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Creating and Grading Valid and Accessible Teacher-Made Tests

Ms. Dodd was surprised and disappointed by her students' performance on her tests. While their performance during classroom learning activities indicated that her students understood the concepts and skills she was teaching, many of her students' test scores showed quite the opposite. A confused and frustrated Ms. Dodd asked her students to write, without signing their names, why they got the grades they did on her test. Students wrote the following:

"Your tests don't cover the material we learned in class."

"We spent all this time learning about one topic and there was only one question on that topic."

"I can't remember all the things you want us to know on one test."

"I accidentally skipped over some questions I could answer because there were too many questions on a page."

"I didn't have enough room to write my answers."

"I didn't understand what I was asked to do on some of the questions."

"A lot of the questions were tricky and confused me."

Ms. Dodd used her students' comments to improve her tests. She determined that it would be better if she tested her students more frequently on smaller amounts of information rather than giving them fewer tests covering a lot of information. She identified the content of her tests by listing the most important topics and concepts she taught as well as the percentage of instructional time she devoted to teaching them. She also asked her students to compose possible test questions and put some of their questions on future tests.

Ms. Dodd decided to use a balance of objective and essay test questions. As she wrote her questions, she made sure the language and sentence structures used were appropriate for her students and that they did not contain clues that helped students guess the correct answer. She highlighted key words in items and paired some of the text with visual images she downloaded from the Internet. To guide her students in responding to the essay questions, she listed the important vocabulary and concepts she wanted them to discuss.

To help her students pay attention to and understand directions, she presented the directions in text boxes bordered by white space. At different places throughout the test, she put reminders to prompt and encourage her students to ask questions if they didn't understand something. She carefully organized her test items in a consistent and uncluttered way to help her students avoid

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skipping lines and test items. She made sure that her students had enough space to answer test items without having to continue writing on another page.

As students worked on the test, she observed them and noticed that they seemed to be more focused and less anxious. After she graded the test, she performed an item analysis to identify which test items were too difficult or too simple, tricky, or confusing. She was pleased that most of her test items were good ones and that her students' test performance matched her expectations for them.

- How do you and your students feel about your tests?
- What factors do you consider in designing your tests?
- How could you improve your tests?

High-quality teacher-made tests can aid you and your students in several ways. They can help you communicate to your students and their families important aspects of your curriculum and motivate your students to learn the concepts and skills you have taught. Your tests also can inform your teaching by identifying curricular areas mastered by your students as well as those that require additional or modified instruction. Test performance can be used to provide feedback to your students about their learning.

As the comments of Ms. Dodd's students reflect, the degree to which these benefits are likely to occur for you and your students depends on the quality of the tests you create. Teacher-made tests may be especially a challenge for those students who may struggle with the content and format of tests because of their attention, memory, organizational, language, reading, and writing difficulties, including your students with disabilities and second language learners (Salend, 2008). Therefore, this chapter offers a variety of best practices you can use to create and grade valid and accessible teacher-made tests that enhance the testing experience for all of your students (examples of these practices are presented in the text and in Figures 1.2–1.6 on pp. 25–33). Once you create good test questions using the information presented in this chapter, you can save them for use in the future.

Specifically, this chapter addresses the following questions:

- What factors should I consider in determining the content of my tests?
- How can I foster the readability and legibility of my tests?
- How can I format my tests to help my students to be organized and motivated and to pay attention?
- How can I help my students understand and follow test directions?
- How can I compose understandable, useful, valid, and appropriate test items?
- How can I grade my teacher-made tests?

WHAT FACTORS SHOULD I CONSIDER IN DETERMINING THE CONTENT OF MY TESTS?

One of the most important decisions you will make when creating your tests is determining the content that the test will assess. In choosing content for your tests, you want to be sure that your tests have *validity.* Tests that are not valid

measures of your curriculum will be of little value to you in assessing your students' learning and enhancing your teaching.

Keys to Best Practice: Ensure that the content of your tests reflects your curriculum and assesses the most important topics, concepts, and skills you have taught (Hogan, 2007).

Validity

Validity refers to the extent to which the test measures what you want it to assess. In particular, it is important for you to make sure that your tests have *content validity,* which relates to the extent to which your test items cover and reflect your curriculum and the most important topics, concepts, and skills you taught and now want to assess. You can evaluate the content validity of your tests by examining the relationship between your test items and the topics and goals within your curriculum by asking the following questions:

- What content does my test assess?
- Is the content of the test complete and reflective of the curriculum and the important skills and concepts I have taught?
- Do test items allow students to demonstrate their knowledge and mastery of important topics and essential skills?
- Do the test items reflect my instructional objectives and priorities?
- Are there a sufficient number of items addressing my instructional objectives and priorities?
- Are test items sequenced from easiest to hardest?

You also can link test content directly to your curriculum by using curriculum-based measurement and the other assessment alternatives we will discuss in Chapter 5.

Keys to Best Practice: Test content should be consistent with the instructional strategies you used to help your students learn (Popham, 2006).

The content of your tests should be consistent with the instruction strategies you used to help your students learn. As such, your test items should reflect not only what but also how content has been taught. For example, content taught via role plays, simulations, cooperative learning, and problem-solving techniques is best tested through essay questions, whereas factual learning taught through teacher-directed activities may best be tested by objective test items such as multiple-choice questions. Additionally, the language you use to present both test directions and items should be consistent with that used in class.

Keys to Best Practice: Weight important topics more heavily so that the content assessed by your tests reflects the level of difficulty of the content as well as the amount of instructional time your class spent learning specific material (Salend, 2008).

You can enhance the validity of your tests by weighting the content of your tests to reflect the complexity of the concepts you taught and the amount of instructional time you devoted to teaching them. In other words, the percentage and number of items on a test assessing mastery of specific topics should be directly related to the levels of difficulty as well as the amount of class time you spent teaching that material. For instance, if you spent several days teaching about photosynthesis, then a corresponding percentage of your test questions should address students' mastery of content related to photosynthesis. Like Ms. Dodd, you can start to identify the content for your test by listing the topics and concepts you want the test to cover and then determining their levels of difficulty and importance as well as the percentage of instructional time you devoted to teaching them.

Keys to Best Practice: Focus the content of your tests by using more frequent tests that assess specific content rather than fewer tests covering a broader scope (Salend, 2008).

