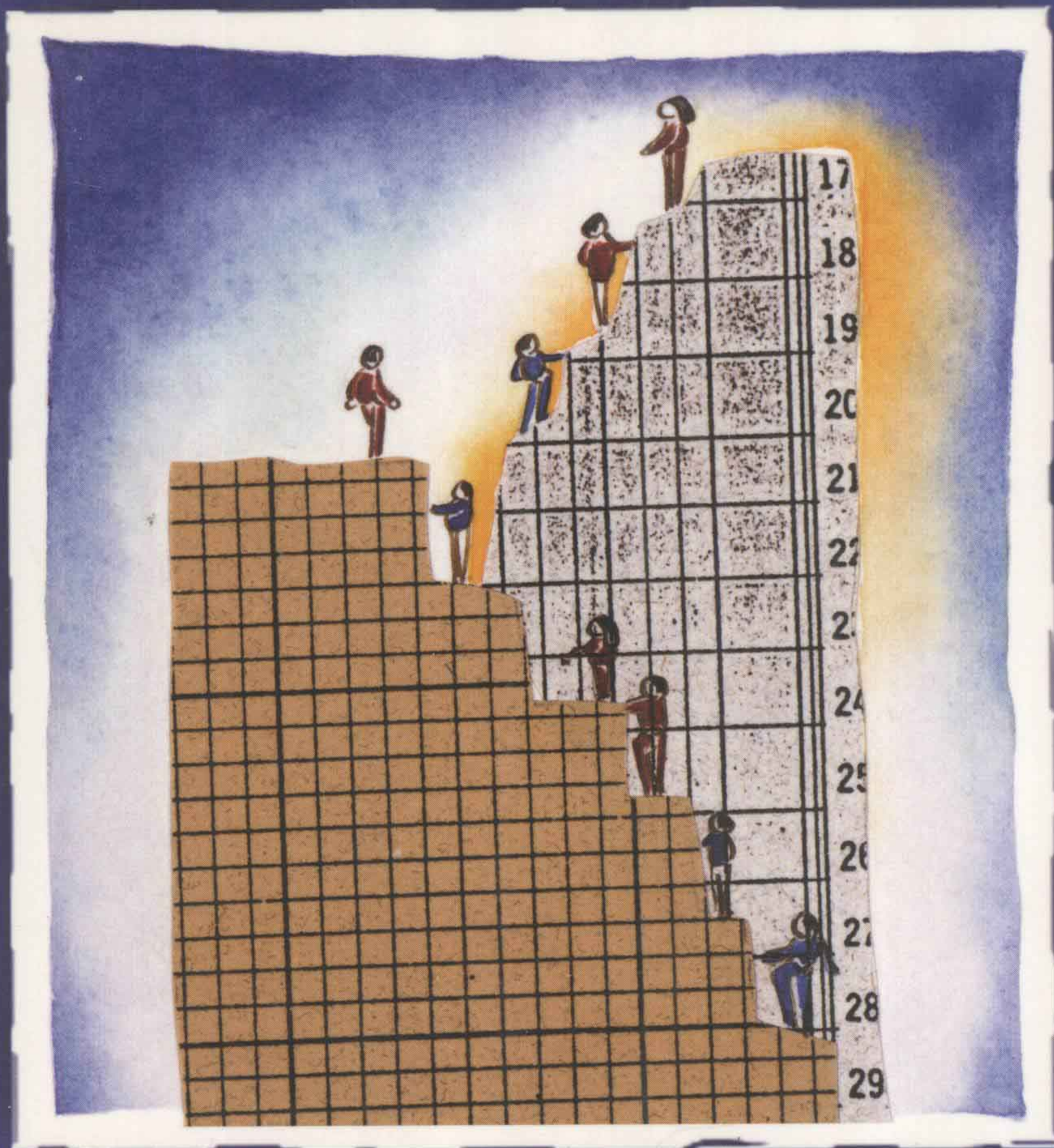


Norman E. Gronlund



Assessment of

*Student*  
*Achievement*

Eighth Edition



EIGHTH EDITION

# Assessment of Student Achievement

**Norman E. Gronlund**

*Professor Emeritus  
University of Illinois*



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and  
Dave, Derek, and Erik

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# P R E F A C E

*Assessment of Student Achievement* emphasizes the principles and practices of achievement assessment that contribute to more effective classroom instruction and improved student learning.

