Social Cognitive and Constructivist Views of Learning
What Would You Do?

Teachers' Casebook

You have finally landed a job teaching English and writing in a high school. The first day of class, you discover that a number of students appear to be just learning English. You make a mental note to meet with them to determine how much and what kind of reading they can handle. To get a sense of the class's interest, you ask them to write a "review" of the last book they read, as if they were on TV doing a "Book Beat" program. There is a bit of grumbling, but the students seem to be writing, so you take a few minutes to try to talk with one of the students who seems to have trouble with English.

That night you look over the "book reviews." Either the students are giving you a hard time, or no one has read anything lately. Several students mention a text from another class, but their reviews are one-sentence evaluations—usually containing the words "lame" or "useless" (often misspelled). In stark contrast are the papers of three students—they are a pleasure to read, worthy of publication in the school literary magazine (if there were one), and they reflect a fairly sophisticated understanding of some good literature.

Critical Thinking

- How would you adapt your plans for this group?
- What will you do tomorrow?
- What teaching approaches do you think will work with this class?
- How will you work with the three students who are more advanced and the students who are just learning English?

Collaboration

With 2 or 3 other students in your class, redesign the assignment to get students more engaged. How could you prepare them to use what they know to succeed on this assignment?

For the past three chapters, we have analyzed different aspects of learning. We considered behavioral and information processing explanations of what and how people learn. We have examined complex cognitive processes such as concept learning and problem solving. These explanations of learning focus on the individual and what is happening in his or her "head." Recent perspectives have called attention to two other aspects of learning that are critical—social and cultural factors. In this chapter, we look at the role of other people and the cultural context in learning.

Two general theoretical frames include social and cultural factors as major elements. The first, social cognitive theory, has its roots in Bandura's early social learning theories of observational learning and vicarious reinforcement. You read about these early versions in Chapter 6. The second, sociocultural constructivist theories, have roots in cognitive perspectives, but have moved well beyond these early explanations. Rather than debating the merits of each approach, we will consider the contributions of these different models of instruction, grounded in different theories of learning. Don't feel that you must choose the "best" approach—there is no such thing.

Even though theorists argue about which model is best, excellent teachers apply all the approaches as appropriate.

By the time you have completed this chapter, you should be able to answer these questions:

- What is reciprocal determinism and what role does it play in social cognitive theory?
- What is self-efficacy, and how does it affect learning in school?
- What is teachers' sense of efficacy?
- How can teachers support the development of self-efficacy and self-regulated learning?
- What are three constructivist perspectives on learning?
- How could you incorporate inquiry, problem-based learning, instructional conversations, and cognitive apprenticeships in your teaching?
- What dilemmas do constructivist teachers face?
Social Cognitive Theory

As we saw in Chapter 6, in the early 1960s, Albert Bandura demonstrated that people can learn by observing the actions and consequences of others. Bandura’s social learning theory emphasized observation, modeling, and vicarious reinforcement. Over time, Bandura’s explanations of learning included more attention to cognitive factors such as expectations and beliefs in addition to the social influences of models. His current perspective is called social cognitive theory.

Reciprocal Determinism

In social cognitive theory, both internal and external factors are important. Environmental events, personal factors, and behaviors are seen as interacting in the process of learning. Personal factors (beliefs, expectations, attitudes, and knowledge), the physical and social environment (resources, consequences of actions, other people, and physical settings), and behavior (individual actions, choices, and verbal statements) all influence and are influenced by each other. Bandura calls this interaction of forces reciprocal determinism.

Figure 9.1 shows the interaction of person, environment, and behaviors in learning settings (Schunk, 2004). Social factors such as models, instructional strategies, or feedback (elements of the environment for students) can affect student personal factors such as goals, sense of efficacy for the task (described in the next section), attributions (beliefs about causes for success and failure), and processes of self-regulation such as planning, monitoring, and controlling distractions. For example, teacher feedback can lead students to set higher goals. Social influences in the environment and personal factors encourage the behaviors that lead to achievement such as persistence and effort (motivation) and learning. But these behaviors also reciprocally impact personal factors. As students achieve, their confidence and interest increase, for example. And behaviors also affect the social environment. For example, if students do not persist or if they seem to misunderstand, teachers may change instructional strategies or feedback.

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**FIGURE 9.1**

**Reciprocal Influences**

All three forces—personal, social, environmental, and behavioral—are in constant interaction. They influence and are influenced by each other.

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Think for a minute about the power of reciprocal determinism in classrooms. If personal factors, behaviors, and the environment are in constant interaction, then cycles of events are progressive and self-perpetuating. Suppose a student who is new to the school walks into class late because he got lost in the unfamiliar building. The student has a tattoo and several visible pierced body parts. The student actually is anxious about his first day and hopes to do better at this new school, but the teacher's initial reaction to the late entry and dramatic appearance is a bit hostile. The student feels insulted and responds in kind, so the teacher begins to form expectations about the student and acts more vigilant, less trusting. The student senses the distrust. He decides that this school will be just as worthless as his previous one—and wonders why he should bother to try. The teacher sees the student's disengagement, invests less effort in teaching him, and the cycle continues.

For a positive example of the complex interplay of forces that can affect students' experiences in school and their lives, see the Stories of Learning/TrIBUTES TO TEACHING.

**STORIES OF LEARNING**

**TRIBUTES TO TEACHING**

"I locked the door, sat down at my desk, and wept…"

The impact of teachers has been captured powerfully in works of fiction. The following story shows both the impact of teachers and the dangers of acting on negative expectations (discussed in Chapter 13). It is adapted from a longer version of this story, available at http://www.saintjohnonline.com/centenialschool/inspirations.html. The teacher, Miss Thompson, encountered Teddy in her second year of teaching fifth grade. He was dirty and had a strange smell. He fell farther and farther behind. She remembered:

*While I did not actually ridicule the boy, my attitude was obviously quite apparent to the class, for he quickly became the class “goat,” the outcast; the unlovable and the unloved. He knew I didn’t like him, but he didn’t know why. All I know is that he was a little boy no one cared about, and I made no effort on his behalf. I knew that Teddy would never catch up in time to be promoted to the sixth grade level. To justify myself, I went to his cumulative folder. First grade: Teddy shows promise by work and attitude, but has poor home situation. Second grade: Teddy could do better. Mother terminally ill. He receives little help at home. Third grade: Teddy is a pleasant boy. Helpful, but too serious. Slow learner. Mother passed away end of year. Fourth grade: Very slow, but well behaved. Father shows no interest. Well, they had passed him four times, but he will certainly repeat fifth grade! Do him good! I said to myself.*

*And then the last day before the holiday arrived. Many gifts were heaped underneath our little tree, waiting for the big moment. As I removed the last bit of masking tape from the brown paper on Teddy’s gift, two items fell to my desk: a gaudy rhinestone bracelet with several stones missing and a small bottle of dime-store cologne—half empty.*

*I could hear the snickers and whispers as I placed the bracelet on my wrist. “Teddy, would you help me fasten it?” He smiled shyly as he fixed the clasp, and I held up my wrist for all of them to admire. There were a few hesitant ooh’s and ohh’s, but as I dabbed the cologne behind my ears, all the little girls lined up for a dab behind their ears.*

*When all the students had left, Teddy walked up to me. “You smell just like my mom,” he said softly. “Her bracelet looks real pretty on you too. I’m glad you liked it.” He left quickly. I locked the door, sat down at my desk, and wept, resolving to make up to Teddy what I had deliberately deprived him of—a teacher who cared. I stayed every afternoon with Teddy from the end of holidays until the last day of school. Sometimes we worked together. Sometimes he worked alone while I drew up lesson plans or graded papers. Slowly but surely he caught up with the rest of the class. In fact, his final averages were among the highest in the class.*

*I did not hear from Teddy until seven years later, when his first letter appeared in my mailbox.*

*“Dear Miss Thompson, I just wanted you to be the first to know, I will be graduating second in my class next month.*

*Very Truly Yours, Teddy Stallard”*

*Four years later, Teddy’s second letter came.*

*“Dear Miss Thompson, I wanted you to be the first to know, I was just informed that I will be graduating first in my class. The university has not been easy, but I liked it.*

*Very Truly Yours, Teddy Stallard”*

*And now today, Teddy’s third letter.*

*“Dear Miss Thompson, I wanted you to be the first to know. As of today I am Theodore Stallard, M.D. How about that?!?!? I’m going to be married in July, the 27th, to be exact. I wanted to ask if you could come and sit where Mom would sit if she were here. I’ll have no family there as Dad died last year.*

*Very Truly Yours, Teddy Stallard”*

*Source: © Elizabeth Silance Stallard. All Rights Reserved.*

Social Cognitive Theory
Self-Efficacy

**WHAT WOULD YOU SAY?**

The last question in your interview for the 8th grade position is, “We have some pretty discouraged students and parents because our scores were so low last year. What would you do to help students believe in their ability to learn?”

