general guidelines of the ADDIE model. This model is comprehensive and specific in that there are sub-steps of each phase of the ADDIE model that are more detailed.

Another Instructional Systems Design Model is the Kemp, Morrison and Ross Model (see Figure 8) of Instructional Systems Design. As seen below the Kemp, Morrison and Ross model presents the instructional design process as a circular process . This implies that the design processes do not function autonomously of one another. As evidenced by the format and organization of the model, each step is not only dependent upon the step before it and impacts the step after it , but at the same time they are impacted by the outer-ring processes. This model contains the steps of the design processes that are generally outlined in the **ADDIE** model.

Kemp, Morrison & Ross ISD Model

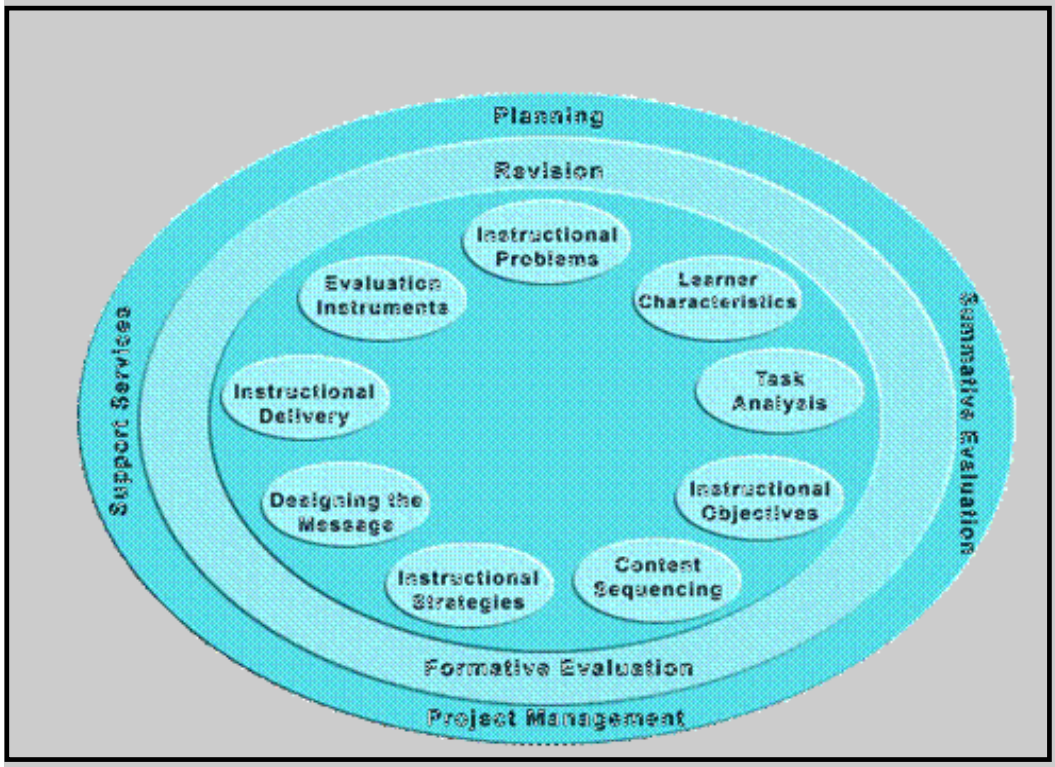

Figure 8 : Kemp, Morrison, & Ross ISD Model

Image adopted from:

http://web.ics.purdue.edu/~baterden/Model2.htm

Although various Instructional Design Models are available for use, the instructional designer often follows the model that best suits the project specifications. Some instructional designers may choose to combine elements from more than one model. The primary concern of the designer is to use the model that will serve to solve the performance problem and is based on needs of the learners and the conditions.

Message Design:

Message design is the format in which the instructional message is relayed to the learner. It involves "planning for the manipulation of the physical form of the message" (Seels and Richey, p. 31).

Message design is the impetus for conveying the content of the instructional objectives. In essence, the message design will include the information that the learner will learn. However, there is much more to message design than simply writing the content. During every instructional design process some instructional messages are designed and delivered to the learner. Message design is an extremely deliberate combination of instructional theory paradigms and graphic design principles. Message design includes the processes of planning what the instructional message will include as well as what it looks like and how it is delivered: text, audio, video, and/or multimedia, etc.

In Instructional Design processes, message design is often driven by the results of the learner, environmental and contextual analyses. Designers try to infuse the multimedia message with the information derived from the analyses in order to produce and develop the most effective instructional messages to include in the product**.** Instructional designers often employ basic principles and theories of designing

instructional messages. For example, a designer may consider the *Three Assumptions of a Cognitive Theory of Multimedia Learning* as described by Richard Mayer (Mayer, 2001) (See Table 1).

