CHAPTER 5: DEFINING INSTRUCTIONAL GOALS AND CONDUCTING GOAL ANALYSIS

Defining Instructional Goals

One of the most important steps in the systematic design process is defining the instructional goal. If you do not know where you are going, how will you know if you ever get there? If the goal is unclear, even the best instruction may not accomplish its desired results.

Often, the instructional design process begins with the specification of learning objectives, overlooking the goal and subordinate skills analyses. Neglecting these two steps in the instructional analysis process, however, is believed to be a mistake and often results in either the inclusion of unnecessary objectives and content information, the exclusion of key objectives and content information or at best, ill-defined relationships among objectives and content information.

This Chapter reviews key concepts covered in Chapters 2 and 3 of the Dick and Carey (1996) textbook. It summarizes approaches for developing goal statements and reviews techniques for identifying major steps necessary to achieve the goal.

Two Approaches for Identifying Goals

Dick and Carey (1996) discuss two methods for identifying instructional goals: (a) the subject matter expert (SME) approach and (b) the performance technology approach. For the purposes of developing an e-learning course, at least one of your team members should serve as the SME as your group works to define a goal statement. It is important to remember that this approach often assumes that training or instruction is appropriate. If, in real life, you feel that training may not be the best method for enhancing performance, you should conduct a needs assessment or training needs analysis to determine the best course of action.

Scope

The scope of your instructional goal will determine the amount of instruction that will be necessary to achieve the goal. A relatively extensive goal may require a series of workshops or a semester of coursework to accomplish. Less extensive goals may take anywhere from a few hours to a few weeks to attain.

Key Components

According to Dick & Carey (1996), a goal statement should include a short description or statement of:

- the learner;
- what learners will know and be able to do;
- the context in which the skills and knowledge will be applied (that provides a rationale for why achievement of the goal is important); and
- the tools that will be available to the learners.

Furthermore, it is believed that the goal statement should provide a rationale for why it is important for learners to achieve it. This may be done in a separate statement within the goal, or may be established as a part of the key components posited by Dick and Carey (1996).

Clarifying Fuzzy Goals

Fuzzy goal statements do not specify what learners can do if they achieve the goal. They typically contain abstract statements of internal learning outcomes like "increase awareness of," "understand" and "appreciate." Fuzzy goals can not be measured, thus making it impossible to determine if learners achieve the goals. The goal should be clarified if it is unclear what performances constitute accomplishment. Mager (1984) described a procedure for clarifying fuzzy goals that include five steps summarized below.

STEP 1

1. Write down the goal. Be sure your statements describe outcomes rather than processes ("have a great golf swing" rather than "learn to have a great golf swing."

STEP 2

1. Brainstorm to identify tasks and skills that have to be completed, demonstrated, or applied for you to agree that the student has successfully achieved the stated goal.

STEP 3

1. Ask yourself the following questions:
• What will I accept as evidence that the goal has been accomplished?
• Given a room full of students, how would I distinguish those who had achieved the goal from those who had not?
• If someone else were assigned the task of identifying the students who have achieved the goal, what indicators would you provide them with?

[3]. Identify someone who has accomplished your goal and write down the indicators of their accomplishment.

STEP 3

[1]. Sort the statements and select those that best represent what is meant by your goal statement. These should be indicators of what learners will be doing once they have achieved your goal.

[2]. Eliminate duplicates.

[3]. Eliminate those that do not actually represent your goal.

[4]. Eliminate or restate those which do not define a performance.

STEP 4

[1]. Incorporate each indicator into a statement that clearly describes what the learner will do. There may be one or many indicators in a given sentence. Statement must describe an outcome that must be achieved before you will acknowledge achievement of the stated goal.

Example: "Understand comma usage"

Performance: Uses commas properly

Statement: Given a set of sentences, the student will be able to place commas in the correct places within the sentence.

STEP 5

[1]. Examine the statement and determine if once the learner demonstrated each of the stated performances you would agree they had achieved your goal.

[2]. Test your statement: If the student is able to correctly place the commas, will you be able to acknowledge that he or she has accomplished the stated goal?

Identify Major Steps

After defining your instructional goal, the next step is to identify the major steps necessary to accomplish the goal. This provides instructional developers with an unambiguous description of what exactly someone would be doing when performing the goal. As noted by Dick and Carey (1996), this is in sharp contrast to first identifying what topics or content areas are necessary to achieve the goal. The content approach focuses on knowing. In comparison, the systematic design approach concentrates on doing.

Goal analysis results in a flow diagram that identifies the skills that lead to the achievement of the instructional goal. This is then used to determine what information needs to be included in the instruction.

In Chapter 3 (Conducting a Goal Analysis), Dick & Carey (1996) discuss two steps in analyzing goals: (a) classifying the goal according to learning outcome, and (b) identifying and sequencing major steps involved in performing the goal. We will concentrate on the second step: identifying and sequencing major steps. It is believed that the classification of learning goals into separate domains (e.g., psychomotor, intellectual skills, verbal information, and attitudes) is an artificial representation of the subject matter. Most instructional goals require a combination of intellectual and psychomotor skills, verbal information and attitudes. For example, playing basketball requires players to shoot, dribble and pass (psychomotor skills), knowledge of the rules (verbal information), development of a game strategy (intellectual skill), and a desire to win (attitudes).

