INSTRUCTION: APPLYING BEHAVIORAL, COGNITIVE, AND CONSTRUCTIVIST APPROACHES

OUTLINE

MEETING THE NEEDS OF DIVERSE LEARNERS

1. Explain why it is not necessary to individualize instruction for every student, and identify the situations in which teachers need to differentiate instruction.

TEACHING METHODS BASED ON BEHAVIORISM

- Direct Instruction
- Mastery Learning

2. Describe the goals of mastery learning and direct instruction, and discuss the advantages and disadvantages of each approach.

TEACHING METHODS BASED ON COGNITIVE LEARNING THEORY

- Discovery Learning and Guided Discovery
- Expository Teaching

3. Explain how discovery learning and expository teaching foster meaningful learning.

TEACHING METHODS BASED ON CONSTRUCTIVISM

- Inquiry Learning
- Cooperative Learning
- Methods of Fostering Comprehension

4. Describe the techniques based on cognitive apprenticeships that are used in constructivist teaching.
A major concern of both novice and expert teachers is being able to meet the diverse needs of every learner in their classrooms. One way to achieve this goal is to choose appropriate instructional approaches. In this module, we explore evidence-based teaching methods that can be considered teacher centered or student centered in their approach to instruction. In teacher-centered approaches, the learning environment is structured and teachers control the amount and pace of information. In student-centered approaches, teachers create a learning environment that enables students to construct meaning from their interactions with subject matter and peers. In this approach, teachers often facilitate student learning rather than dispense information. Effective teachers do not choose a teaching method because it is student centered or teacher centered but because it is best suited to:

- particular learning objectives (what teachers want students to know and be able to do);
- how students will demonstrate their learning of the material; and
- the subject matter itself, on occasion.

Learning objectives for a lesson can range from lower level to higher level skills, and the assessment that teachers use for evaluating students’ mastery of the material should match the learning objectives. Consider Bloom’s taxonomy shown in Table 18.1, which is useful for determining learning objectives and assessment of those objectives (Anderson & Krathwohl, 2001; Bloom, Englehart, Frost, Hill, & Krathwohl, 1956). For example, students in a high school chemistry class who listen to their teacher lecture and take notes (teacher-centered approach) would be expected to demonstrate lower level skills such as knowledge and understanding, perhaps on a multiple-choice test. These students might not perform as well on an essay test that assesses higher level skills, such as analyzing compounds, evaluating the validity of experimental results, or creating problem solutions, because it is inconsistent with the way they learned the information. As you read about the variety of instructional methods, think about whether the teacher-centered or student-centered approach of each method is best

### TABLE 18.1 Levels of Bloom’s Taxonomy

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>DESCRIPTION</th>
<th>INSTRUCTIONAL ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remember</td>
<td>Remembering facts or information learned earlier without necessarily understanding or being able to use that knowledge</td>
<td>state, define, list, label, name</td>
</tr>
<tr>
<td>Understand</td>
<td>Understanding or making sense of information without connecting it to prior knowledge</td>
<td>explain, describe, summarize, paraphrase</td>
</tr>
<tr>
<td>Apply</td>
<td>Selecting and using information to solve a problem or specific task</td>
<td>demonstrate, compute, solve, or apply knowledge</td>
</tr>
<tr>
<td>Analyze</td>
<td>Breaking information into parts; making connections between those parts</td>
<td>compare, contrast, categorize, classify</td>
</tr>
<tr>
<td>Evaluate</td>
<td>Making judgments about the value of information for a particular situation</td>
<td>justify, critique, recommend</td>
</tr>
<tr>
<td>Create</td>
<td>Creating or generating new ideas by combining information</td>
<td>produce, develop, invent, design, hypothesize</td>
</tr>
</tbody>
</table>
suited for the particular students you are working with and your learning objectives. Before we delve into teaching methods, let’s first address the concern of effective teachers—meeting the needs of diverse learners.

MEETING THE NEEDS OF DIVERSE LEARNERS

Explain why it is not necessary to individualize instruction for every student, and identify the situations in which teachers need to differentiate instruction.

In any given classroom, even when students are similar in ability or achievement level, you will encounter students who have varying cultural, socioeconomic, linguistic, and family backgrounds, different levels of prior knowledge, work ethics, and motivation, and different interests, to name a few characteristics. It is unrealistic to consider creating individualized instructional methods for students based on their specific characteristics.

However, there are times when it is important to implement differentiated instruction, providing a different learning experience to address particular students’ needs. For example, differentiation might be necessary for students with language impairments or who are English language learners, students with learning disabilities or intellectual disabilities, or students who are gifted. It also might be helpful to group students who have similar levels of skill for the groups to optimally benefit from instruction, such as grouping students with different levels of reading skill. These forms of differentiation are discussed in more detail in several other modules.

You also may have heard of matching instruction to a student’s learning style. I have heard many of my own students tell me that they are verbal learners or visual learners and therefore learn best when instruction matches their learning preference. The visual–verbal distinction is only one model of more than 70 approaches to thinking about learning styles or preferences (Coffield, Moseley, Hall, & Ecclestone, 2004). With so many ways to define learning style, it would be impossible to accurately say that any one model is correct. The notion of learning styles is likely to be an urban legend in education, a popular and widely accepted belief with little empirical support (Kirschner & van Merriënboer, 2013). Most of the studies examining learning styles used questionable research designs, and of those that used a valid research design, results were primarily negative (Rohrer & Pashler, 2012). Also, an examination of the research literature indicates no conclusive evidence for a benefit of modifying instruction to match students’ learning styles (Pashler, McDaniel, Rohrer, & Bjork, 2009; Rohrer & Pashler, 2012).

