chapter 4

Direct Instruction

When I (J. M. D.) began my teacher preparation program in the late 1970s, I was astonished to discover that elementary classrooms looked very different from the ones I remembered from the 1950s and 1960s. As I observed and participated in classrooms at various grade levels, I enjoyed watching many types of instruction, most of them models of teaching I had never seen before in a classroom. I also saw more familiar instruction. In time, however, it was clear to me that even in these conventional lessons, the teachers were doing some things that differed from the

instruction of my childhood experience. In my methods course, I learned to understand and appreciate those differences.

Direct instruction, once described as **interactive teaching** (Stallings, 1975; Stallings, Cory, Fairweather, & Needles, 1978; Stallings, Needles, & Stayrook, 1979) and **active teaching** (Brophy & Good, 1986), is probably the model of teaching you are also most familiar with from your own K–12 school experiences. Direct instruction is the kind of teaching children usually mimic when they play school. Your knowledge of the characteristics of well-designed direct instruction will serve you well when you need to develop a traditional lesson. We also believe you will have a greater understanding and appreciation of hands-on, discovery models of teaching if you learn the components and structure of a strong direct instruction lesson. For this reason, our examination of the models of teaching begins with direct instruction. Recently, this model has also been referred to as **explicit teaching** (Coles, 2001; De La Paz & Graham, 2002; Gersten, Woodward, & Darch, 1986) and **instructivist teaching** (Kozioff, LaNunziata, & Cowardin, 2001); however, your cooperating teachers will most likely use *Direct Instruction* to describe their traditional lessons.

The specific format for Direct Instruction used in this chapter was first popularized by Madeline Hunter in the 1960s (Hunter, 1967a, 1967b, 1967c, 1967d, 1971, 1976, 1982, 1994). As you read the first case study, consider why Direct Instruction was also referred to as interactive teaching decades ago.

Case Study 4.1: Third Grade, Abbreviations in Addresses

Mrs. Newell teaches a traditional third-grade class in an urban neighborhood. Her students have been working with the writing process since first grade. They are conversant with the stages of the writing process and are quite independent, conferencing with one another and revising their own writing. The class wrote letters and addressed envelopes to their grandparents inviting them to the school's festival celebrating U.S. immigrant cultures past and present. As she was reviewing some of their work, Mrs. Newell recognized that a small group of the children needed a minilesson on writing abbreviations in addresses. It is included in the state's third-grade curriculum and will be assessed on the state's proficiency test.

She wants to teach this lesson quickly so that her students can return to polishing their writing pieces, so she has chosen the Direct Instruction model for planning and teaching this lesson. Here is her **long-term objective** for the minilesson for the letter-writing unit:

> Using the standard five-part format, the learner will write friendly letters and thank-you letters and will address the accompanying envelopes using the correct abbreviations.

This is her **instructional objective**:

> The learner will capitalize and write street and state abbreviations correctly when addressing envelopes.

These objectives reflect several content standards and elementary benchmarks in her state's language arts curriculum.

Mrs. Newell gives her class the signal for their attention, then asks for a small group of children to meet with her at the kidney-shaped table in the corner. They will need to come to the group ready to write.

Mrs. Newell: Raise your hand if you can tell us one way we use capital letters in our writing. I'll wait until everyone has an idea to share. Great! Everyone has a hand up. Sharon?

Sharon: At the beginning of each sentence.

Mrs. Newell: Exactly right. Another example? Greg?

Greg: For days of the week?

Mrs. Newell: Yes! When else do we use capitals? Nancy?

Nancy: We use them when we write the month of the year.

Mrs. Newell: Yes! Whisper to your neighbor one more time when we use capital letters in our writing. What else did you remember? Sally?

Sally: Barbara said our first and last names.

Mrs. Newell: Exactly right! If you were thinking that, you were correct also. Did any pair come up with ideas we haven't mentioned yet today? Andrew?

Andrew: We also use capital letters when we write the names of special places, like California.

Mrs. Newell: Excellent! Andrew reminded us of something we are going to be working on today—using capital letters in our addresses and using abbreviations in writing addresses. I noticed yesterday when you addressed your envelopes to your grandparents that most of you used the long way to write out street and city addresses. This was just fine to do. But today we are going to learn special abbreviations to use when we address envelopes. We will learn street address abbreviations and some state abbreviations that we use a lot.

We use abbreviations to shorten the words in the address we are going to write. This makes writing addresses faster. The post office also prefers that we use abbreviations on our mail, especially state name abbreviations.

Some abbreviations you already know are (*She writes these on the board*)

Mister → Mr.

Madam → Mrs.

Doctor → Dr.

September → Sept.

Monday → Mon.

Every abbreviation is a short form of the word it represents. Most abbreviations end with periods. Today we are going to learn the abbreviations for these words used in addresses:

street

avenue

boulevard

drive

court

Michigan

Ohio

Indiana

Do any of you live on a street that is called something else? Nick?

Nick: We live on Peach Tree Lane.

Mrs. Newell: Then let's add *lane* to our list. Do any of you have grandparents that live in another state besides Michigan, Ohio, or Indiana? Several hands! Lisa?

Lisa: My grandparents live in Florida. So do Ina's.

Mrs. Newell: How many of you have grandparents who live in Florida? (*Several hands are raised*.) Well, it looks like we should add Florida to our list of state names. (*She does so*.)

Later on in the school year, we will learn the abbreviations for many other states. Today we will focus on these abbreviations.

Let's begin. When we use words that name a special street, we need to begin by capitalizing the first letter of each word. Our school is on Hamilton Street. Let's practice with that. First I'll write Hamilton. Next, I'll write the abbreviation for street.

To form some abbreviations, you simply cut the word short, then add the period.

That is how we form abbreviations for these words. (*She models on a chart and "thinks out loud" as she writes*.) I first write a capital S, then I add a small t. The last thing I write is the period.

Hamilton St.

street → St.

(*Mrs. Newell works through a few more quick examples, again using "think alouds."*)

Which of you lives on Village Street? (*She writes this on the board without using the abbreviation*.) Charlie? Would you recopy the name of your street on the chart using the abbreviation? The rest of you think silently about what you would write if you were rewriting this street name. (*Charlie*

comes up to the chart and writes.) Thumbs up if you would have written this abbreviation as Charlie has written it, thumbs down if you would change it, thumbs in the middle if you're not sure. Great job, Charlie! You wrote your street name perfectly. Add your house number in front of Village.

We also form the abbreviation for the word *avenue* by using the first few letters. (*She models on the board and thinks aloud as she writes*.) I write the name of the avenue first—Irvine Avenue—with what kind of letter? Everyone?

Group: Capital.

Mrs. Newell: Right. Capital **I,** Irvine (*She writes*). Next, I write the first three letters of the word *avenue* (*She writes*). Now I finish with a period.

Irvine → Ave.

Avenue → Ave.

Who remembers the letters used to abbreviate the word *street*? Gene?

Gene: S and T.

Mrs. Newell: Right. How do we write the letter S? Lee?

Lee: As a capital letter.

Mrs. Newell: Exactly. How do we end the abbreviation? Robin?

Robin: With a period.

Mrs. Newell: Yes! Let's use our sign language alphabet now. Show with your hands the three letters we use to write the abbreviation for the word avenue. (*They do so*.) Great. Looks like everyone remembered the signs for A, V, and E. How do we write the A? Amy?

Amy: With a capital.

Mrs. Newell: How do we end the abbreviation? Lauren?

Lauren: With a period.

Mrs. Newell: That's right. The abbreviations for the next two words do not use the first few letters. They are written differently. These abbreviations still begin with a capital letter and end with a period.

Court is abbreviated like this. First we write the name of the court. Let's practice with Brenda Court. Some of you live there. I write Brenda with a capital B. Next I write the abbreviation for court, which is capital C, small T. Thumbs up or down? Do I need a period at the end of the abbreviation? (*The children respond*.) Exactly right, I do need one.

Brenda Court → Brenda Ct.

Mrs. Newell continues to directly teach the abbreviations for *road*, *boulevard*, *Michigan*, *Indiana*, *Ohio*, and *Florida* to the children. She illustrates how the abbreviations for states are now written with two capital letters and no periods.

