CHAPTER

3

INSTRUCTIONAL GOALS AND OBJECTIVES: FOUNDATION FOR ASSESSMENT

What types of learning outcomes do you expect from your teaching? Knowledge? Understanding? Applications? Thinking skills? Problem-solving skills? Performance skills? Attitudes? Clearly, defining desired learning outcomes is the first step in good teaching. It is also essential to the assessment of student learning. Sound assessment requires relating the assessment procedures as directly as possible to intended learning outcomes.

Instructional goals and objectives play a key role in both the instructional process and the assessment process. They serve as guides for both teaching and learning, communicate the intent of the instruction to others, and provide guidelines for assessing student learning. These major purposes are illustrated in Figure 3.1.

Beginning in the late 1980s and continuing to the present, there were numerous attempts, as part of national and state educational reform efforts, to rethink the major goals of instruction. This rethinking was epitomized by publication of the *Curriculum and Evaluation Standards* by the National Council of Teachers of Mathematics (NCTM) (1989) and more recently updated in the form of the *Principles and Standards for School Mathematics* (NCTM, 2000). The NCTM standards have served as a model for other content areas working to establish new curriculum standards. With the encouragement and support of foundations and the federal government, national efforts to establish subject-matter standards were initiated in a variety of areas, including English, science, history, geography, social studies, civics, economics, foreign languages, physical education, and the arts. A key characteristic of these efforts is that they seek to establish more ambitious instructional goals for all students.

The NCTM standards illustrate what are called content standards in the federal Goals 2000: Educate America Act of 1994 and in the No Child Left Behind Act of 2001. The first two NCTM standards for grades K to 4 are shown in Figure 3.2. Although these brief

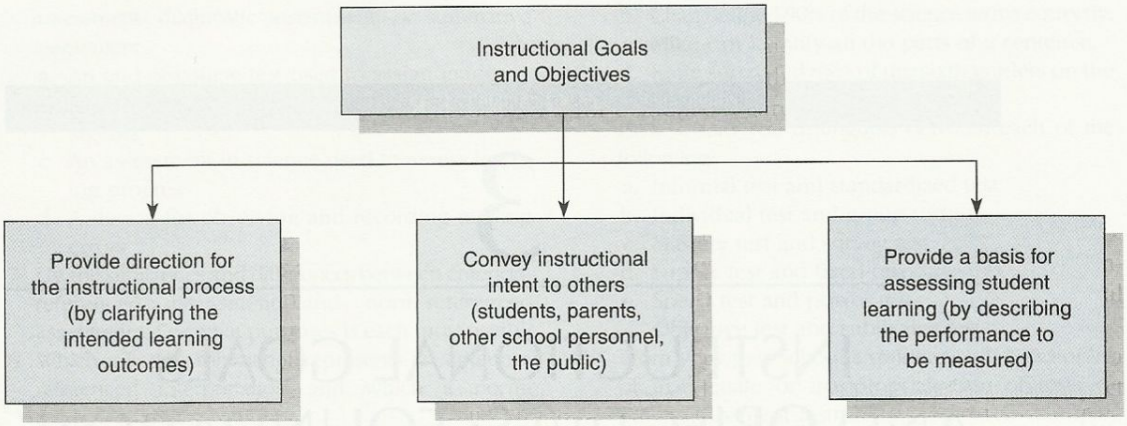

Figure 3.1
The purposes of instructional goals and objectives

NCTM Standard 1: Mathematics as Problem Soving

In Grades K–4, the study of mathematics should emphasize problem solving so that students can

- use problem-solving approaches to investigate and understand mathematical content;
- formulate problems from everyday and mathematical situations;
- develop and apply strategies to solve a wide variety of problems;
- verify and interpret results with respect to the original problem;
- acquire confidence in using mathematics meaningfully.

NCTM Standard 2: Mathematics and Communication

In Grades K–4 the study of mathematics should include numerous opportunities for communication so that students can

- relate physical materials, pictures, and diagrams to mathematical ideas;
- reflect on and clarify their thinking about mathematical ideas and situations;
- relate their everyday language to mathematical language and symbols;
- realize that representing, discussing, reading, writing, and listening to mathematics is a vital part of learning and using mathematics.

Source: Curriculum and Evaluation Standards (pp. 23 & 26) by National Council of Teachers of Mathematics, 1989. Reston, VA: National Council of Teachers of Mathematics Copyright 1989 by the National Council of Teachers of Mathematics. Reprinted by permission.

Figure 3.2
National Council of Teachers of Mathematics: Curriculum and evaluation standards

standards are described in more detail in the NCTM's publication, they are general descriptions of the knowledge, skills, and understandings that should be taught. They provide a broad framework from which more specific curriculum guidelines, instructional materials, and assessments may be developed.

A number of states and districts provide more detailed curriculum guidelines and associated instructional materials. Such guidelines and materials specify the types of performance students are expected to demonstrate at the end of the instructional sequence (e.g., unit or course). Describing intended learning outcomes in performance terms is the main function of properly stated instructional goals and objectives. This clarification of what students should be learning and how the learning is to be expressed not only aids the teacher but also helps others understand the focus of the instruction. Some states and districts are beginning to emphasize the importance of learning outcomes to the process of education by developing guidelines for outcomes-based education and tying graduation or grade retention requirements to the attainment of learning goals.

Examples of content standards in different subjects from five states are illustrated in Figure 3.3. The subject areas and grade ranges for state content standards vary from state

Colorado, Geography, Standard 4: "Students understand how economic, political, cultural, and social processes interact to shape patterns of human populations, interdependence, cooperation, and conflict. . . . In grades K–4, what students know and are able to do includes . . . identifying the causes of human migration" (*Colorado Model Content Standards for Geography*, Colorado Department of Education, Adopted, June 1995, Amended, November 1995; available: http://www.cde.state.co.us/download/pdf/geography.pdf).

New York State Standard 4: Science "students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science" (Learning Standards of New York State; available: http://www.emsc.nyse.gov/ciai/pub/standards.pdf).