Albert Bandura (1986, 1997) suggests that predictions about possible outcomes of behavior are critical for learning because they affect motivation. “Will I succeed or fail? Will I be liked or laughed at?” “Will I be more accepted by teachers in this new school?” These predictions are affected by self-efficacy—our beliefs about our personal competence or effectiveness in a given area. Bandura (1997) defines self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p. 3).

**Self-Efficacy, Self-Concept, and Self-Esteem.** Most people assume self-efficacy is the same as self-concept or self-esteem, but it isn’t. Self-efficacy is future-oriented, “a context-specific assessment of competence to perform a specific task” (Pajares, 1997, p. 15). Self-concept is a more global construct that contains many perceptions about the self, including self-efficacy. Self-concept is developed as a result of external and internal comparisons, using other people or other aspects of the self as frames of reference. But self-efficacy focuses on your ability to successfully accomplish a particular task with no need for comparisons—the question is whether you can do it, not whether others would be successful. Also, self-efficacy beliefs are strong predictors of behavior, but self-concept has weaker predictive power (Bandura, 1997).

Compared to self-esteem, self-efficacy is concerned with judgments of personal capabilities; self-esteem is concerned with judgments of self-worth. There is no direct relationship between self-esteem and self-efficacy. It is possible to feel highly efficacious in one area and still not have a high level of self-esteem, or vice versa (Valentine, Dubois, & Cooper, 2004). For example, I have very low self-efficacy for singing, but my self-esteem is not affected, probably because my life does not require singing. But if my

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**Self-efficacy** A person’s sense of being able to deal effectively with a particular task.
self-efficacy for teaching a particular class started dropping after several bad experiences, I knew my self-esteem would suffer.

**Sources of Self-Efficacy.** Bandura identified four sources of self-efficacy expectations: mastery experiences, physiological and emotional arousal, vicarious experiences, and social persuasion. **Mastery experiences** are our own direct experiences—the most powerful source of efficacy information. Successes raise efficacy beliefs, while failures lower efficacy. Level of arousal affects self-efficacy, depending on how the arousal is interpreted. As you face the task, are you anxious and worried (lowers efficacy) or excited and “psyched” (raises efficacy) (Bandura, 1997; Pintrich & Schunk, 2002)?

In **vicarious experiences**, someone else models accomplishments. The more closely the student identifies with the model, the greater the impact on self-efficacy will be. When the model performs well, the student’s efficacy is enhanced, but when the model performs poorly, efficacy expectations decrease. Although mastery experiences generally are acknowledged as the most influential source of efficacy beliefs in adults, Keyser and Barling (1981) found that children (6th graders in this study) rely more on **modeling** as a source of self-efficacy information.

**Social persuasion** can be a “pep talk” or specific performance feedback. Social persuasion alone can’t create enduring increases in self-efficacy, but a persuasive boost in self-efficacy can lead a student to make an effort, attempt new strategies, or try hard enough to succeed (Bandura, 1982). Social persuasion can counter occasional setbacks that might have instilled self-doubt and interrupted persistence. The potency of persuasion depends on the credibility, trustworthiness, and expertise of the persuader (Bandura, 1997).

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**Applying Social Cognitive Theory**

Self-efficacy and self-regulated learning are two key elements of social cognitive theory that are especially important in learning and teaching.

**STOP | THINK | WRITE** On a scale from 1 to 100, how confident are you that you will finish reading this chapter today?

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**Self-Efficacy and Motivation**

Let’s assume your sense of efficacy is around 90 for completing this chapter. Greater efficacy leads to greater effort and persistence in the face of setbacks, so even if you are interrupted in your reading, you are likely to return to the task. I believe I can finish writing this section tonight, so I have returned to working on it after stopping to visit a friend in the hospital. Of course, that could make for a late night, because I have to teach two classes tomorrow as well. Self-efficacy also influences motivation through goal setting. If we have a high sense of efficacy in a given area, we will set higher goals, be less afraid of failure, and find new strategies when old ones fail. If your sense of efficacy for reading this chapter is high, you are likely to set high goals for completing the chapter—maybe you will take some notes, too. If your sense of efficacy is low, however, you may avoid the reading altogether or give up easily when problems arise (Bandura, 1993, 1997; Zimmerman, 1995).

What is the most motivating level of efficacy? Should students be accurate, optimistic, or pessimistic in their predictions? There is evidence that a higher sense of self-efficacy supports motivation, even when the efficacy is an overestimation. Children and adults who are optimistic about the future are more mentally and physically healthy, less depressed, and more motivated to achieve (Flammer, 1995). After examining almost 140 studies of motivation, Sandra Graham concluded that these qualities characterize many African Americans. She found that the African Americans studied had strong self-concepts and high expectations, even in the face of difficulties (Graham, 1994, 1995).

**Mastery experiences** Our own direct experiences—the most powerful source of efficacy information.

**Arousal** Physical and psychological reactions causing a person to feel alert, excited, or tense.

**Vicarious experiences** Accomplishments that are modeled by someone else.

**Modeling** Changes in behavior, thinking, or emotions that happen through observing another person—a model.

**Social persuasion** A “pep talk” or specific performance feedback—one source of self-efficacy.
As you might expect, there are dangers in underestimating abilities because then students are more likely to put out a weak effort and give up easily. But there are dangers in continually overestimating performance as well. Students who think that they are better readers than they actually are may not be motivated to go back and repair misunderstandings as they read. They don’t discover that they did not really understand the material until it is too late (Pintrich & Zusho, 2002).

Research indicates that performance in school is improved and self-efficacy is increased when students (a) adopt short-term goals so it is easier to judge progress; (b) are taught to use specific learning strategies such as outlining or summarizing that help them focus attention; and (c) receive rewards based on achievement, not just engagement, because achievement rewards signal increasing competence (Graham & Weiner, 1996).

**Teachers’ Sense of Efficacy**

Much of my own research has focused on a particular kind of self-efficacy—teachers’ sense of efficacy (Hoy & Woolfolk, 1990, 1993; Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998; Woolfolk & Hoy, 1990; Woolfolk Hoy & Burke-Spero, 2005). Teachers’ sense of efficacy, a teacher’s belief that he or she can reach even difficult students to help them learn, appears to be one of the few personal characteristics of teachers that is correlated with student achievement. Self-efficacy theory predicts that teachers with a high sense of efficacy work harder and persist longer even when students are difficult to teach, in part because these teachers believe in themselves and in their students. Also, they are less likely to experience burn-out (Fives, Hamman, & Olivarez, 2005).

We have found that prospective teachers tend to increase in their personal sense of efficacy as a consequence of completing student teaching. But sense of efficacy may go down after the first year as a teacher, perhaps because the support that was there for you in student teaching is gone (Woolfolk Hoy & Burke-Spero, 2005). Teachers’ sense of efficacy is higher in schools where the other teachers and administrators have high expectations for students and where teachers receive help from their principals in solving instructional and management problems (Capa, 2005; Hoy & Woolfolk, 1993). Another important conclusion from our research is that efficacy grows from real success with students, not just from the moral support or cheering of professors and colleagues. Any experience or training that helps you succeed in the day-to-day tasks of teaching will give you a foundation for developing a sense of efficacy in your career.