As Ms. Dodd realized, frequent tests that assess specific content, rather than fewer tests covering a broader scope, can foster validity and be beneficial for you and your students. It allows you to create tests that more thoroughly assess the specific content you have taught. More frequent tests have the advantage of offering students opportunities to develop effective test-taking skills and also help students who have difficulty remembering large amounts of information.

Keys to Best Practice: Involve students in determining the content of tests by asking them to identify important topics and compose possible test questions (Levine, 2003).

Like Ms. Dodd's students, your students can be a good source for identifying content for your tests. You can have your students work in groups to identify important topics that have been covered. You also can assign homework that asks students to compose possible test questions. This serves the dual purpose of helping your students to study and review their notes and textbook readings and providing you with a bank of potential questions. You can survey students at the beginning of a unit to determine what questions they have about important topics. To assist students in writing test items, you can review with them the content of the test as well as the qualities of good test questions (which we will discuss later in this chapter).

HOW CAN I FOSTER THE READABILITY AND LEGIBILITY OF MY TESTS?

Keys to Best Practice: Use a variety of strategies and technologies to enhance the readability and legibility of your testing materials (Salend, 2009; Sperling, 2006).

Testing materials that are difficult for students to read can cause problems for them, especially those of your students with reading, language, and learning difficulties (Sperling, 2006). Students who have difficulty reading your tests will

have problems comprehending the test's directions and items. As a result, they may not be able to answer questions correctly, even when they have mastered the material you are testing. You can increase the accessibility of your tests for your students by enhancing the readability and legibility of your testing materials and formatting them appropriately so that they help your students stay organized and focused. Using technology can help you achieve these goals.

Keys to Best Practice: Foster the readability of your tests by carefully paying attention to your language and the types and number of words and sentence structures you use (Kozen, Murray, & Windell, 2006; Thompson, Johnstone, & Thurlow, 2002).

Fostering Readability

Readability refers to the linguistic factors that affect the ease with which students can read your text-based materials. The readability of your test items and directions can be fostered by carefully paying attention to your language as well as to the types and numbers of words and sentence structures you use. Therefore, as Ms. Dodd did, you can increase the readability of your testing materials by

- being as brief and direct as possible;
- using easy-to-understand language;
- offering examples that explain statements;
- eliminating unnecessary words and limiting the use of different words and prepositional phrases;
- referring directly to important points, objects, or events rather than using pronouns;
- presenting text in a tense and voice your students can comprehend;
- using sentence structures that are clear, explicit, and recognizable to students;
- having each sentence focus on only one main point;
- highlighting key words, terms, and concepts within sentences;
- embedding definitions or examples of important or difficult terminology into sentences;
- minimizing the length of sentences and paragraphs by deleting unnecessary clauses and phrases and by dividing long sentences into two or more sentences;
- avoiding the use of double negatives, abbreviations, contractions, acronyms, quotations, and parentheses;
- beginning paragraphs with a topic sentence; and
- having clear transitions and connections between sentences and paragraphs.

Keys to Best Practice: Use software programs to make sure that the readability of your tests is appropriate for your students (Salend, 2009).

Using Readability Software Programs

After you initially develop your tests, you can check to make sure that their readability is appropriate for your students by using software programs that determine the readability of text (see Figure 1.1). Many of these resources can help you revise your tests to make them more readable for your students. For example, readability programs can identify difficult words that can then be replaced with

synonyms that are more appropriate for your students. In addition, most word processing programs provide access to readability formulas as well as strategies for enhancing a selection's readability. For instance, the automatic summarizing feature in many word processing programs (e.g., AutoSummarize in Microsoft Word) can help you condense and summarize test sections into shorter versions. Since readability software programs only assess readability in terms of the number of syllables (or letters) in a word and the number of words in a sentence, it is important to use them critically and as a guide. When using them, you should remember that the content-based terms that are being assessed by your tests cannot and should not be simplified.

Figure 1.1 Test Creation Resource Web Sites

Readability Formula Resources

Micro Power and Light Company (www.micropowerandlight.com)
ReadabilityStudio (www.oleandersolutions.com/readabilitystudio.html)
Online Readability Software (www.readability.online-web-software.com/demo.php)
Fryinator Readability Software (www.geocities.com/fryinator)
Readability Formulas (www.readabilityformulas.com)

Integrating Visual Supports Into Tests Resources

BoardMaker and Writing with Symbols (www.mayer-johnson.com)
Intellipics (www.synapseadaptive.com/intellitools)

Image Sharing Resources

Library of Congress Photographs Online Catalog (www.loc.gov/rr/print/catalog.html)
Flickr (www.flickr.com)
Picsearch (www.picsearch.com)

Item Analysis Resources

Assessment Systems (www.assess.com/xcart/home.php?cat=19)
Logic Extension Resources (www.lxr.com/site/home.aspx)
Open Office (www.openoffice.org)
Excel (www.office.microsoft.com/en-us/excel/default.aspx)
Gnumeric (http://projects.gnome.org/gnumeric)

Keys to Best Practice: Pair test text with visual supports such as pictures, graphics, and symbols (Abell, Bauder, & Simmons, 2004; Beddow, Kettler, & Elliott, 2008).

Pairing Visual Supports With Text

Pairing test text with visual supports such as pictures, graphics, and symbols can enhance the reading process and make your testing materials more readable, understandable, and motivating. In turn, this can promote your students' on-task behavior during testing situations. Embedding visuals in tests can enhance the test performance of students who have difficulty reading, hearing, or understanding

English. For instance, the accessibility of science tests can be fostered by providing students with graphics of a phenomena or an experiment followed by a series of related test questions (Abell et al., 2004).

However, always keep in mind that some students may be distracted by too many visuals and unnecessary stimuli. Therefore, when determining which and how many visual supports to use, you should make sure they are necessary and well-placed by considering whether they

- promote the readability and legibility of the test;
- explain, highlight, supplement, or summarize the testing materials;
- are linked to the text;
- are integrated appropriately within the test item;
- convey the intended information;
- assist students in identifying and comprehending important information;
- are self-explanatory or labeled appropriately;
- enhance the quality and visual presentation of the test without distracting students;
- prompt students to engage in and maintain on-task behavior; and
- are current, age-appropriate, and culturally sensitive (Beddow et al., 2008).

