

Definition of Design

Instructional Design is defined as the process by which instruction is improved through the analysis of learning needs and systematic development of learning materials (Seels and Richey, 1994). This domain includes analysis as well as systematic design of instruction at both micro and macro levels. Macro level refers to analysis of performance problem at the organizational level in order to identify proper instructional solutions while micro-level refers to analysis and design of specific units of instruction such as a unit plan within a classroom. Collecting data about performance requirements of the job, the context in which the job is completed, and about the people performing the job completes analysis phase of instructional design process. Analysis data is then used to develop a problem statement. An effective analysis will identify any gaps between the actual and the optimal situations. Systematic design serves as the planning function for the remaining domains. During this process a blueprint for the learning materials is created (Seels & Glasgow, 1998).

In order to conduct an effective analysis, an instructional designer collects data about learner, environment, and tasks using variety of tools. Once the data has been collected, the instructional designer analyzes the information to gain perspective on the nature of the problem and to write a problem statement. Next, a solution is recommended. There are many models one can follow to conduct an analysis, one such model is Allison Rossett's Training Needs Assessment (1987). Following this model, one would use techniques such as extant data analysis, needs assessment, and subject matter analysis. Through these methods, the instructional designer is able to state the optimal, actuals, causes, feelings, and solutions (Rossett, 1987).

Once the recommendations have been approved by the stakeholder, the instructional designer makes decisions regarding the goals, instructional strategies, assessment and delivery system (Dick, Carey & Carey, 1994).

The domain of instructional design is the process of specifying conditions for which embodies four major areas: instructional systems design, message design, instructional strategies, and learner characteristics (Seels & Richey, 1994).

Instructional Systems Design (ISD)

Seels and Richey define Instructional Systems Design as *"an organized procedure that includes the steps of analyzing, designing, developing, implementing, and evaluating instruction"* (1994, p. 30). This orderly process has measurable outcomes. Each step can be defined as:

- Analyze –the process of defining what is to be learned
- Design - the process of deciding what the content will be and how it will be delivered
- Develop - the process of producing the materials using a variety of forms of author ware
- Implement - the process of using the materials in an instructional setting
- Evaluate - the process of determining the impact of the instruction (Seels & Richey, 1994).

The Instructional Systems Design (ISD) process is used to create effective and efficient instruction to meet a specific goal. Although ISD process may seem linear with each step proceeding the latter, it is circular; each step serves as a check and balance for the next. Evaluation happens throughout the whole process not just at the end. The most general model used for ISD is the ADDIE model (**A**nalyze, **D**esign, **D**evelop, **I**mplement, and **E**valuate).

The Domain of Design focuses on the first two phases of ADDIE: Analyze and Design. Front-end analysis including, performance analysis and needs assessment is the first part of the ISD. Data for performance analysis and the needs assessment is gathered in through a variety of methods such as interviews, surveys, and observations.

Furthermore, this phase of ISD also includes analyzing the learners and the learning environment to make informed decisions regarding instruction. Learner analysis identifies characteristics such as entry behaviors, prior knowledge, attitudes, and motivation. In conjunction with learner and environmental analyses, the instructional designer also conducts an instructional analysis which breaks down the steps the learner must take to achieve the instructional goal. Once the instructional analysis and learner profile have been created, and learning context is defined then an instructional designer begins the design phase.

In the design phase, the instructional designer translates the instructional analysis results (needs) into performance objectives. Performance objectives are then used to develop assessment items or strategies. The final step in the design phase is establishing the instructional strategies. In addition, instructional designers choose a delivery system before making decision about sequencing instruction, grouping students, and selecting specific learning activities. Depending on the instructional designer's tenet, he/she may choose to follow Gagne's Conditions of Learning, Bloom's Taxonomy of Learning, or another constructivist approach (Dick, Carey, & Carey, 2005).

Message Design

Seels and Richey define message design as "*planning for the manipulation of the physical form of the message.*" (1994, p. 31).