Although it may not be necessary to match instruction to the learning preferences of individual students, it is important to teach with the unique backgrounds and interests of your students in mind. This is known as culturally responsive pedagogy. Culturally responsive pedagogy involves instruction that uses students’ cultural beliefs, values, family and community backgrounds, language, and prior knowledge to create learning experiences characterized by active construction of knowledge and connections to personal experience (Brown-Jeffy & Cooper, 2011; Gay, 2010; Nieto & Boder, 2008; Utley, Obiakor, & Bakken, 2011). The intended result is an environment of equitable learning for all. Guidelines 18.1 list the major principles of culturally responsive instruction. As you can see, these principles are discussed in many modules throughout this textbook because they are principles of effective teaching in general.

Teachers who implement these principles will enable students of all backgrounds to reach their potential regardless of the specific teaching methods they may choose for different lessons. Now let’s turn to the various approaches to instruction.

Think about your K-12 educational experiences. Which teachers were effective in encouraging you to reach your potential? What were some of the teaching principles they may have used?
Module 18: Instruction: Applying Behavioral, Cognitive, and Constructivist Approaches

TEACHING METHODS BASED ON BEHAVIORISM

Describe the goals of mastery learning and direct instruction, and discuss the advantages and disadvantages of each approach.

Operant conditioning:
See Module 8

Behavioral learning theory proposes, simply, that learning leads to a change in an individual’s behavior. This school of thought has its roots in operant conditioning, which proposes that an individual’s behavior is the result of two environmental stimuli: antecedents and consequences. Antecedents are stimuli or situations that signal that a behavior is expected, whereas consequences are stimuli that either strengthen the likelihood that the behavior will occur again or reduce the future occurrence of the behavior. For example, a typical classroom interaction would involve a teacher asking a question (antecedent), a student providing a response (behavior), and the teacher offering feedback (consequence). Behavioral learning theory is equated with teacher-centered instructional approaches in which teachers serve as dispensers of information and structure the learning environment to help students progress from simple to more complex skills. Two examples of this approach are direct instruction and mastery learning, in which teachers create an antecedent for learning and consequences that strengthen students’ knowledge and skills.

Direct Instruction
The goal of direct instruction is to maximize the time that students spend in appropriate tasks by emphasizing completion of learning tasks and by minimizing off-task behavior such as puzzles, games, and teacher–student interactions not directly related to academic tasks (Joyce, Weil, & Calhoun, 2004; Rosenshine, 1979). With this approach, teachers use a high degree of control.
to create a structured learning environment and monitor student progress. Direct instruction assumes students learn best when teachers structure the learning environment to present accurate information in small chunks and offer many opportunities for practice and feedback (Kirschner, Sweller, & Clark, 2006; Mayer, 2004; Rosenshine, 1985). This approach also requires all students to move through the content at the same pace. Let’s examine the typical components of direct instruction by discussing what occurs before, during, and after a lesson.

Teachers using direct instruction would begin a lesson by reviewing the previous day’s lecture and checking student work. This allows teachers to identify misconceptions or errors so that they can reteach the material to the entire class. Next, teachers would introduce new content by activating prior knowledge through discussion of the learning objective or an overview of the lesson (Joyce et al., 2004; Rosenshine, 1985). Identifying the learning objective or lesson overview provides students with a purpose for learning the material and an overall procedure for how material is to be learned. Preparing students for the lesson using these steps improves student achievement (Fisher et al., 1980; Medley, Soar, & Coker, 1984).

During a lesson, teachers control the pace and presentation of new material. They present information in small steps to be mastered one step at a time, provide varied examples, use modeling, and reexplain challenging concepts. They also check for understanding by asking convergent questions that call for a right answer or questions that require students to explain their answers (Rosenshine, 1985).

Once students have learned material, they have an opportunity to progress through four structured types of practice.

1. In **controlled practice**, the teacher leads students through examples, providing immediate corrective feedback. This stage requires careful monitoring to prevent students from learning incorrect procedures or concepts. Rather than simply giving the right answers, effective teachers provide feedback, telling students what they have done correctly, prompting them for clarification or improved answers, and reteaching when necessary (Fisher et al., 1980; Rosenshine, 1971).

2. In **guided practice**, students practice on their own while the teacher provides reinforcement and corrective feedback. For example, high school students might complete a worksheet conjugating Spanish verbs as teachers move through the classroom to check on their progress.

3. Students move to **independent practice** when they are able to practice knowledge or skills with about 85% to 90% accuracy. Homework is an example of independent practice.

4. Students also need to engage in **distributed practice**, a process of spreading out practice over a period of time. These short and frequent practice periods are more effective than fewer but longer practice opportunities, especially for children in early elementary grades (Cepeda et al., 2009; Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006). To foster long-term learning, teachers also provide weekly and monthly reviews and reteach as necessary.