Effective instruction includes (1) clarifying in performance terms what students are expected to learn, (2) planning instructional activities that provide for the intended learning, and (3) using assessment procedures that are in harmony with the intended learning outcomes and the instructional activities. This book focuses on achievement assessment, but it views assessment as an integral part of the instructional process. It can aid in determining learning readiness, in monitoring and improving learning, and in grading or certifying student achievement. If assessment planning is done at the same time as instructional planning, the two can work together to help students achieve the intended learning outcomes of the instruction.

The first two chapters describe the assessment process and its role in instruction. This is followed by chapters on content standards and assessment planning. The revised edition of *Bloom's Taxonomy of Educational Objectives* is presented as a framework for preparing assessment methods that are useful with learning outcomes ranging from simple to complex. The remaining chapters cover how to prepare tests and performance assessments, how to use portfolios for assessment, grading and reporting student achievement, how to interpret standardized achievement test scores, and a final chapter on validity and reliability. The last two chapters present the more technical aspects of assessment, but the concepts and procedures can be easily understood without any previous knowledge in the area. They were placed last so that they could be used wherever they best fit in the teaching schedule. Brief descriptions of validity and reliability and how to use the concepts in preparing assessment instruments is included in Chapter 2, for those who want to deal with these technical aspects last, or not at all.

**This eighth edition includes a number of changes:**

1. A new chapter on content standards (Chapter 3) was added that describes and illustrates the role of content standards in assessment.
2. A new chapter on assessment planning (Chapter 4) was added that emphasizes how to make assessments more instructionally relevant.
3. Chapters 7 and 8 were combined to remove redundancy and to place all material on performance assessment in the same chapter.
4. The revised edition of *Bloom's Taxonomy of Educational Objectives* was described and illustrated in Chapter 4 and the Appendix, and changes were made in other chapters to fit the new taxonomy categories.



5. The “References and Additional Reading” section was updated in all chapters.

The book is written in a simple and direct manner, using frequent examples and illustrations to clarify important points. It provides a well-balanced treatment of testing and performance assessment, each to be used where most appropriate. In short, it is a practical guide for those who want to learn how to prepare valid assessment instruments that contribute to effective instruction and student learning.

I would like to thank the following reviewers for their time and input: Mary Aspedon, Southwestern Oklahoma State University; Cheryl Cummins, Delta State University; and Stacey Neuharth-Pritchett, University of Georgia.

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*Norman E. Gronlund*

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# Achievement Assessment and Instruction

Studying this chapter should enable you to<sup>1</sup>

1. Explain why both testing and performance assessment are important in achievement assessment.
2. Write a definition of achievement assessment.
3. Describe the relation between instruction and assessment.
4. Distinguish among the various roles of assessment in the instructional process.
5. List the ways that assessments can directly aid learning.

All of us have taken various types of paper-and-pencil tests during our many years of schooling. Some of these were teacher-made tests requiring us to select an answer (e.g., true-false, multiple choice, or matching) or to supply an answer (e.g., short answer or essay). Others were standardized tests of aptitude or achievement, primarily using multiple-choice items. The widespread use of paper-and-pencil testing in the schools was due, at least in part, to the efficiency with which they could measure a large number of learning outcomes and the ease of scoring and recording the results.