California Reading Comprehension Standard: "Read and orally respond to familiar stories and other texts by answering factual comprehension questions about cause-and-effect relationships. Read and orally respond to stories and texts from content areas by restating facts and details to clarify ideas" (*California English-Language Development Standards for California Public Schools*: *Kindergarten Through Grade Twelve,* July 1999; available: http://www.cde.ca.gov/cdepress/Eng-Lang-Dev-Stnd.pdf).

Florida Grades 6–8 Mathematics Standard 5: "The student understands and applies theories related to numbers. 1. Uses concepts about numbers, including primes, factors, and multiples, to build number sequences" (*Florida Sunshine Standards*; available: http://www.firn.edu/doe/curric/prek12/pdf/math6.pdf).

Virginia, Grade 3, History and Social Science Standards of Learning, Standard 3.1. "The student will explain how the contributions of ancient Greece and Rome have influenced the present world in terms of architecture, government (direct and representative democracy), and sports" (*History and Social Science Standards of Learning for Virginia Public Schools*, March 2001; available: http://www.pen.kqw.va.us/VDOE/superintendent/Sols/historysol2001.pdf).

Figure 3.3
Examples of state content standards statements

to state. In Colorado, for example, four separate sets of content standards were adopted for history, geography, civics, and economics. Some states, such as Virginia, have grade-level-specific standards, whereas other states have standards adopted for a range of grades, and a few states have grade-level-specific standards as well as standards covering a range of grades (e.g., Florida). The standards also vary from state to state in terms of their specificity and emphases within a content area. Links to content standards by subject area and by state are provided at *http://edstandards.org/standards.html.*

State content standards have been reviewed and graded (American Federation of Teachers, 2001; *Education Week*, 2006; Gross, 2005; and others). We do not attempt to evaluate the different perspectives brought to bear in the various reviews of state standards or the grades assigned to the standards by the reviewers. It is worth acknowledging, however, that the reviews have come to quite different conclusions about the state standards, in large part because the reviewers use different criteria for judging the standards. The reviewers differ not only in the importance given to the specificity and rigor of the standards but also in their views on the priority that should be given to basic skills and factual knowledge in comparison to applications of ideas to solve problems in contexts outside the classroom. The key point for present purposes, however, is that content standards can and should, if they are to be more than window dressing, influence the emphasis given to different topics within a content area and the assessments developed by teachers as well as those developed and required by states or districts.

Our interest in this book, of course, is in the usefulness of instructional goals objectives for assessing student learning. As noted in Chapter 2, effective assessment depends as much on a clear description of what is to be assessed as on a determination of how to assess. Thus, before we develop or select tests and other assessment instruments to measure student learning, we need to clearly specify the intended learning outcomes. That is the main function of well-stated instructional goals and objectives. State or district content standards provide a starting point, but given the general level at which most content standards are written, there is a need to elaborate the standards in order to clearly specify the learning outcomes in a form that can guide instruction and assessment in the classroom.

INSTRUCTIONAL OBJECTIVES AS LEARNING OUTCOMES*

Instructional goals and objectives are sometimes stated in terms of actions to be taken. Thus, we might have a statement such as this:

Demonstrate to students how to use the microscope.

Although this statement clearly indicates what the teaching activity is, it is less clear about intended learning outcomes and does not point explicitly to the type of student assessment that would be most appropriate. Literally, the objective will have been achieved when the demonstration has been completed—regardless if the students have learned anything. A better way to state objectives is in terms of what we expect students to be able to do at

* Some of the material in this chapter was adapted from N. E. Gronlund, *How to write and use instructional objectives*, 5th ed. (Upper Saddle River, NJ: Prentice Hall, 2000).

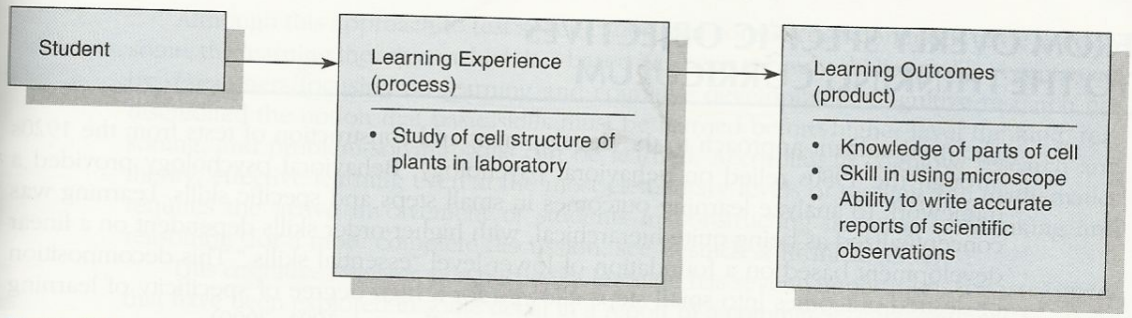

Figure 3.4
The relationship of learning experience to learning outcomes

the end of instruction. After demonstrating how to use the microscope, for example, we might expect students to be able to demonstrate skill in using the microscope to identify features of a cell.

A statement such as this directs attention to the students and to the types of performance they are expected to exhibit as a result of the instruction. Thus, our focus shifts from the teacher to the student and from the learning experiences to the learning outcomes. This shift in focus makes clear the intent of our instruction and sets the stage for assessing student learning. Well-stated outcomes make clear the types of student performance we are willing to accept as evidence that the instruction has been successful.

When viewing instructional objectives in terms of learning outcomes, it is important to keep in mind that we are concerned with the *products* of learning rather than with the *process* of learning. This is not meant to suggest that the process is unimportant. Quite the contrary, processes such as writing notes, outlining, drafting, and revision in developing a written essay may be quite important; but the long-term instructional objective concerns the product of the finished essay. Figure 3.4 makes three important points about the role of instructional objectives in teaching–learning situations.

First, objectives establish direction, and when they are stated in terms of learning outcomes, they go beyond knowledge of the specific course content. Note the distinction between "study of" and "knowledge of" cell structures. The content (study of cell structure) is more aptly listed under process because it is the vehicle through which objectives (knowledge of parts of cell and so on) are attained.