She keeps the lesson fast paced, with many opportunities for student response. Frequently during the lesson, she reviews what has been taught quickly before she moves on to the next abbreviation. Mrs. Newell varies the students' response mode. Sometimes she allows for choral responses, sometimes for kinesthetic responses, such as the use of the sign language alphabet, and sometimes for thumbs up or thumbs down. She has also allowed the children to tell a neighbor how they would write an abbreviation she has asked for, and she has used competent student models to work on the board.

By now, Mrs. Newell is feeling confident that the group is ready to practice writing these abbreviations. She wants to supervise their practice before she brings this lesson to a close.

Mrs. Newell: I am going to ask you to write the abbreviations for each of the new words I write on the chart. In addition, you will need to write your own complete street address on your paper using the abbreviations we have learned.

When I dismiss you one at a time, you will need to take the envelopes you addressed yesterday from your writing folders. (*She writes*.)

1. Find envelopes

Then, you need to rewrite the street addresses and state names using the abbreviations we learned today.

1. Find envelopes
2. Use abbreviations

When you are done with that, you may put the envelopes back into your writing folders. You may choose to read your library book or write in your journals.

3. R.Y.L.B. or journals

What's the first thing you will do when you are dismissed? Connie?

Connie: Get our envelopes to our grandparents from our writing folders.

Mrs. Newell: Right! What will you do with the envelopes? Lisa?

Lisa: Change the addresses to use abbreviations.

Mrs. Newell: Yes. And what are your choices when you have put your envelopes back into your writing folders? Brandi?

Brandi: Journals or R.Y.L.B.

Mrs. Newell: Great. Here is your list.

Mrs. Newell erases the board and rewrites the words used during the lesson in a different order. As children rewrite these words using abbreviations, she checks their work. After they have also written their street addresses using abbreviations for the street and

state, she dismisses them individually to work independently. Two students write the list of words using the correct abbreviations and remembering capital letters. However, when they write out their street addresses, they neglect to use capitals. Mrs. Newell spends a few extra minutes with these two children reviewing why it is important to remember to use capitals when they address envelopes. She gives them a few moments to correct their addresses, and then she dismisses them to find their envelopes.

Mrs. Newell now begins her conferencing time with a number of students who are already revising second drafts of their latest writing pieces. Ten minutes later, all the students in Mrs. Newell's class are either working independently on first or second drafts or peer conferencing quietly. She gathers her materials to prepare for students to read aloud to one another from their works in progress. A few minutes later, she gives the signal to gain the attention of the entire class.

Before she gives directions for moving to the rug for author sharing, she asks one of the students from the minilesson group to provide **closure** on the writing workshop time by stating what the lesson was about today and why it was important. Lisa tells the class that today they reviewed writing abbreviations in street addresses. She also says that they want to make sure to address envelopes correctly so that their letters are delivered.

Mrs. Newell asks which children have writing to share with the class before lunch.

Sally, Peter, and Chloe raise their hands. They are asked to bring their work to the rug area. The rest of the children are dismissed by shoe color to find a quiet seat on the rug. She brings the author chair to the front of the rug area and indicates that Chloe may have a seat and get ready to begin.

Case Study 4.1: Post-Lesson Reflection

Once the children are at lunch, Mrs. Newell collects the envelopes her students have addressed. She wants to assess quickly whether any further practice will be needed soon in using abbreviations in addresses. She is pleased to see that each envelope is addressed correctly. As she gathers her lunch and prepares to leave her classroom, she considers how the minilesson went and what needs to be done tomorrow during writing workshop.

Today during the review, students remembered many uses for capital letters: at the beginning of sentences, days and months of the year, names and places. The curriculum for third grade in Mrs. Newell's district expects students to also use capital letters for initials, at the beginning of quotations, and in titles of literary and other creative works. She will be reviewing student writing with an eye to assessing whether some of her students will require minilessons in these skills as well, or whether the entire class will need them.

Mrs. Newell notes that even though the Direct Instruction format she chose for this lesson is prescribed and predictable, it was effective for her objective today. By making the material relevant to her students' lives, as well as by keeping the lesson as fast-paced as possible, she was able to maintain the attention of the students in the small group. Frequent **checking for understanding** provided her with sufficient evidence that students grasped the

concept and format of the abbreviations used in the lesson. Those frequent and varied checks for understanding also keep her students focused when she uses Direct Instruction for full-group lessons.

The brief **guided practice** given to students before they were dismissed provided Mrs. Newell with the chance to see which students needed some extra attention. The individualized dismissal from the group allowed students to proceed through the rest of the lesson time at their own rate.

The Stages of Direct Instruction

The following stages of Direct Instruction are presented in the classic order to help you understand and differentiate among them. Mrs. Newell's lesson followed this order; however, the Direct Instruction lessons you teach may vary the order. You may also find that you omit elements from time to time on the basis of the particular needs of your students and the content you want to teach. Professional teachers use the models of teaching, but they do not let these models use them. Consider the stages of Direct Instruction as chess pieces that have distinct "moves."

Focus Activity

Imagine that you are an energetic fourth grader, discouraged that your kickball team failed to beat your fiercest rival at recess. Recess is over, and it is time to line up to go back to class. Even though your team will have other chances on the field, you can taste the disappointment. Geography is right after recess, and although you generally enjoy this subject, your mind is still on your sorely felt defeat. Or you may be a junior in high school who has misplaced an expensive Palm Pilot, and you know that your parents will be angry if they find out. You are probably not ready to jump into a new topic in precalculus at the end of the day.

Teachers need to recognize that as we begin a new lesson or a new part of the school day, our students are not equally ready to begin with us. In addition to the varying degrees of prior knowledge that students bring to a lesson, they also come to the lesson with things on their minds such as a playground defeat, a misunderstanding with a friend, or wandering thoughts about what they might do after school. This is a natural part of life at school for most of us, isn't it?

Teachers cannot force students to shift their attention, but they can stack the deck by providing a **focus activity**. The purpose of this activity is to prepare students for new material at the beginning of a Direct Instruction lesson. Focus activities are short periods of two to three minutes to warm up the group. They may consist of a brief review of material covered earlier, a quick thinking game related to the subject to be taught, or something as simple as an engaging question to get students thinking. This motivating aspect of the focus activity is the reason some teachers refer to this part of the lesson as the "hook." The main point of the focus activity is to help

students shift gears mentally from what happened prior to the lesson and to prepare them for attending to the new content.

Mrs. Newell wanted to expand her students' use of abbreviations when they wrote addresses. In her focus activity, she chose to review the use of capital letters by asking students what they already knew. She kept this activity fast paced and provided opportunities for the group to participate either individually or with a partner.

Stating the Objective and Providing the Rationale

After the focus activity, the teacher states the instructional objective to the students. The objective tells students what they will know or be able to do at the end of a lesson. The objective should be stated using vocabulary that is **developmentally appropriate** for the students. The teacher would describe a lesson to a colleague using professional vocabulary, but she would choose other words to describe that same lesson to a group of third graders. A similar objective would be stated differently still to a group of seventh graders.

In Direct Instruction, stating the objective is often paired with **providing the rationale** for the lesson. The rationale for a lesson tells the students why the content to be learned is important to their daily lives. It is not sufficient to tell students that lessons will be helpful on an upcoming test or important in a subsequent grade. Students need to see a lesson's meaning and relevance to their own lives. For example, Mrs. Newell explained that using abbreviations on envelopes is quicker for us and preferred by the postal service as well. It ensures that letters will be delivered. As with the objective, the rationale must be communicated in terms that students easily understand.

It is important in Direct Instruction to state the objective and rationale at the beginning of the lesson. This charts the course for the lesson and helps keep the teacher on track.

Providing this information to students early in the lesson is a feature of Direct Instruction, but not necessarily of all lesson designs. Other models of teaching delay the discussion of objectives, often until the end of the lesson, and for very good reasons. However, Direct Instruction defines explicitly at the beginning of each lesson what the performance expectations for the students will be and why they are important.