Table 1: Mayer's Three Assumptions of Multimedia Learning

Assumption	Description	Implication in ISD
Dual Channels	Learners have separate channels for processing visual and auditory information	Information input, storage, and recall is enhanced by presenting information in both visual and verbal form.
Limited Capacity	Learners are limited in the amount of information that they can process in each channel at one time	Images and words should be coupled when deemed to be an effective. They should serve to send the same message. Designers should not present too much verbal or visual information to a learner. Also designers should not present too much information for the learner to store in their working memory while learning; message design can impact this.
Active Processing	Learners engage in active learning by attending to relevant incoming information, organizing selected information into coherent representations, and integrating mental representations with other knowledge	Designers should design instructional messages specifically for the ease of the learner to: select, organize and integrate the information by strategically using: • Font Type, **Bold,** Underlined, *Italicized*, size & color variances, etc. • Graphics • Formatting-how the information is laid out, spaced, organized • Advanced Organizers

Instructional Strategies:

Instructional Strategies may be considered the "how to" or the guide on the manner in which the content will be developed, written and delivered. The strategies will be considered and planned according to: learner

characteristics, learning outcomes and instructional goals. Therefore, the instructional strategies will vary according to each instructional design project. Information from instructional analysis will guide decision making in choosing instructional strategies for every instructional design project. Additionally, a designer will use this information to choose an instructional model that will meet the needs of the learners as well as the instructional goals.

In 1965, Robert Gagne published *The Conditions of Learning* which outlined the relationship between learning objectives and appropriate instructional design strategies . As an instructional theory, Gagne's Conditions of Learning theory is based on cognitive information processing theories of learning. The model assists designers in designing instructional events particularly selection of instructional strategies. The basic principles of Gagne's work should be considered and utilized during the design and development phase of Instructional Design. The general principles that are useful for instructional designers are:

- A different type of instruction is necessary for different learning outcomes.
- The particular procedures that make up instructional events vary according to each type of learning outcome.

Gagne identifies five categories of learning: Illustrates learning outcomes as well as the instructional strategy that can be implemented to meet the outcome.

Table 2: ***Gagne's Taxonomy of Learning Outcomes & Conditions of Learning***

Gagne's Taxonomy of Learning Outcomes & Conditions of Learning		
Taxonomy of Learning Outcomes	**Example**	**Critical Learning Conditions**
Verbal Information	Stating previously learned materials such as facts, concepts, principles, and procedures, e.g., listing the seven major symptoms of cancer	1. Draw attention to distinctive features by variations in print or speech. 2. Present information so that it can be made into chunks. 3. Provide a meaningful context for effective encoding of information. 4. Provide cues for effective recall and generalization of information.

Intellectual Skills : Discriminations, Concrete Concepts, Defined Concepts, Rules, Higher Order Rules	Discriminations: Distinguishing objects, features, or symbols, e.g., hearing different pitches played on a musical instrument Concrete Concepts: Identifying classes of concrete objects, features, or events, e.g., picking out all the green M&Ms from the candy jar Defined Concepts: classifying new examples of events or ideas by their definition, e.g., noting "she sells sea shells" as alliteration Rules: Applying a single relationship to solve a class of problems, e.g., calculating the earned run averages (ERA) of the Atlanta Braves Higher Order Rules: Applying a new combination of rules to solve a complex problem, e. g., generating a balanced budget for a state organization	1. Call attention to distinctive features. 2. Stay within the limits of working memory. 3. Stimulate the recall of previously learned component skills. 4. Present verbal cues to the ordering or combination of component skills. 5. Schedule occasions for practice and spaced review. 6. Use a variety of contexts to promote transfer.

Cognitive Strategies	Employing personal ways to guide learning, thinking, acting, and feeling, e.g., devising a corporate plan to improve customer relations	1. Describe or demonstrate the strategy. 2. Provide a variety of occasions for practice using the strategy. 3. Provide informative feedback as to the creativity or originality of the strategy or outcome.
Attitudes	Choosing personal actions based on internal states of understanding and feeling, e.g., deciding to exercise daily as a part of preventive health care	1. Establish an expectancy of success associated with the desired attitude. 2. Assure student identification with an admired human model. 3. Arrange for communication or demonstration of choice of personal action. 4. Give feedback for successful performance; or allow observation of feedback in the human model.
Motor Skills	Executing performances involving the use muscles, e.g., doing a triple somersault dive off the high board	1. Present verbal or other guidance to cue the executive subroutine. 2. Arrange repeated practice. 3. Furnish immediate feedback as to the accuracy of performance. 4. Encourage the use of mental practice.

http://www.my-ecoach.com/idtimeline/theory/gagne.html

Information from: Driscoll, M. *(1991) Psychology of Learning for Instruction*. Allyn and Bacon.