Direct instruction is a popular method in the early elementary grades, where much of instruction is focused on basic skills, such as reading, mathematics, spelling, handwriting, and early science and social studies knowledge. Direct instruction is effective

- for **lower level objectives** in Bloom’s taxonomy and for improving students’ basic skills in reading and mathematics (Brophy & Evertson, 1976; Denham & Lieberman, 1980; Poncy, McCallum, & Schmitt, 2010);
- as an initial instructional strategy for lower achieving students (Good, Biddle, & Brophy, 1975); and
- for teaching basic skills to students with disabilities (Reddy, Ramar, & Kusama, 2000; Turnbull, Turnbull, Shank, Smith, & Leal, 2002).
Direct instruction can also be used for teaching more complex skills and subjects. Elementary school students have learned how to design controlled experiments in science through direct instruction (Klahr & Nigam, 2004; Lazonder & Egberink, 2014). Direct instruction is effective for teaching multistep procedures typically found in high school subjects, such as algebra, geometry, and computer programming (Anderson, Corbett, Koedinger, & Pelletier, 1995; Klahr & Carver, 1988). The key to the effectiveness of this approach is to provide students with worked examples and timely feedback, such as on homework assignments and quizzes (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011).

However, direct instruction is not effective for all students and all situations (Joyce et al., 2004). This method may not benefit high-achieving students or task-oriented students who are intrinsically driven to perform and succeed on tasks (Ebmeier & Good, 1979; Solomon & Kendall, 1976). Also, direct instruction should not become the sole instructional method for lower achieving students. Rather, as these students achieve more success, teachers should transition to less structured learning experiences and emphasize more complex knowledge and skills (McFaul, 1983; Means & Knapp, 1991). Furthermore, direct instruction may not be sufficient alone for encouraging long-term retention and transfer of complex skills (Dean & Kuhn, 2007). Teachers should follow direct instruction with opportunities for extended practice with problem solving and application of strategies. For a more balanced emphasis on basic and complex learning skills, direct instruction can effectively be used together with more student-centered approaches (Dean & Kuhn, 2007; Kierstad, 1985).

Mastery Learning

Mastery learning is based on the idea that all students can learn curricular material if given sufficient time (Carroll, 1971). Teachers set a prespecified mastery level, such as 80% on a unit test. Students who do not master a certain unit are allowed to repeat it or an equivalent version at their own pace and to take another unit test until they have mastered the material (Joyce et al., 2004). The approach consists of (Bloom, 1971; Guskey & Jung, 2011):

- developing major learning objectives representing a course or unit;
- dividing major learning objectives into smaller units from simple to complex, with each unit having its own learning objectives;
- conducting a formative assessment—a brief diagnostic test to assess students’ current level of performance before instruction and to determine areas needing improvement;
- presenting material to students, who typically work individually and independently;
- providing students with feedback about their progress (reinforcement of learning); and
- conducting a summative assessment—a test to determine what the student has learned.

This sequence of instruction has been used with students at all grade levels and for curricula ranging from basic skills to complex material (Joyce et al., 2004). Mastery learning is also appropriate for students of varying achievement and ability levels. Students who need extra time and teacher feedback to achieve mastery are allowed this opportunity, while those who master the material after initial teaching can be given enrichment or extension activities (Bloom, 1971; Guskey & Jung, 2011). Keep in mind that enrichment should be rewarding and challenging, does not need to be related to the subject matter in the current lesson, and should not involve busy work or more difficult work in the same lesson (Guskey & Jung, 2011). Compared to traditional instruction, well-implemented mastery learning leads to higher school achievement and increased confidence and academic self-concept, a perception of one’s knowledge and abilities in school subjects (Guskey & Pigott, 1988; Kulik, Kulik, & Bangert-Drowns, 1990). However, mastery learning may not improve performance on standardized tests compared to other teaching methods (Kulik et al, 1990; Slavin, 1990;
Wambugu & Changeiywo, 2008). Also, this method may widen the achievement gap between students rather than narrowing it. While lower achieving students are given extra time to repeat content in order to achieve mastery, the enrichment activities of higher achieving students may further enhance their achievement.

Think about the grade level you intend to teach. Would you consider using mastery learning or direct instruction? Why or why not?

TEACHING METHODS BASED ON COGNITIVE LEARNING THEORY

Explain how discovery learning and expository teaching foster meaningful learning.

Cognitive learning theory proposes that learning involves actively constructing knowledge. Teaching methods based on this perspective are considered student centered because they focus on the mental processes students use in knowledge construction rather than the external stimuli teachers use in behaviorist approaches. An important concept in cognitive learning theory is meaningful learning—actively forming new knowledge structures by (Mayer, 2003):

- selecting relevant information,
- organizing the information into a coherent structure, and
- integrating the information with relevant prior knowledge.

Teachers can foster meaningful learning using one of two distinct teaching methods—discovery learning and expository teaching—or both. Today’s K-12 teachers consider these two methods to be complementary, as each has features that encourage meaningful learning when used appropriately.
Discovery Learning and Guided Discovery

Discovery learning encourages students to discover and internalize a concept, rule, or principle through unstructured exploration of to-be-learned information (Bruner, 1961). For example, high school students might be given various inclines and objects and be expected to experiment with the materials—without explicit guidance from the teacher—to “discover” certain physics principles.