Presenting Content and Modeling

Presenting the content and **modeling** are generally interwoven so tightly in a traditional Direct Instruction lesson that it is difficult to say where one ends and the other begins. The content of a Direct Instruction lesson is what will be learned by the students: knowledge, skills, or procedures. Content can be presented by the teacher or given through a video, a reading selection, or technology such as a software program, CD-ROM, or Web site. Our discussion of content will focus on traditional teacher presentations. Modeling provides students with specific demonstrations of working with the content. The teacher explicitly demonstrates how the students can be successful in the lesson.

Content must be introduced clearly and systematically and explained in the context of students' everyday lives. As we discuss several ways of making the most of content presentation, consider how closely content presentation and modeling are joined together in Direct Instruction. Let's look first at providing clarity. The process of bread making can be explained to first graders or eighth graders in a clear fashion, but you would use less-sophisticated vocabulary with young children than you would with middle school students. Specific information about chemical interactions as a result of mixing ingredients in the right amounts and under the right conditions would be confusing to young children but highly appropriate for adolescents. The knowledge that certain ingredients allow bread dough to rise and bake into familiar loaves of bread will provide enough beginning understanding for young children. One aspect of clarity is determining how much information to give to students, then giving it in a precise manner.

Modeling should also provide verbal and visual cues for successfully mastering the objective. Sometimes a **think aloud** provides students with greater clarity in understanding a procedure for accomplishing a task. A think aloud is a kind of modeling in which teachers verbalize their thoughts and decisions as they carry out a task. For example, as a teacher demonstrates cutting out a construction paper square to serve as a math **manipulative** during the next lesson, she might "think out loud" in class, saying "I am cutting this square very carefully because we will be using it today to create fractional shapes. I need the sides of my square to be very neat. My smaller, fraction pieces should be accurate in size."

The demands of individual tasks will become apparent to you as you prepare think alouds for each lesson. In a handwriting lesson on the capital cursive F, for example, the teacher will write the letter on the board and simultaneously talk through the strokes needed to form the letter correctly. Next, the teacher may ask the students to write the letter in the air with their fingers (kinesthetic experience) or trace sandpaper letters using the same strokes in the same order (tactile experience) while the teacher models the letter formation a second time and repeats the think aloud. During the modeling stage of Direct Instruction, the teacher should make the content accessible to students in as many ways as possible.

Providing a systematic presentation of content is also essential for an effective Direct Instruction lesson. This is especially true if the content to be taught is sequential in nature, such as in teaching rules to games like bingo, Jeopardy, or softball. Procedural content in mathematics always needs to be presented sequentially. If your students have been working with manipulatives to learn the concept of single-digit multiplying, they may be ready to learn the partial-products technique for multiplication:

$$\begin{array}{r} 46 \\ \times\ 7 \\ \hline \end{array} \qquad \begin{array}{l} 7 \times 40 = 280 \\ 7 \times 6 \ \ = 42 \end{array} \qquad \begin{array}{r} 280 \\ +\ 42 \\ \hline 322 \end{array}$$

What should be done first, second, third, and so on in computing the answer to this problem must be considered carefully by the teacher while she plans the lesson,

not haphazardly attempted during the lesson. We need to break any procedure or way of thinking down into small steps. We call this process **task analysis**. Each separate step in using the algorithm must be presented with sufficient modeling and practice. When working with algorithms, the exact sequence of each step is crucial to the success and accuracy of the computation.

One way to aid clarity and ensure that you are presenting the content systematically is to list the steps in sequential order on the board, overhead, or chart paper as you model and think aloud. During the lesson, this type of modeling provides the visual learners in your class with an opportunity to access your words and actions after you have completed a step. The list provides a permanent record of what to do, and when, throughout the lesson. Many teachers prepare chart paper to be used during this visual think aloud so that they can keep the list handy for students' reference after the lesson is over. Other teachers have students record these steps in a math journal. The orchestration of doing, saying, and recording while you are modeling new content or reviewing previously learned content is one way to help students understand and successfully complete a task. When you use visual, auditory, kinesthetic, and tactile approaches **(V-A-K-T)**, you unite the presentation of your content and modeling in a powerful way. You will see several examples of thinking aloud and multiple forms of modeling in the next case study.

It is important that teachers provide sufficient modeling of new tasks. You may want to use student models also. Allowing a capable student to model gives the class an opportunity to watch one of their own perform successfully. You will choose students to provide accurate modeling on the basis of their work in past lessons. You can also ask these students to think aloud while they do their work, which provides additional **rehearsal** time for the class as they begin to understand the content of your lesson.

Lessons that connect content with students' authentic life experiences are very motivating for students. Whenever possible as you work with new content or tasks in a Direct Instruction lesson, relate this content to your students' interests and everyday experiences. For example, younger students will need to use their multiplication skills as they plan for making and bringing birthday treats for their class. Older students may be motivated in a statistics lesson if it relates to computing athletes' performance averages. While providing the rationale for the lesson motivates students initially, content presentation and modeling give the teacher additional opportunities to connect new content to students' experiences.

Checking for Understanding

As you are teaching a Direct Instruction lesson, two types of feedback will help you decide whether students understand the material: what they say and what they do. In Direct Instruction, teachers check student understanding by asking specific questions and providing collective practice. In a well-crafted Direct Instruction lesson, teachers ask the entire class many questions that will reveal student understanding. Fast-paced questions at the knowledge and comprehension levels of Bloom's taxonomy are the most effective ones in a Direct Instruction lesson. If you

Cycles of content presentation, modeling, and checking for understanding indicate to teachers whether it is time to progress with the lesson.

have phrased these questions well, student answers will provide you with the immediate feedback you require. Your responses to their answers also provide students with a sense of their success.

The blanket question, Are there any questions? is seldom useful in a Direct Instruction lesson. Often students cannot readily articulate what questions they have. Students might also think they understand the content and have no need to ask questions. Invariably there will also be students who are able to articulate a question and are aware of their lack of understanding, but these students may be too embarrassed to speak up in class. If you ask specific questions to check for understanding, you can determine students' grasp of the content by the quality of their answers. Do you understand how to cut and paste a paragraph as you word-process? will not give you the feedback you need. What is our first step as we cut and paste? and How do we highlight our paragraph with the mouse? are examples of specific questions that check for understanding.

Just as Mrs. Newell modeled in the first case study, you can check student understanding by eliciting verbal responses—chorally, to a partner, or individually. Depending on the content of the lesson and the grade level of your students, you will "orchestrate" this in various ways. One typical choice is to ask for raised hands from the students who volunteer. It is wise to wait until a good number of students have raised their hands before calling on any one student. This **wait time** provides the class with a few quiet moments to process the question and arrive at an answer, something that students at all grade levels need. Beginning teachers have a tendency to call on the first hand raised in response to their questions, and this is understandable. Initially you will be relieved when you see that first hand. However, with experience and confidence, you will realize that those few moments of wait time are important. They will elicit greater full-class participation and help establish a reflective environment in your classroom. During this type of checking for understanding, some teachers will allow small groups to come up with an answer together and then share it with the full class.

When it is appropriate, choral responses are both effective as a learning tool and enjoyable. The students who have the correct answer rehearse the content. The students who are not yet sure of the answers benefit from hearing their peers recite correctly, and they do not feel singled out for not yet having the answers.

Many teachers utilize partner checks, such as "Turn to your neighbor and share one reason that wetlands need to be preserved." After a few moments, you can ask for their responses one at a time, asking for answers that differ from earlier responses: "Did another pair come up with a different idea?" This technique checks understanding for questions that have multiple answers. It also provides silent **positive reinforcement** for partners whose answers were identical or similar to the ones shared, even if they did not have the chance to offer their own ideas.

Silent **signaling** with gestures can also be used to answer questions. Younger students can be instructed to form letters or symbols with their fingers or hands (greater than, less than, equal to, for example), use the thumbs-up or thumbs-down sign, or use the sign language alphabet. Some teachers allow for "secret" gesture responses, such as "With your hand in front of your tummy, so that only I can see your answer, thumbs up for yes, thumbs down for no, and thumbs in the middle if you are not sure." For some students this is just plain fun; for others, it provides privacy when they are not sure of the answer. Clearly, student responses to your checking-for-understanding questions must be age appropriate. Secondary students respond best to straightforward questions and answers.

