

The Domain of Design

Instructional Systems Design • Message Design • Instructional Strategies • Learner Characteristics

Instructional design is “the process of solving instructional problems by systematic analysis of the conditions for learning” (Seels & Glasgow, 1998, p. 1). It is evident that analysis is a key process event of the instructional design process. That is to say, instructional design involves the two phases: analysis and design. The results of the analysis phase are the foundation for all subsequent development activities in the design phase. Without going through the phase of analysis, the whole instructional design becomes ineffective. In the analysis phase, instructional designers need to identify what instructional problem is, what learners know versus what they should be taught, what characteristics of learners are, what the delivery environment is and should be by conducting needs analysis, task analysis, instructional analysis, and environmental analysis. Given the results of analysis, instructional specifications that address needs are subsequently developed in the design phase. They include instructional materials, instructional activities, sequence of instruction, instructional strategies, and somewhat formative evaluation plans for materials and learning.

As well as being a process, instructional design is a field of theory and practice within the larger field of instructional technology. Of the five domains within the field of Instructional technology, the design domain is a core. All of the other domains are dependent on the design domain. According to Seels and Richey (1994), the domain of design encompasses four major areas of theory and practice: instructional systems design, message design, instructional strategies, and learner characteristics.

Instructional Systems Design

Instructional Systems Design (ISD) is “an organized procedure that includes the steps of Analyzing, Designing, Developing, Implementing, and Evaluating (ADDIE) instruction” (Seels and Richey, 1994, p. 31). The definition indicates that ISD is a systematic process of designing instruction, from needs assessment through the design and development of instructional materials, and implementation and evaluation of instructional intervention. The ADDIE model of designing instruction suggests that the instructional decisions made in each step (output) are used as the input for the next step. In other words, the analysis stage begins with understanding learners and learning/performance environment, assessing the needs, and analyzing goals to determine which learning/performance problems are of high priority. The results of such an analysis are then used as an output to:

- formulate learning goals and objectives,
- identify assessment and instructional strategies,
- select and develop media, materials, and resources, and
- properly sequence instructional tasks.

In the development stage, specific materials and procedures are created to give life to the design blueprints. In the implementation stage, learners actually use the materials and procedures that were created in the development stage. In the evaluation stage the learners are assessed to determine to what extent they mastered the objectives specified at the beginning, and revisions are made as needed.

In the instructional systems design field there have been a number of ISD models that guide instructional designers in solving learning solutions, but almost all of them are developed on the basis of the generic “ADDIE” model. Although the ADDIE model is described as a systematic process of separate steps that done in a linear sequence, in practice it is expanded or utilized as a non-linear, iterative systematic process to designing instruction, highlighting the importance of evaluation and feedback throughout the entire process, stressing the importance of gathering and distributing information in each of the five phases. Such models are the Dick and Carey’s Model (1996) (see Figure 1), the Seels & Glasgow Model (1998), the R2D2 Model (1995), and the Air

Force Model (1975). Of them, the Dick and Carey's model is widely used by practitioners as a framework to design a system of instruction. It breaks the components of the ADDIE model into more specific task steps to designing instruction, highlighting the formative evaluation that is ongoing along with the entire procedural steps. The Seels & Glasgow Model is a new adaptation of the ADDIE model based on the assumption that design happens in a context of project management, also stressing feedback and evaluation among the systematic process of instructional design and development. Contrasting to the two models above, The R2D2 Model and the Air Force Model appear somewhat different variations on the ADDIE model. The R2D2 Model is an iterative, reflective instructional design model based on constructivist theory, which stands for "Recursive" and "Reflective" and "Design" and "Development." It emphasizes formative evaluation in the stage of design and development that brings about changes or revisions early. The Air Force Model is an ISD model that usually used for course planning and development in the training setting. This model emphasizes a thorough systems analysis while at the same time the importance of feedback and interaction between steps of the model that contribute the revise of the course design.

The decision to use an ISD model depends on the specific needs of particular situations or localities. Additionally, the ISD model is just a tool for solving many types of instructional or performance problems. Within the practice of the field, practitioners should step back to see where they are going, otherwise the tool will control them, instead of them controlling the tool.

Message Design

Message design "involves planning for the manipulation of the physical form of the message" (Grabowski, 1991, p. 206). Simply speaking, it refers to planning or selecting what physical form of message to be presented to learners. Message can come in the form of words and/or graphics. Graphics include illustrations, pictures, diagrams, charts, animation, icons, recorded sound, and video. Message cannot be separated from its medium of delivery. Thus, Message design to be discussed below can also be considered as media design. Message design is intended to promote learning with learners. There are some factors that affect learning effectiveness of message: features of the message, learner characteristics, context, and learning goals/tasks. When designing instructional message, there is a general model or process for instructional designers to follow:

- (1) review desired learning outcome and define goal of message design;
- (2) define the context including learner characteristics, learning context, available delivery media and resources;
- (3) assess requirements of content and instructional strategies;
- (4) identify communication function needed to match content types such as multiple content, procedures, concepts, facts, process, and principles; and
- (5) make design decisions by applying principles of learning and instruction (e.g., focusing on attention, activating prior knowledge in memory, minimize cognitive load, and supporting motivation)(Martin, 2007).

Instructional Strategies

According to Dick, Carey, and Carey (2005), instructional strategies are "the way in which instruction is presented to the learners and get them engaged" (p. 183). A well-designed instruction package should contain instructional strategies that an instructor might normally use with the learners in the instruction. The development of an instructional strategy involves the application of one or more instructional design theories. Instructional design theories guide designers in making the decision about what types of learning are involved and what instructional methods for facilitating learning and development are recommended. There are a number of instructional and instructional design theories that designer can choose from to make instructional decisions. Examples of these models are Mayer's "design instruction for constructivist learning" model, Schank's "learning by doing" model, Jonassen's "designing constructivist learning

environments" model, Hannafin's "open learning environments" model, and Gagne's nine instructional events.

Mayer's model focuses on strategies for organizing and utilizing instructional materials to support learning. Schank's model provides strategies for developing learning around goal-based scenarios, which can be used for all major aspects of project-based learning. Jonassen's theory offers strategies for ill-defined or ill-structured problem solving from constructivist perspective. Hannafin's model focuses on strategies for constructing open learning environments where divergent thinking and multiple perspectives are valued. Among instructional design theories discussed above, the decision to the use of which theories for particular situations is built on the framework Reigeluth describes. The framework consists of elements the theory is concerned with: type of learning, control of learning, focus of learning, grouping of learning, interactions for learning, and support for learning. However, Gagne's nine instructional events prescribe a more specific and general guideline for instructional designers developing instructional strategies. The theory is appropriate for all types of learning and all learning environments so that it is widely used and adapted by instructional designers.

Learner Characteristics

Learner characteristics are those elements of the learner's experiential background and cognitive psychology that impact the effectiveness of the learning process. Learner characteristics include previous knowledge and experience, thinking and learning style, motivation and attitude, expectation and interest, culture background and special needs. Data regarding learner characteristics contribute to designing appropriate and effective instruction for target learners. Such data can be gathered by academic records, survey, questionnaire, face-to-face interviews, and motivation and attitude surveys as well. It is critical that instructional designers spend time examining consciously characteristics of the target learners such as diversity and commonalities, in the mean time, and have a particular audience in mind rather than centering on the content when creating instruction.

To combine the above specification in the design domain into an integrated presentation, please see the following domain of development.