Second, consider the varying degrees of dependence that the products ("knowledge," "skill," and "ability") have on the course content. "Knowledge of parts of cell" is the most closely related to the specific content of a biology course. "Skill in using microscope" and "ability to write accurate reports of scientific observations" relate to a greater variety of course content that could be used to achieve the same objectives.

The third point illustrated by the diagram is the degree to which objectives vary in complexity. The first learning outcome, "knowledge of parts of cell," is specific, is easily attained, and can be measured readily by a short-answer or fixed-response paper-and-pencil test. The last learning outcome, "ability to write accurate reports of scientific observations," is rather general, is unlikely to be attained completely in a single course, and requires judgmental analysis of student performances.

FROM OVERLY SPECIFIC OBJECTIVES TO THE THINKING CURRICULUM

The predominant approach to the development and construction of tests from the 1920s through the 1980s relied on behavioral psychology. Behavioral psychology provided a framework to analyze learning outcomes in small steps and specific skills. Learning was conceptualized as being quite hierarchical, with higher-order skills dependent on a linear development based on a foundation of lower-level "essential skills." This decomposition of desired outcomes into small steps allowed for a high degree of specificity of learning outcomes (for an elaboration of these points, see Shepard, 1991, 2000).

Highly specific objectives enabled the construction of precise test objectives. When coupled with the notion of linear learning hierarchies, specific objectives provided a natural basis for developing "criterion-referenced mastery tests." The behavioral objectives used to construct mastery tests were typically concerned with relatively simple knowledge and skill outcomes. This made it possible to analyze each intended learning outcome in considerable detail and to describe the expected student performance in specific terms. The objective to "add whole numbers," for example, might be further defined by a list of specific tasks such as the following:

- Add two single-digit numbers with sums of 10 or less (2 + 5).
- Add two single-digit numbers with sums greater than 10 (6 + 8).
- Add three single-digit numbers with sums of 10 or less (2 + 4 + 3).
- Add three single-digit numbers with sums greater than 10 (7 + 5 + 9).
- Add two two-digit numbers without carrying (21 + 34).
- Add two two-digit numbers with simple carrying (36 + 27).
- Add two two-digit numbers with carrying into nine (57 + 48).
- Add two or more three-digit numbers with repeated carrying (687 + 839).

With mastery objectives such as these, it was frequently possible to specify a large representative sample of the specific responses expected of the students at the end of instruction. The learning tasks were then placed in sequential order so that they could be systematically taught and tested until mastery was achieved, as shown in Figure 3.5. This procedure of stating specific tasks and then teaching and testing them one by one has been used in individualized instruction, in training programs, and in areas of classroom instruction that stress simple learning outcomes (e.g., basic skills). The limited nature of the objectives and the detailed specification of the learning tasks enhance the use of criterion-referenced interpretation.

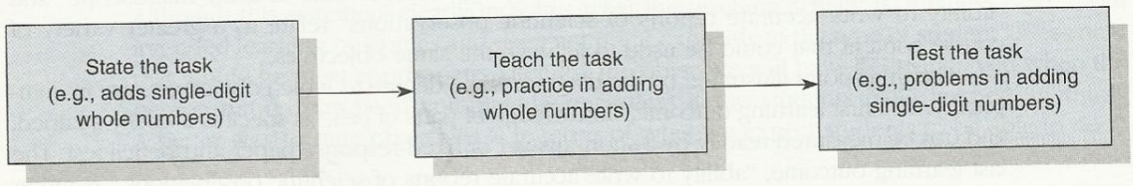

Figure 3.5
Learning tasks is sequential order

Although this approach to test specification and construction continues to be used by some, the learning theory on which it is based has been strongly challenged in recent years by researchers focusing on learning and cognitive development. Cognitive research has discredited the notion that basic skills must be learned before higher-level thinking, reasoning, and problem-solving skills can be learned. According to cognitive research and theory, effective learning even at the most elementary levels of reading and mathematics requires the active involvement of students in constructing meaning by thinking and reasoning (for a more complete discussion, see Resnick & Resnick, 1992).

This cognitive research perspective of learning has several implications for assessment that have been explored in some detail in a report of a committee of the National Academy of Sciences (Pellegrino, Chudowsky, & Glaser, 2001). First, the types of instructional objectives associated with the perspective are concerned with the more complex learning outcomes (e.g., understanding, problem solving, reasoning, thinking skills, application to authentic problem situations outside of school). Second, the perspective suggests the need for more comprehensive tasks that involve extended periods of time. Third, tasks need to be presented in a meaningful context; that is, they need to involve "authentic" problems.

Resnick and Resnick (1992) used an example from the assessment of writing to illustrate the distinction between the approaches to assessment that are compatible with the behavioral and cognitive perspectives. From either perspective, it could be readily agreed that the ability to edit one's own work is an important part of writing. An analysis of the specific skills involved might lead to the development of a test in which students were presented with written material and asked to identify errors and choose possible corrections. As Resnick and Resnick note, such a test might be useful for identifying copyediting skills but would not foster the skills involved in writing and revising one's own work because it would not involve actual "crafting [of] phrases and sentences to convey intended meaning" (Resnick & Resnick, 1992, p. 6). Thus, the cognitive perspective leads to the use of written essays where students write rough drafts, review their drafts, and revise.

The cognitive research perspective also has implications for assessments in other content areas. In reading, it encourages the use of authentic texts (e.g., complete short stories or informational pieces) rather than the use of short segments consisting of a paragraph or two written specifically for the test. In mathematics, it encourages the application of problems with real-world content (e.g., the collection and analysis of data to determine the best location of a store). In science, it encourages the use of performance-based tasks involving active experimentation and analysis of results. In social studies, it encourages the analysis of documents and the interpretation of historical events.