The other dimension of checking for understanding is to give collective practice that you will review before the lesson moves forward. This type of checking for understanding provides students with the opportunity to work with the new material directly. One example is to have them solve a math problem individually and review it aloud before you move on to the next example. You may want students to work in pairs as you check their understanding of new skills. This checking for understanding by doing should occur after ample teacher and student modeling. Once this scaffolding is in place, students should be ready to try the new skill directly. As you review this work aloud, you will know to what extent your students are able to apply what

they have learned. You will also see what points need to be explained again or explained differently. As long as you continue to process student answers aloud, you are still in the checking-for-understanding stage of Direct Instruction and not yet into guided practice.

So far, we have discussed each of the elements of Direct Instruction as though there is a particular sequence to be followed. In some lessons, you may find that you use these elements in the order they have been presented in this chapter. However, most teachers intersperse their checking-for-understanding questions throughout their content presentation and modeling, as well as asking them after the skill has been demonstrated.

The cycle of content presentation, modeling, and then checking for understanding is one reason that Direct Instruction was once called interactive teaching. The continual teaching and checking for understanding during Direct Instruction provides students with small amounts of new material that will be assessed immediately by the teacher. This action, in turn, gives teachers an opportunity to reteach the content and provide additional modeling. Exactly how this cycle will play out in a classroom will depend on how well your students grasp the content or skill that is the focus of your lesson. Given time, you will think on your feet and adjust your actions as you progress through these cycles.

You will ask checking-for-understanding questions that address content knowledge you want students to understand and any skills or processes they need for success in the tasks assigned. You should also check their understanding of any routine tasks you will want them to accomplish after their **independent practice** has been completed. They might read, write in their journals, or complete any unfinished assignments. This procedure can help prevent the What do I do now? questions that arise when the teacher has not been specific enough with instructions. It will also buy you some uninterrupted time during students' guided practice to work with students who need reteaching.

Teachers' actions during the cycles of content presentation, modeling, and checking for understanding can be modified in many ways for special needs students and English language learners at all grade levels. Chapter 13 will provide examples of instructional modifications that can be included in your lesson plans.

Guided Practice

Earlier we mentioned two ways to assess your students' progress toward reaching mastery of a lesson objective: listening to what they say and observing what they do.

Checking for understanding addresses how students conceptualize and then verbalize their understanding. Checking for understanding also provides collective practice that will be reviewed in the full group before moving into individual practice periods. Guided practice is exactly that, practice that students do alone without the benefit of a partner and without the safety net of full-class review. You need to check each student's competence and reteach as needed before you allow them to finish tasks independently. Guided practice is your first opportunity to assess your students' individual understanding.

One way to provide guided practice before you dismiss students for independent seatwork is to give the class a few problems or questions to answer. These items must be structured in exactly the same way as the ones the students will solve in independent practice. For example, if you have prepared a handout of 10 math problems, you might choose to work with 3 of these problems during guided practice. Students can complete all 3 practice problems and then alert you when they are finished. As students raise their hands, stop by their work area to check their progress. If they have done each problem correctly, dismiss them one by one to complete the remaining work on their own. Another option is to have some students complete guided practice problems one at a time. Selected students may need more support, and you will want to check their work more frequently. The direction of your lesson and your knowledge of your students will tell you which of these options to choose.

During guided practice, the teacher assesses students' progress, analyzes errors, and addresses needs one-on-one. This is a very active and important stage of a Direct Instruction lesson. As you dismiss individual students to complete their assignment, you may find that a small group of students will benefit from a more structured reteaching of the skill. The last phase of guided practice provides time for you to review the content presentation and modeling section of your lesson, provide time for student think alouds again, recheck their understanding, and give additional practice. Again, you dismiss students one-by-one as they demonstrate the skill successfully.

The guided practice step in Direct Instruction gives teachers their first opportunity to assess what students can do on their own.

If someone is still having difficulty after reteaching, it is always appropriate to provide a review task or alternative assignment for that student to work on while other students are completing their independent practice. You may need to consider how best to reteach the material to that student later. You also may ask another student to peer-tutor (and excuse the student receiving tutoring from independent practice).

Independent Practice

Independent practice is an opportunity for students to practice skills independent of any monitoring by the teacher or help from another student. It is essential that students demonstrate mastery of the objective before being dismissed for independent practice. It is always more difficult to reteach skills that have been practiced incorrectly than to provide careful practice the first time around. This is another reason to monitor carefully during guided practice.

If you have prepared a handout with 10 math problems to serve as independent practice for your students, the first 3 might be used as guided practice problems and the last 7 as independent practice problems. Once the handout is completed, you will need to decide whether you want students to self-check their work or leave it for you to review. Many teachers choose to give homework on the same day that a skill has been introduced. Be very careful about this. You must be sure that your students understand their new material completely. If they practice a skill incorrectly at home, they will be reinforcing their errors, and it may be necessary to reteach that material.

Closure

Closure in a lesson is provided when the teacher is ready to begin the next lesson or activity in the school day and wants to "tie the bow" on the previous lesson. Closure brings any lesson to a satisfying finish both cognitively and aesthetically. In a Direct Instruction lesson, closure will occur after the independent practice period and before instructions are given for the next activity. The teacher will give the signal for attention and then ask for a quick review of what was learned during the lesson. While the teacher herself can provide this review, it is best for students to summarize or comment on what was accomplished during the lesson. Teachers can highlight students' **metacognitive** abilities by asking questions that not only reflect content concerns but also reinforce the value of the lesson: What did you learn in today's lesson that you did not know yesterday? Why is that learning important to you? Some teachers complete closure by previewing what will be happening in class the next day.

Teachers often complain that when parents ask their children what happened at school that day, the answer is invariably "Nothing." One way to address this situation directly is to inquire during closure, "If Mom asks you today what we did in math class, what will you answer?" Even when the teacher is not so forthright, closure provides a "rehearsal" for students to pull together what they learned during a class period.

Table 4.1 The Stages of Direct Instruction

Stage	Teacher Action	Students' Response	Notes
Focus activity	Presents quick (2–3 minutes) activity that engages students' interest and promotes students' thinking	Answer questions and participate in the activity	May involve review of yesterday's lesson or a related skill
State the objective	Describes in students' terms what they will be doing in today's lesson	Listen	Adjust vocabulary to suit particular group of students
Provide the rationale	Describes why the content from today's lesson is important and meaningful to students	Listen	Find current relevance—not "You'll need this next year"
Present content	Presents the content of the lesson sequentially	Listen and observe instruction	Prepare for clarity of instruction, systematically given
Model	Demonstrates skills and procedures, does think alouds	Observe	Consider using visual, auditory, kinesthetic, and tactile modeling
Check for understanding	Asks specific questions to assess student understanding of the content, procedure, or skill taught	Answer questions individually, chorally, verbally, and with signaling	Intersperse checking-for-understanding questions throughout content presentation and modeling sequence as needed
Provide guided practice	Provides and guides short practice period; dismisses individual students as they are ready for independent practice	Perform task or work with content individually while being monitored	Check individual students' work frequently to troubleshoot errors
Provide closure	"Ties the bow" on the lesson, reviews the importance of the content, may also preview what will happen tomorrow	Summarize or comment on the content of the lesson	Providing closure is most effective when students participate
Provide mass practice	Provides frequent opportunities to practice skill	Practice skill or work with content	Mass practice periods should immediately follow initial mastery of objective for the next few days to ensure overlearning
Ensure distributive practice	Provides brief, intermittent practice over the rest of the school year to keep skills fresh	Practice skill or work with content	Brief homework practice may serve this purpose

Mass and Distributed Practice

Students may master a skill during a Direct Instruction lesson, but that does not mean the skill has been learned for a lifetime. Skills must be practiced well beyond the demands of guided and independent practice. Students need a significant amount of practice in a short amount of time after they have learned new content so they can overlearn the material. This practice is called **mass practice**. **Overlearning** will occur when a student can perform a skill at the **automatic level**. Short opportunities to practice specific skills for several days in a row after the initial lesson will provide enough mass practice for a skill. Mass practice may be homework, in-class work, or center activities.