You can use a range of software and hardware to integrate visual supports into your tests (Parette, Wojcik, Peterson-Karlan, & Hourcade, 2005). Software programs provide access to a collection of graphics, photos, and picture communication symbols that can be paired with text (see Figure 1.1). You can also use digital cameras and computer graphics to integrate visual images into your tests to help students understand and pay attention to the test's directions and items. Like Ms. Dodd, you can use the image searching features available in most search engines or specialized image-sharing resources (see Figure 1.1) to identify appropriate and relevant pictures and images for use in your tests.

Fostering Legibility

Another critical factor that will affect your students' ability to read your tests is *legibility.* Whereas readability focuses on the linguistic variables that affect the ease of reading, *legibility* relates to the layout, format, organization, size, and appearance of the text, pictorials, and graphics in your tests. Technology can help you improve the legibility of your tests by offering resources for applying the principles of typographic and visual design, and formatting tests to foster your students' organizational, attention, and test-taking skills.

Keys to Best Practice: Apply the principles of typographic and visual design to create testing materials that are legible, organized, and formatted appropriately (Acrey, Johnstone, & Milligan, 2005; Salend, 2009).

Applying the Principles of Typographic and Visual Design

The principles of typographic and visual design can help you create testing materials that are legible, organized, and formatted appropriately. These principles, which are presented below and available via use of most word processing

programs, can enhance the testing experience for students by facilitating understanding and speed.

Type Size: Type that is too small makes it difficult for your students to read, and type that is too large may cause their eyes to make excessive movements so that they pause more frequently. Therefore, it is suggested that your tests be composed using 12- to 14-point type. However, it is recommended that test text for students who are starting to read or who have visual difficulties be at least 18-point type.

Typefaces and Fonts: The legibility of your tests can be enhanced by your selection of typefaces and fonts that are familiar to your students and avoiding a mix of typefaces and fonts. Sans serif fonts such as Arial are good choices for students with reading difficulties because they look more like hand lettering, which can facilitate letter and word identification.

Case: Test text should be printed in lowercase and capital letters when grammatically appropriate because lowercase letters are easier for your students to discriminate and ALL CAPITAL TEXT OFTEN CAUSES STUDENTS TO READ MORE SLOWLY.

Style: Uninterrupted text presented in stylistic features such as *italics* and **boldface** slows the reading process. Therefore, stylistic variants should be used cautiously, sparingly, and only to **emphasize** and *highlight* small amounts of text embedded in sentences (e.g., highlighting key words in test directions or items) or to make brief headings more noticeable (e.g., highlighting headings that introduce directions for sections of the test). In general, it is more desirable to use color, italics, and boldface rather than underlining to highlight important text, as underlining can distract your students and make it harder for them to discriminate letters (e.g., *y* as *v* or *u* and *g* as *a*).

Line Length: Since line lengths can affect students' reading fluency, it is recommended that you present test text in line lengths of approximately four inches. You can do this by presenting text so that each line contains between 40 and 70 characters, or 7 to 12 words. When it is critical to present a series of text together in order to provide the context for understanding it (e.g., sentence completion and true-false items), try to present word clusters on the same line.

Spacing and Sequencing: Inappropriate spacing and sequencing of text can cause your students to become confused, disorganized, and frustrated. Therefore, you should try to examine the impact of all spaces on a test and make adjustments to make sure that the overall spacing is consistent and provides a logical structure for students and helps them make transitions from item to item. Providing students with enough space for written responses can help structure the length of their answers and facilitate their performance by not requiring them to continue writing on another page.

Justification: A test's legibility can be fostered by using left-aligned text and ragged right margins. It is suggested that you avoid justified text as it causes uneven word and letter spacing of text, which can cause your students to experience problems tracking the flow of text. Since centered text slows the reading process, it should be used selectively such as for titles or lists. Using a wider margin at the bottom of the page and numbering the pages can support student performance by helping them stay organized.

Background and Contrast: Your tests' backgrounds and contrast can impact your students' success in reading and completing them. Therefore, the color of the text and background should be markedly different so that it will be easier for students to identify and focus on critical information. You can enhance the background and contrast of your tests by printing it using black or blue text on an off-white, pale, or matte pastel background.

You can focus your students' attention on important aspects of tests by surrounding those aspects with white space or by embedding them in thick and dark borders. For example, important directions or test items can be placed in text boxes that are bordered by white space.

HOW CAN I FORMAT MY TESTS TO HELP MY STUDENTS TO BE ORGANIZED AND MOTIVATED AND TO PAY ATTENTION?

Keys to Best Practice: Format tests to help your students stay organized and pay attention (Acrey et al., 2005; Beddow et al., 2008; Salend, 2008).

Formatting Tests to Support Organization and Attention

Test materials that are poorly formatted and disorganized can hinder readability and legibility and overwhelm your students and affect their attention and motivation. For instance, one of Ms. Dodd's students said that having too many items on a page resulted in accidentally skipping over questions. This is especially true for your students who have organizational and attention difficulties. The following are ways you can format your tests to help your students stay organized and pay attention:

- Limit the number of items on a page and limit clutter by providing sufficient blank space between items.
- Present items in a natural, fixed, organized, symmetrical, and simple numbered sequence to guide students in making transitions from one item to another. Having a clearly predictable and delineated sequence throughout the test can help your students avoid skipping lines and test items.
- Group similar question types together.
- Sequence items from easiest to hardest to help motivate students and keep them from becoming frustrated.
- Place test items and the directions for completing them on the same page so that students do not have to be distracted by turning back and forth.
- Reduce the confusion that can occur when students are asked to transfer items to a separate answer sheet by having students write their answers on the test itself.
- Provide students with sufficient space to answer test items without having to continue writing on another page. An appropriate amount of space between items can serve to structure the length of their responses.
- Give students some space between questions so that they can write a rationale or clarification for their responses to these items.
- Offer students scrap paper or space to perform a memory dump or download of important information and mnemonics they studied (we will learn more about effective study and test-taking behaviors in Chapter 4).
- Present sequenced information in chronological order through use of numbers or the words *first, second,* and *third*.
- Employ bullets to present essential information that does not have a numerical or hierarchical order.