Shepard (2000) used an example problem of Thompson's (1995) to illustrate how even a simple mathematical question can probe a student's deep understanding of a concept. Thompson's illustrative problem was designed to assess understanding of simple fractions by elementary school children. A figure displayed for the problem showed a rectangle divided into five segments of equal size. Three of the five segments were shaded. A traditional paper-and-pencil test might simply ask what fraction of the rectangle is shaded. Although a correct answer of three fifths would provide some information, it would not, by itself, give much of an indication that the student had deep understanding of fractions. Additional questions are needed to probe the depth of the student's understanding. As discussed by Shepard (2000), Thompson explored the depth of understanding by asking questions such as "Can you see three fifths of something? Can you see five thirds of something? Can you

see five thirds of three fifths?" An affirmative answer to any question was followed by a request for the student to show or explain how the student sees the particular quantity. Asking multiple questions on a single concept obviously is time consuming, particularly if the assessment is to cover a wide range of content in a short time, but such probing is necessary if the goal is the diagnosis of the depth of a student's understanding of a concept.

The previous description identifies two ends of a continuum running from highly specific objectives (e.g., add two-digit integers or identify details that are explicitly stated in text) to much more general learning goals (e.g., relate physical materials and diagrams to mathematical ideas or read complicated text with understanding). Part of the debate about content standards is related to the location of standards between the two ends of this continuum. In practice, neither extreme is apt to be entirely satisfactory as a guide to the development or selection of assessments. The specific discrete skills end of the continuum leads to an overemphasis on disconnected, low-level skills and factual knowledge. The broad cognitive process end often remains at too general a level to provide adequate guidance for the development or selection of assessments that will have desirable measurement properties. Thus, in practice, an intermediate framework is needed to guide the development of assessments.

Types of Learning Outcomes to Consider

Although the cognitive research perspective is useful in forcing attention on broader educational goals that need to be addressed in the development or selection of an assessment, those general goals need to be supplemented by more systematic thinking about the types of learning outcomes that would provide evidence that the goals are being achieved. It is useful, for this reason, to classify learning outcomes under a few general headings. Any such classification is necessarily arbitrary, but it serves several useful purposes. It indicates types of learning outcomes that should be considered, it provides a framework for classifying those outcomes, and it directs attention toward changes in student performance in a variety of areas.

The following list of outcomes delineates the major areas in which instructional objectives might be classified. The more specific areas under each type of outcome should not be regarded as exclusive; they are merely suggestive of categories to be considered. For a different set of categories, see the lists of outcomes in Appendix F.

1. Knowledge
   - 1.1 Terminology
   - 1.2 Specific facts
   - 1.3 Concepts and principles
   - 1.4 Methods and procedures
2. Understanding
   - 2.1 Concepts and principles
   - 2.2 Methods and procedures
   - 2.3 Written material, graphs, maps, and numerical data
   - 2.4 Problem situations
3. Application
   - 3.1 Factual information
   - 3.2 Concepts and principles

- 3.3 Methods and procedures
- 3.4 Problem-solving skills

4. Thinking skills
- 4.1 Critical thinking
- 4.2 Scientific thinking

5. General skills
- 5.1 Laboratory skills
- 5.2 Performance skills
- 5.3 Communication skills
- 5.4 Computational skills
- 5.5 Social skills

6. Attitudes
- 6.1 Social attitudes
- 6.2 Scientific attitudes

7. Interests
- 7.1 Personal interests
- 7.2 Educational interests
- 7.3 Vocational interests

8. Appreciations
- 8.1 Literature, art, and music
- 8.2 Social and scientific achievements

9. Adjustments
- 9.1 Social adjustments
- 9.2 Emotional adjustments

Taxonomy of Educational Objectives

A useful guide for developing a comprehensive list of instructional objectives is the *Taxonomy of Educational Objectives.* This detailed classification of objectives is similar in form to the classification system used for plants and animals. It attempts to identify and classify all possible educational outcomes. The system first divides objectives into the following three major areas.

1. **Cognitive Domain**: Knowledge outcomes and intellectual abilities and skills
2. **Affective Domain**: Attitudes, interests, appreciation, and modes of adjustment
3. **Psychomotor Domain**: Perceptual and motor skills

Each of the three domains is subdivided into categories and subcategories. The major categories in the cognitive domain, for example, are knowledge, comprehension, application, analysis, synthesis, and evaluation. These categories begin with relatively simple knowledge outcomes and proceed through increasingly complex levels of intellectual ability. This pattern of classification is characteristic of all three domains.

The *Taxonomy* is primarily useful in identifying the types of learning outcomes that should be considered when developing a comprehensive list of objectives for classroom instruction. One need not use the terminology of the taxonomies when stating learning outcomes, but a review of the various taxonomy categories will aid in the development of a more complete list. The broad range of learning outcomes covered in the *Taxonomy*

provides assurance that important types of learning are not overlooked. Appendix G provides a detailed summary of the *Taxonomy* categories and a list of the original sources from which the summaries were derived. In addition to detailed descriptions of the categories in each domain, illustrative instructional objectives from a variety of content areas are presented, as are lists of verbs that are useful in stating objectives for student performance.

GUIDELINES

Begin with a Simple Framework

Starting with a simple framework (Knowledge, Understanding, Application, Analysis, Synthesis, Evaluation) will help move from factual information to more complex learning outcomes, as illustrated in the following examples.

K = Knowledge
U = Understanding
Ap = Application
An = Analysis
S = Synthesis
E = Evaluation

Each of these categories can be expanded with skills and affective outcomes as needed.

Reading

K: Knows vocabulary
U: Reads with comprehension
Ap: Reads to obtain information to solve a problem
An: Analyzes text and outlines arguments
S: Integrates the main ideas across two or more passages
E: Critiques the conclusions in a text and offers alternatives

Writing

K: Knows the mechanics of writing
U: Understands grammatical principles in writing
Ap: Writes to communicate for a specific purpose
An: Outlines essay before writing
S: Writes narrative essay
E: Critiques writings of others

Mathematics

K: Knows the number system and basic operations
U: Understands math concepts and processes
Ap: Uses mathematics to solve problems
An: Shows how to solve multistep problems
S: Derives proofs
E: Critiques proofs in geometry

Science

K: Knows terms and facts
U: Understands scientific principles
Ap: Applies principles to new situations
An: Analyzes chemical reactions
S: Conducts and reports experiments
E: Critiques scientific reports

Social Studies

K: Knows factual information about social issues
U: Understands causes of social issues
Ap: Applies critical-thinking skills to social issues
An: Analyzes events leading to social change
S: Writes speech on a social issue
E: Critiques essay on social change

Other Sources for Lists of Objectives

Illustrative instructional objectives for various grade levels and subject-matter areas may be obtained from the following sources.