Even so, the teacher must provide practice in the skill from time to time throughout the school year to keep the skill alive in the students' repertoires. This is called **distributed practice**. Opportunities to practice skills once they have been mastered must be spread throughout the school year. Too frequently, teachers are dismayed that students lose a skill they performed well earlier in the school year. This situation generally occurs when content or skills have not been reinforced for some time. Every few weeks, a brief review of previously learned material will help students keep those skills alive. Both mass and distributive practice can occur in the context of an engaging activity, not just on a worksheet. A creative teacher can find ways to help keep students' skills up to speed by designing meaningful, authentic, and enjoyable tasks.

Case Study 4.2: Middle School, Improper Fractions and Mixed Numbers

Ms. Bernard teaches sixth-grade math in an urban middle school. One particular class has been struggling. She has often found that most of the students need to return to using manipulatives for some concepts. Lately they have been working with fraction manipulatives and diagrams in order to better understand equivalent mixed numbers and improper fractions, and she believes they are ready to rewrite improper fractions as mixed numbers without the use of manipulatives. Ms. Bernard has chosen Direct Instruction for this lesson as a follow-up to the group's successful fraction explorations. This is her long-term objective:

> The learner will add, subtract, multiply, and divide any two mixed numbers with unlike denominators.

This is today's lesson objective:

> The learner will write any improper fraction as a mixed number.

She has written this question on the board:

What is the difference between a mixed number and an improper fraction?

Ms. Bernard: Class! What have we been working on the last few days? Brian?

Brian: We worked with a partner with those fraction pieces.

Ms. Bernard: Right. What discoveries did you make? Sally?

Sally: There were two ways to write the same fractional amount. One had whole numbers and one was written just as a fraction.

Ms. Bernard: What did we call those two ways of writing the amount? Billy?

Billy: Well, both were fractions. But if the fraction was written with a whole number, you call it a mixed number, like 3 and ½.

Ms. Bernard: Billy, why did we say "mixed"?

Billy: Well, we wrote the amount using both a whole number and a regular fraction. We said there was a mixture in the way we wrote the amount. The number 3 and ½.

Ms. Bernard: Yes, and what did we call the other way to write the same amount? Linda?

Linda: An improper fraction because the numerator was a bigger number than the denominator. Three and ½ could also be written as 7 over 2.

Ms. Bernard: Today we are going to change improper fractions into mixed numbers without using the fraction shapes. It is much easier to compute the answer than to always rely on using manipulatives, and it saves a lot of time. You showed me yesterday that we can set aside the fraction shapes for a while.

I'll start with this example: $\frac{17}{4}$. (*She writes this problem on the board.*) I read that improper fraction as seventeen fourths. To turn it into a whole number, I need to divide. These steps will be familiar to you from whole-number division. I first divide the denominator, 4, into the numerator, 17. I ask myself how many groups of 4 I can find in 17, and I know the answer is 4. (*She writes this step on the board.*)

1. Divide Numerator → Denominator.

Now, I write the 4 in the quotient space above the 17. I know that I need to write the 4 above the 7 in the number 17. Why is that? Jeff?

Jeff: Because you are dividing into 17 and not into 1.

Ms. Bernard: Yes. (*She writes this step on the board.*)

1. Divide Numerator → Denominator.
2. Write whole number in the Quotient space.

Now, I am going to multiply my number in the quotient by the divisor, 4×4, and record the answer below the 17. (*She writes the next two steps.*)

1. Divide Numerator → Denominator.
2. Write whole number in the Quotient space.
3. Multiply the Quotient by the Dividend.
4. Write the Product under the Dividend.

To finish, I subtract 16 from 17, which leaves me 1. I write the 1 as a Numerator next to 4 in the Quotient. (*She writes these two steps on the board.*)

1. Divide Numerator → Denominator.
2. Write whole number in the Quotient space.
3. Multiply the Quotient by the Dividend.
4. Write the Product under the Dividend.
5. Subtract.
6. Write the difference as a Numerator to the right of the Quotient.

My Divisor becomes a Denominator again under my new Numerator. (*She writes this on the board.*)

1. Divide Numerator → Denominator.
2. Write whole number in the Quotient space.
3. Multiply the Quotient by the Dividend.
4. Write the Product under the Dividend.
5. Subtract.
6. Write the difference as a Numerator to the right of the Quotient.
7. Write the Divisor as the Denominator.

Now I know that $\frac{17}{4}$, an improper fraction, is another way of saying 4¼, a mixed number. This procedure should be familiar to you from our work in division. I am going to work through another example, but faster this time. (*She talks through another problem.*)

Let's try another example, and I'll be asking you for the steps I should take. Let's look at this improper fraction: $\frac{39}{5}$. What do I do first? Sally?

Ms. Bernard structures a checking-for-understanding sequence in which individual students each provide one step in the sequence for turning $\frac{39}{5}$ into a mixed number. Sometimes students refer to the chart she created during her first example. Other students do

not need this assistance. After this example, Ms. Bernard asks one of the students to provide a think aloud for the group as the student solves the last problem on the board. By now her students have seen this procedure modeled four times.

Ms. Bernard: (*showing a worksheet to the class*) This is your task for today. I am going to ask you to work alone on the first two problems. Please raise your hand when you have completed them, and I will check your answers. If your work is correct, you may finish the rest of the worksheet. When you are finished with the worksheet, where should you put it? Jeff?

Jeff: In our green class folder next to the aquarium.

Ms. Bernard: Yes. What do you need to do after you have put your work into the folder? Brian?

Brian: Take a math puzzle from the yellow pocket and our homework from the green pocket.

Ms. Bernard: Yes! Your homework is a review of work we have done this semester.

Ms. Bernard hands out the worksheet. Within a few minutes, most of the students have successfully completed their guided practice. She gives the go-ahead to finish their worksheets. She brings Billy and Tricia up to her table. They have both written the subtraction remainder as the denominator instead of the numerator in each of the solutions. Quickly, Ms. Bernard draws circles and fractional pieces on the board to represent the first example, and together they solve this problem using pictures. She refers them to the first problem they solved and asks them to compare their written answer to the one they just worked out on the board. With a startled "Oh!" Billy corrects his three answers. Ms. Bernard asks Tricia what she did when she first solved her problems. Tricia tells her that she switched the numerator and the denominator but now understands what to do next time. Before she lets them go back to their seats, Ms. Bernard asks them to work the fourth and fifth problems on the worksheet, just in case. Satisfied that they are ready for independent practice, she dismisses them both.

Within the next 10 minutes, it is clear that everyone in the class has completed the independent practice work and has taken the puzzle and their homework. Ms. Bernard gives the class signal, and the students become quiet. She thanks them for their diligence during the period. She asks someone to explain what they would say about class today if the principal stopped them in the hall. When the bell rings, Ms. Bernard dismisses her students.

Case Study 4.2: Post-Lesson Reflection

Ms. Bernard was confident that this class was ready to move into computation work today. Their preparation with manipulatives and diagrams paid off, and few students had difficulties

with the lesson. As she prepared for this class, Ms. Bernard decided on the examples she would use for modeling in advance, and she also drew clear diagrams to accompany each problem to be used in modeling and guided practice.

The effort she took in preparation was worthwhile when Billy and Tricia made their errors during the guided practice. By moving back to the use of diagrams as visual aids, they were able to self-correct their errors and move into independent practice. When the class meets tomorrow, Ms. Bernard will remember to ask them specific questions based on the errors they made today. During the opening part of her next lesson, she can briefly assess whether they remember today's procedure.

The next Direct Instruction lesson will be to write mixed numbers as improper fractions, the inverse of today's objective. With a more advanced group, Ms. Bernard might have chosen to combine the two skills. For this group, she felt it best to separate the two lessons.

After the students have been dismissed, Ms. Bernard briefly reviews the independent practice sheets placed in the green folder. At a glance, she can tell that each student met today's objective, and they are ready to move on.

Brief Background of Direct Instruction

If you are an advocate of teaching practices that are apparently more student centered than Direct Instruction, you may have been surprised to find that this model was once referred to as interactive teaching. Educational research was done in the 1970s to determine effective teaching behaviors. This research examined the practice of elementary teachers whose students consistently performed well on standardized tests (Brophy, 1979; Brophy & Evertson, 1974; Gage, 1978; Good, 1979; Rosenshine, 1979; Stallings, 1975). Keep in mind that these studies equated student success with achievement in math and reading skills, primarily at the knowledge and comprehension levels of Bloom's taxonomy.