As with any kind of efficacy, there may be both benefits and dangers in overestimating abilities. Optimistic teachers probably set higher goals, work harder, reteach when necessary, and persist in the face of problems. But some benefits might follow from having doubts about your efficacy. Doubts might foster reflection, motivation to learn, greater
responsiveness to diversity, productive collaboration, and the kind of disequilibrium described by Plagiet that motivates change (Wheatley, 2002). I believe that a sense of efficacy for learning to teach would be necessary to respond to doubts in these positive ways, but it is true that persistent high efficacy perceptions in the face of poor performance can produce avoidance rather than action.

**Self-Regulated Learning**

**STOP | THINK | WRITE** How are you studying right now? What goals have you set for your reading today? What is your plan for learning, and what strategies are you using right now to learn? How did you learn those strategies?

Barry Zimmerman (2002) defines self-regulation as the process we use to activate and sustain our thoughts, behaviors, and emotions in order to reach our goals. When the goals involve learning, we talk about self-regulated learning.

Today, people change jobs an average of seven times before they retire. Many of these career changes require new learning that must be self-initiated and self-directed (Martinez-Pons, 2002; Weinstein, 1994). Thus, one goal of teaching should be to free students from the need for teachers, so the students can continue to learn independently throughout their lives. To continue learning independently throughout life, you must be a self-regulated learner. Self-regulated learners have a combination of academic learning skills and self-control that makes learning easier, so they are more motivated; in other words, they have the **skill** and the **will** to learn (McCombs & Marzano, 1990; Murphy & Alexander, 2000). Self-regulated learners transform their mental abilities, whatever they are, into academic skills and strategies (Zimmerman, 2002). Many studies link strategy use to different measures of academic achievement, especially for middle-school and high-school students (Fredricks et al., 2004).

**What Influences Self-Regulation?** The concept of self-regulated learning integrates much of what is known about effective learning and motivation. As you can see from the processes described above, three factors influence skill and will: knowledge, motivation, and self-discipline or volition.

To be self-regulated learners, students need knowledge about themselves, the subject, the task, strategies for learning, and the contexts in which they will apply their learning. “Expert” students know about **themselves** and how they learn best. For example, they know their preferred learning styles; what is easy and what is hard for them; how to cope with the difficult parts; what their interests and talents are; and how to use their strengths (see Chapter 4 of this book). These experts also know quite a bit about the **subject** being studied—and the more they know, the easier it is to learn more (Alexander, 2006). They probably understand that different learning tasks require different approaches on their part. A simple memory task, for example, might require a mnemonic strategy (see Chapter 7), whereas a complex comprehension task might be approached by means of concept maps of the key ideas (see Chapter 8). Also, self-regulated learners know that learning is often difficult and knowledge is seldom absolute; there usually are different ways of looking at problems as well as different solutions (Pressley, 1995; Winne, 1995).

These expert students not only know what each task requires but they also can apply the strategy needed. They can skim or read carefully. They can use memory strategies or reorganize the material. As they become more knowledgeable in a field, they apply many of these strategies automatically. In short, they have mastered a large, flexible repertoire of learning strategies and tactics (see Chapter 8).

Finally, expert learners think about the **contexts** in which they will apply their knowledge—and where and where they will use their learning—so they can set motivating goals and connect present work to future accomplishments (Wang & Palincsar, 1989; Weinstein, 1994; Winne, 1995).

Self-regulated learners are motivated to learn (see Chapter 10). They find many tasks in school interesting because they value learning, not just performing well in the eyes of others. But even if they are not intrinsically motivated by a particular task, they are serious...
Self-regulated learners have a combination of academic learning skills and self-control that makes learning easier; they have the skill and the will to learn.

It is late Thursday morning, the last day of March. I am in Florida, but I have been writing almost all day every day since last weekend. My right arm is aching from a fall last week, but I want to keep writing because the deadline for this chapter is very near. I have knowledge and motivation, but to keep going I need a good dose of volition. Volition is an old-fashioned word for will-power. The technical definition for volition is protecting opportunities to reach goals by applying self-regulated learning. Self-regulated learners know how to protect themselves from distractions—where to study, for example, so they are not interrupted. They know how to cope when they feel anxious, drowsy, or lazy (Corno, 1992, 1995b; Snow, Corno, & Jackson, 1996). And they know what to do when tempted to stop working and have (another) cup of coffee—the temptation I’m facing now—that, and a beautiful sunny day that beckons me to the beach.

Obviously, not all of your students will be expert self-regulated learners when it comes to academics. In fact, some psychologists suggest that you think of this capacity as one of many characteristics that distinguish individuals (Snow, Corno, & Jackson, 1996). Some students are much better at it than others. How can you help more students become self-regulated learners in school? What is involved in being self-regulated?

Models of Self-Regulated Learning and Agency. Models of self-regulated learning describe how learners—like you!—make choices among the skills they use to learn and how they manage factors that affect learning. There are several models (Puustinen & Pulkkien, 2001). Let’s look at one developed by Phil Winne and Allyson Hadwin (1998), depicted in Figure 9.2. It has many facets, as it should when the topic at hand is how you manage your academic life.

The model of self-regulated learning in Figure 9.2 is based on a position that learners are agents. Agency is the capacity to coordinate learning skills, motivation, and emotions to reach your goals. Agents are not puppets on strings held by teachers, textbook authors, or web page designers. Instead, agents control many factors that influence how they learn. Self-regulating learners exercise agency as they engage in a cycle of four main stages: analyzing the task, setting goals and designing plans, engaging in learning, and adjusting their approach to learning.

1. Analyzing the learning task. You are familiar with this stage of self-regulated learning. What do you do when a professor announces there will be a test? You ask about con-
ditions you believe will influence how you'll study. Is it essay or multiple-choice? Is my best friend more up-to-date than I? In general, learners examine whatever information they think is relevant in order to construct a sense of what the task is about, what resources to bring to bear, and how they feel about the work to be done.

2. Setting goals and devising plans. Knowing conditions that influence work on tasks provides information that learners use to create goals for learning. Then, plans can be developed about how to reach those goals. What goals for studying might you set for a quiz covering only one chapter that counts just 3% toward your course grade? Would your goals change if the test covered the last six chapters and counted 30% toward your course grade? What targets are identified in these goals—repeating definitions, being able to discuss how a teacher could apply findings from key research studies described in the textbook, or critiquing theoretical positions? Choosing goals affects the shape of a learner's plans for how to study. Is cramming (massed practice) the best approach? Is a better plan
to study a half-hour each day, overlapping content a bit from one day to the next (distributed practice)?

3. Enacting tactics and strategies to accomplish the task. Self-regulated learners are especially alert during this stage as they monitor how well the plan is working. This is metacognitive monitoring (see Chapter 7). Are you reaching your goals? Is the approach you take to learning too effortful for the results you are achieving? Is your progress rate fast enough to be prepared for the test?

4. Regulating learning. In this stage of self-regulated learning, learners make decisions about whether changes are needed in any of the three preceding stages. For example, if learning is slow: Should you study with your best friend? Do you need to review some prior material that provides foundations for the content you are now studying?

An Individual Example

Students today are faced with constant distractions. Barry Zimmerman (2002, p. 64) describes Tracy, a high school student who is devoted to MTV:

An important mid-term math exam is two weeks away, and she had begun to study while listening to popular music "to relax her." Tracy has not set any study goals for herself—instead she simply tells herself to do as well as she can on the test. She uses no specific learning strategies for condensing and memorizing important material and does not plan out her study time, so she ends up cramming for a few hours before the test. She has only vague self-evaluative standards and cannot gauge her academic preparation accurately. Tracy attributes her learning difficulties to an inherent lack of mathematical ability and is very defensive about her poor study methods. However, she does not ask for help from others because she is afraid of "looking stupid," or seek out supplementary materials from the library because she "already has too much to learn." She finds studying to be anxiety-provoking, has little self-confidence in achieving success, and sees little intrinsic value in acquiring mathematical skill.