Keys to Best Practice: Format tests to provide students with strategy, encouragement, and motivation prompts and reminders (Salend, 2009).

Providing Strategy, Encouragement, and Motivation Prompts and Reminders

Your students may need strategy, encouragement, and motivation prompts and reminders to help them organize, remember, and retrieve important content, solve problems, and complete tasks independently (Lenz, 2006). Therefore, when appropriate, you can format your tests to prompt and remind students to use such test-taking strategies as reviewing and asking questions about test items and directions, paying attention to emphasized or highlighted information, understanding context cues, and constructing mental pictures. For instance, at the beginning of the essay question section of tests, you can provide students with a reminder to use ANSWER, a test-taking strategy designed to guide students in writing essay responses (Hughes, Schumaker, & Deshler, 2005). (See Figure 1.6 on p. 33.) Specific information about ANSWER and other test-taking strategies is presented in Chapter 4.

You also can embed motivating and encouraging words and icons throughout the test. These prompts and reminders can be especially helpful for students who experience anxiety when taking tests. (We will learn more about how you can try to minimize test anxiety in Chapter 4.) At the beginning of the test, you can include a statement and graphics that encourage students to do well and to work hard to show all they have learned in class. As Ms. Dodd did throughout her test, you can periodically place prompts to remind students to stay focused and motivated and to engage in self-reinforcement (e.g., *Are you doing your best? Tell yourself you are doing well and give yourself a pat on the back*), to seek clarification (e.g., *Do you have any questions about the test?*), to follow directions (e.g., *Remember to write in complete sentences*), and to alert them to the length of the test and to relax (e.g., *Smile. You are halfway through the test*). At the end of the test, you can congratulate them (e.g., *Way to go. Congratulations on finishing the test*), and remind them to review each question and their answers (e.g., *Did you check all of your answers?*). Additional suggestions for using technology-based testing to motivate your students when taking your tests are provided in Chapter 3.

HOW CAN I HELP MY STUDENTS UNDERSTAND AND FOLLOW TEST DIRECTIONS?

In addition to the guidelines we just discussed, you can help your students understand and follow directions by using the guidelines presented below to introduce important aspects of your test and carefully phrase and present directions for test items. We will discuss specific guidelines for presenting directions for specific types of questions later in this chapter.

Keys to Best Practice: Clearly introduce important aspects of tests (McLoughlin & Lewis, 2008; Overton, 2009).

Introducing the Test

You can increase the accessibility of your tests and help your students perform better on your tests if you give them an overview of the important parts of tests, such as the overall directions and rules. When introducing a test, convey a positive attitude toward the test and make certain that *all students* are attentive, pausing when they are not. Try to keep your introduction as brief as possible (remember some students will be nervous and anxious to start taking the test), and orally highlight key words and statements.

Begin by describing the test and the reasons for taking it. Next, share important aspects about the test by reviewing the overall directions. To ensure that students understand the test's directions, you can, at the beginning of the test, assign several practice items relating to the various types of questions on the test. These practice items can be reviewed with students before allowing them to proceed with the rest of the test. If new types of questions or answer sheets are being used on the test, clearly identify and explain them, highlighting their novel aspects. You also can explain the breakdown of points for specific items and sections and remind students to work on those sections worth the most points in descending order.

Your introduction should alert students to the rules that will be in effect during testing and remind them of the importance of academic honesty. Rules should specify the testing behaviors allowed by students, the materials they are allowed to use, and the procedures they should follow to ask questions, seek assistance, and go to the bathroom. Prior to beginning the testing, you should make sure that students' physical needs (medications, hunger, thirst, or use of the bathroom) have been addressed. You can remind students to use good test-taking skills, and you can ensure that testing accommodations have been implemented and that specialized devices and technology that students use are working properly.

It helps to encourage your students to ask questions about the overall test and to ask them to paraphrase and explain important or novel directions, procedures, and rules. You may want to assess their comprehension of the following:

- *Directions and rules* ("What directions and rules are you expected to follow when working on this test?" "Can you think of any problems you might have in completing this test?" "What should you do if you have a problem?")
- *Materials they need and can use to complete the test* ("What materials do you need?" "What materials can you use?")
- *Ways they can obtain clarification or assistance* ("If you have a question or experience a problem, what should you do?")
- *Point totals for specific questions and sections* ("Which sections are worth the most points? How many points is the essay question worth?")
- *Time limit for completing the test* ("How long do you have to work on the test?")
- *Things they can do if they finish early* ("What can you do if you finish early?")
- *Questions they may have about the test* ("Do you have any questions about the test before we begin?")

If you have students who typically experience some difficulties following directions, you can have them complete several items under your supervision before beginning to work independently. You also can periodically monitor their performance and structure the testing so that these students work on one specific section at a time and check with you before going on to the next section.

Keys to Best Practice: Clearly and carefully phrase and present directions for test items (Conderman & Koroghlanian, 2002; Salend, 2008).

Phrasing and Presenting Directions for Test Items

As Ms. Dodd's students' comments indicated, it is extremely important for teachers to clearly phrase and present directions for each section of the test that contains different types of items (see Figures 1.2–1.6 on pp. 25–33 for examples of best practices for phrasing and presenting directions). When phrasing and presenting directions and items, consider the following:

- Use easy-to-understand language that is familiar to students (e.g., instead of asking students to compare and contrast two concepts, you can ask them to write how the concepts are alike and different).
- Avoid vague terms that may confuse students or be subject to multiple interpretations (e.g., *frequently*, *usually*) and eliminate unnecessary information.
- Include statements that specify the precision you expect students to provide when answering. For example, directions for a section on measuring angles should include a statement defining that, in order to be correct, students' measurements must be within a specific number of degrees.
- List the point totals associated with items and sections prominently. Providing this information can help students develop a plan and timeline for completing tests based on the point values associated with specific items and sections of tests.
- Check test directions and items to make sure that they do not contain clues that can unintentionally lead to guessing the correct response. Proofread your tests to make sure that they do not include

  grammatical cues (e.g., the articles *a* and *an,* plurals);

  word cues (e.g., the same words appear in the question and answer); and

  similarity cues (e.g., the information in one question leads to the answers in other questions).