In recent years there has been a reaction to the heavy emphasis on paper-and-pencil testing. Some critics have contended that there should be more emphasis on the assessment of **authentic**, “real-life” tasks (e.g., solving problems that exist in the real world). Others have contended that paper-and-pencil testing should be replaced, at least in part, by **alternative** types of assessment. Some reactions have been extreme but they highlight the importance of focusing more attention on the actual performance of students (see Box 1.1). If you want to determine if students can write, have them write something. If you want to determine if students can operate a machine, have them

<sup>1</sup>Space does not permit using the preferred two-step method of stating intended learning outcomes described in Chapter 4. These statements, however, should provide a focus for your study and for application of the content in each chapter.



operate the machine. If you want to determine if students can conduct an experiment, have them conduct an experiment. In short, if you want to determine if they can perform a task, have them perform the task. There is little doubt that more emphasis on performance assessment in the schools would improve the assessment of our intended learning outcomes. However, paper-and-pencil testing still has an important role to play, even as we focus more directly on performance-based tasks.

Most types of performance have a knowledge component that is important to the performance. Good writing includes such factors as knowledge of vocabulary, grammar, and spelling. These are not well sampled by a writing task because we tend to use only the words we know, use sentence structures that we can punctuate easily, and substitute words we can spell for those we can't spell. Thus, in writing, we can structure it to conceal our weaknesses. A separate test of vocabulary, grammar, and spelling can identify these weaknesses and be used to improve writing skill. Just don't interpret the test results as measures of "writing ability." The tests measure knowledge useful in writing but writing ability is determined by assessing the actual writing (**performance assessment**). Similarly, in operating machinery, the actual operation of the machine is the ultimate goal, but tests measuring knowledge of how to operate the machine and the safety precautions to follow may be needed before the hands-on performance assessment. Likewise, before conducting an experiment, tests can be used to determine how well students know the information needed for a well-controlled experiment.

**BOX 1.1**  
**Commonly Used Assessment Terms**

Performance Assessments	Assessments requiring students to demonstrate their achievement of understandings and skills by actually performing a task or set of tasks (e.g., writing a story, giving a speech, conducting an experiment, operating a machine).
Alternative Assessments	A title for performance assessments that emphasizes that these assessment methods provide an alternative to traditional paper-and-pencil testing.
Authentic Assessments	A title for performance assessments that stresses the importance of focusing on the application of understandings and skills to real problems in "real-world" contextual settings.



Throughout this book, the emphasis will be on achievement assessment that includes both paper-and-pencil testing and performance assessment. Tests can provide direct measures of many important learning outcomes, ranging from simple to complex, and they can provide needed information for assessing and improving actual performance tasks. Thus, although we should strive for as authentic assessment as we can obtain, within the constraints of the school setting, both tests and performance-based tasks are needed for a complete assessment of student achievement.

As used in this book, **achievement assessment** is a broad category that includes all of the various methods for determining the extent to which students are achieving the intended learning outcomes of instruction. Because we are limiting our concern to achievement assessment, the single term *assessment* is used throughout the book as a matter of convenience.

## Relation between Instruction and Assessment

In preparing for any type of instructional program our main concern is “How can we most effectively bring about student learning?” As we ponder this question, our attention is naturally directed toward the methods and materials of instruction. However, at the same time we should also consider the role of assessment in the instructional process. When properly designed and appropriately used, assessment procedures can contribute to more effective instruction and greater student learning.

The close relation between instruction and assessment can be seen in Table 1.1. Both require that we clearly specify the learning outcomes to be achieved by students, and the provisions of well-designed assessments closely parallel the characteristics of effective instruction. This relation highlights the importance of broadening instructional planning to include assessment planning. The typical procedure of limiting instructional planning to the teaching-learning process is inadequate. Effective instruction requires that we expand our concern to a teaching-learning-assessment process, with assessment as a basic part of the instructional program. As with all instructional activities, the main function of assessment is to improve learning and it can contribute to this end in a number of ways.