Clearly, Tracy is unlikely to do well on the test. What would help? For an answer, let's consider Zimmerman's cycle of self-regulated learning. His cycle has three phases and is similar to the Winne and Hadwin model described above. In phase 1, the forethought phase (like Winne & Hadwin's steps 1 and 2 of analyzing the task and setting goals), Tracy needs to set clear, reasonable goals and plan a few strategies for accomplishing those goals. And Tracy's beliefs about motivation make a difference at this point too. If Tracy had a sense of self-efficacy for applying the strategies that she planned, if she believed that using those strategies would lead to math learning and success on the test, if she saw some connections between her own interests and the math learning, and if she were trying to master the material—not just look good or avoid looking bad—then she would be on the road to self-regulated learning.

Moving to phase 2, from the forethought to the performance phase (similar to Winne and Hadwin's step 3 of enacting the strategies) brings new challenges. Now Tracy must have a repertoire of self-control (volitional) and learning strategies, including using imagery, mnemonics, attention focusing, and other techniques such as those described in Chapters 7 and 8 (Kiewra, 2002). She also will need to self-observe, that is, monitor how things are going so she can change strategies if needed. Actual recording of time spent, problems solved, or pages written may provide clues about when or how to make the best use of study time. 'Turning off the music would help, too.

Finally, Tracy needs to move to phase 3, similar to Winne and Hadwin's step 4 of regulating learning, by looking back on her performance and reflecting on what happened. It will help her develop a sense of efficacy if she attributes successes to effort and good strategy use and avoids self-defeating actions and beliefs such as making weak efforts, pretending not to care, or assuming she is "no good at math."

Both Zimmerman's and Winne and Hadwin's models emphasize the cyclical nature of self-regulated learning. Each phase flows into the next, and the cycle continues as stu-
Reaching Every Student: Two Classrooms and the Family

Students differ in their self-regulation knowledge and skills. But teachers must work with an entire classroom, and still “reach every student.” Here are two examples of real situations where teachers did just that. The first involves writing, the second math problem solving—both complex tasks.

**Writing.** Carol is a 2nd grade student described by Nancy Perry and Lynn Drummond (2003). Lynn was Carol’s teacher; she characterizes Carol as “a very weak writer.” Carol has difficulty finding facts, and then transforming those facts into meaningful prose for a research report. Also, she has difficulty with the mechanics of writing, which, according to Lynn, “holds her back.”

Over the course of the year, Lynn involved her grade 2 and 3 students in three projects about animals. Through this writing, she wanted students to learn how to: (a) do research, (b) write expository text, (c) edit and revise their writing, and (d) use the computer as a tool for researching and writing. For the first report, the class worked on one topic together (Chimpanzees). They did the fact-finding and writing together, because Lynn needed to show them how to do research and write a report. Also, the class developed frameworks for working collaboratively as a community of learners. When they wrote the second report (on Penguins), Lynn offered students many more choices and encouraged them to depend more on themselves and one another. Finally, for the third report, students chose an animal, conducted a self-regulated research project, and wrote a report. Now that they knew how to do research and write a report, they could work alone or together and be successful at this complex task.

Carol worked with a student in grade 3 (Carol was in grade 2) who was doing research on a related topic. He showed Carol how to use a table of contents, and offered advice about how to phrase ideas in her report. Also, Carol underlined words she thought were misspelled so she could check them later when she met with Lynn to edit her report. Unlike many low-achieving students who have not learned strategies for self-regulating learning, Carol was not afraid to attempt challenging tasks, and she was confident about her ability to develop as a writer. Reflecting on her progress across the school year, Carol said, “I learned a lot from when I was in grade 1 because I had a lot of trouble then.”

**Math Problem Solving.** Lynn Fuchs and her colleagues (2003) assessed the value of incorporating self-regulated learning strategies into math problem-solving lessons in real classrooms. The researchers worked with 24 teachers. All of the teachers taught the same content in their 3rd grade classes. Some of these teachers (randomly chosen) taught in their usual way. Another randomly chosen group incorporated strategies to encourage problem-solving transfer—using skills and knowledge learned in the lesson to solve problems in other situations and classes. The third group of teachers added transfers and self-regulated learning strategies to their units on math problem solving. Here are a few of the transfer and self-regulated learning strategies taught:

- Using a key, students scored their homework and gave it to a homework collector (a peer).
- Students graphed their completion of homework on a class report.
- Students used individual thermometer graphs that were kept in folders to chart their daily scores on individual problems.
- At the beginning of each session, students inspected their previous charts and set goals to beat their previous scores.
- Students discussed with partners how they might apply problem-solving strategies outside class.
• Before some lessons, students reported to the group about how they had applied problem-solving skills outside class.

Both transfer and self-regulated learning strategies helped students learn mathematical problem solving and apply this knowledge to new problems. The addition of self-regulated learning strategies was especially effective when students were asked to solve problems that were very different from those they encountered in the lessons. Students at every achievement level as well as students with learning disabilities benefited from learning the strategies.

Families and Self-Regulated Learning. Children begin to learn self-regulation in their homes. Parents can teach and support self-regulated learning through modeling, encouragement, facilitation, rewarding of goal setting, good strategy use, and other processes described in the next section (Martinez-Pons, 2002). The Guidelines give some ideas for helping students become more self-regulating.

Teaching Toward Self-Efficacy and Self-Regulated Learning

Most teachers agree that students need to develop skills and attitudes for independent, life-long learning (self-regulated learning and a sense of efficacy for learning). Fortunately, there is a growing body of research that offers guidance about how to design tasks and structure classroom interactions to support students’ development of and engagement in self-regulated learning (Neuman & Roskos, 1997; Perry, 1998; Turner, 1995; Wharton-McDonald, Pressley, Rankin, Mistrieta, Yokoi, & Ettenberger, 1997; Woolfolk, Perry, & Wiane, 2006; Zimmerman, 2002). This research indicates that students develop academically effective forms of self-regulated learning (SRL) and a sense of efficacy for learning when teachers involve them in complex meaningful tasks that extend over long

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**Guidelines: Supporting Self-Regulation**

1. **Emphasize the value of encouragement.**
   - ** EXAMPLES:** Teach students to encourage each other.
   - Tell parents about the areas that are most challenging for their child—the areas that will be the most in need of encouragement.

2. **Model self-regulation.**
   - ** EXAMPLES:** Target small steps for improving an academic skill. Tailor goals to the student’s current achievement level.
   - Discuss with your students how you set goals and monitor progress.
   - Ask parents to show their children how they set goals for the day or week, write to-do lists, or keep appointment books.

3. **Make families a source of good strategy ideas.**
   - ** EXAMPLES:** Have short, simple materials describing a “strategy of the month” that students can practice at home.

4. **Create a lending library of books about goal setting, motivation, learning, and time-management strategies for students.**

5. **Encourage families to help their children focus on problem-solving processes and not turn immediately to the answers at the back of the book when doing homework.**

6. **Provide self-evaluation guidelines.**
   - ** EXAMPLES:** Develop rubrics for self-evaluation with students (see Chapter 15). Model how to use them.
   - Provide record-keeping sheets for assignments early in the year, then gradually have students develop their own.
   - Encourage parents to model self-evaluation as they focus on areas they want to improve.
   - For parent conferences, have examples of materials other families have successfully used to keep track of progress.

For more ideas to share with parents, see: [http://www.pbs.org/wholechild/parents/building.html](http://www.pbs.org/wholechild/parents/building.html)
periods of time, much like the constructivist activities described later in this chapter. Also, to develop self-regulated learning and self-efficacy for learning, students need to have some control over their learning processes and products—they need to make choices. And because self-monitoring and self-evaluation are key to effective SRL and a sense of efficacy, teachers can help students develop SRL by involving them in setting criteria for evaluating their learning processes and products, then giving them opportunities to make judgments about their progress using those standards. Finally, it helps to work collaboratively with peers and seek feedback from them. Let’s examine each of these more closely.