There are various Instructional Design models that can be utilized in planning and applying instructional strategies . One of the most simplistic but valuable instructional strategies is the **S**elect **O**rganize **I**ntegrate (**SOI**) model proposed by Richard Mayer (Mayer, 2001). Mayer's **SOI** model can be implemented for any type of learning outcome. This model includes:

- **S**-Selecting Relevant Information
- **O**-Organizing Incoming Information
- **I**-Integrating Incoming Information

In pragmatic terms and from the learner's perspective, selecting relevant information will include-choosing to attend to clearly important information to learn. This may be indicated by bold-faced, underlined, highlighted information or any other "indicator" that will say to the learner-"this is important". Organizing information will include how the learner perceives the information that they are learning. In what fashion is the information presented to the learner? How is the information structured? This strategy may include an outline format or if the message is auditory, it may include a deliberate pause. The integration of information is essentially, how the learner "puts it all together". This should include intentional and planned connections established by the designer. In other words, the designer should ensure, based on analysis data, that the content not only connects in and of itself but also that the learner connects the newly learned information with prior knowledge. Connections may be established in a number of ways, according to the specific design product. One example is using analogies. These connections or integration of information will ensure learning takes place as instructional messages with no connections are just words.

In Instructional Design processes the ARCS Model (Keller, 1987) may also be used to apply the basic principles and steps of making connections with the learners. The model is designed to increase learner motivation as without learner motivation the presentation of information is likely to be irrelevant. The ARCS Model of Learner Motivation (see Figure 9) demonstrates the general steps or guidelines that could be followed in considering the instructional strategies. The instructional strategies should be chosen for an instructional design product to improve learner motivation.

- **A**-Attention-How are you going to gain and keep the attention of the learner?
- **R**-Relevance-How are you going to make the content relevant to the learner?
- **C**-Confidence-How are you going to make the learner feel as if they can and will learn the material and master the learning objective?
- **S**-Satisfaction-How are you going to cause the learner to feel as if they have gained something from the material and their learning? Is this material and learning personally meaningful and/or purposeful to the learner is some way?

ARCS Model of Motivation

Figure 9: ARCS Model of Motivation

Image adopted from:

http://ausweb.scu.edu.au/aw04/papers/refereed/lund/paper.htm

Learner Characteristics:

The learner characteristics are the driving force behind all instruction. If the learner characteristics are not accurately, thoroughly and effectively analyzed the instruction may be irrelevant and ineffective. Learner characteristics should include any and all information that is relevant to the instructional design project. Typically, the following information will be utilized as a starting point for the learner analysis: age, socioeconomic background, entry behaviors, prior knowledge, attitude toward content, attitude toward delivery system, academic motivation for instruction, education and ability levels, learning preference/style, and attitude toward organization. This information may be adequate to begin an instructional design project. However, during the instructional analysis, the designer should determine if any other learner information would be pertinent and use that information as well. An instructional design project and product should always include some degree of learner analysis as effective instruction is learner centered.

Historically, Pedagogy or teaching has been content and teacher centered. However, the paradigm shift in education has resulted in moving from a more teacher centered approach of instruction to a more learner centered approach. Today, pedagogy is the art, science, or profession of teaching (Merriam Webster Dictionary, 2006).

In 1973, Malcolm Knowles published the book, The Adult Learner: A Neglected Species in which Andragogy was originally defined as "the art and science of helping adults learn". It has since shifted to a more expansive meaning. The term now refers to learner-focused education for people of all ages. A straightforward depiction of Andragogy is to consider the learner at the center and the learning content surrounding them (see Figure 10).

Visual Comparison: Andragogy & Pedagogy

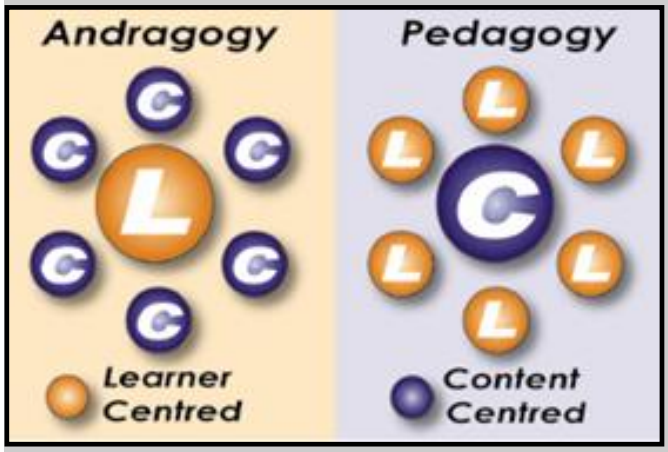

Figure 10: Visual Comparison: Andragogy & Pedagogy

Image adopted from:

http://ausweb.scu.edu.au/aw04/papers/refereed/lund/paper.htm

An instructional designer that approaches instructional design from a learner centered point of view will consider the following general principles of Andragogy that are related to learners and their characteristics:

Learners Need:

- To know why they are learning something
- To learn through experience and problem solving
- To explore topics of immediate value to them-useful, pragmatic
- Choices
- To focus on process, including social process
- Self-directedness, motivated by where the learning will get them (Knowles, 1973).

Introduction About Me History & Definition Domains Competencies Artifacts Resume References Works Cited Glossary