## Assessment in the Instructional Process

To be fully integrated with instruction, plans for assessment should be made during the planning for instruction. From the beginning of instruction to the end there are numerous decisions that teachers need to make. Carefully



TABLE 1.1 Relation between Instruction and Assessment

Instruction	Assessment
<b>Instruction is most effective when</b> <ol style="list-style-type: none"><li>1. Directed toward a clearly defined set of intended learning outcomes.</li><li>2. The methods and materials of instruction are congruent with the outcomes to be achieved.</li><li>3. The instruction is designed to fit the characteristics and needs of the students.</li><li>4. Instructional decisions are based on information that is meaningful, dependable, and relevant.</li><li>5. Students are periodically informed concerning their learning progress.</li><li>6. Remediation is provided for students not achieving the intended learning.</li><li>7. Instructional effectiveness is periodically reviewed and the intended learning outcomes and instruction modified as needed.</li></ol>	<b>Assessment is most effective when</b> <ol style="list-style-type: none"><li>1. Designed to assess a clearly defined set of intended learning outcomes.</li><li>2. The nature and function of the assessments are congruent with the outcomes to be assessed.</li><li>3. The assessments are designed to fit the relevant student characteristics and are fair to everyone.</li><li>4. Assessments provide information that is meaningful, dependable, and relevant.</li><li>5. Provision is made for giving the students early feedback of assessment results.</li><li>6. Specific learning weaknesses are revealed by the assessment results.</li><li>7. Assessment results provide information useful for evaluating the appropriateness of the objectives, the methods, and the materials of instruction.</li></ol>

planned assessment procedures can improve the effectiveness of many of these decisions by providing more objective information on which to base judgments. Let us consider some of the decisions teachers need to make at (1) the beginning of instruction, (2) during instruction, and (3) at the end of instruction.

**Beginning of Instruction (Placement Assessment)**

There are two major questions that teachers need to answer before proceeding with the instruction:

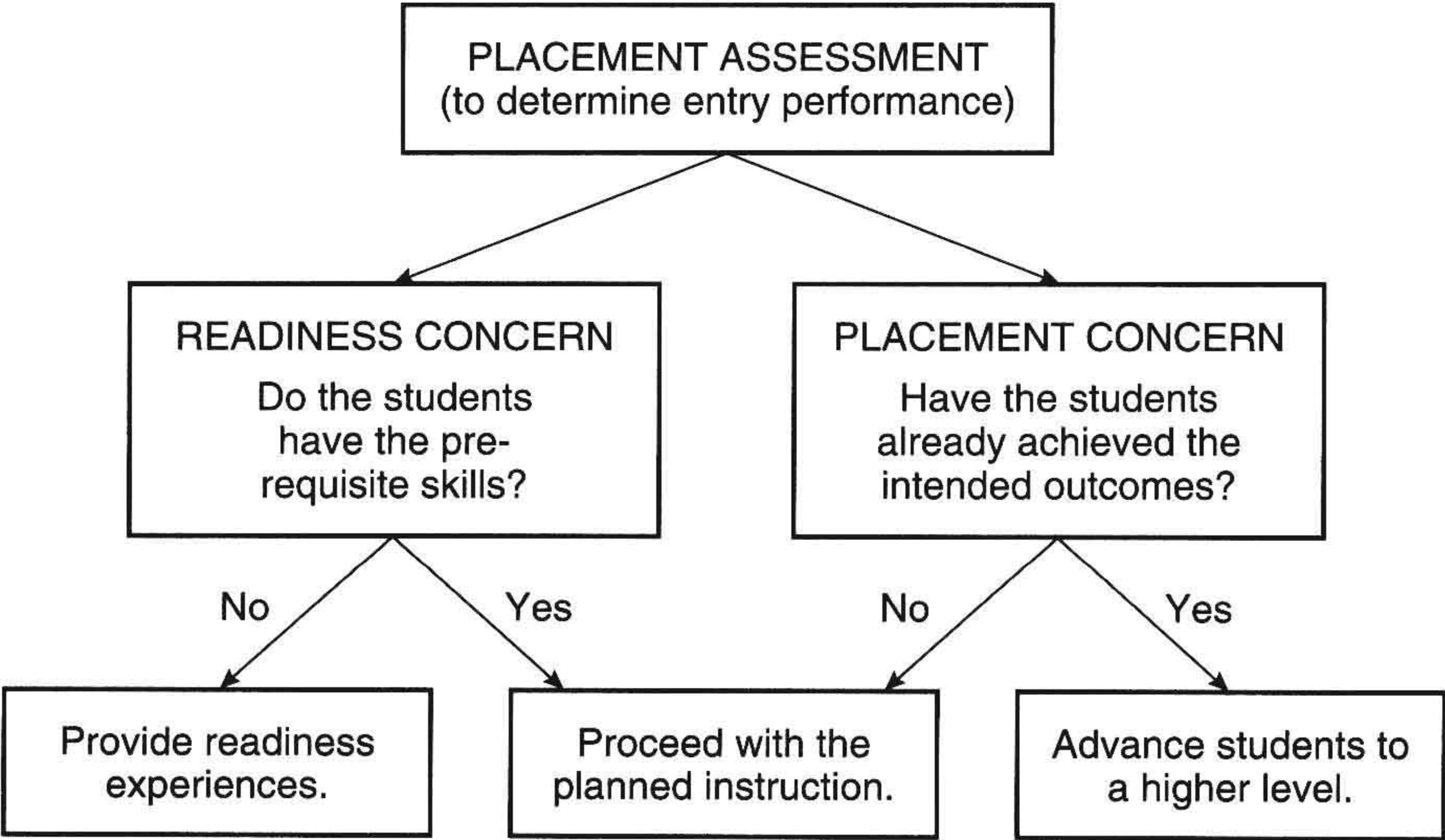
1. To what extent do the students possess the skills and abilities that are needed to begin instruction?
2. To what extent have the students already achieved the intended learning outcomes of the planned instruction?