**Complex Tasks.** Teachers don’t want to assign students tasks that are too difficult and that lead to frustration. This is especially true when students have learning difficulties or disabilities. In fact, research indicates that the most motivating and academically beneficial tasks for students are those that challenge, but don’t overwhelm them (Rohrkenper & Corrono, 1988; Turner, 1997); complex tasks need not be overly difficult for students.

The term *complex* refers to the design of tasks, not their level of difficulty. From a design point of view, tasks are complex when they address multiple goals and involve large chunks of meaning, such as projects and thematic units. Furthermore, complex tasks extend over long periods of time, engage students in a variety of cognitive and metacognitive processes, and allow for the production of a wide range of products (Perry, VandeKamp, Mercer, & Nordby, 2002; Wharton-McDonald et al., 1997). For example, a study of Egyptian pyramids might result in the production of written reports, maps, diagrams, and models.

Even more important, complex tasks provide students with information about their learning progress. These tasks require them to engage in deep, elaborative thinking and problem solving. In the process, students develop and refine their cognitive and metacognitive strategies. Furthermore, succeeding at such tasks increases students’ self-efficacy and intrinsic motivation (McCaslin & Good, 1996; Turner, 1997). Rohrkenper and Corrono (1988) advised teachers to design complex tasks that provide opportunities for students to modify the learning conditions in order to cope with challenging problems.

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**In order to develop self-regulated learning and self-efficacy for learning, students need to have some control over their learning processes and products; teachers can help by involving students in evaluating their learning processes, products, and progress.**
Learning to cope with stressful situations and make adaptations is an important educational goal. Remember from Chapter 4, that according to Sternberg, one aspect of intelligence is choosing or adapting environments so that you can succeed.

Control. Teachers can share control with students by giving them choices. When students have choices (e.g., about what to produce, how to produce it, where to work, who to work with), they are more likely to anticipate a successful outcome (increased self-efficacy) and consequently increase effort and persist when difficulty arises (Turner & Paris, 1995). Also, by involving students in making decisions, teachers invite them to take responsibility for learning by planning, setting goals, monitoring progress, and evaluating outcomes (Turner, 1997). These are qualities of highly effective, self-regulating learners.

Giving students choices creates opportunities for them to adjust the level of challenge particular tasks present (e.g., they can choose easy or more challenging reading materials, determine the nature and amount of writing in a report, supplement writing with other expressions of learning). But what if students make poor academic choices? Highly effective, high-SRL teachers carefully consider the choices they give to students. They make sure students have the knowledge and skills they need to operate independently and make good decisions (Perry & Drummond, 2002). For example, when students are learning new skills or routines, teachers can offer choices with constraints (e.g., students must write a minimum of four sentences/paragraphs/pages, but they can choose to write more; they must demonstrate their understanding of an animal’s habitat, food, and babies, but they can write, draw, or speak their knowledge).

Highly effective teachers also teach and model good decision making. For example, when students are choosing partners, they ask them to consider what they need from their partner (e.g., shared interest and commitment, perhaps knowledge or skills that they need to develop). When students are making choices about how best to use their time, these teachers ask, “What can you do when you’re finished? What can you do if you are waiting for my help?” Often, lists are generated and posted, so students can refer to them while they work. Finally, highly effective teachers give students feedback about the choices they make and tailor the choices they give to suit the unique characteristics of particular learners. For example, they might encourage some students to select research topics for which resources are readily available and written at a level that is accessible to the learner. Alternatively, they might encourage some students to work collaboratively versus independently to ensure they have the support they need to be successful.

Self-Evaluation. Evaluation practices that support SRL are nonthreatening. They are embedded in ongoing activities, emphasize process as well as products, focus on personal progress, and help students to interpret errors as opportunities for learning to occur. In these contexts, students enjoy and actually seek challenging tasks because the cost of participation is low (Paris & Ayres, 1994). Involving students in generating evaluation criteria and evaluating their own work also reduces the anxiety that often accompanies assessment by giving students a sense of control over the outcome. Students can judge their work in relation to a set of qualities both they and their teachers identify as “good” work. They can consider the effectiveness of their approaches to learning and alter their behaviors in ways that enhance it (Winne & Perry, 2000).

In high-SRL classrooms, there are both formal and informal opportunities for students to evaluate their learning. For example, one student teacher asked 4th- and 5th-grade students to submit reflections journals describing the games they designed with a partner or small group of collaborators in a probability and statistics unit (Perry, Phillips, & Dowler, 2004). Their journals explained their contribution to the group’s process and product, and described what they learned from participating. The student teacher took these reflections into account when she evaluated the games. More informally, teachers ask students “What have you learned about yourself as a writer today?” “What do good researchers and writers do?” “What can we do that we couldn’t do before?” Questions like these, posed to individuals or embedded in class discussions, prompt students’ metacognition, motivation, and strategic action—the components of SRL.
Collaboration. The Committee on Increasing High School Students’ Motivation to Learn (2004) concluded that when students put their heads together, they are more receptive to challenging assignments—the very kind of complex task that develops self-regulation. The Committee added:

Collaborative work also can help students develop skills in cooperation. Furthermore, it helps create a community of learners who have responsibility for each other’s learning, rather than a competitive environment, which is alienating to many students, particularly those who do not perform as well as their classmates. (p. 51)

The most effective uses of cooperative/collaborative relationships to support SRL are those that reflect a climate of community and shared problem solving (Perry & Drummond, 2002; Perry, VandeKamp, Mercer, & Nordby, 2002). In these contexts, teachers and students actually co-regulate each other’s learning (McCaslin & Good, 1996), offering support, whether working alone, in pairs, or small groups. This support is instrumental to individuals’ development and use of metacognition, intrinsic motivation, and strategic action (e.g., sharing ideas, comparing strategies for solving problems, identifying everyone’s area of expertise). High-SRL teachers spend time at the start of each school year teaching routines and establishing norms of participation (e.g., how to give constructive feedback and how to interpret and respond to peers’ suggestions). As you will see in Chapter 12, developing useful management and learning procedures and routines takes time in the beginning of the year, but it is time well spent. Once routines and patterns of interaction are established, students can focus on learning and teachers can attend to teaching academic skills and the curriculum.

The last element of teaching for self-regulation, collaboration, is an important ingredient in constructivist learning. We will spend the rest of the chapter exploring more closely this important and very current perspective.

Cognitive and Social Constructivism

Consider this situation:

A young child who has never been to the hospital is in her bed in the pediatric wing. The nurse at the station down the hall calls over the intercom above the bed, “Hi Chelsea, how are you doing? Do you need anything?” The girl looks puzzled and does not answer. The nurse repeats the question with the same result. Finally, the nurse says emphatically, “Chelsea, are you there? Say something!” The little girl responds tentatively, “Hello wall—I’m here.”

Chelsea encountered a new situation—a talking wall. The wall is persistent. It sounds like a grown-up wall. She shouldn’t talk to strangers, but she is not sure about walls. She uses what she knows and what the situation provides to construct meaning and to act.

Here is another example of constructing meaning taken from Berk (2001, p. 31). This time, a father and his 4-year-old son co-construct understandings as they walk along a California beach, collecting litter after a busy day:

Ben: (running ahead and calling out) Some bottles and cans, I’ll get them.
Mel: If the bottles are broken, you could cut yourself, so let me get them. (Catches up and holds out the bag as Ben drops items in)
Ben: Dad, look at this shell. It’s a whole one, really big. Colors all inside!
Mel: Hmmm, might be an abalone shell.
Ben: What’s abalone?
Mel: Do you remember what I had in my sandwich on the wharf yesterday? That’s abalone.
Ben: You eat it?
Mel: Well, you can. You eat a meaty part that the abalone uses to stick to rocks.
Ben: Ewww. I don’t want to eat it. Can I keep the shell?
Mel: I think so. Maybe you can find some things in your room to put in it. *(Points to the shell’s colors)* Sometimes people make jewelry out of these shells.
Ben: Like mom’s necklace?
Mel: That’s right. Mom’s necklace is made out of a kind of abalone with a very colorful shell—pinks, purples, blues. It’s called Paua. When you turn it, the colors change.
Ben: Wow! Let’s look for Paua shells!
Mel: You can’t find them here, only in New Zealand.
Ben: Where’s that? I have you been there?
Mel: No, someone brought Mom the necklace as a gift. But I’ll show you New Zealand on the globe. It’s far away, halfway around the world.