Message Design is used to create an interface between the user and the product. Some of the characteristics of message design are the symbols, such as text, that deal with print, graphics, computer based instruction, or web pages. Text structure is manipulated to communicate the message or topic to the learner. An instructional designer needs to take the medium and goal into account when making decisions regarding message design. The message design will vary depending on whether the medium is static such as a photo or dynamic such as a film. Furthermore, message design incorporates sequencing of pages or screens (Seels & Ritchey, 1994). An example of message design would be using images with abstract text which could enhance a learner's understanding, but if the image does not duplicate the accompanying text, then it will not assist with the learner's comprehension.

An instructional designer may choose Mayer's Designing Instruction for Constructivist Learning or Select, Organize, Integrate (SOI) model to enhance transfer of information and learner retention. This focuses

on a non-discovery and non-manipulation approach to constructivist learning. By using outlines and headers and lighting certain text using typographical signals, the learners are able to cognitively process the material. Some examples of message design include use of headings, text structure on a page, and use of images (Mayer, 1999).

Instructional strategies

Seels & Richey (1994) define instructional strategies as “*specifications for selecting and sequencing events and activities within a lesson*” (p. 31). Instructional strategies are used to achieve specific goals or objectives. In order to identify proper instructional strategies for a set of goals and objectives, the instructional designer should classify them (knowledge, skills and attitude) according to taxonomy of learning. Instructional designers often use either Bloom’s (1956) or Gagne’s (1970) classification for learning outcomes. Gagne (1970) defined nine events:

1. Gaining attention
2. Informing learner of the objective
3. Stimulating recall of prerequisite learning
4. Presenting the stimulus material
5. Providing learning guidance
6. Eliciting the performance
7. Providing feedback about performance correctness
8. Assessing the performance
9. Enhancing retention and transfer

Dick and Carey have organized these nine events into five learning components: pre-instructional activities, content presentation, learner participation, assessment, and follow-through activities. The instructional designer uses each component to prescribe instructional strategies (Dick, Carey, & Carey, 2005).

Instructional strategies cover a wide range of activities including a method of delivery, sequencing and grouping content, describing learning components, establishing student grouping, and selecting media for instruction (Dick, Carey, & Carey, 2005). Once instructional strategies are identified, according to Dick, Carey & Carey (2005) the first step for developing an instructional strategy is to develop a teaching sequence and cluster or group content. The size of the cluster of information is based on age of the learners, complexity of the material, type of learning that is to take place, whether the activity can be varied, and time.

The instructional designer makes decisions regarding the pre-instructional activities, content, learner participation, assessment, and follows through activities prior to the development of the materials and content. When identifying pre-instructional activities, the instructional designer may choose to apply the Keller’s ARCS (Attention, Relevance, Confidence, Satisfaction) model to determine strategies that can motivate the learners. Furthermore, the appropriate form of content presentation and the student participation are defined, and the media or delivery system is selected (Dick, Carey, & Carey, 2005).

Learner Characteristics

Learner characteristic is information regarding entry behaviors, prior knowledge, attitudes toward content and potential delivery system, educational and ability levels, general learning preferences, attitudes toward the organization, and group characteristics (Dick, Carey, and Carey, 2005). Analyzing learner characteristics assists with various components within the design stage such as identifying instructional strategies and media selection. For example, designing a learning module for adult readers with low reading skills may require selection of different media, message, and instructional activities compared with adult learners that are have higher level of reading skills.

As an instructional designer, not only should emphasis should be placed on learner characteristics but also on group characteristics. For example, people born between 1968-1979 are considered Generation X (Gen-Xers) and the Millennials who were born on or after the year 1982. As Generation X enters the workforce, trainers who are aware of their characteristics will be able to develop training that satisfies their traits. Gen-Xers seek evaluation, value expertise, and crave high stimulation (Rominelli, 2003). The Educational Institute conducted a study to determine the best method of training for Gen-Xers. The study concluded that the Gen-Xers prefer Internet and group projects over textbook and instructor led training (Kennedy, 1999).

The Millennials represent the group entering higher education. Their learning preferences lean toward group work, experiential activities, structure, and the use of technology. Understanding the audience will assist the instructional designer with the development of instruction and delivery method that will maximize the retention of information (Oblinger, 2003).