Figure 5.1: An example of Goal Statement

In order to identify and sequence major steps, ask yourself, what do learners need to do to perform a particular goal. Your goal statement may already include a short description of the major steps. Each step may represent a physical activity or a mental step, and the description of each step
should include a verb. A goal analysis results in a flow diagram, or visual display, that clearly identifies and illustrates the relationship among the major steps. Figure 5.1 illustrates an example of goal statement including its steps.

Conducting Goal Analysis

After establishing the instructional goal, the next step in the systematic design process is to identify the subordinate skills, knowledge and attitudes necessary to accomplish the goal. The resulting diagrams (instructional analysis maps) will then be used to generate, cluster and sequence learning goals and objectives in the proceeding step. Dick & Carey (1996) discuss several techniques for identifying subordinate skills, such as hierarchical analysis and cluster analysis. Dick and Carey also use the term "instructional analysis" to describe both goal and subordinate skills analyses, as well as to discuss techniques for analyzing attitudinal goals and verbal information. Other commonly cited methods used to identify relevant skills and knowledge include, but not limited to content analysis, subject matter analysis, task analysis, job analysis, procedural analysis and critical incident analysis. Distinguishing and applying the appropriate analysis techniques are viewed as two of the most complex and time consuming tasks associated with the systematic design process.

In this chapter, we simplify the process by focusing on one basic approach to identifying relevant subordinate skills and knowledge. This does not mean that we believe the distinctions are unimportant.

Simplifying the Process

We simplify the analysis process by synthesizing key attributes of various techniques into one approach we call "Instructional Analysis." Instructional analysis assumes that knowledge can be divided into two basic categories: (a) declarative and (b) procedural knowledge. It helps us answer the question, "What does the target audience need to know and be able to do to accomplish the goal?" It analyzes the major steps specified by goal analysis and seeks to identify the skills and knowledge necessary to accomplish each step in the goal.

Alternative analysis techniques are posited to address different types of learning and performance. Several examples are provided in Chapter 4 of the Dick and Carey (1996) textbook. A hierarchical analysis is recommended for analyzing intellectual and psychomotor skills. Cluster analysis is suggested for identifying major categories of verbal information. Alternative instructional analysis techniques are posited for addressing attitudinal goals, and so on and so forth. To add further complexity, each analysis technique comes with its own set of conventions and procedures. While being able to distinguish between different analysis techniques and use alternative taxonomies to classify learning are competencies associated with highly skilled instructional designers, it is questionable whether the application of these different analysis techniques results in better training or instruction.

The basic purpose of the analysis techniques is to identify what learners need to know and be able to do to achieve a specified goal. We can achieve this purpose by classifying knowledge into two basic categories: declarative and procedural knowledge. Declarative knowledge are the things we know and procedural knowledge are the things we can do. By taking a parsimonious view of learning outcomes we can reduce the number of factors that must be addressed to complete the analysis process.

An Example of an Instructional Analysis Map

An instructional analysis results in visual displays (hereby referred to as an instructional analysis maps) that specify and illustrate the relationships between what learners need to know and be able to do. Figure 5.2 illustrates a portion of the instructional analysis conducted for this Chapter. In the example, box 2.0 (Re) Design Instruction is one of the major steps identified by the goal analysis. The relationships between procedural knowledge are illustrated by horizontal lines and arrows and the relationships between declarative knowledge are represented by vertical lines and arrows. Also note the scheme used to number each box.

The concept of learning hierarchies may also help you conduct your instructional analyses. Hierarchies suggest that learning outcomes may be arranged in order of complexity. For example, in Figure 5.2 the complex skill of completing an analysis report may be broken down into three simpler skills (i.e., completing a goal analysis, subordinate skills analysis, learner and context
analyses). In turn, completing a goal analysis may be further broken down into subordinate skills and knowledge.

![Figure 5.2 Sample of instructional analysis map](image)

**Conventions**

Conventions for diagramming an analysis are specified by Dick and Carey (1996). To apply the simplified analysis process described above, we suggest that you use a slightly modified set of conventions:

1. Write your instructional goal, along with all related steps that appear in boxes at the top of a page.
2. Use boxes connected by horizontal lines and arrows to depict steps within a procedure or process.
3. Use boxes that are connected by vertical lines and arrows to illustrate superordinate and subordinate skills and knowledge.
4. Statements of all skills and knowledge should include verbs that indicate what the student must be able to do with the specified skill or knowledge. Do not include boxes that contain only nouns.
5. If one of the steps involves a decision, it should be represented by a yes/no question within a decision diamond.
6. Use a broken line to illustrate entry behaviors.
7. Use large circles with capital letters to indicate a break in flow that resumes on a separate page.
8. Use small circles with small letters to indicate a break in flow that resumes on the same page.