Look at the knowledge being co-constructed about sea creatures and their uses for food or decoration; safety; environmental responsibility; and even geography. Constructivist theories of learning focus on how people make meaning, both on their own like Chelsea and in interaction with others like Ben.

**Constructivist Views of Learning**

Constructivism is a broad term used by philosophers, curriculum designers, psychologists, educators, and others. Ernst Von Glasersfeld calls it “a vast and wooly area in contemporary psychology, epistemology, and education” (1997, p. 204). Constructivist perspectives are grounded in the research of Piaget, Vygotsky, the Gestalt psychologists, Bartlett, and Bruner as well as the philosophy of John Dewey, to mention just a few intellectual roots.

There is no one constructivist theory of learning, but “most constructivists share two main ideas: that learners are active in constructing their own knowledge and that social interactions are important to knowledge construction” (Bruning, Schraw, Norby, & Ronning, 2004, p. 195). Constructivism views learning as more than receiving and processing information transmitted by teachers or texts. Rather, learning is the active and personal construction of knowledge (de Kock, Sleegers, and Vocken, 2004). Thus, many theories in cognitive science include some kind of constructivism because these theories assume that individuals construct their own cognitive structures as they interpret their experiences in particular situations (Palincsar, 1998). There are constructivist approaches in science and mathematics education, in educational psychology and anthropology, and in computer-based education. Even though many psychologists and educators use

*Constructivist theories are based on the ideas that learners actively develop their knowledge, rather than passively receive it, in package form, from teachers or outside sources.*
the term constructivism, they often mean very different things (Driscol, 2005; McCaslin & Hickey, 2001; Phillips, 1997).

One way to organize constructivist views is to talk about two forms of constructivism: psychological and social construction (Paltinaskar, 1998; Phillips, 1997). We could oversimplify a bit and say that psychological constructivists focus on how individuals use information, resources, and even help from others to build and improve their mental models and problem-solving strategies. In contrast, social constructivists see learning as increasing our abilities to participate with others in activities that are meaningful in the culture (Windschitl, 2002). Let's look a bit closer at each type of constructivism.

**Psychological/Individual Constructivism.** Psychological constructivists "are concerned with how individuals build up certain elements of their cognitive or emotional apparatus" (Phillips, 1997, p. 153). These constructivists are interested in individual knowledge, beliefs, self-concept, or identity, so they are sometimes called individual constructivists or cognitive constructivists; they all focus on the inner psychological life of people. When Chelsea talked to the wall in the previous section, she was making meaning using her own individual knowledge and beliefs about how to respond when someone (or something) talks to you. She was using what she knew to impose intellectual structure on her world (Piaget, 1971; Windschitl, 2002).

Using these standards, the most recent information processing theories are constructivist (Mayer, 1996). Information processing approaches to learning regard the human mind as a symbol processing system. This system converts sensory input into symbol structures (propositions, images, or schemas), and then processes (rehearses or elaborates) those symbol structures so knowledge can be held in memory and retrieved. The outside world is seen as a source of input, but once the sensations are perceived and enter working memory, the important work is assumed to be happening "inside the head" of the individual (Schunk, 2000; Vera & Simon, 1993). Some psychologists, however, believe that information processing is "trivial" or "weak" constructivism because the individual's only constructive contribution is to build accurate representations of the outside world (Deary, 1992; Garrison, 1995; Marshall, 1996; Windschitl, 2002).

In contrast, Piaget's psychological (cognitive) constructivist perspective is less concerned with "correct" representations and more interested in meaning as constructed by the individual. As we saw in Chapter 2, Piaget proposed a sequence of cognitive stages that all humans pass through. Thinking at each stage builds on and incorporates previous stages as it becomes more organized and adaptive and less tied to concrete events. Piaget's special concern was with logic and the construction of universal knowledge that cannot be learned directly from the environment—knowledge such as conservation or reversibility (Miller, 2002). Such knowledge comes from reflecting on and coordinating our own cognitions or thoughts, not from mapping external reality. Piaget saw the social environment as an important factor in development, but did not believe that social interaction was the main mechanism for changing thinking (Moshman, 1997). Some educational and developmental psychologists have referred to Piaget's kind of constructivism as "first wave constructivism" or "solo" constructivism, with its emphasis on individual meaning-making (De Corte, Greer, and Verschaffel, 1996; Paris, Byrnes, & Paris, 2001).

At the extreme end of individual constructivism is the notion of **radical constructivism.** This perspective holds that there is no reality or truth in the world, only the individual's perceptions and beliefs. Each of us constructs meaning from our own experiences, but we have no way of understanding or "knowing" the reality of others (Woods & Murphy, 2002). A difficulty with this position is that, when pushed to the extreme of relativism, all knowledge and all beliefs are equal because they are all valid individual perceptions. There are problems with this thinking for educators. First, teachers have a professional responsibility to emphasize some values, such as honesty or justice, over others such as bigotry and deception. All perceptions and beliefs are not equal. As teachers, we ask students to work hard to learn. If learning cannot advance understanding

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**First wave constructivism** A focus on the individual and psychological sources of knowing, as in Piaget’s theory.

**Radical constructivism** Knowledge is assumed to be the individual’s construction; it cannot be judged right or wrong.
because all understandings are equally good, then, as David Mosheim (1997) notes, “we
might just as well let students continue to believe whatever they believe” (p. 230). Also,
it appears that some knowledge, such as counting and one-to-one correspondence, is not
constructed, but universal. Knowing one-to-one correspondence is part of being human
(Geary, 1995; Schunk, 2000).

**Vygotsky’s Social Constructivism.** As you also saw in Chapter 2, Vygotsky believed that
social interaction, cultural tools, and activity shape individual development and learning,
just as Ben’s interactions on the beach with his father shaped Ben’s learning about sea
creatures, safety, environmental responsibility, and geography. By participating in a broad
range of activities with others, learners appropriate (internalize or take for themselves)
the outcomes produced by working together; these outcomes could include both new
strategies and knowledge. Putting learning in social and cultural context is “second

Because his theory relies heavily on social interactions and the cultural context to ex-
plain learning, most psychologists classify Vygotsky as a social constructivist (Palinscar,
1998; Prawat, 1996). However, some theorists categorize him as a psychological con-
structivist because he was primarily interested in development within the individual
(Mosheim, 1997; Phillips, 1997). In a sense, Vygotsky was both. One advantage of his
theory of learning is that it gives us a way to consider both the psychological and the so-
cial. He bridges both camps. For example, Vygotsky’s concept of the zone of proximal
development—the area where a child can solve a problem with the help (scaffolding) of
an adult or more able peer—has been called a place where culture and cognition create
each other (Cole, 1985). Culture creates cognition when the adult uses tools and prac-
tices from the culture (language, maps, computers, looms, or music) to steer the child
toward goals the culture values (reading, writing, weaving, dance). Cognition creates
culture as the adult and child together generate new practices and problem solutions to
add to the cultural group’s repertoire (Serpell, 1993). One way of integrating individual
and social constructivism is to think of knowledge as individually constructed and socially
mediated (Windschutt, 2002).

The term constructionism is sometimes used to talk about how public knowledge is
created. Although this is not our main concern in educational psychology, it is worth a
quick look.