When presenting directions that have several steps, it is helpful to number and list the steps in sequential order (see Figures 1.3–1.5 on pp. 25–31). For example, a test item related to latitude and longitude can be presented by listing the following steps:

1. Identify the city on the map.
2. Use the map to determine the city's latitude and longitude.
3. Use the appropriate format to write the coordinates for the city's latitude and longitude.

Keys to Best Practice: Use technology to help your students focus on and pay attention to test directions (Salend, 2009).

Using Technology

You can use technology to help your students focus on and pay attention to test directions. Via technology you can use cues (circling, color coding, font variations, underlining, italicizing, boldfacing, enlarging) and graphics to *highlight* critical aspects of directions by

- presenting important directions and a correct model of each type of test item in text boxes that are bordered by white space as Ms. Dodd did in the chapter opening vignette (see Figures 1.2–1.5 on pp. 25–33);
- displaying direction reminders at important locations throughout the test (e.g., *Remember to write clearly and to use complete sentences*; see Figures 1.5 and 1.6 on pp. 31 and 33);
- using color-coded arrows to alert students to pay attention to the directions for a new set of test items; and
- embedding symbols, icons, pictorials, reminders, or signs at various sections of the test to direct and prompt students. For example, *go* signs can be used to encourage students to continue to keep working, and *stop* signs can indicate the end of a section.

As we discussed previously, you can use software and digital cameras to present computer-based activity directions, which employ combinations of pictures, graphics, symbols, and words to aid your students in comprehending and following sequential directions (Stromer, Kimball, Kinney, & Taylor, 2006).

HOW CAN I COMPOSE UNDERSTANDABLE, USEFUL, VALID, AND APPROPRIATE TEST ITEMS?

Test items are the most critical part of any test. Unfortunately, writing understandable, useful, appropriate, and valid test questions is very difficult. As mentioned earlier, it is essential that you make sure that test items assess the most important and relevant concepts and skills you have taught. In addition, your test items should be consistent with the instructional strategies you used to help your students learn.

Keys to Best Practice: Consider if it is appropriate to match the content and format of your test questions with the high-stakes tests your students will take (Hogan, 2007).

Although it is not appropriate to "teach to the test," you can consider whether it is appropriate to match the content and format of test questions on your teacher-made tests with the high-stakes tests your students will take. That way, you can assess student performance while at the same time helping students become more familiar with the conditions they will encounter when taking high-stakes tests.

Keys to Best Practice: Make your test questions motivating, creative, challenging, and relevant to your students' lives and academic abilities (Savage, Savage, & Armstrong, 2006).

It helps to use test questions that are motivating, challenging, and relevant to your students' lives and academic abilities. When possible, you can motivate your students and personalize your tests by phrasing items using the students' and teachers' names (make sure that individuals will not be embarrassed or object to having their names used in questions). You also can personalize your tests by incorporating students' interests and experiences as well as integrating popular characters, items, and trends in test items. Science, English, and social studies questions can be related to local sites and museums, and math word problems can be presented using names and persons, places, and things associated with their community. For example, the essay question in Figure 1.6 on page 33 asks students to apply and share their knowledge of food groups and healthy foods choices by responding from the perspective of being on a schoolwide committee examining healthy school meals. You can motivate and challenge your students by presenting them with creative test items that incorporate suspense, fantasy, curiosity, uncertainty, and novelty.

Keys to Best Practice: Make sure your test questions are respectful and reflective of your students' individual differences (Beddow et al., 2008).

Inclusive tests contain test questions that are respectful and reflective of your students' individual differences related to race, linguistic ability, economic status, gender, ethnicity, cultural and religious backgrounds, family structure, and sexual orientation. Therefore, you need to make sure that your test questions assess content from a multicultural perspective and portray individuals and groups in realistic, factually correct, and nonstereotypic ways. You can make your test questions more inclusive and meaningful for your students by using a variety of culturally relevant referents and presenting and describing individuals and groups using appropriate terms.

When writing your test questions, you need to address the strengths and challenges of your students. Student performance on your tests can be improved by composing well-written, grammatically correct, challenging, and academically appropriate test items that students can read and understand. You can make your tests fairer for students by avoiding *hinging,* which refers to the use of items whose correct answers require students to answer preceding questions correctly (National Board of Medical Examiners, 2002).

Objective Test Items

Tests are usually made up of objective and essay test questions (which we will discuss later). Objective test questions, including multiple choice, matching, true-false, and sentence completion items, ask students to select or write a number, letter, word, or short phrase or sentence. Although objective items are typically used to assess students' memory and understanding of information, they also can be used to test simple problem solving and data interpretation as well as the application of rules (Brookhart & Nitko, 2008).

In addition to considering the recommendations for phrasing and presenting test directions we discussed previously, here are some guidelines that can help you compose your objective and essay test items. Sample items incorporating these guidelines are presented in Figures 1.2–1.6.

Keys to Best Practice: Use effective guidelines for composing multiple-choice items (Brookhart & Nitko, 2008; Hogan, 2007; National Board of Medical Examiners, 2002).

Composing Multiple-Choice Items

Multiple-choice items, which can be used to assess your students' application of content or recall of information, are the most common type of test items on teacher-made tests. These items are made up of the *stem,* which presents a question, statement, paragraph, or visual (e.g., chart, map) and the conditions associated with it, followed by a series of answer choices consisting of the correct answer as well as incorrect choices or *distractors.* When writing multiple-choice questions, you should pay careful attention to each item stem and the answer choices. The stem should

- present the conditions associated with the item and provide a context for answering it;
- address only one major point related to important content from the curriculum;
- focus only on the information students need to answer the question and avoid unnecessary information;
- be free of idiomatic expressions, jargon, and extraneous verbiage;
- be written so that students can answer it without looking at the answer choices;
- be longer than the answer choices so that you don't have to repeat content from the stem when presenting your answer choices;
- be written in the active voice; and
- be stated in the positive. In the limited number of cases in which you use a negative stem, it is suggested that you highlight the negative words (e.g., *not, except*) and briefly phrase your answer choices as single words, short phrases, or sentences.