1. **Professional association standards:** Although usually stated at a more general level than needed, the content standards of professional associations provide an excellent starting point for considering instructional objectives. A listing of some of the content standards of professional associations is provided in Appendix C.

2. **State content standards:** The content standards adopted by states also provide a good starting point for identifying instructional objectives. Although the content standards for the state or district in which a teacher is working obviously are most relevant, useful ideas may also be derived from standards of other states. For easy access to state content standards, see *http://www.ccsso.org/projects/State_Education_Indicators/Key_State_Education_Policies/3160.cfm.*

3. **Methods books:** Most books on methods of teaching discuss objectives, present examples, and cite references to other sources of objectives in various instructional areas.

4. **Yearbooks and subject-matter standards publications of educational organizations:** The yearbooks (and other publications dealing with subject-matter standards) of organizations such as the National Council of Teachers of English, the National Council of Teachers of Mathematics, the National Council for the Social Studies, and the National Science Teachers Association provide an excellent resource.

5. **Encyclopedia of Educational Research:** This publication typically contains an article on each major teaching area, which includes references to sources of instructional objectives.

6. **Curriculum frameworks and guides:** Many local and state curriculum frameworks or guides contain lists of instructional objectives.

7. **Test manuals.** The manuals accompanying published tests frequently contain lists of objectives that were used in constructing the tests.

8. **Banks of objectives:** Some organizations and test publishers maintain various banks of objectives and relevant test items. See Appendix C for addresses of some objectives banks.

In using content standards objectives from these various sources, it is important that the ones selected be relevant to the local instructional program. Content standards and selected objectives will most likely need to be reworded. Many of them will not be stated as intended learning outcomes or in performance terms. Published content standards and lists of objectives are probably most useful for obtaining ideas concerning possible outcomes and for assessing the completeness of a prepared list.

Criteria for Selecting Appropriate Objectives

Our emphasis throughout this section has been on the role of the classroom teacher in the process of selecting instructional objectives. We have deliberately avoided discussions concerning which objectives should receive priority at various grade levels and in various subject-matter areas. This is a decision for school boards, administrators,

curriculum committees, and individual teachers. Our aim has been to clarify how to identify those instructional objectives that will be most useful for teaching and assessment purposes.

In preparing a list of instructional objectives for a particular course, the teacher faces the problem of determining the adequacy of the final list of objectives. The following questions will serve as criteria for this purpose (see Figure 3.6).

1. **Do the objectives include all important outcomes of the course?** Knowledge objectives are seldom neglected. However, objectives in the area of understanding, application, thinking skills, attitudes, and the like tend to be slighted unless special efforts are made to consider them. Objectives derived mainly from the methods of instruction and the social experiences of the students are also easily overlooked.

2. **Are the objectives in harmony with the content standards of the state or district and with general goals of the school?** Where states or districts have adopted content standards, the objectives developed by individual teachers need to be consistent with those standards. The objectives developed by teachers must also be consistent with the general goals of the school in which they are used. For example, a teacher of third-grade social studies in Virginia would want to take into account the statement of the standard shown in Figure 3.3 that students "will explain how the contributions of ancient Greece and Rome have influenced the present world in terms of architecture, government (direct and representative democracy), and sports." Similarly, if independent thought, self-direction, and effectiveness of communication are highly valued in the school, then these outcomes should be reflected in the teachers' objectives. Objectives inconsistent with these valued outcomes should be omitted from the list. Part of the difficulty of applying this criterion is that the goals of the school are seldom explicitly stated.

3. **Are the objectives in harmony with sound principles of learning?** Because objectives indicate the desired outcomes of a series of learning experiences, they should be consistent with sound principles of learning. That is, they should (a) be appropriate to the age level and experiential background of the students (principle of readiness), (b) be related to the needs and interests of the students (principle of motivation), (c) reflect learning outcomes that are most permanent (principle of retention), and (d) include learning outcomes that are most generally applicable to various specific situations (principle of transfer).

4. **Are the objectives realistic in terms of the abilities of the students and the time and facilities available?** First attempts at identifying objectives for a particular course frequently result in an impressive but unattainable list of outcomes. Thus, the final list of objectives should be reviewed in light of the students' developmental levels, their beginning skills and understandings, the time available for achieving the objectives, and the adequacy of the instructional resources and equipment available. It is usually better to have a limited set of clearly defined, attainable objectives than a long list of nonfunctional goals.

Make Allowance for Unanticipated Learning Outcomes

No matter how carefully a set of instructional objectives has been selected for a course, there are likely to be some unanticipated effects of the instruction. These effects may be desirable or undesirable, and the majority of them are likely to fall into the affective area.