Information concerning the first question is frequently obtained from *readiness* pretests. These are tests given at the beginning of a course or unit of instruction that cover those prerequisite skills necessary for success in the planned instruction. For example, a test of computational skill might be given at the beginning of an algebra course, or a test of English grammar might be given at the beginning of a German course. Students lacking in prerequisite skills could be given remedial work, or they could be placed in a special section that had lower prerequisites.

The second question is frequently answered by a *placement* pretest covering the intended learning outcomes of the planned instruction. This might very well be the same test that is given at the end of the instruction; preferably it should be another form of it. Here we are interested in determining whether students have already mastered some of the material we plan to include in our instruction. If they have, we might need to modify our teaching plans, encourage some students to skip particular units, and place other students at a more advanced level of instruction. The function of placement assessment is summarized in Figure 1.1.

In addition to the use of pretests, performance-based tasks may also be useful for determining entry skills. In the area of writing, for example, obtaining writing samples at the beginning of instruction can establish a base for later assessments of progress. This type of preassessment would be especially valuable if portfolios of student work were to be maintained during the instruction.



**FIGURE 1.1** Simplified Model for the Instructional Role of Placement Assessment.



The contribution that preassessment can make to instruction depends on the nature of the instruction, how well we know students, and how the results are to be used. A pretest in arithmetic may be quite useful at the beginning of an algebra course, whereas a pretest in a course that lacks a clearly defined set of prerequisite skills (e.g., social studies) may be of little value. Similarly, the results of a test of basic skills may be of great value to a new teacher unfamiliar with the students and of less value to an experienced teacher familiar with the students' backgrounds. In addition, preassessment will contribute little to the instructional program unless plans are made to remedy deficiencies, place students in the most beneficial position in the instructional sequence, or use the results as a base for assessing future progress. To be most effective, the use of preassessment should be considered during the instructional planning stage.

### **During Instruction (Formative and Diagnostic Assessment)**

During the instructional program our main concern is with the learning progress being made by students. Questions such as the following must be answered.

1. On which learning tasks are the students progressing satisfactorily? On which ones do they need help?
2. Which students are having such severe learning problems that they need remedial work?