The answer choices should have the following characteristics:

- They should have only one correct answer.
- They should contain three to five letter- or number-based response alternatives. Increasing the number of response choices reduces the likelihood that students will be able to select the correct answer by guessing.
- They should not contain key words or phrases from the stem.
- They should be presented using a vertical format (unless students are used to working with a horizontal format) that presents each answer alternative on a separate indented line followed by a blank.
- They should be presented in a logical and thoughtful sequence such as by alphabetical, numerical, or chronological order. Since the correct numerical choice often is the middle number, it is best to include numeral choices that are closer to the middle number and the correct response and not at the extremes. Numerical data also should be presented in the same format. For example, all item choices should be presented in the format that is most appropriate for the item (e.g., whole numbers, percentages, ranges, decimals, fractions). When there is not an obvious sequence, randomly vary the correct answer in the answer alternative sequence and

make sure that you avoid predictable patterns (e.g., the correct answer is always C).

- They should be feasible, grammatically correct, and similar in length, completeness, and specificity. These factors are important to lessen the likelihood that students will select the correct answer based on a process of elimination or guessing by focusing on the choices' plausibility, grammar, wording, length, completeness, or detail. You also should avoid using meaningless and humorous answer alternatives.
- They should share common elements. For example, if the correct choice is a specific planet, then all of the choices should be planets. However, be careful to make sure that you do not tip off your students by phrasing the correct answer in a way that it shares more similar elements than the other choices. This is especially important when your answer choices contain two or more alternatives. For instance, if the response choices are (a) Saturn and Jupiter; (b) Saturn and Mars; (c) Jupiter and Uranus; and (d) Saturn and Neptune, the correct answer is most likely (a) Saturn and Jupiter because both Saturn and Jupiter appear in the other choices.
- They should be based on common error patterns and misunderstandings associated with the topic or skill. You can ask students to respond to open-ended versions of the multiple-choice questions and then use their most frequent errors and misunderstandings as distractors.
- They should not include categorical words and absolutes such as *always, all, only,* or *never.*

To avoid confusion, the stem and the answer choices should contain familiar, easy-to-understand language and direct sentences. These items should not assess students' opinions or values and should be free of double negatives. When using multiple-choice items to test vocabulary words and content specific terminology, the stem should contain the word, and the possible definitions should be listed in the answer choices (Brookhart & Nitko, 2008).

You can tailor your multiple-choice items for your students, particularly those with special needs, by

- highlighting keywords;
- decreasing the number of answer alternatives;
- eliminating confusing language;
- limiting the use of certain response alternatives such as having to select *all of the above* or *none of the above,* as using these types of response choices serves to make the question a series of true-false items (however, if you choose to use these types of choices, make sure they periodically serve as the correct response); and
- allowing students to circle the answer they choose rather than requiring them to transfer it to a separate answer sheet.

A sample multiple-choice item depicting many of these effective guidelines is presented in Figure 1.2.

Figure 1.2 Sample Multiple-Choice Item

Directions: (Circle) the letter of the choice that best answers the question. Each multiple-choice item is worth 3 points.

1. A poet writes, ***Bertha blew big, blue bubbles.*** What type of poetic device is the poet using?
   a. Alliteration
   b. Metaphor
   c. Onomatopoeia
   d. Personification

KEYS TO BEST PRACTICE

- Directions are clear and concise, include the visual cue of circling, and are presented in a text box.
- Students respond on the test by circling the letter of their choice.
- Students are informed of the point values associated with each item of this type.
- The item stem presents information related to only one major point and provides the context for answering the question.
- The item stem is stated in the positive without excess verbiage, longer than the answer choices, and important information in the item stem is highlighted.
- The correct choice is clearly the best answer.
- The answer choices share common elements, and are feasible, shorter than the item stem, of the same length, and presented alphabetically and vertically with appropriate lettering, indentation, and spacing.
- The answer choices do not include difficult choices such as *all of the above*, or *A and D*.
- There are no clues that can unintentionally lead students to guess or figure out the correct response.

Keys to Best Practice: Use effective guidelines for composing matching items (Brookhart & Nitko, 2008; Conderman & Koroghlanian, 2002; Hogan, 2007).

Composing Matching Items

Matching items are appropriate for testing students' mastery of relationships between two concepts or sets of information. Therefore, consider using matching items when you can create homogeneous lists of corresponding premises and responses that relate to a single theme or concept. When writing matching items, you should consider the following factors that can impact your students' performance (Hogan, 2007):

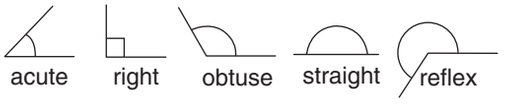
- Each matching section contains a maximum of 10 understandable, grammatically similar, and concise item pairs related to a single theme or topic.

If you feel it is necessary to assess more than 10 item pairs, the additional item pairs should be grouped by topic or content area and presented in separate matching sections.

- The matching section has two appropriately named columns made up of only one type of information or element and organized in a logical way (alphabetically, chronologically, numerical, etc.) with items listed in one column labeled with numbers and items presented in the other column labeled with letters.
- The matching section has one column that contains approximately 25% more items than the other column. When there are an equal number of items in each column, students may inadvertently get the last pair correct as it is the only pair left.
- The matching section contains feasible choices, and only one correct response for each pair is offered.
- The matching section is presented so that the longer items are listed in the left-hand column. Since most students work on matching items by reading an item in the left-hand column and then seeking the appropriate match by examining all the choices in the right-hand column, structuring your matching items in this way can help students maximize use of their time. For example, a matching item assessing key science terms should be presented so that the definitions are in the left-hand column and the terms are in the right-hand column.

Careful presentation of matching items is important for your students, especially those with special needs. Your directions for these items should help your students clearly understand the basis for matching the item pairs (Brookhart & Nitko, 2008). By placing the directions and both columns on the same page, you can prevent the possible confusion that can occur when students have to turn back and forth to match sections that appear on two different pages. You also can help students follow your directions by embedding an example of a correct response in the matching item. Your directions should inform students whether items from columns can be used more than once. Structuring these items so that students write the letter or number associated with their response choice on a blank line can avoid the confusion and disorganization that can occur when students are required to draw lines connecting the matched pairs from one column to another. A sample matching item depicting many of these effective guidelines is presented in Figure 1.3.

You can minimize the reading requirements associated with these items by presenting graphic or pictorial representations in one column. For example, in the sample matching item related to angles presented in Figure 1.3, you can present graphic representations of angles depicting the different types of angles such as



rather than their definitions in Column 1.