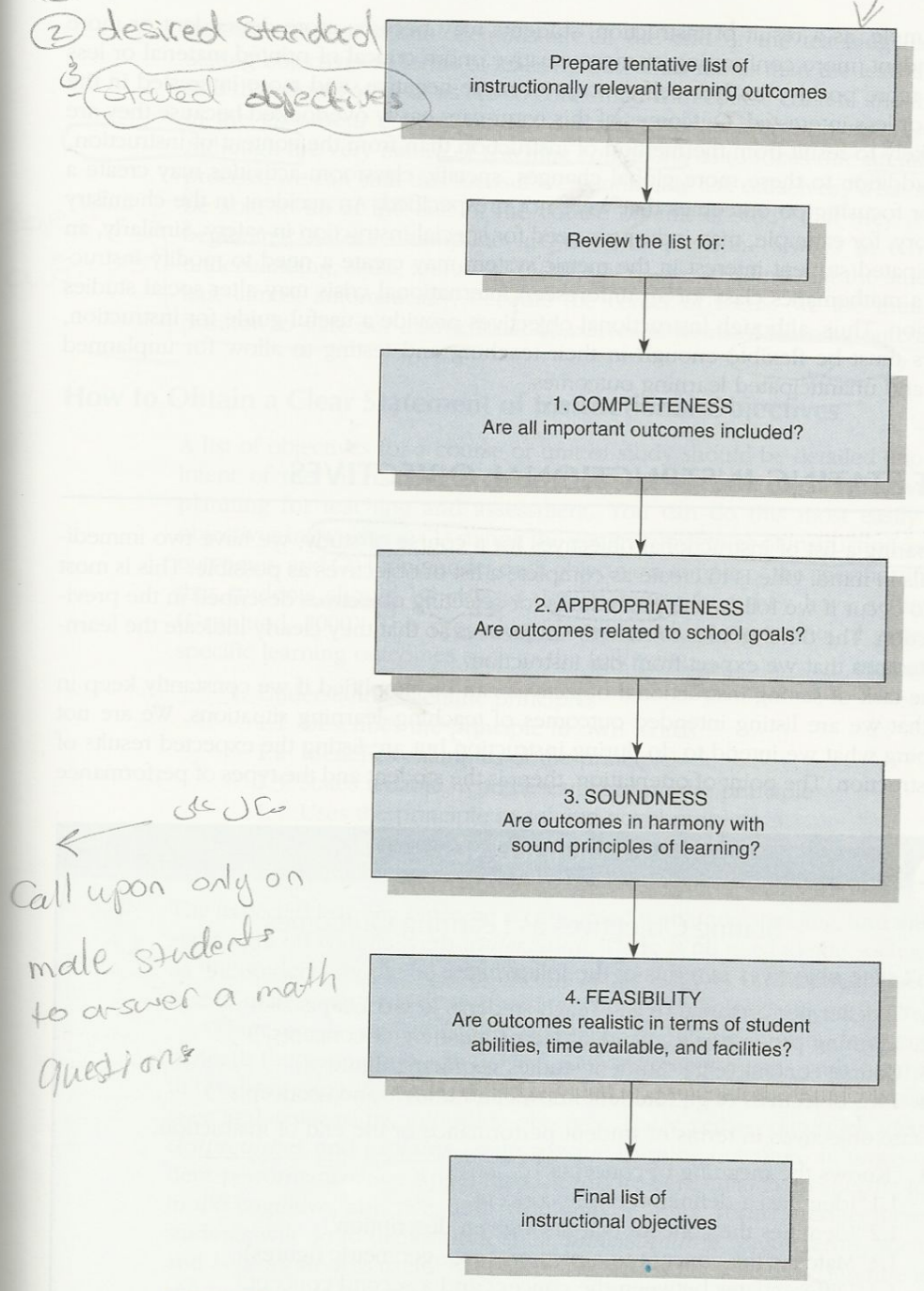

Figure 3.6
Summary of criteria for selecting the final list of objectives

For example, as a result of instruction, students may become more dependent or more independent, more conforming or more creative, more critical of printed material or less critical, more positive in their self-concept or more negative, and more interested in the subject or less interested. Outcomes of this nature are easily overlooked because they are more likely to result from the method of instruction than from the content of instruction.

In addition to these more global changes, specific classroom activities may create a need for focusing on outcomes that were not prespecified. An accident in the chemistry laboratory, for example, may indicate a need for special instruction in safety. Similarly, an unanticipated student interest in the metric system may create a need to modify instruction in a mathematics class, or an unforeseen international crisis may alter social studies instruction. Thus, although instructional objectives provide a useful guide for instruction, teachers must be flexible enough in their teaching and testing to allow for unplanned events and unanticipated learning outcomes.

METHOD OF STATING INSTRUCTIONAL OBJECTIVES

In preparing a list of instructional objectives for a course of study, we have two immediate goals in mind. One is to create as complete a list of objectives as possible. This is most likely to occur if we follow the procedures for selecting objectives described in the previous section. The other goal is to state the objectives so that they clearly indicate the learning outcomes that we expect from our instruction.

The task of stating instructional objectives can be simplified if we constantly keep in mind that we are listing intended outcomes of teaching–learning situations. We are not describing what we intend to do during instruction but are listing the expected results of that instruction. The point of orientation, then, is the student and the types of performance

GUIDELINES

Stating Objectives as Learning Outcomes

Don't state objectives in terms of the following:

1. Teacher performance (e.g., "Teach students key concepts.")
2. Learning process (e.g., "Student learns meaning of concepts.")
3. Course content (e.g., "Student studies geometric figures.")
4. Two objectives (e.g., "Student knows and understands concepts.")

State objectives in terms of student performance or the end of instruction:

1. "Knows the meaning of concepts."
   - 1.1 "Identifies a definition of the concept."
   - 1.2 "Identifies the concept that fits a given description."
   - 1.3 "Matches the concept to a picture" (e.g., geometric figures).
   - 1.4 "Differentiates between the concept and a second concept."
   - 1.5 "Applies the concept to an everyday situation."

that the student should demonstrate at the end of the teaching–learning experience. Stating objectives in terms of learning outcomes rather than the learning process is easier said than done. Most of us are so concerned with course content and the ongoing process in the classroom that we find it difficult to concentrate on the results of instruction. Although the very nature of teaching conditions us to focus our attention on the learning process, we can shift this focus if we continually ask ourselves, What should the students be able to do at the end of the course or unit of study that they could not do at the beginning? As we attempt to answer this question—always in terms of knowledge, understanding, skills, attitudes, and the like—we will find that the students' performance has, almost automatically, become the center of focus. We are then in a much better position to state our instructional objectives in terms of learning outcomes.

How to Obtain a Clear Statement of Instructional Objectives

A list of objectives for a course or unit of study should be detailed enough to convey the intent of the instruction yet general enough to serve as an effective overall guide in planning for teaching and assessment. You can do this most easily by defining your objectives in two steps: (1) stating the general objectives of instruction as intended learning outcomes, and (2) listing under each objective a sample of the specific types of performance that students should be able to demonstrate when they have achieved the objective (Gronlund, 2000). This procedure should result in statements of general objectives and specific learning outcomes such as the following:

1. Understands scientific principles
   - 1.1 Describes the principle in own words
   - 1.2 Identifies examples of the principle
   - 1.3 States tenable hypotheses based on the principle
   - 1.4 Uses the principle in solving novel problem
   - 1.5 Distinguishes between two given principles
   - 1.6 Explains the relationship between two given principles

The expected learning outcome is concerned with understanding, and the general objective starts right off with the verb *understands*. There is no need to add such repetitious material as "the students should be able to demonstrate that they understand." Keeping the statement free of unnecessary words and starting with a verb helps focus on the intended outcome.