Tests used to monitor student progress during instruction are called *formative* tests. Formative tests are typically designed to measure the extent to which students have mastered the learning outcomes of a rather limited segment of instruction, such as a unit or a textbook chapter. These tests are similar to the quizzes and unit tests that teachers have traditionally used, but they place greater emphasis on (1) measuring all of the intended outcomes of the unit of instruction, and (2) using the results to improve learning (rather than to assign grades). The purpose is to identify the students' learning successes and failures so that adjustments in instruction and learning can be made. When the majority of students fail a test item, or set of items, the material is typically retaught in a group setting. When a minority of students experience learning failures, alternate methods of study are usually prescribed for each student (for example, reading assignments in a second book, computer instruction, and visual aids). These corrective prescriptions are frequently keyed to each item, or to each set of items designed to measure a separate learning task, so that students can begin immediately after testing to correct their individual learning errors.



Formative assessment using performance-based tasks may involve periodic assessments of a product (e.g., writing sample, drawing) or of a process (e.g., giving a speech, operating a machine) with feedback to students concerning strengths and weaknesses. The aim here, as with formative testing, is to monitor learning progress and to provide corrective prescriptions to improve learning.

When a student's learning problems are so persistent that they cannot be resolved by the corrective prescriptions of formative assessment, a more intensive study of the student's learning difficulties is called for. It is here that *diagnostic* assessment is useful. Diagnostic assessment attempts to answer such questions as the following: Are the students having difficulty in addition because they don't know certain number combinations or because they don't know how to carry? Are the students' difficulties in reading German due to their inadequate knowledge of vocabulary or to their poor grasp of certain elements of grammar? Are the students unable to apply scientific principles to new situations because they don't understand the principles, because their knowledge of particular concepts is weak, or because the new situations are too unfamiliar to them? Thus, diagnostic assessment focuses on the common sources of error encountered by students, so that the learning difficulties can be pinpointed and remedied.

Diagnostic assessment can frequently be aided by the use of diagnostic tests. These tests typically include a relatively large number of test items in each specific area with slight variations from one set of items to the next so that the cause of specific learning errors can be identified. In detecting errors in the addition of whole numbers, for example, we might construct a test that includes a set of items requiring no carrying, a set that requires simple carrying, and one that requires repeated carrying to determine if carrying is the source of the difficulty. Unfortunately, diagnostic tests are difficult to construct in most areas of instruction. Therefore, we must depend more heavily on observation and judgment.

Diagnosing learning problems is a matter of degree. Formative assessment determines whether a student has mastered the learning tasks being taught and, if not, prescribes how to remedy the learning failures. Diagnostic assessment is designed to probe deeper into the causes of learning deficiencies that are left unresolved by formative assessment. Of course, this is not to imply that all learning problems can be overcome by formative and diagnostic assessment. These are simply methods to aid in the identification and diagnosis of specific learning difficulties so that appropriate remedial steps can be taken. Diagnosing and remedying severe learning problems frequently require a wide array of assessment procedures and the services of specially trained personnel. All we are attempting to do here is to show how formative and diagnostic assessment can contribute to improved student learning during instruction. The model presented in Figure 1.2 summarizes the process.