Research illustrated that these effective teachers used similar elements in lesson presentation fairly consistently in their teaching. They behaved in particular ways during instruction, and these behaviors became the basic elements in what we now call Direct Instruction. Rather than telling and showing students new content to be learned and then assigning seatwork, the teachers observed in these studies asked many questions during lessons to check student understanding of the content or processes being taught. The teachers provided many opportunities for fast-paced student responses to these questions in a variety of ways. During instruction, correct answers were positively reinforced with statements like, "Exactly right!" Incorrect answers were dignified with the question redirected to elicit a correct student response. Reteaching occurred as needed during each lesson. Because of this continual interaction between the students and the teacher, Direct Instruction was considered much more interactive than traditional classroom teaching.

Many studies found that this particular pattern of instructional practices resulted in significant student achievement in basic reading and math skills. This pattern was generally referred to as Direct Instruction, even though specific formats of this lesson design have varied somewhat over time (Adams & Engelmann, 1996; Allington, 2002; Allington & Johnston, 2002; Becker & Carnine, 1980; Carnine, 1997; De La Paz & Graham, 2002; Din, 2000; Gage & Needles, 1989; Gardner et al., 1994; Medley, 1979; Peterson, 1979; Rosenshine, 1979; Scarcelli & Morgan, 1999; Simmons, Fuchs, Fuchs, Mathes, & Hodge, 1995; Ullmann & Krassner, 1966; Ulrich, Stachnik, & Mabry, 1970; Viadero, 2002; Wang, Haertel, & Walberg, 1993a, 1993b; Waxman & Walberg, 1999). These studies were not designed to analyze how various student characteristics might also affect achievement outcomes.

One consistent criticism of Direct Instruction has been that its emphasis on following steps in a rigid order results in cookie-cutter lessons. While effective Direct Instruction lessons do have certain characteristics in common, there is still a great deal of variability in how each specific lesson might be designed. Another misconception is that Direct Instruction makes all teachers appear to have the same teaching style. This is not the case at all. Distinctive personalities, clarity and intention throughout the lesson, genuine enthusiasm for the content, and individual pacing make Direct Instruction lessons unique to every teacher. As you review the research on Direct Instruction, pay close attention to the situations in which it has supported student learning. Keep in mind also that while many lessons in K–12 education can be taught using Direct Instruction, it is not uniformly appropriate for all students at all times.

Direct Instruction and Research on Teaching

Over the past 40 years, the Direct Instruction approach has been written about extensively in the literature on effective teaching (Anderson, Evertson, & Brophy, 1979; Brophy, 1999; Darch & Carnine, 1986; Gersten, Woodward, & Darch, 1986; Good & Grouws, 1979; Hunter, 1994; Medley, 1979; Paik, 2002; Peterson, 1979; Rosenshine, 1979, 1986, 1995). Studies have examined the efficacy of Direct Instruction for general and special education students not only in respect to reading and math but also regarding creativity, independence, and curiosity. Direct Instruction has been found to be particularly effective with elementary and secondary at-risk students academically; furthermore, it promotes self-esteem and positive social skills. In the past decade, Direct Instruction has been used to teach not only basic skills in reading and math but also chemistry, United States history, and literary classics.

In the 1970s, researchers also began looking at student characteristics as they related to achievement with Direct Instruction in traditional classrooms. Relative success depended on the desired cognitive or affective student outcomes, and a number of studies came up with contradictory findings. For example, Grapko (1972) found that low-performing students did better with Direct Instruction in basic skills. However, Bennett (1976) found that low-performing boys did better with nondirective, open approaches to basic skill instruction. Studies indicated that high-performing students with Direct Instruction in basic skills did well on

standardized tests (Bennett, 1976; Ward & Barcher, 1975). Solomon and Kendall (1979), however, found that high-performing students with open approaches to instruction also did well.

When student characteristics and creativity were examined, findings were again contradictory. Solomon and Kendall (1979) found that low-performing students scored higher on paper-and-pencil measures of creativity with Direct Instruction, but high-performing students performed better on measures of creativity in open classrooms with less-traditional instruction. Ward and Barcher (1975) found no significant differences in low-performing students' creativity whether they were placed in traditional classrooms with Direct Instruction or in open classrooms, but high-performing students were seen to be more creative in Direct Instruction classrooms.

Affective outcomes were also studied in terms of student characteristics in both traditional classrooms with Direct Instruction and in open classroom settings. Direct Instruction has been used effectively in promoting positive self-esteem and social skills in students (Adams & Engelmann, 1996; Becker & Carnine, 1980; Binder & Watkins, 1990; Burke, 2002; Cashwell, Skinner, & Smith, 2001). Bennett (1976) found that students with strong self-concepts who were sociable and motivated achieved more in traditional classrooms. Students with negative self-concepts who were less sociable and less self-motivated were seen to achieve more in open classrooms. Anxiety also played a role in whether students achieved more in standardized test situations in either traditional or open classrooms. Students with low anxiety performed better on a mathematics test in traditional classrooms when they had experienced traditional instruction. Anxious students performed better in an open classroom setting (Papay, Costello, & Hedl, 1975).

Locus of control refers to the extent to which students feel they have control over their successes and failures in the classroom. Papay et al. (1975) found that students who received Direct Instruction in traditional classrooms and students who received less-traditional forms of instruction in open classrooms did not differ significantly in terms of locus of control. Wright and DuCette (1976) found that students who felt they had greater control over their school achievement (called *internals*) did better in open classrooms. However, students in this study who felt their efforts did not affect their achievement (called *externals*) performed about the same with either approach. Externals attributed their successes or failures to luck or other forces over which they had little control.

Direct Instruction has consistently been found effective for students at risk (Becker & Engelmann, 1978; Becker & Gersten, 1982; Bereiter & Engelmann, 1966; Darch, Gersten & Taylor, 1987; Dermody, 2001; Fazio, 2001; Meyer, 1984; Meyer, Gersten, & Gutkin, 1984; Mills, Cole, & Dale, 2002; and many others). Direct Instruction Follow Through was a longitudinal study of basic reading and math achievement of at-risk children from kindergarten through third grade. As a result of Direct Instruction, these students achieved higher test scores than their control group counterparts (Stallings, 1975). Additional studies evaluated these students in the fifth, sixth, and ninth grades (Becker & Gersten, 1982; Meyer, 1984; and Meyer, Gersten, & Gutkin, 1984), and the earlier findings were consistent with findings from the later studies.

Since the 1970s, Direct Instruction has been used almost exclusively in special education classrooms for teaching basic skills in reading and math. More recently, Direct Instruction has been found effective in teaching secondary chemistry to students with learning disabilities (Woodward & Noell, 1991), math (Kelly, Gersten, & Carnine, 1990), United States history (Carnine, Steeley, & Silbert, 1996), reading (Lovett et al., 1994), and literary classics (Dimino, Gersten, Carnine, & Blake, 1990). In these studies, instructors were focusing on concepts, relationships among ideas, and strategies, as opposed to basic skills. The model continues to be used for teaching basic reading skills, such as phonological awareness, to special education students, as it has been in the past (O'Connor, Notari-Syverson, & Vadasy, 1996; Torgesen & Davis, 1996). Current research on the continuing efficacy of Direct Instruction for students with special needs will be of particular interest to general education teachers who want to participate in inclusion programs (Butler, Miller, & Lee, 2001; Swanson, 1999, 2001; Troia & Graham, 2002) or modify instruction for students not formally identified as having special needs.

Other studies have pointed to the positive effects of Direct Instruction when coupled with cooperative learning and other experiential learning strategies in the classroom (Losardo & Bricker, 1994; Lovett et al., 1994). This instructional integration is routinely seen in classrooms across the country. Many teachers consider this practice appropriate in view of the diversity of students' instructional needs and the current focus on student collaboration. However, the growing emphasis on standardized test scores may place Direct Instruction "on the front burner" in U.S. classrooms.