However, discovery learning without any guidance from the teacher generally does not benefit learning because students need a sufficient amount of prior knowledge (Alfieri et al., 2011; Bruner, 1961; Fletcher, 2009). Without it, students may not be able to integrate the to-be-learned principle into their memory or may activate inappropriate knowledge (Klahr & Nigam, 2004). Students also may fail to stumble across the principle at all because of too much freedom in the discovery process (Mayer, 2004). As a result, the discovery process often leads to gaps in understanding and results in negative transfer (incorrectly applying prior knowledge to the problem) or zero transfer (failing to recognize when they can apply their knowledge).

A form of discovery learning called guided discovery is considered more effective than pure discovery in facilitating the learning and transfer of knowledge (Alfieri et al., 2011; Mayer, 2004). In this approach, the teacher provides enough guidance to ensure that students discover the rule or principle to be learned. For the high school students discovering physics principles, the teacher would provide general guidelines for experimentation, ask them to explain their thought processes to themselves or others, and provide feedback and support to steer their activities in the right direction when needed. The structure and guidance allow students to focus cognitive resources on integrating and reorganizing knowledge and making inferences rather than on figuring out how to carry out the discovery process itself (Alfieri et al., 2011; Chi, 2009; Fletcher, 2009). To be successful using guided discovery, teachers must consider the individual abilities and needs of students in determining how much and what type of guidance to provide (Mayer, 2004). It is also helpful to teach students the procedure for discovery learning because this provides them with a “tool” for engaging in active learning in many other domains (Bruner, 1961; Chi, 2009; Kirschner et al., 2006). Recent research suggests that a guided discovery approach can be effective for:

- development of conceptual knowledge in preschoolers (Fisher, Hirsh-Pasek, Newcombe, & Golinkoff, 2013); and
- learning and transfer of new scientific knowledge for students from elementary through high school (Akinbobola & Afolabi, 2009; Balim, 2009; Dean & Kuhn, 2007).

Expository Teaching

In expository teaching (also called meaningful verbal learning), the goal is not to have students independently discover to-be-learned content but to ensure that new information will be integrated into the learner’s memory in a meaningful way (Ausubel, 1963, 2000).

Teachers begin by emphasizing the relevance of the new content to what students already know and to real-life examples and situations. To do this, they use an advance organizer, a tool that presents general information and provides a structure into which new information can be integrated. Take a moment to flip back to the beginning of this module and examine the outline on page 566. It is one example of an advance organizer. Advance organizers are not just outlines. They can be visual presentations, such as a flowchart that introduces a process, or an analogy that compares a new concept (a molecule) to a familiar one (a solar system). Advance organizers that consist of concrete models or analogies presented either verbally or graphically, rather than abstract examples or principles, are most effective (Mayer, 1992; Robinson, 1998). Advance organizers also enhance learning and promote transfer (application of knowledge to new situations), especially when new material is unfamiliar or difficult (Corkill, 1992; Luiten, Ames, & Ackerson, 1980; Morin & Miller, 1998).
After activating students’ relevant knowledge, teachers present topics in a highly organized process that moves from general, or prerequisite, knowledge to more specific topics. This structuring provides a relevant foundation on which students can build. Teachers also offer students opportunities to practice their knowledge in many different contexts to be certain they develop a thorough understanding of the new content. Implemented in this way, expository teaching is an efficient method for teaching subject matter content, such as science, math, social studies, or health, especially with students from the upper elementary grades through high school (Ausubel, 2000; Luiten et al., 1980).

Have you ever experienced discovery learning, guided discovery, or expository teaching? Reflect on how effective these methods were for your learning.

TEACHING METHODS BASED ON CONSTRUCTIVISM

Describe the techniques based on cognitive apprenticeships that are used in constructivist teaching.

Teaching methods based on constructivism are considered student centered because constructivism emphasizes the individual’s active role in exploring and socially interacting within his or her environment. Many constructivist theories of learning are based on situated cognition, a conceptual framework with roots in the writings of Russian educational psychologist Lev Vygotsky, Swiss psychologist Jean Piaget, and philosopher/educator John Dewey (Cobb & Bowers, 1999; Rogoff, 1990). Situated cognition is about learning in authentic contexts, such as apprenticeships, in which individuals work alongside experts and acquire necessary skills for solving problems and completing tasks that are important in the real world (Brown, Collins, & Duguid, 1989; Collins, Hawkins, & Carver, 1991).

Educators can bring situated cognition into schools by creating what are called cognitive apprenticeships, in which students develop cognitive skills through guided participation in authentic activities (Brown et al., 1989; Collins, Brown, & Newman, 1989; Lave & Wenger, 1991). Students participate in activities at a level commensurate with their ability and move gradually toward full participation. For example, young children at first may only be able to participate in conversation around the dinner table by talking about their day at school, but they will gradually move on to discussing current events and social issues with increasing cognitive and language development and with support from family members. Cognitive apprenticeships involve many techniques (Dennen, 2004; Enkenberg, 2001):

- **modeling** (performing a behavior for others to imitate) by the adult or the more experienced individual,
- **explaining** (discussing one’s reasoning or the need for certain strategies),
- **coaching** (monitoring students’ activities and assisting and supporting them when necessary),
- practicing,
- **scaffolding** (providing support to students so they can accomplish a task) and **fading** (gradually withdrawing scaffolding),
- **exploration** (forming and testing hypotheses; finding new ideas and viewpoints), and
- **reflection** (assessing and analyzing one’s learning performance), and **articulation** (verbally expressing the results of one’s reflection).
Module 18: Instruction: Applying Behavioral, Cognitive, and Constructivist Approaches

These techniques are found in many of the constructivist teaching methods described next. As you read, try to identify the techniques in each teaching method.