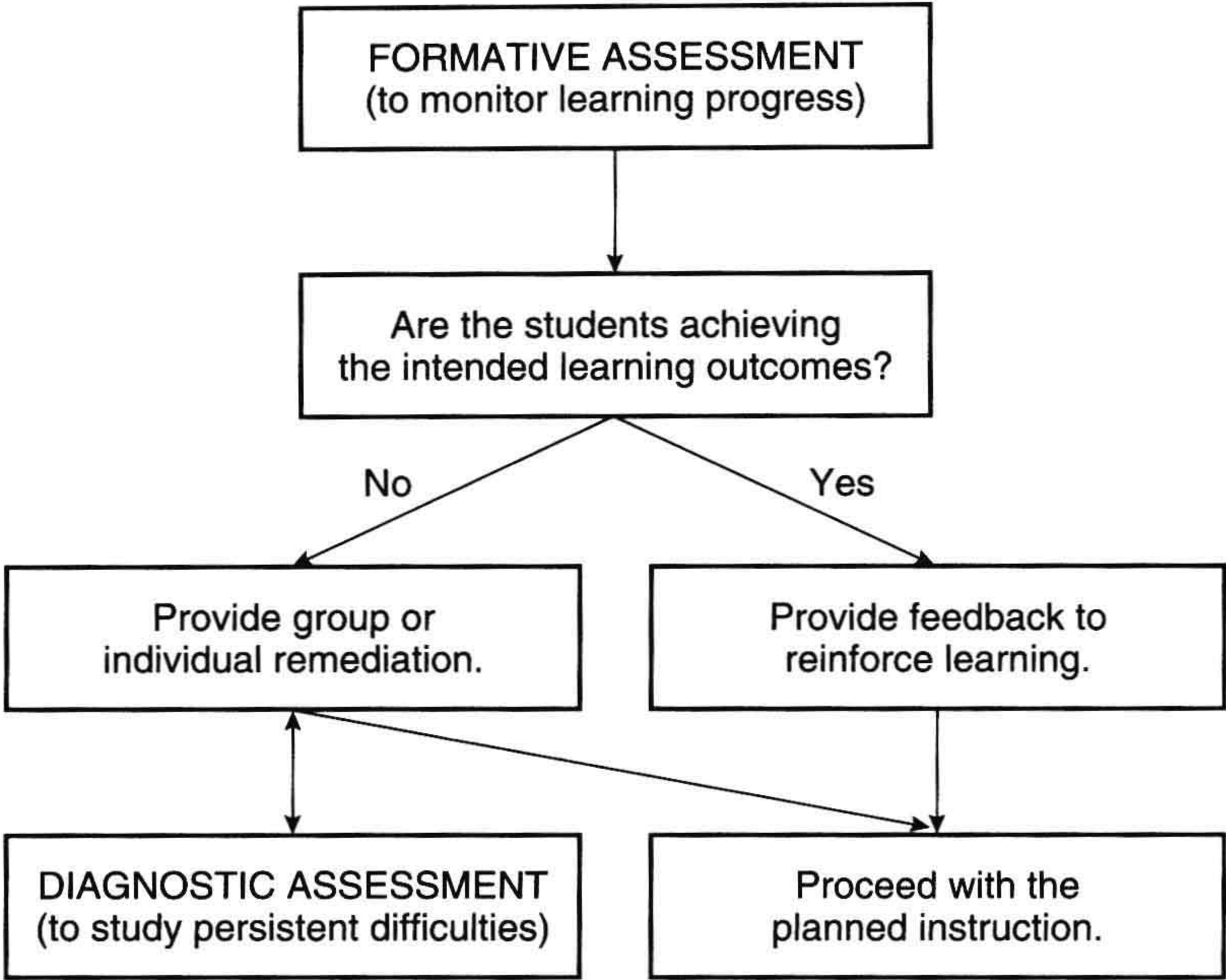


FIGURE 1.2    Simplified Model for the Instructional Role of Formative Assessment.