Figure 1.3 Sample Matching Item

Directions: Match each definition in Column 1 with its angle name in Column 2 using the following procedure:

1. Read the definition in Column 1.
2. Find its matching angle name in Column 2.
3. Write the letter of the angle name in Column 2 in the blank next to its definition in Column 1.
   - The first one is done for you as an example.
   - Remember that each type of angle may be selected once, more than once, or not at all.
   - Each correct match is worth 2 points.

Column 1: Angle Definitions	Column 2: Angle Name
A__ 1. An angle that is less than 90 degrees	A. Acute angle
___ 2. An angle that is 90 degrees	B. Corresponding angle
___ 3. An angle that is greater than 90 and less than 180 degrees	C. Obtuse angle
___ 4. An angle that is 180 degrees	D. Reflex angle
___ 5. An angle that is greater than 180 degrees and less than 360 degrees	E. Right angle
	F. Straight angle
	G. Supplementary angle

KEYS TO BEST PRACTICE

- Directions help students understand the basis for matching the item pairs and are presented in a text box with numbered steps to guide students.
- Directions inform students whether items from columns can be used more than once.
- Directions inform students of the point totals associated with item pairs.
- Directions and all aspects of the item are presented on the same page and include an example of a correct response.
- Students are provided with a blank in which to record the letter or number associated with their response choice rather than a drawing line.
- Columns contain fewer than 10 understandable, grammatically similar item pairs related to a single topic with longer item statements listed on the left, and shorter item statements on the right.
- Columns have been labeled appropriately and organized in a logical way with items listed in one column labeled with numbers and items presented in the other column labeled with letters.
- Columns contain feasible choices related to common elements with only one correct response for each pair and with approximately 25% more items in one column than in the other.

Keys to Best Practice: Use effective guidelines for composing true-false items (Brookhart & Nitko, 2008; Hogan, 2007; Salend, 2008).

Composing True-False Items

True-false items are used to test students' factual knowledge and understanding of whether aspects of concepts are presented correctly and completely.

Although these items typically are presented as statements that students identify as *true* or *false*, they also can be questions for which the response is *yes* or *no* (e.g., *Is it possible for a naturalized citizen to become president of the United States? Yes or No*).

Keep in mind that true-false items may not accurately reflect student mastery, since students have a 50% chance of guessing the correct answer. In addition, many students may encounter problems answering true-false items, especially when these items require them to make false statements true. You can try to minimize these problems and enhance the validity of your true-false items by using the following guidelines:

- Limit your use of true-false questions.
- Have each item address only one important point or relationship.
- Focus items on content related to material taught rather than intuition, common sense, or general knowledge.
- Phrase items as concise declarative statements that are clearly either true or false.
- Provide the relevant background information and context for answering the question.
- Present the source of the information (e.g., *According to our textbook*).
- Highlight important parts of items.
- Avoid the use of vague statements, terms, and phrases (e.g., *usually, probably, rarely, frequently, is useful for*), which can mean different things to different students; **qualifying words** (e.g., *often, may, can, sometimes, usually, frequently, generally*), which cue students that a statement is true; and **absolute words** (e.g., *always, all, every, entirely, only, never, none*), which indicate that a statement is false.
- State items positively and without double negatives. When items must be stated in the negative, highlight the **negative** words and phrases (e.g., *no, not, cannot*).
- Delete questions that assess mastery of nonessential content, skills, and facts (e.g., *George Washington chopped down a cherry tree. True or False*).
- Make sure items do not contain misleading and irrelevant information or ask students to make value judgments. When using items that require evaluative judgments, phrase items as evaluative statements (e.g., *Compared to . . . , it is . . .*).
- Write false statements based on common misconceptions associated with the topic being assessed.
- Make all true-false items of the same length, if possible.
- Group true-false items by content assessed.
- Link true-false items to interpretations of visuals such as graphs and maps and text-based materials.
- Write the response choices of *True or False* completely so that students can answer by circling either *True* or *False*, since some students may inadvertently confuse the *T* and the *F* when working in the pressure situation of a test.
- Watch for and avoid predictable answer patterns (e.g., TTFF or FTFT). You can do this by randomizing the sequence of true and false statements so that there are no obvious patterns and a similar number of statements that are true and false. Having an equal number of items that are true and false also can minimize the impact of guessing, as students tend to guess true more often than false.

A sample true-false item depicting many of these effective guidelines is in Figure 1.4.

Figure 1.4 Sample True-False Item

Directions:

1. Read each statement.
2. If the statement is **true**, circle (True.)
3. If the statement is **false**, circle (False.)

- The first one is done for you as an example.
- Each true-false item is worth 1 point.

Example: (True) or False Cirrus clouds form at heights ***greater*** than ***20,000 feet.***

1. True or False A ***meander*** is a feature of a lake.

KEYS TO BEST PRACTICE

- Directions are clear and concise, include the visual cue of circling, and are presented in a text box with numbered steps to guide students.
- Students are provided with a correct model of the item type and informed of the point values associated with each item of this type.
- Response choices are written out, and students indicate their responses by circling either *True* or *False* rather than writing it out.
- Items measure one important concept, point, or relationship that was taught.
- Important information in the item statement is highlighted.
- Item statements are phrased concisely and positively and are free of vague terms, qualifying and absolute words, and double negatives.
- Items are unequivocally true or false.

Keys to Best Practice: Use effective guidelines for composing sentence completion items (Brookhart & Nitko, 2008; Hogan, 2007; Salend, 2008).

Composing Sentence Completion Items

Sentence completion items involve students writing or choosing a word or short phrase that best completes a sentence. Since sentence completion items frequently relate to information presented in print materials that can be vague when taken out of the context of a paragraph or chapter, you should make sure that the content being assessed is appropriate for this type of item. Rather than composing these items by copying the wording from textbooks and other instructional materials, paraphrase the information in language that is understandable to students. The following are some additional suggestions for writing sentence completion items that can help your students respond to these types of items.

- Make sure these items address important content and concepts and not trivial and vague information.
- Make sure that the omitted word or phrase is important and relevant.