Think about your learning in and out of school. Have you experienced any of the aforementioned techniques?

Inquiry Learning

In inquiry learning, students construct knowledge and develop problem-solving skills through a process of formulating and testing a hypothesis (Yilmaz, 2011). The process begins with the teacher presenting a complex and perplexing situation. This creates disequilibrium in students where they may be confused by the new information and motivated to solve the problem and acquire new knowledge in the process (Yilmaz, 2011). Inquiry typically involves several phases:

1. formulating appropriate research questions,
2. collecting and organizing data,
3. analyzing and evaluating data, and
4. communicating the research results in a presentation.

More than a finite list of steps, however, the process of inquiry, shown in Figure 18.1, usually is practiced as a continuous cycle, which can take several days, weeks, or even months (Bruner, 1965; Yilmaz, 2011). While this approach appears similar to the scientific method, inquiry learning assignments can be designed for any discipline and any developmental level.

In inquiry learning, teachers serve as facilitators, using their expertise to guide the inquiry lesson and to evaluate students’ progress and the direction of the inquiry process. This approach requires the teacher to design and monitor inquiry groups to ensure that students are working collaboratively. If some students are allowed to take over the inquiry process of the group, the opportunity for all students to “construct” knowledge for themselves may be reduced. Students with intellectual disabilities, who generally show a weakness in independent insight and inductive thinking relative to typically achieving students, may require additional coaching and scaffolding to benefit from the inquiry process (Mastropieri, Scruggs, & Butcher, 1997; Mastropieri et al., 1996).
Inquiry learning is effective for elementary and secondary students (Gillani, 2003). Inquiry activities that are properly structured and guided by the teacher lead to better student learning compared to unstructured student-led inquiry or traditional lessons such as lectures (Furtak, Seidel, Iverson, & Briggs, 2012). Providing students with opportunities to engage in the inquiry process before reading or instruction facilitates greater transfer compared to traditional instruction alone (Parker et al., 2011).

Cooperative Learning

Cooperative learning involves students working together to achieve a shared goal. In a high school U.S. history course, for example, a cooperative learning group might create a presentation on the Bill of Rights in which group members work together to develop the content of the presentation, each member presents a portion, and the group is graded on the final product. In a fifth-grade language arts class, a teacher may have each cooperative group conduct an author analysis in which groups compare and contrast the themes and writing styles of the author’s books and create a presentation or product to showcase the results of their analysis. Cooperative learning can be used for any subject and with students from elementary through high school (Johnson & Johnson, 1986). It also can be a component of other active learning approaches, such as problem-based learning, class projects, inquiry learning, and team-based learning (Johnson, Johnson, & Smith, 2014). Regardless of the approach, a cooperative group activity must contain these five elements (Johnson & Johnson, 1999, 2009):

1. **Positive interdependence:** Members of the group work together and depend on one another so that all group members succeed.
2. **Individual and group accountability:** Each member must contribute to the group for the group to succeed and be rewarded.
3. **Interpersonal skills:** Trust, communication, decision making, leadership, and conflict resolution are all important to the success of cooperative learning.
4. **Face-to-face interaction:** Offering effective help and feedback, exchanging resources effectively, challenging one another’s reasoning, and motivating one another to achieve goals are all necessary for effective learning.
5. **Group processing:** Reflecting on how well the group is functioning and how to improve is important for successful cooperative learning.
Teachers can use Guidelines 18.2 to create activities that incorporate these five essential elements.

Decades of research show that cooperative learning yields many beneficial academic and social outcomes, including the following:

- higher level reasoning, creative thinking, and long-term retention and transfer of learned information (Johnson & Johnson, 1998);
- higher achievement in reading and mathematics (Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003; Slavin, Lake, Chambers, Cheung, & Davis, 2009);
- increased self-esteem, especially in students with disabilities (Johnson & Johnson, 1998);
- greater intrinsic motivation for learning (Johnson & Johnson, 1985); and
- improved peer relationships in general, among students with disabilities and nondisabled students, and between students of different ethnicities (Johnson & Johnson, 2000, 2002; McMaster & Fuchs, 2002).

**Methods of Fostering Comprehension**

Teachers can use several methods to promote students’ comprehension, all of which foster the construction of knowledge through social interactions and embody several characteristics of cognitive apprenticeships.