When researchers have looked at all studies of Direct Instruction holistically, they have found that it has the edge on less traditional teaching when only student achievement outcomes are measured. When researchers have studied the achievement of specific groups of students, results have been mixed. However, we have seen over time that context is everything in the classroom. Teachers must deliberate over the needs of their students and decide which instructional method is the right one at the time.

In the past as well as today, Direct Instruction has not been without its critics. Many educators and teacher educators feel that the model constrains teachers' creativity. They believe its focus on mastery of prescribed behavioral objectives taught in a sequential manner places an unnecessary ceiling on student learning. However, most of today's teachers recognize that Direct Instruction is a beneficial model to have in their repertoires.

Direct Instruction and Learning Theory

Direct Instruction relates to the behaviorist and information processing learning theories as applied to the classroom. Two characteristics of Direct Instruction that relate specifically to behaviorism are positive reinforcement and lesson design (Hunter, 1994; Skinner, 1953).

B. F. Skinner believed that learning is a result of change in behavior (1953). The key concept of Skinner's work is reinforcement of behavior. Teachers' questions, behavioral expectations, and so on (stimuli) will produce a response from students: correct or incorrect answers to questions, appropriate or inappropriate behavior. The

ways teachers respond to students' behaviors are said to be the consequences of those behaviors. Whether consequences are positive, negative, or neutral, they will have an effect on students' future behavior.

When teachers want students to repeat desirable behaviors, such as answering questions correctly or acting in socially appropriate ways, they will provide positive consequences, or reinforcement, for those behaviors. Examples of positive reinforcement are verbal praise, written comments, and good grades. It is important that teachers provide immediate reinforcement during lessons each time it is deserved.

Reinforcement can also be negative. In addition to working hard to enjoy teacher praise, students will work hard to avoid an unpleasant situation. For example, teachers inform students that any class work not finished during the period will be additional homework that night, and students will stay on task and finish their class work in a timely fashion to avoid that consequence.

Skinner (1968) and Markle (1969) organized aspects of behaviorism into principles for effective practice. Table 4.2 compares these principles and the Direct Instruction model.

Direct Instruction also relates to **information processing theory**. Information processing refers to how students receive, store, and retrieve information. As students receive sensory information during lessons, it becomes part of their **short-term memory**. Short-term memory is what students are able to focus on in a given moment and lasts from 20 to 30 seconds. They can use information in their short-term memories if they remain focused on it, and retrieval must be immediate (Anderson, 1990). Miller (1956) found that only five to nine items can be held in short-term memory at one time if those items are "chunked" into meaningful units. Numbers that we use each day, such as Social Security numbers and phone numbers, have been organized into chunks. In Direct Instruction lessons, teachers can make use of chunking during cycles of content presentation, modeling, and checking for understanding.

Table 4.2 Behaviorism and Direct Instruction

Behaviorism	Direct instruction
1. Information presented in small amounts	Task analysis, Content presentation
2. Many opportunities for immediate positive feedback	Checking for understanding
3. Use of question-answer format	Checking for understanding
4. Student responses required	Checking for understanding
5. Questions arranged by level of difficulty	Task analysis, Content presentation

To move information from short-term memory into **long-term memory**, students must use the information repeatedly. Guided, independent, mass, and distributed practice periods in Direct Instruction lessons perform that function. Once information is in long-term memory, it can remain there indefinitely, to be retrieved as needed (Anderson, 1990).

Using information processing theory, Robert Gagne identified nine instructional phases of learning that help students move information from reception through short-term memory and into long-term memory (Gagne & Driscoll, 1988). Table 4.3 shows how Gagne's steps align with the steps of information processing and Direct Instruction.

Direct Instruction and the Technologist Philosophy of Curriculum and Instruction

Direct Instruction also relates to the technologist philosophy of curriculum and instruction (Costa & Garmston, 1994; Eisner & Vallance, 1974). Remember that this philosophy refers to a "technology of instruction," a way to transmit knowledge and instruct skills in an efficient manner. The technologist approach to curriculum design is to develop a long-term objective that can be broken down into small component parts and daily instructional objectives. These objectives will be sequenced so that they build toward the long-term objective. This part-to-whole organization of content delineates the focus of each individual lesson, and the teacher's intent throughout each lesson is to ensure every student's mastery of the skill. Ms. Bernard's instructional objective was written very precisely and focused on one computational skill, renaming improper fractions as mixed numbers. She knew that a particular group of her students needed to have computational content broken down into small, manageable components.

The technologist philosophy is also apparent in the design of Direct Instruction lessons, in which lesson content is broken down into components that are analyzed into tasks and taught in a specific sequence of steps during content presentation and modeling. Because of this systematized structure of the model, many Direct Instruction lessons sound quite similar to the cases presented in this chapter, regardless of their content. Even if particular elements of the design are omitted from a lesson, most students experience Direct Instruction lessons in similar ways. Still, pacing and individual teacher style will contribute to variety and student interest in Direct Instruction lessons.

Technology and Direct Instruction

Direct Instruction is a straightforward way to teach skills in technology. In such lessons, Direct Instruction is the model of teaching, and technology itself is the content. Sometimes, exploration is integral to a learning experience that involves technology, such as when you want students to research a topic on the Internet or locate

Table 4.3 Gagne's Phases of Learning, Information Processing, and Direct Instruction

Gagne's Phases of Learning	Information Processing	Direct Instruction
1. Gain student attention	Reception	Focus activity
2. State the objective	Motivation	State the objective Provide the rationale
3. Recall prior knowledge	Retrieval	Focus activity
4. Present stimulus	Reception	Content presentation
5. Provide learning guidance	Explanations	Modeling
6. Provide feedback	Reinforcement	Checking for understanding
7. Elicit performance	Retrieval	Guided practice
8. Assess performance	Retrieval	Independent practice
9. Cue retrieval	Retrieval	Mass and distributive practice

SOURCE: Adapted from *The Conditions of Learning* by Robert M. Gagne. Copyright © 1965, 1970, 1977 by Holt, Rinehart & Winston, Inc.

a variety of appropriate Web sites for a class activity. However, the research skills students need to perform these tasks are most efficiently taught using Direct Instruction.

The International Society for Technology in Education (ISTE) is a global organization of educators who promote technology education at all levels of schooling. ISTE has long recognized that citizens in today's world need to be technologically literate. In the United States, the National Educational Technology (NET) Standards for Students were developed to describe what K–12 students should know about technology and be able to do with their technological skills. The organization has also developed the National Educational Technology Standards for Teachers. Many states have adopted both of these sets of standards to guide the technology education of their students and to codify the technology expectations they have of teachers. The NET Standards for Students are divided into six categories:

1. Basic Operations and Concepts
2. Social, Ethical, and Human Issues
3. Technology Productivity Tools
4. Technology Communication Tools
5. Technology Research Tools
6. Technology Problem-Solving Tools

Performance indicators at various grade levels (K–2, 3–5, 6–8, and 9–12) describe unit objectives in technology instruction that address one or more of these standards (International Society for Technology in Education, 2001). Classroom teachers, in collaboration with media specialists, can develop a sequential curriculum to promote student mastery of these indicators.

The original numbering of the performance indicators in *National Educational Technology Standards for Students: Connecting Curriculum and Technology* (International Society for Technology in Education, 2000) has been used in the examples below.* Only those performance indicators in each section containing material that can be taught using Direct Instruction are provided. Some of the performance indicators given below include components that relate to more than one standard. For example, at the Grades 3–5 level, Performance Indicator 5 combines the use of scanners (technology productivity tool) with multimedia authoring (technology communication tool). You will notice that the Grades K–2 and Grades 3–5 sections have several more examples showing where Direct Instruction can be used to teach technology skills than do the Grades 6–8 and Grades 9–12 levels. In the lower grades, students are learning the technology skills they will use in later levels. The operative verb in these early performance indicators is *use*, which places those tasks at the application level of Bloom's taxonomy. The higher levels of Bloom's taxonomy, analysis, synthesis, and evaluation, are represented in most of the performance indicators given at the Grades 6–8 and Grades 9–12 levels.

GRADES PK–2

NET Standard 1: Basic Operations and Concepts

Performance Indicator 1: Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technology.

Direct Instruction Extension

Separate lessons can be taught for each of these input and output devices.