There are several things to remember about the specific learning outcomes listed beneath the general objective. First, each statement begins with a verb. Here, however, the verbs are specific and indicate definite, observable responses, that is, ones that can be seen and assessed by an outside observer. These verbs—*describes, identifies, states, uses, distinguishes,* and *explains*—state specific learning outcomes in terms of observable student performance. See Appendix G for more verbs that state specific learning outcomes in the cognitive, affective, and psychomotor areas. Terms such as these clarify what the students will do to demonstrate their *understanding*. Vague terms, such as *realizes, sees,* and *believes* are less useful in defining objectives because they describe internal states that can be expressed by various types of overt behavior.

Second, the list of specific learning outcomes is merely a sample of the many specific ways that an **understanding of scientific principles** might be shown. A student who

achieved this objective probably could demonstrate many other responses. Because it would be impractical to list all the specific types of performance that denote understanding, attempt to obtain a **representative sample**. This yields an operational definition of the general objective yet keeps the overall list of objectives and specific learning outcomes within manageable proportions.

Finally, note that the specific learning outcomes are free of specific course content. Rather than listing the scientific principles the students are to understand, they specify the types of student performance acceptable as evidence of understanding. Keeping the statements free of specific course content makes it possible to use the same list of learning outcomes with various units of study. Each unit of study will indicate the principles to be understood, and the list of specific learning outcomes will indicate how the students are expected to demonstrate their understanding. For example, if the unit were on force and motion, the previous list would be easily converted to that specific area science content (e.g., understands principles of force and motion: describes the principles of force and motion in own words, identifies examples of the principles of force and motion, and so on). Once developed, the instructional objectives can be readily converted into a table of specifications for an assessment. As we will see in Chapter 6, a table of specifications also is a convenient means of relating the learning outcomes to the various content areas for assessment purposes.

Stating the General Instructional Objectives

One problem in stating the general instructional objectives is selecting the proper level of generality. The objectives should be specific enough to provide direction for instruction but not so specific that instruction is reduced to training. When we state our major objectives in general terms, we provide for the integration of specific facts and skills into complex response patterns. General statements also give the teacher greater freedom in selecting the methods and materials of instruction. The "understanding of scientific principles," for example, may be achieved through lecture, discussion, demonstration, group problem-solving activity, laboratory work, or some combination of these methods. Similarly, the objective may be achieved through the use of different textbooks or various other types of instructional material. Stating the general objectives at this level provides a focus for instruction but does not restrict the teacher to a particular instructional method or a given set of instructional materials.

The following list of general instructional objectives shows the desired level of generality.

- Knows basic terminology
- Understands concepts
- Relates concepts to everyday observations
- Applies principles to new situations
- Interprets graphs
- Sings independently, on pitch and in rhythm
- Demonstrates skill in critical thinking
- Formulates a position on an issue
- Writes a well-organized theme
- Converses in a second language (e.g., Spanish)

- Appreciates poetry
- Demonstrates scientific attitude
- Evaluates an experiment's adequacy

The verbs at the beginning of each statement are general enough to encompass a range of specific learning outcomes. A sample of specific outcomes would need to be added before these general statements would be useful guides for teaching and assessment. Note that each statement contains a single objective (e.g., *not* "Knows and understands") and that each statement is relatively free of course content.

The degree of generality may, of course, vary somewhat with the period of instruction for which the list is being prepared. The objectives for a brief unit of instruction are likely to be more specific than those for an entire course of study. In either case, however, selecting 8 to 12 general instructional objectives will usually provide a list that is both manageable and suitable.

Stating the Specific Learning Outcomes

As stated earlier, each general instructional objective must be defined by a sample of specific learning outcomes to clarify how students can demonstrate that they have achieved the general objective. Unless the general objectives are further defined in this manner, they will not provide adequate direction for teaching or assessment.

Statements of specific learning outcomes for a general objective will be easier to write and will more clearly convey instructional intent if each statement begins with an action verb that indicates definite, observable responses (e.g., *identifies, solves, communicates*). Such statements specify the types of student performance acceptable as evidence that the general instructional objective has been achieved. This assumes, of course, that each specific learning outcome is directly relevant to the general objective it is defining. A statement such as "Writes the textbook definition of a principle" would be appropriate for listing under "Knows principles" but not under "Understands principles." For the latter objective, we would need a statement that goes beyond the recall of information because understanding implies some novelty in the response. Here, a statement such as "Explains the principle in own words" or "Applies the principle to solve an applied problem" would be more relevant.

A major problem in defining general instructional objectives is deciding how many specific learning outcomes to list under each objective. It is obvious that a fixed number cannot be specified. Simple knowledge and skill outcomes typically require fewer statements than complex ones. Because it is usually impossible or impractical to list all possible student responses for each general objective, the sample should be as representative as possible. In smost cases, there is not much advantage in listing more than seven or eight specific learning outcomes for each objective; four or five statements are probably more common. As a general guide, enough learning outcomes should be listed for each objective to show the typical performance of students who have satisfactorily achieved the objective.

The following general objectives and specific learning outcomes illustrate a satisfactory level of specificity for stating the intended learning outcomes.