**RECIPROCAL TEACHING**

Based on Vygotsky’s zone of proximal development, reciprocal teaching teaches metacognitive strategies necessary for skilled reading comprehension. Using this method, a group of students would be jointly responsible for understanding and evaluating an assigned text (which is why it is called reciprocal). The teacher would first model four comprehension strategies (questioning about the main idea, clarifying, summarizing, and predicting) and then provide scaffolding to students, who take turns leading discussions (Brown & Palincsar, 1987; Palincsar, 2003). Scaffolding by the teacher (and later by the students) may involve asking questions and rephrasing or elaborating on statements (Brown & Palincsar, 1989; Rosenshine & Meister, 1994). Students are given as much support as they need to complete the activity (Collins et al., 1989). Students with lower reading ability can participate and contribute to the level of their ability while learning from those with more ability or experience (Brown & Palincsar, 1989). As students acquire skill, they take greater responsibility over the reciprocal teaching process, and scaffolding gradually fades.

Reciprocal teaching is most appropriate at the elementary school level, when instruction in reading focuses on the acquisition of comprehension skill. The method results in substantially improved reading comprehension in students of all ages (Rosenshine & Meister, 1994; Slavin et al., 2009). It also improves the comprehension skills of elementary and middle school students with intellectual disabilities and learning disabilities (Alfassi, Weiss, & Lifshitz, 2009; Gajria, Jitendra, Sood, & Sacks, 2007). Because students are required to articulate what makes a good question, prediction, and summary, their strategies become decontextualized, meaning students are able to use them in many domains, which improves transfer (Collins et al., 1989). Even though reciprocal teaching focuses on metacognitive skills involved in reading comprehension, this approach also has been used to improve students’ vocabulary and their ability to solve story problems in math (Mandel, Osana, & Venkatesh, 2013; Meyer, 2014; Reilly, Parsons, & Bortolor, 2009).
INSTRUCTIONAL CONVERSATIONS

In many elementary school classrooms, students’ verbal contributions during reading lessons are limited to known answers (Gallimore & Goldenberg, 1992), as when a teacher asks, “Who is the main character in this story?” Teachers can move away from the traditional role of evaluating students’ responses toward assisting students in interpreting texts by using instructional conversations, a method that assumes that (a) students have something important to say and (b) their input is valued (Gallimore & Goldenberg, 1992). This method consists of 10 elements (see Table 18.2) that reflect Vygotsky’s notion of assisted learning in the zone of proximal development.

Teachers and students engage in a joint conversation about a text that looks like a spontaneous discussion where each person contributes to the dialogue by building on, extending, or challenging a previous comment. However, the discussion is a planned interaction with instructional and conversational purposes (Gallimore & Goldenberg, 1992; Gallimore & Tharp, 1990). The instructional purpose focuses on learning objectives—what the teacher wants students to acquire from reading the text (e.g., vocabulary, comprehension, themes). The conversational purpose involves creating a joint understanding and interpretation of the text through genuine communication.

Teachers have used instructional conversations to promote elementary school students’ interaction with and comprehension of stories during reading lessons (Gallimore & Goldenberg, 1992; Saunders & Goldenberg, 1999). Students participating in instructional conversations have achieved grade-level or higher reading skills and mastery of more complex, differentiated concepts than children receiving traditional reading comprehension instruction.

GUIDELINES 18.2
Tips for Effective Use of Cooperative Learning

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Teaching tips</th>
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<tr>
<td>Positive interdependence</td>
<td>• Establish a group goal stating that all group members must reach their learning goals.</td>
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<td></td>
<td>• Provide rewards based on the success of the group (e.g., a group grade, bonus points, or tangible rewards).</td>
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<td></td>
<td>• Distribute limited resources.</td>
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<td>• Assign each member a specific role.</td>
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<td></td>
<td>• Divide the work so that one member’s assignment is necessary for the next member to complete his or her assignment.</td>
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<tr>
<td>Individual and group accountability</td>
<td>• Randomly select one student’s product to represent the group.</td>
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<td></td>
<td>• Test all group members and average the scores.</td>
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<td>Interpersonal skills</td>
<td>• Teach communication skills, especially in the elementary grades.</td>
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<td></td>
<td>• Include interpersonal objectives for a cooperative lesson.</td>
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<td></td>
<td>• Inform students of the collaborative skills needed to work successfully in their groups.</td>
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<tr>
<td>Face-to-face interaction</td>
<td>• Monitor group members’ use of resources and level of challenge and feedback.</td>
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<td></td>
<td>• Monitor and scaffold interactions and collaboration, especially for students in elementary grades.</td>
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<td>Group processing</td>
<td>• Allow time for groups to reflect on their functioning so students do not assume that speed and finishing early are more important than meaningful learning.</td>
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<td></td>
<td>• Have students identify what was helpful and unhelpful in their interactions.</td>
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<td>• Use information about group processing to make decisions about what to change for the next task or what changes to make in group placements.</td>
</tr>
</tbody>
</table>

These findings have primarily come from research with culturally diverse populations, as the instructional conversations method was initially developed and used with native Hawaiian children in grades K-3 in urban Honolulu and was later adapted for use with Latino students in Los Angeles, California (Au, 1979; Goldenberg, 1987). Although research results are promising, more empirical support for this approach is needed (Gallimore & Goldenberg, 1992). The effectiveness of instructional conversations with other grade levels and other student populations has yet to be tested. Another potential obstacle to the widespread adoption of this method is that effective implementation requires one year of teacher training (Moll, 2001).