- Use word blanks that require a one-word response. If word blanks must contain more than one word, limit the length to a short phrase.
- Locate word blanks near the end of the items.
- Have only one word blank per sentence.
- Keep word blanks the same length and use the same format. This helps you avoid giving students cues about the length of the word.
- Avoid giving grammatical cues. For example, use a(n) before a blank that is answered with a noun (e.g., *A narrow section of land that connects two larger portions of land is a(n)* isthmus).
- Determine if you will accept specific synonyms, abbreviations, and other possible variations as correct responses as well as misspellings. Be sure to let students know this in the written directions.
- Pair these items with a text box containing a word bank from which students can choose a response to complete the statement. Words in the word bank should share similar grammatical features (e.g., similar parts of speech, capitalization), be presented in a logical order (e.g., alphabetical, numerical order), and have proper spacing. Where possible, the words in word banks can be categorized and placed together in the list.
- Inform students if words from the word bank may be used more than once.

A sample sentence completion item depicting many of these effective guidelines is presented in Figure 1.5.

Keys to Best Practice: Use effective guidelines for composing essay questions (Brookhart & Nitko, 2008; Hogan, 2007; Salend, 2008).

Composing Essay Questions

In many teacher-made tests, objective questions tend to be predominant. However, essay test items are used to assess your students' in-depth mastery of content from your curriculum and their ability to apply these concepts. These items also allow your students to demonstrate their writing, higher-level thinking, creativity, and problem-solving skills, and to express their opinions. Like Ms. Dodd, you can improve the quality of your tests by having an appropriate balance between objective and essay test items.

Essay questions use either a restricted response format or an open-ended format (Brookhart & Nitko, 2008). Whereas restricted response essay items provide students with a structure that directs both the content and format of their essay (e.g., *What is the relationship between weathering and erosion? Provide examples to support your answer*), open-ended essay questions allow students greater leeway in the way they respond (e.g., *Imagine you are living in the South after Lee's surrender at Appomattox. Based on what we have learned, write a diary entry that describes the impact of Lee's surrender on you, your family, and your town*).

Because of the numerous skills students need to answer essay questions, you should try to create questions that are appropriate for a range of students, clearly state what you are asking students to do, and are understandable in terms of their readability and level of difficulty (use the readability and legibility guidelines discussed earlier in this chapter). When writing essay questions, you also should make sure they address important content from your curriculum and provide your students with the opportunity to apply their learning.

Figure 1.5 Sample Sentence Completion Item

Directions:

1. Read the sentence.
2. Look at the *word bank.*
3. Choose the word from the word bank that correctly completes the sentence.
   Each word in the word bank can be used only once.
4. Write the correct word on the blank at the end of sentence.
5. Write clearly so I can read it.
   Each correctly completed sentence is worth 1 point.

1. The subatomic particles inside an atom that have a ***positive*** charge are _____.
2. Isotopes are atoms of the ***same*** *element* that have ***different*** *numbers* of _____.

Word Bank

Compounds	Ions
Deuterons	Neutrons
Electrons	Protons

KEYS TO BEST PRACTICE

- Directions are clear and concise and are presented in a text box with numbered steps to guide students.
- Direction reminders are displayed in a prominent location (e.g. *Write clearly so I can read it*).
- Students are given a text box containing a word bank from which students can choose a response to complete the statement. Words in the word bank share similar grammatical features (e.g., similar parts of speech, capitalization), are presented in a logical order (e.g., alphabetical, numerical order), and have proper spacing.
- Students write their answers on the blank rather than transferring them to another page.
- Students are informed about whether they may use a word from the bank more than once, and about the point values associated with each item of this type.
- The word blanks require a one-word response, are located at the end of the sentence, are of the same length, and use the same format.
- Important content in the sentences is highlighted.
- Sentences and omitted words relate to relevant content and concepts that were taught.
- Items are presented using one sentence and one word blank and provide a sufficient context for answering the question correctly.
- Items are phrased so there is only one correct answer and grammatical cues are not provided.

Therefore, as Ms. Dodd did, you can plan and compose your essay questions based on your curricular goals and your students' abilities by using the following guidelines:

- Highlight key words that your students can use to analyze, structure, and write their answers.
- Specify the desired length of their response and your basis for evaluating it. When essay questions ask students to present their opinions, make sure that your students understand that they will be judged on their ability to support their opinion rather than the position they express.

- List important vocabulary and concepts to be addressed in the essays for students. Place these lists in prominent locations on your tests to make sure that your students will notice them before composing their responses.
- Break open-ended essay questions into smaller sequential subquestions. Using subquestions in lieu of a single open-ended essay question can help your students produce a more organized and complete answer.

A sample essay question depicting many of these effective guidelines is presented in Figure 1.6.

When memory of factual information is not an essential aspect of what you are testing, you can help your students understand and respond to essay items in several ways. You can define important concepts that students should include in their essays. When it is not possible to define a large number of words and concepts on the test itself, you can allow students to use a word list or dictionary. Additional testing accommodations that can help your students respond to essay questions are presented in Chapter 2.

HOW CAN I GRADE MY TEACHER-MADE TESTS?

Test grading provides you with a good opportunity to collect and analyze information about your students' learning and their test performance. This information also serves as an excellent way to inform your teaching and evaluate your tests. Below are guidelines to help you do this.

Keys to Best Practice: Create and use a complete scoring key or answer sheet (Brookhart & Nitko, 2008; Hogan, 2007; National Board of Medical Examiners, 2002).

Creating Scoring Keys or Answer Sheets

Begin grading your tests by creating a *scoring key,* also called an *answer sheet,* that lists the correct answers to specific questions and the points each question is worth. Since some of your test questions may have multiple correct answers, especially your essay questions, your scoring key can contain the range of responses you will consider correct as well as the guidelines you will use to award points for partially correct or incomplete answers. If you deduct points for incorrect answers, your scoring key should address these procedures.

Your scoring key is used to grade and score your students' tests and to obtain raw scores and percentages. Raw scores and percentages are important in helping you determine the mean, mode, median, and range of your students' scores on a test. The *mean* is the average of your students' scores on the test, the *mode* is the most frequently occurring score obtained by your students, and the *median* is the midpoint of your students' test scores. In looking at the class's performance, you can look at the difference between the lowest and highest scores, which is referred to as the *range.* By examining the mean, mode, median, and range, you can examine the distribution of your students' scores, which can help you see how your