NET Standard 1: Basic Operations and Concepts

NET Standard 5: Technology Research Tools

Performance Indicator 4: Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning.

Direct Instruction Extension

Separate lessons can be taught for each of these developmentally appropriate multimedia resources.

GRADES 3–5

NET Standard 3: Technology Productivity Tools

Performance Indicator 4: Use general purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum.

Direct Instruction Extension

Separate lessons can be taught for each of these developmentally appropriate productivity tools and peripherals.

NET Standard 3: Technology Productivity Tools

NET Standard 4: Technology Communication Tools

Performance Indicator 5: Use technology tools (e.g., multimedia authoring, presentations, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom.

Direct Instruction Extension

Separate lessons can be taught for each of these technology productivity and technology communication tools listed.

GRADES 6–8

NET Standard 3: Technology Productivity Tools

NET Standard 5: Technology Research Tools

Performance Indicator 4: Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.

Direct Instruction Extension

Separate lessons can be taught for each content-specific technology tool and category.

NET Standard 4: Technology Communication Tools

NET Standard 5: Technology Research Tools

NET Standard 6: Technology Problem-Solving Tools

Performance Indicator 6: Design, develop, publish, and present products (e.g., Web pages, videotapes using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.)

Direct Instruction Extension

Separate lessons can be taught for each developmentally appropriate design, publish, and presentation product.

GRADES 9–12

NET Standard 3: Technology Productivity Tools

NET Standard 4: Technology Communication Tools

Performance Indicator 5: Use technology tools and resources for managing and communicating personal/professional information (e.g., finances, schedules, addresses, purchases, correspondence).

Direct Instruction Extension

Separate lessons can be taught for developmentally appropriate tools and resources to manage and communicate information.

Direct Instruction, Content Standards, and Benchmarks

Direct Instruction is best used across the curriculum when lesson content can be broken down into procedures or steps. When you use Direct Instruction, you can organize assessment using Bloom's knowledge, comprehension, and application levels. These levels are typically reflected in traditional assessments (e.g., multiple choice, true and false, fill in the blank, and short answer). However, Direct Instruction can also be used to teach cognitive processes explicitly (e.g., summarizing and predicting) and communication formats required by the analysis, synthesis, and evaluation levels of critical thinking (e.g., graphing, tables, essay format, and debate structure).

Below are some representative examples of content standards and benchmarks from the *Michigan Curriculum Framework*.* These content standards provide appropriate opportunities for teachers to use Direct Instruction to support student learning. The wording of standards and benchmarks for your state or school district may differ somewhat.

English Language Arts

CONTENT STANDARD 8: All students will use the characteristics of different types of texts, aesthetic elements, and mechanics—including text structure, figurative and descriptive language, spelling, punctuation, and grammar.

Elementary Benchmark: Identify and use mechanics that enhance and clarify understanding (conventional punctuation, capitalization, and spelling).

*Excerpts from the *Michigan Curriculum Framework* are reprinted with permission of the Michigan Department of Education.

Student mastery of this content requires clear and sufficient teacher modeling. The think aloud process is well suited for teaching these skills: using context clues, predicting, using subject-verb agreement, writing specific forms of poetry, and writing a well-structured and developed editorial.

The content standard and benchmark examples below illustrate concepts in social studies, math, and science that can be taught using Direct Instruction. In addition, inquiry processes in those core content areas (e.g., observing, predicting, and researching using multimedia) can be taught systematically using Direct Instruction.

Social Studies—Historical Perspective

CONTENT STANDARD 1: All students will sequence chronologically eras of American history in order to examine relationships and explain cause and effect.

Early Elementary Benchmark: Use analog and digital clocks to tell time.

Young children need explicit teaching when learning to tell time, especially with an analog clock.

Science—Use Scientific Knowledge From the Life Sciences in Real-World Contexts

CONTENT STANDARD 3: All students will apply an understanding of cells to the function of multicellular organisms; and explain how cells grow, develop, and reproduce.

High School Benchmark: Explain how multicellular organisms grow, based on how cells grow and reproduce.

Textbook reading alone is not sufficient for students to understand this material. Well-designed Direct Instruction using visual resources, perhaps in conjunction with technological resources, can support student learning of those benchmarks in science.

The math benchmarks below have been chosen specifically to demonstrate how Direct Instruction can be used throughout the grade levels as major concepts develop across one content standard.

Math—Patterns, Relationships, and Functions

CONTENT STANDARD 2: Students describe the relationships among variables, predict what will happen to one variable as another variable is changed, analyze natural variation and sources of variability, and compare patterns of change.

Elementary Benchmark: Use tables, charts, open sentences, and hands-on models to represent change and variability.

Middle School Benchmark: Represent variability or change by ordered pairs, tables, graphs, and equations.

High School Benchmark: Represent functions using symbolism such as matrices, vectors, and functional representation (f(x)).

Why Choose Direct Instruction?

Think about how you learn best and for what reasons. When I want to learn a particular cooking skill from my mother, I want her to show me that skill exactly as it needs to be done and then to critique my level of mastery as I practice doing it myself. In those moments, my needs are best served by Direct Instruction. If I want to create a new recipe, I want to experiment with the ingredients I like best without someone telling me how to go about the process. My preference in that moment will be trial and error, a playful approach to my creation. Earlier in this chapter, we considered the research on the efficacy of Direct Instruction. Under what circumstances would you use this model? Which content is best taught in a direct manner? Several considerations will help guide your decision to use Direct Instruction in your classroom:

1. Is the content of your lesson at the knowledge, comprehension, or application levels of Bloom's taxonomy of the cognitive domain?
2. If you are working with manipulatives or equipment, will Direct Instruction help you to teach the procedures for a math or science exploration clearly?
3. Are the students ready conceptually for teacher-driven instruction? If you are working on math computation, your students may be ready for Direct Instruction if they already have a solid, hands-on understanding of concepts embedded in the task.
4. Will Direct Instruction allow you to teach classroom management routines, rules, or game procedures in an efficient manner?
5. Must the content of a lesson be taught using small, sequential steps to ensure student achievement?

Summary

Over several decades, educational research has consistently shown Direct Instruction to be highly effective for teaching low-level reading and math skills. The model can also be used effectively to teach rules and procedures. Although Direct Instruction is generally used for objectives at the knowledge, comprehension, and application levels of the cognitive domain in Bloom's taxonomy, it can also be used to teach explicitly the cognitive processes required by analysis, synthesis, and evaluation.

The organization of a Direct Instruction lesson helps focus the teacher's attention on two things: first, the objective to be mastered, and second, the evolution of students' understanding throughout the lesson. Students are provided with sequenced content presentation and multiple ways to demonstrate what they can do. Lessons taught using Direct Instruction are easily assessed. The model is effective in mastery learning when students must achieve one instructional objective before moving on to the next.

Some teachers and teacher educators believe that Direct Instruction embodies the idea that teachers are the "keepers of the knowledge" in the classroom; what is to be learned must come only through them. Even if Direct Instruction does not resonate with your personal philosophy of teaching, it is important to remember that sometimes this model is highly appropriate, even in early childhood classrooms.

Putting It Together

1. Describe the advantages you see of using Direct Instruction in the elementary, middle, or high school classroom.
2. Review your state or district curriculum and, in two different subjects, find specific content that you might teach using Direct Instruction. Think carefully about the developmental needs of your students. Why is Direct Instruction the best choice for these lessons?
3. Choose a basic skill in math, writing, science, or social studies. Outline a Direct Instruction lesson, paying special attention to questions that check for understanding.
4. Describe a traditional lesson you have seen in a field placement class. Analyze the lesson, using the steps of Direct Instruction. Describe anything you would change about this lesson.

Student Study Site

The Companion Web site for *Models of Teaching: Connecting Student Learning With Standards*

www.sagepub.com/delloliostudy

Visit the Web-based student study site to enhance your understanding of the book content and discover additional resources that will take your learning one step further. You can enhance your understanding by using the comprehensive Study Guide, which includes chapter learning objectives, flash cards, practice tests, and more. You'll find special features, such as the links to standards from U.S. States and associated activities, Learning from Journal Articles, Field Experience worksheets, Learning from Case Studies, and PRAXIS resources.

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