Reciprocal questioning, which is a method of reinforcing new concepts, information, or procedures that students have learned in class, encourages structured conversations among students. Because each student’s understanding of new material may differ from that of others, the social negotiation of conflicting perspectives can lead to a restructuring of knowledge (Bearison, 1982; Glachan & Light, 1982).

For example, after high school students participate in a history lesson on the consequences of the Missouri Compromise of 1820, they would independently generate two or three questions using question stems, shown in Table 18.3, and then take turns in cooperative groups asking and answering each other’s questions. This approach is called reciprocal because students help each other achieve an understanding of material.

### TABLE 18.2 Components of Instructional Conversations

<table>
<thead>
<tr>
<th>INSTRUCTIONAL ELEMENTS</th>
<th>HOW TO IMPLEMENT</th>
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<tbody>
<tr>
<td>1. Thematic focus</td>
<td>• Select a theme or idea as a starting point for focusing the discussion.</td>
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<td></td>
<td>• Make a general plan for how the theme will unfold.</td>
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<tr>
<td>2. Activation and use of background knowledge</td>
<td>• Provide students with necessary background knowledge for understanding the text</td>
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<tr>
<td></td>
<td>by weaving the knowledge into the discussions.</td>
</tr>
<tr>
<td>3. Direct teaching</td>
<td>• When necessary, teach a skill or concept directly.</td>
</tr>
<tr>
<td>4. Promotion of more complex language and expression</td>
<td>• Elicit more complex language by asking students to expand on their thoughts, questioning them, and restating their contributions using more complex grammar and vocabulary.</td>
</tr>
<tr>
<td>5. Promotion of bases for statements or positions</td>
<td>• Encourage students to use text, pictures, and reasoning to support an argument or a position.</td>
</tr>
<tr>
<td></td>
<td>• Probe for the bases of students’ statements (e.g., ask “How do you know?”).</td>
</tr>
<tr>
<td>6. Fewer “known-answer” questions</td>
<td>• Focus on questions for which there might be more than one correct answer.</td>
</tr>
<tr>
<td>7. Responsiveness to student contributions</td>
<td>• Be responsive to students’ statements and the opportunities they provide for further discussion, while maintaining the focus and coherence of the discussion and the initial plan for the discussion.</td>
</tr>
<tr>
<td>8. Connected discourse</td>
<td>• Be sure the discussion involves interaction and turn taking so that succeeding contributions build on and extend previous ones.</td>
</tr>
<tr>
<td>9. A challenging but nonthreatening atmosphere</td>
<td>• Create an open, supportive environment that challenges students to negotiate and construct the meaning of the text.</td>
</tr>
<tr>
<td>10. General participation</td>
<td>• Encourage students to volunteer to speak or to influence the selection of speaking turns rather than directly determining who speaks.</td>
</tr>
</tbody>
</table>

The question stems are the most important aspect of this approach, because they guide discussions by encouraging students to do the following things (King, 1990, 2002):

- provide explanations to others,
- think about the material in new ways by confronting different perspectives, and
- monitor their own thinking through metacognitive questions.

Providing students with more instruction on how to generate the questions is better than offering less instruction. In research by King (1990, 2002), students trained in the use of “why” and “how” questions asked more critical thinking questions and gave and received more elaborated explanations than untrained students.

Reciprocal questioning results in several positive academic outcomes. Students using this technique generate more high-level (critical thinking) questions than those involved in group discussion (King, 1990, 2002). Students who give explanations of lesson content in peer groups also improve their own comprehension of the material (Dansereau, 1988; Webb, 1989). Research with students in elementary school through college shows that reciprocal questioning improves comprehension more effectively than group discussion, unguided peer questioning (i.e., no question stems provided), and a general review of material (Fantuzzo, Riggio, Connelly, & Dimeff, 1989; King, 1991). Reciprocal questioning may also be appropriate for students with disabilities. A recent study with children with autism spectrum disorder indicates that these students were able to increase the frequency of questioning and responding while reading in peer groups after being taught reciprocal questioning (Whalon & Hanline, 2008).

### TABLE 18.3
**Question Stems for Reciprocal Questioning**

<table>
<thead>
<tr>
<th>TYPE OF PROMPT</th>
<th>PURPOSE</th>
<th>EXAMPLES</th>
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</table>
| Comprehension checking | To enable students to test themselves       | • What does . . . mean?  
• Describe in your own words . . . 
• What is a new example of . . . ? |
| Knowledge constructing | To construct new knowledge and integrate it with prior knowledge by:  
• explaining  
• making evaluative, comparative, or evidential connections within the material | • Explain why . . .  
• Explain how . . .  
• How do you account for . . . ?  
• How does . . . tie in with what we learned before?  
• What conclusions can you draw about . . . ?  
• What would happen if . . . ?  
• How would . . . affect . . . ?  
• What do you think causes . . . ?  
• What are the strengths and weaknesses of . . . ? |
| Thought provoking     | To create cognitive conflict through expression of different points of view | • What do you think would happen if . . . ?  
• Do you agree or disagree with this statement? Why or why not?  
• What is the best . . . and why? |
| Metacognitive         | To monitor thinking and learning             | • What made you think of that?  
• What is your reasoning? |

SOURCE: Adapted from King, 2002.
Module 18: Instruction: Applying Behavioral, Cognitive, and Constructivist Approaches

SUMMARY

1. Explain why it is not necessary to individualize instruction for every student and identify the situations in which teachers need to differentiate instruction. With so many individual differences among students, it would be impractical to individualize instruction for each student. Also, there is no conclusive evidence to support the existence of individual learning styles, which means that modifying instruction to individual styles is not necessary. Teachers may need to differentiate instruction to meet the needs of English language learners, students with language impairments, students with disabilities, and students who are gifted.