**Constructionism.** Social constructionists do not focus on individual learning. Their
concern is how public knowledge in disciplines such as science, math, economics, or his-
tory is constructed. Beyond this kind of academic knowledge, constructionists also are
interested in how common-sense ideas, everyday beliefs, and commonly held under-
standings about people and the world are communicated to new members of a socio-
cultural group (Georgen, 1997; Phillips, 1997). Questions raised might include who
determines what constitutes history, what is the proper way to behave in public, or how
to get elected class president. All knowledge is socially constructed, and, more important,
some people have more power than others to define what constitutes such knowledge.
Relationships between and among teachers, students, families, and the community are the
central issues. Collaboration to understand diverse viewpoints is encouraged, and tradi-
tional bodies of knowledge often are challenged (Georgen, 1997). The philosophies of
Jacques Derrida and Michel Foucault are important sources for constructionists. Vyg-
otsky’s theory, with its attention to how cognition creates culture, has some elements in
common with constructionism.

These different perspectives on constructivism raise some general questions, and dis-
agree on the answers. These questions can never be fully resolved, but different theories
tend to favor different positions. Let’s consider the questions.

**How Is Knowledge Constructed?**

One tension among different approaches to constructivism is based on how knowledge is
1. The realities and truths of the external world direct knowledge construction. Individuals reconstruct outside reality by building accurate mental representations such as propositional networks, concepts, cause-and-effect patterns, and condition-action production rules that reflect "the way things really are." The more the person learns, the deeper and broader his or her experience is, the closer that person's knowledge will reflect objective reality. Information processing holds this view of knowledge (Cobb & Bowers, 1999).

2. Internal processes such as Piaget's organization, assimilation, and accommodation direct knowledge construction. New knowledge is abstracted from old knowledge. Knowledge is not a mirror of reality, but rather an abstraction that grows and develops with cognitive activity. Knowledge is not true or false; it just grows more internally consistent and organized with development.

3. Both external and internal factors direct knowledge construction. Knowledge grows through the interactions of internal (cognitive) and external (environmental and social) factors. Vygotsky's description of cognitive development through the appropriation and use of cultural tools such as language is consistent with this view (Bruning, Schraw, Norby, & Rommit, 2004). Another example is Bandura's theory of reciprocal interactions among people, behaviors, and environments (Schunk, 2000). Table 9.1 summarizes the three general explanations about how knowledge is constructed.

**Knowledge: Situated or General?**

A second question that cuts across many constructivist perspectives is whether knowledge is internal, general, and transferable or bound to the time and place in which it is constructed. Psychologists who emphasize the social construction of knowledge and situated learning affirm Vygotsky's notion that learning is inherently social and embedded in a particular cultural setting (Cobb & Bowers, 1999). What is true in one time and place—such as the "fact" before Columbus's time that the earth was flat—becomes false in another time and place. Particular ideas may be useful within a specific community of practice, such as 15-century navigation, but useless outside that community. What counts as new knowledge is determined in part by how well the new idea fits with current accepted practice. Over time, the current practice may be questioned and even overthrown, but until such major shifts occur, current practice will shape what is considered valuable.

**Situated learning** emphasizes that learning in the real world is not like studying in school. It is more like an apprenticeship where novices, with the support of an expert guide and model, take on more and more responsibility until they are able to function independently. Proponents of this view believe situated learning explains learning in...
factories, around the dinner table, in high school halls, in street gangs, in the business office, and on the playground.

Situated learning is often described as "enculturation," or adopting the norms, behaviors, skills, beliefs, language, and attitudes of a particular community. The community might be mathematicians or gang members or writers or students in your 8th-grade class or soccer players—any group that has particular ways of thinking and doing. Knowledge is seen not as individual cognitive structures but as a creation of the community over time. The practices of the community—the ways of interacting and getting things done, as well as the tools the community has created—constitute the knowledge of that community. Learning means becoming more able to participate in those practices, use the tools, and take on the identity of a member of the community (Derry, 1992; Garrison, 1995; Greeno, Collins, & Resnick, 1996; Rogoff, 1998).

At the most basic level, "situated learning emphasizes the idea that much of what is learned is specific to the situation in which it is learned" (Anderson, Reder, & Simon, 1996, p. 5). Thus, some would argue, learning to do calculations in school may help students do more school calculations, but it may not help them balance a checkbook, because the skills can be applied only in the context in which they were learned, namely school (Lave, 1997; Lave & Wenger, 1991). But it also appears that knowledge and skills can be applied across contexts that were not part of the initial learning situation, as when you use your ability to read and calculate to do your income taxes, even though income tax forms were not part of your high school curriculum (Anderson, Reder, & Simon, 1996).

Learning that is situated in school does not have to be doomed or irrelevant (Berciter, 1997). As you saw in Chapter 8, a major question in educational psychology and education in general concerns the transfer of knowledge from one situation to another. How can you encourage this transfer? Help is on the way in the next section.

**Common Elements of Constructivist Perspectives**

**STOP | THINK | WRITE** What makes a lesson student-centered? List the characteristics and features that put the student in the center of learning.

We have looked at some areas of disagreement among the constructivist perspectives, but what about areas of agreement? All constructivist theories assume that knowing develops as learners, like Chelsea and Ben, try to make sense of their experiences. "Learners, therefore, are not empty vessels waiting to be filled, but rather active organisms seeking meaning" (Drsicoll, 2005, p. 487). These learners construct mental models or schemas and continue to revise them to make better sense of their experiences. Their constructions do not necessarily resemble external reality; rather, they are the unique interpretations of the learner, like Chelsea's friendly, persistent wall. This doesn't mean that all constructions are equally useful or viable. Learners test their understandings against experience and the understandings of other people—they negotiate and co-construct meanings like Ben did with his father.

Constructivists share similar goals for learning. They emphasize knowledge in use rather than the storing of inert facts, concepts, and skills. Learning goals include developing abilities to find and solve ill-structured problems, critical thinking, inquiry, self-determination, and openness to multiple perspectives (Drsicoll, 2005).

Even though there is no single constructivist theory, many constructivist approaches recommend five conditions for learning:

1. Embed learning in complex, realistic, and relevant learning environments.
2. Provide for social negotiation and shared responsibility as a part of learning.
4. Nurture self-awareness and an understanding that knowledge is constructed.
5. Encourage ownership in learning. (Drsicoll, 2005; Marshall, 1992)

Before we discuss particular teaching approaches, let's look more closely at these dimensions of constructivist teaching.

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Chapter 9: Social Cognitive and Constructivist Views of Learning
Complex Learning Environments and Authentic Tasks. Constructivists believe that students should not be given stripped-down, simplified problems and basic skills drills, but instead should encounter complex learning environments that deal with "fuzzy," ill-structured problems. The world beyond school presents few simple problems or step-by-step directions, so schools should be sure that every student has experience solving complex problems. Complex problems are not simply difficult ones; they have many parts. There are multiple, interacting elements in complex problems and multiple solutions are possible. There is no one right way to reach a conclusion, and each solution may bring a new set of problems. These complex problems should be embedded in authentic tasks and activities, the kinds of situations that students will face as they apply what they are learning to the real world (Needles & Knapp, 1994). Students may need support as they work on these complex problems, with teachers helping them find resources, keeping track of their progress, breaking larger problems down into smaller ones, and so on. This aspect of constructivist approaches is consistent with self-regulation and situated learning in emphasizing learning in situations where the learning will be applied.

Social Negotiation. Many constructivists share Vygotsky's belief that higher mental processes develop through social negotiation and interaction, so collaboration in learning is valued. The Language Development and Hypermedia Group (1992) suggests that a major goal of teaching is to develop students' abilities to establish and defend their own positions while respecting the positions of others and working together to negotiate or co-construct meaning. To accomplish this exchange, students must talk and listen to each other. It is a challenge for children in cultures that are individualistic and competitive, such as the United States, to adopt what has been called an intersubjective attitude—a commitment to build shared meaning by finding common ground and exchanging interpretations.