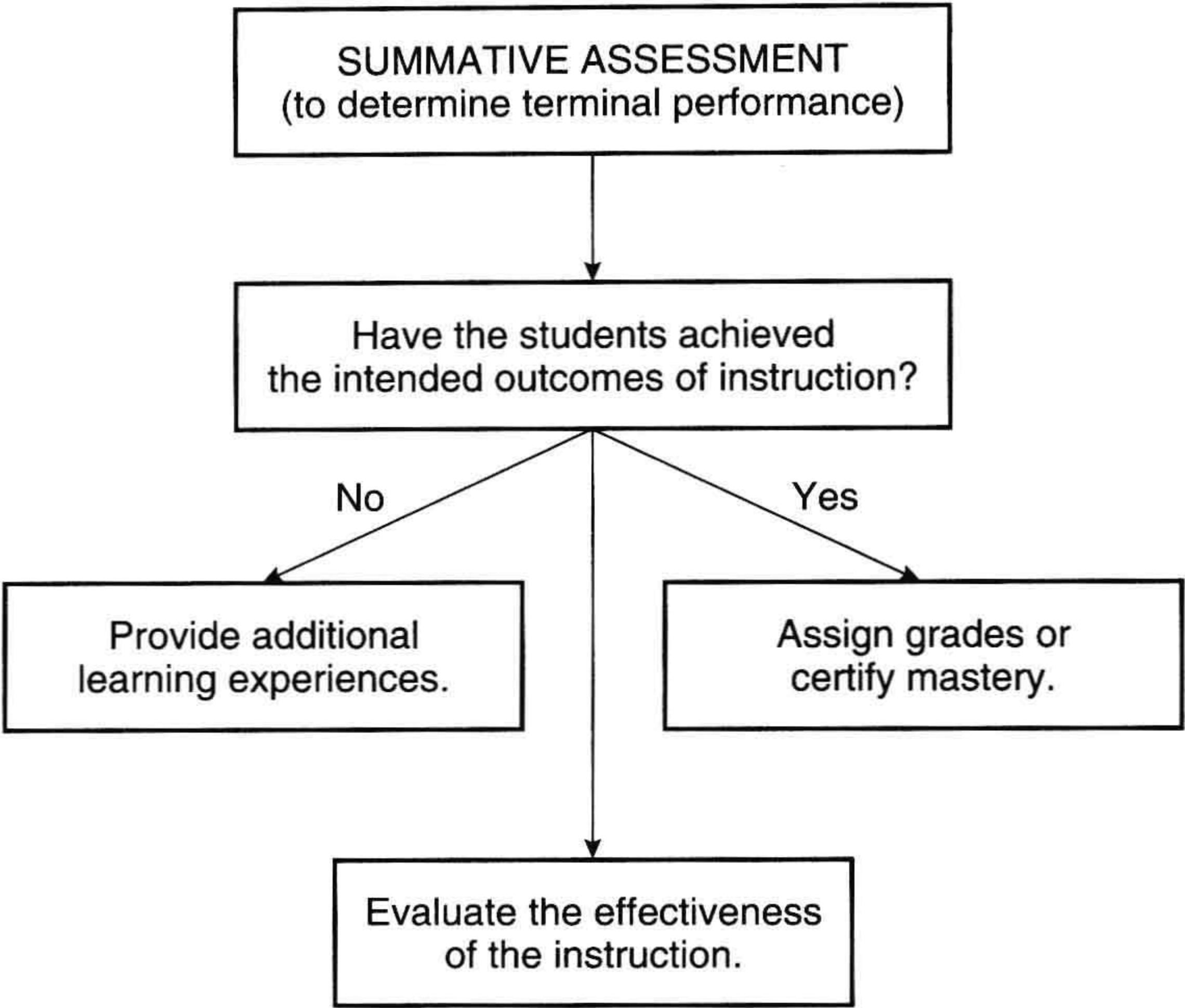
**End of Instruction (Summative Assessment)**

At the end of a course or unit of instruction we are concerned primarily with the extent to which the students have achieved the intended outcomes of the instruction. Questions such as the following must be answered:

- 1. Which students have mastered the learning tasks to such a degree that they should proceed to the next course or unit of instruction?
- 2. What grade should be assigned to each student?

Achievement assessment at the end of instruction for the purpose of certifying mastery or assigning grades is called *summative* assessment. This assessment is typically comprehensive in coverage and includes both tests and performance assessments. Although the results are used primarily for grading, there should be some feedback to students and the results should be used for evaluating the effectiveness of the instruction. See Figure 1.3 for the summative assessment model.





**FIGURE 1.3** Simplified Model for the Instructional Role of Summative Assessment.

## Other Ways Assessments Can Aid Learning

As noted in the previous section, assessments can aid the teacher in making various instructional decisions having a direct influence on student learning. In addition, assessments can aid student learning in a number of other ways.

### Student Motivation

A carefully planned assessment program can have a direct influence on student learning by (1) providing students with short-term goals, (2) clarifying the types of tasks to be learned, and (3) providing feedback concerning their learning progress. Short-term goals are more motivating than telling students “Some day you will find this knowledge or skill useful.” An expected assessment stimulates learning activity and directs it toward the learning tasks to be assessed. Its contribution to learning depends to a large extent on how faithfully our assessments reflect all of the important outcomes of the instruction and how we use the results. For example, if the application of principles is