2. Describe the goals of mastery learning and direct instruction, and discuss the advantages and disadvantages of each approach. Mastery learning encourages all students to achieve mastery of course content by adjusting the amount of time and feedback provided to meet students’ needs as they progress through individual curricular units. Mastery approaches are applicable to all grade levels and to material of varying complexity, but they may widen the achievement gap between lower and higher achieving students. Direct instruction maximizes academic learning time through use of teacher control, structured lessons, practice, and feedback. The approach is effective for teaching basic skills, especially with lower achieving students and students with disabilities, but it may not be beneficial when used with high-achieving or task-oriented students or as a teacher’s only instructional method.

3. Explain how discovery learning and expository teaching foster meaningful learning. Both approaches promote meaningful learning, in which students form new knowledge by selecting and organizing information and relating it to prior knowledge. In discovery learning, students actively discover and internalize a concept, rule, or principle through unstructured exploration of lesson content. Expository teaching promotes meaningful learning by (a) activating students’ prior knowledge through advance organizers; (b) emphasizing how new material relates to what students already know and to real-life examples and situations, and (c) providing opportunities for students to practice their knowledge in many different contexts.

KEY CONCEPTS

- advance organizers, 373
- Bloom’s taxonomy, 367
- cognitive apprenticeships, 374
- cooperative learning, 376
- direct instruction, 369
- discovery learning, 373
- expository teaching, 373
- guided discovery, 373
- inquiry discovery, 375
- instructional conversations, 378
- learning objectives, 367
- mastery learning, 371
- meaningful learning, 372
- reciprocal questioning, 379
- reciprocal teaching, 377

CASE STUDIES: REFLECT AND EVALUATE

EARLY CHILDHOOD: COUNTING POCKETS

These questions refer to the case study on page 366.

1. Explain how the two high school students who are assisting in the preschool classroom represent a cognitive apprenticeship.

2. How does the counting pockets activity reflect a guided discovery approach?

3. Make a prediction about what would happen if Ms. Abby allowed children to learn number concepts through a pure discovery approach.
4. Is there any room for pure discovery in a preschool classroom? Why or why not?

5. To what extent should Ms. Abby use a direct instruction approach in her classroom?

**ELEMENTARY SCHOOL: THE MACHINE HUNT**

These questions refer to the case study on page 338.

1. What type of instructional approach does Mr. Finnegan use for math? Why might this approach be effective for this group of students?
2. Explain how the walk around the school and the small group discussions afterward represent a guided discovery approach.
3. Why might guided discovery be effective for a lesson about simple machines? What must teachers do to ensure that guided discovery is successful?

**MIDDLE SCHOOL: SARCOPHAGUS STUDIES**

These questions refer to the case study on page 340.

1. Explain how the museum trip represents the concept of meaningful learning.
2. How does the museum scavenger hunt reflect a guided discovery approach? How does the scavenger hunt serve as an advance organizer?
3. Using the five elements of cooperative learning, evaluate how well the sarcophagus project represents cooperative learning. What suggestions for improvement would you give Mrs. DeSantis?
4. After the museum trip and before the group project, Mrs. DeSantis covers information on ancient Egypt. Should she use direct instruction or expository teaching for her Period 5 class? Justify your response.
5. Refer to your response to Question 4 above. What teaching approach should Mrs. DeSantis use for her Period 3 class? Provide a rationale for your position. (Note: This is an open-ended question.)
6. Assume Period 5 students go to English class where they are learning about symbolism and themes in novels. Choose an instructional approach that would be most appropriate for this type of lesson and provide a rationale for your response.

**HIGH SCHOOL: TEACHER’S LOUNGE**

These questions refer to the case study on page 342.

1. Mr. Williams suggests that Mr. Webster use “bell work” at the start of class. Explain how bell work can be a component of direct instruction and expository teaching.
2. Mr. Webster uses lecture to teach students about constructing a typical “five-paragraph essay.” Identify the type of instructional approach he is using and explain why it may be ineffective in this situation.
3. How does Mr. Williams teach writing in his class? Explain how this approach represents situated cognition.
4. Imagine that you are observing Mr. Williams’s English class, where he is teaching writing by having students write cover letters for jobs. Using the components of cognitive apprenticeships, elaborate on what this lesson might look like.
5. Assume that Mr. Webster wants to try a new approach to teach his students grammar. Explain how he could use cooperative learning and its five elements to accomplish this. What benefits does this approach yield?
6. As a teacher, you want to introduce the English Grammar and Composition class to novels. What instructional approach or approaches based on constructivism would you choose? Provide a rationale for your response.
Apply and practice what you’ve learned

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- Practice quizzes to test your knowledge of key concepts
- Videos and multimedia content to enhance your exploration of key topics