1. Understands the meaning of concepts
   1.1 Explains the concept in own words
   1.2 Identifies the meaning of a concept in context

1.3 Differentiates between proper and improper instances of a concept
1.4 Distinguishes between two similar concepts on the basis of meaning
1.5 Uses a concept to explain an everyday event

2. Demonstrates skill in critical thinking
2.1 Distinguishes between fact and opinion
2.2 Distinguishes between relevant and irrelevant information
2.3 Identifies fallacious reasoning in written material
2.4 Identifies the limitations of given data
2.5 Formulates valid conclusions from given data
2.6 Identifies the assumptions underlying conclusions

In addition to illustrating the desired degree of specificity, these statements are good examples of content-free objectives. As noted earlier, both the general objectives and the specific learning outcomes should be kept free of specific content so that they can be used with various units of study. In stating our specific learning outcomes, we are attempting to describe what types of student performance represent each general objective—not what specific content the students are to learn.

Keeping the specific learning outcomes content free is, of course, a matter of degree. In some cases, all we can do is modify our statements so that they apply to a wider range of course material. The following statements illustrate ways to improve specific learning outcomes in this regard.

EXAMPLES

Poor:	Distinguishes between a square and a rectangle
Better:	Distinguishes among geometric shapes
Poor:	Identifies relevant historical antecedents of the Louisiana Purchase
Better:	Identifies relevant historical antecedents of a historical event
Poor:	Describes the main characters in Toni Morrison's *Beloved*
Better:	Describes the main characters in the story

If we used the first version of each of these specific learning outcomes, we would have to write new statements for each identification, comparison, or description we wanted our students to make. The better versions can be used with various areas of content, thus freeing us from the repetitious writing of objectives as new subject matter is considered. Specific learning outcomes should specify the *types of reactions* the students are to make to the content, not identify the content itself.

In some cases, it may be desirable or necessary to consult reference books and other relevant materials for the types of performance that might represent an objective. When defining such complex outcomes as critical thinking, literary appreciation, and scientific attitude, for example, a review of the literature can be very useful. Although you may not find a detailed list of the specific components of each outcome, even general descriptions of the concepts will aid in defining relevant types of performance. In any event, resist the temptation to omit complex outcomes simply because they are difficult to define.

Clarification of Verbs Used in Specific Learning Outcomes

Because the action verb is a key element in stating the specific learning outcomes, the selection and clarification of these verbs play an important role in obtaining a clearly defined set of instructional objectives. Ideally, we would like each verb (a) to convey clearly our instructional intent, and (b) to specify precisely the student performance we are willing to accept as evidence that the general objective has been attained. Some verbs convey instructional intent well (e.g., *identifies*); others are more effective at specifying the student responses to be observed (e.g., *labels, encircles, underlines*). When it is necessary to choose between these two types of verbs, it is best to select those that most clearly convey instructional intent and then, if necessary, clarify further the expected student responses in one of the following ways.

1. Add a third level of specificity to the list of objectives.
2. Define the action verbs used in the specific learning outcomes.
3. Use sample test items to illustrate the intended outcomes.

These procedures are probably most useful as guides to test construction and for communicating your intended learning outcomes to others.

The meaning of each specific learning outcome can be further clarified by listing tasks students are expected to perform to demonstrate achievement of the outcome. This would provide three levels for each instructional objective, as follows:

1. Comprehends the meaning of written material
   1.1 Identifies the main thought in a passage
      1.1.1 Underlines the topic sentence
      1.1.2 Selects the most appropriate title for the passage
      1.1.3 Writes the main theme of the passage

Adding the third level of specificity, might be useful for clarifying some learning outcomes. The specific tasks describe how students will indicate that they can "identify the main thought in a passage," but our intended outcome is still identifying the main thought. Underlining, selecting, and writing are simply responses we are willing to use as indicators of the "ability to identify." Thus, although the third level may be a desirable transition between specific learning outcomes and relevant test items, these specific responses are not instructional outcomes in their own right (i.e., we are not interested in teaching students how to underline, select, and write but how to identify). This third level of specificity highlights one of the advantages of using levels of objectives rather than a list of specific tasks to describe the intended outcomes of instruction. With levels, we are less likely to confuse the intended outcomes of instruction with the indicators of those outcomes.

Summary of Steps for Stating Instructional Objectives

The final list of objectives for a course or unit should include all important learning outcomes (e.g., knowledge, understanding, skills, attitude) and should clearly convey how students are expected to perform at the end of the learning experience. The following summary of steps (Gronlund, 2000) provides guidelines for obtaining a clear statement of instructional objectives.

I. Stating the general instructional objectives
1. State each general objective as an intended learning outcome (i.e., students' terminal performance).
2. Begin each general objective with a verb (e.g., *knows, applies, interprets*). Omit "The student should be able to . . ."
3. State each general objective to include only one general learning outcome (e.g., not "Knows and understands").
4. State each general objective at the proper level of generality (i.e., it should encompass a readily definable domain of responses). Eight to 12 general objectives will usually suffice.
5. Keep each general objective sufficiently free of course content so that it can be used with various units of study.
6. Minimize the overlap with other objectives.

II. Stating the specific learning outcomes
1. List beneath each general instructional objective a representative sample of specific learning outcomes that describe the terminal performance students are expected to demonstrate.
2. Begin each specific learning outcome with an action verb that specifies observable performance (e.g., *identifies, describes*).
3. Make sure that each specific learning outcome is relevant to the general objective it describes.
4. Include enough specific learning outcomes to describe adequately the performance of students who have attained the objective.
5. Keep the specific learning outcomes sufficiently free of course content so that the list can be used with various units of study.
6. Consult reference materials for the specific components of those complex outcomes that are difficult to define (e.g., critical thinking, scientific attitude, creativity).
7. Add a third level of specificity to the list of outcomes, if needed.

This procedure for stating objectives does not include the conditions under which the achievement of learning outcomes will be demonstrated (e.g., open book, diagrams will be provided) or the standards for evaluating performance (e.g., 90% correct). Although some teachers may want to add such information to each objective, there are advantages in stating the conditions and standards separately from the objectives. In many cases, the same conditions and standards apply to all objectives being assessed at a given time, and thus a statement such as the following may be sufficient for an entire set of objectives.

EXAMPLE Student performance will be determined under closed-book conditions, but all needed formulas will be provided. Hand calculators may be used.

A statement such as this will prevent the repetitious writing of the same conditions and standards for each objective and also avoid rewriting the list of objectives each time the conditions or standards are changed. We may, for example, use the same objectives