Figure 5.2 does not apply 5 of the conventions noted above. Can you identify the conventions that are not included in Figure 5.2?

**Answer**

If you answered conventions 1, 5, 6, 7 and 8, you are correct!

- Since Figure 5.2 analyzes one of the major steps associated with the goal, it does not include the goal statement at the top;
- No major decisions are illustrated in the analysis so no decision diamonds are depicted;
- No entry behaviors are defined, therefore the analysis does not include a broken line;
- There are no breaks in the flow that resume on another page so no large circles are used (although, a more detailed analysis here would result in the use of large circles); and
- There are no breaks in the flow that resume on the page so no small circles are used (although, a more detailed analysis here would result in the use of small circles).

**Identifying Entry Behaviors**

As you continue to break each skill down into its component parts, you may start asking yourself, "When should I stop?" As a general rule of thumb, you can stop your analysis when you begin identifying skills and knowledge that learners should have prior to instruction.

For example, let's say your goal is to have students write a research paper. Sooner or later, if you continue to break down the process into its component parts, you will begin to identify basic skills such as, "write a complete sentence," and "use appropriate punctuation."

If your target audience is 9 to 10-year-old elementary school students, addressing basic skills may be an important part of your instruction. However, if your target audience is high school or college students, chances are that you expect them to have already mastered these skills prior to instruction. In such instances, the basic skills become pre-requisite or entry level behaviors, and your instruction will focus on advanced research or writing skills.

**Still Difficult and Time Consuming?**

Of all of the steps involved in the systematic design process, you may find this to be one of the
most challenging. As you conduct your instructional analysis, you may wonder, "Is this really worth it? I already know what I want my students to learn. Why do I need to identify subordinate skills and knowledge and diagram their relationships?"

If you or any of your team members begin to start asking such questions, consider your students. If you, as the instructor, instructional designer, or subject matter expert have problems defining the relationship among targeted skills and knowledge, how do you think your students may feel as novices attempting to make sense of the information for possibly the first time? You may even want to consider providing students with copies of your instructional analysis maps as a part of your instruction. Research suggests that graphic advance organizers that depict the relationship between targeted learning objectives may enhance the acquisition and retention of key concepts.

Concepts that may help you identify subordinate skills and knowledge and prepare your instructional maps follow.

**Limitations with Instructional Analysis**

Some argue that instructional analyses, particularly those that break down learning outcomes into hierarchies, are not valid. Can you think of reasons why? Reflect on current perspectives of knowledge representation and constructivist views of learning.

**Summary**

To design effective instruction, it is important to have a clear picture of what you want your students to know and be able to do. The Instructional Analysis techniques discussed in this chapter provide a systematic method for identifying subordinate skills and knowledge necessary to achieve your instructional goal.

It is recognized that there are a variety of analysis techniques and questions as to the validity of hierarchical methods. This chapter attempts to simplify the instructional analysis process by combining several techniques into one general procedure that results in the development of instructional analysis maps.

The maps illustrate the relationship among key subordinate skills and knowledge and helps to identify entry-level behaviors. They will be used later in the systematic design process to help you generate performance objectives for your instructional unit.

**Task Analysis**

According to Jonassen, Tessmer and Hannum (1999) task analysis is "the single most important component process in the instructional design process" (p. vii). It is through a task analysis that the instructional designer describes how learners should be able to think and perform at the end of the instruction and a blueprint is drawn up of how to accomplish it.

Task analysis differs from needs assessment. A needs assessment seeks to describe the learner, the context of the learning, and describes the goals of an instructional intervention. Task analysis determines what needs to be learned in order to achieve those goals given the particular context and learner.

Instructional designers perform task analysis in order to determine:

- the goals and objectives of learning
- the operational components of jobs, skills, learning goals or objectives
- what type of knowledge characterizes the tasks
- which tasks have the highest priority
- the sequence that the instruction should follow
- how to select or design instructional activities that foster learning
- how to select appropriate media
- how to assess a learners performance

When conducting a task analysis the designer seeks to clarify the outcomes of the instruction, decides which outcomes should be further analyzed and developed, analyzes the components and requirements of those outcomes, arranges the outcomes into an appropriate sequence and determines the type of task being learned.

According to Jonassen, Tessmer and Hannum (1999, p. 6) there are five general classes of task analysis:

- **Job analysis**: describes the behaviors involved in performing a job; generally used when dealing with procedural instruction
• **Learning analysis**: describes the way learners process information as they perform tasks; generally performed when dealing with direct instruction

• **Cognitive task analysis**: describes the actions, knowledge and thinking that learners engage in when performing some task; generally used for problem-solving or guided instruction

• **Activity analysis**: analyzes how people perform in natural, everyday settings; generally used when designing constructivist learning environments

• **Content analysis**: used to break down subject matter content into discrete constructs and their relationships; generally used when planning content, subject or topic-oriented instruction

**References**