Multiple Perspectives and Representations of Content. When students encounter only one model, one analogy, one way of understanding complex content, they often oversimplify as they try to apply that one approach to every situation. I saw this happen in my educational psychology class when six students were presenting an example of guided discovery learning. The students' presentation was a clear copy of a guided discovery demonstration I had given earlier in the semester, but with some major misconceptions. My students knew only one way to represent discovery learning. Resources for the class

Complex learning environments
Problems and learning situations that mimic the ill-structured nature of real life.

Social negotiation Aspect of learning process that relies on collaboration with others and respect for different perspectives.

Intersubjective attitude A commitment to build shared meaning with others by finding common ground and exchanging interpretations.
should have provided multiple representations of content using different analogies, examples, and metaphors.

Raud Spillro and his colleagues (1991) suggest that "revisiting the same material, at different times, in rearranged contexts, for different purposes, and from different conceptual perspectives is essential for attaining the goals of advanced knowledge acquisition" (p. 28). This idea is consistent with Jerome Bruner's (1966) spiral curriculum, a structure for teaching that introduces the fundamental structure of all subjects—the "big ideas"—early in the school years, then revisits the subjects in more and more complex forms over time.

Understanding the Knowledge Construction Process. Constructivist approaches emphasize making students aware of their own role in constructing knowledge (Cunningham, 1992). The assumptions we make, our beliefs, and our experiences shape what each of us comes to "know" about the world. Different assumptions and different experiences lead to different knowledge. If students are aware of the influences that shape their thinking, they will be more able to choose, develop, and defend positions in a self-critical way while respecting the positions of others.

Student Ownership of Learning. "While there are several interpretations of what [constructivist] theory means, most agree that it involves a dramatic change in the focus of teaching, putting the students' own efforts to understand at the center of the educational enterprise" (Frawat, 1992, p. 357). Student ownership does not mean that the teacher abandons responsibility for instruction. Because the design of teaching is a central issue in this book, we will spend the rest of this chapter discussing examples of ownership of learning and student-centered instruction.

Applying Constructivist Perspectives

Even though there are many applications of constructivist views of learning, we can recognize constructivist approaches by the activities of the teacher and the students. Mark Windschitl (2002) suggests that the following activities encourage meaningful learning:

- Teachers elicit students' ideas and experiences in relation to key topics, then fashion learning situations that help students elaborate on or restructure their current knowledge.
- Students are given frequent opportunities to engage in complex, meaningful, problem-based activities.
- Teachers provide students with a variety of information resources as well as the tools (technological and conceptual) necessary to mediate learning.
- Students work collaboratively and are given support to engage in task-oriented dialogue with one another.
- Teachers make their own thinking processes explicit to learners and encourage students to do the same through dialogue, writing, drawings, or other representations.
- Students are routinely asked to apply knowledge in diverse and authentic contexts, to explain ideas, interpret texts, predict phenomena, and construct arguments based on evidence, rather than to focus exclusively on the acquisition of predetermined "right answers."
- Teachers encourage students' reflective and autonomous thinking in conjunction with the conditions listed above.
- Teachers employ a variety of assessment strategies to understand how students' ideas are evolving and to give feedback on the processes as well as the products of their thinking. (p. 137)

In this section, we will examine three specific teaching approaches that put the student at the center: inquiry and problem-based learning, dialogic and instructional conversations, and cognitive apprenticeships. Two other approaches consistent with construc-
tivism are cooperative learning, discussed in Chapter 11, and conceptual change, discussed in Chapter 13.

Inquiry and Problem-Based Learning

John Dewey described the basic inquiry learning format in 1910. There have been many adaptations of this strategy, but the form usually includes the following elements (Echevarria, 2003; Lashley, Matczynski, & Rowley, 2002). The teacher presents a puzzling event, question, or problem. The students:

- formulate hypotheses to explain the event or solve the problem,
- collect data to test the hypotheses,
- draw conclusions, and
- reflect on the original problem and the thinking processes needed to solve it.

**Examples of Inquiry.** In one kind of inquiry, teachers present a problem and students ask yes/no questions to gather data and test hypotheses. This allows the teacher to monitor students’ thinking and guide the process. Here is an example:

1. **Teacher presents discrepant event** (after clarifying ground rules). The teacher blows softly across the top of an 8½” × 11” sheet of paper, and the paper rises. She tells students to figure out why it rises.
2. **Students ask questions** to gather more information and to isolate relevant variables. Teacher answers only “yes” or “no.” Students ask if temperature is important (no). They ask if the paper is of a special kind (no). They ask if air pressure has anything to do with the paper rising (yes). Questions continue.
3. **Students test causal relationships.** In this case, they ask if the nature of the air on top causes the paper to rise (yes). They ask if the fast movement of the air results in less pressure on the top (yes). Then they test out the rule with other materials—for example, thin plastic.
4. **Students form a generalization** (principle): “If the air on the top moves faster than the air on the bottom of a surface, then the air pressure on top is lessened, and the object rises.” Later lessons expand students’ understanding of the principles and physical laws through further experiments.
5. **The teacher leads students in a discussion of their thinking processes.** What were the important variables? How did you put the causes and effects together? and so on. (Pasch et al., 1991, pp. 188–189)

Shirley Magnusson and Annemarie Palincsar have developed a teachers’ guide for planning, implementing, and assessing different phases of inquiry science units (Palincsar, Magnusson, Marano, Ford, & Brown, 1998). The model, called **Guided Inquiry Supporting Multiple Literacies or GtISMi**, is shown in Figure 9.3 on the next page.

The teacher first identifies a curriculum area and some general guiding questions, puzzles, or problems. For example, an elementary teacher chooses communication as the area and asks this general question: “How and why do humans and animals communicate?” Next, several specific focus questions are posed. “How do whales communicate?” “How do gorillas communicate?” The focus questions have to be carefully chosen to guide students toward important understandings. One key idea in understanding animal communication is the relationship among the animal’s structures, survival functions, and habitat. Animals have specific structures such as large ears or echo-locators, which function to find food or attract mates or identify predators, and these structures and functions are related to the animals’ habitats. Thus, focus questions must ask about animals with different structures for communication, different functional needs for survival, and different habitats. Questions about animals with the same kinds of structures or the same habitats would not be good focus points for inquiry (Magnusson & Palincsar, 1995).

The next phase is to engage students in the inquiry, perhaps by playing different animal sounds, having students make guesses and claims about communication, and asking the students questions about their guesses and claims. Then, the students conduct
FIGURE 9.3

A Model to Guide Teacher Thinking about Inquiry-Based Science Instruction
The straight lines show the sequence of phases in instruction and the curved lines show cycles that might be repeated during instruction.

GUIDING QUESTION and Focus Questions

REPORT Findings
[publishing]

ENGAGE...
- claims
- hypotheses
- questions

INVESTIGATE
- procedures
- determine RELATIONSHIPS

evaluate EXPLANATION

Prediction


Both first-hand and second-hand investigations. First-hand investigations are direct experiences and experiments, for example, measuring the size of bats' eyes and ears in relation to their bodies (using pictures or videos—not real bats). In second-hand investigations, students consult books, the Internet, interviews with experts, and other resources to find specific information or get new ideas. As part of their investigating, the students begin to identify patterns. The curved line in Figure 9.3 shows that cycles can be repeated. In fact, students might go through several cycles of investigating, identifying patterns, and reporting results before moving on to constructing explanations and making final reports. Another possible cycle is to evaluate explanations before reporting by making and then checking predictions, applying the explanation to new situations.

Inquiry teaching allows students to learn content and process at the same time. In the examples above, students learned about the effects of air pressure, how airplanes fly, how animals communicate, and how structures are related to habitats. In addition, they learned the inquiry process itself—how to solve problems, evaluate solutions, and think critically.

Problem-Based Learning. The goals of problem-based learning are to help students develop flexible knowledge that can be applied in many situations, in contrast to inert knowledge. Inert knowledge is information that is memorized but seldom applied (Cognition and Technology Group at Vanderbilt [CTGV], 1996; Whitehead, 1929). Other goals of problem-based learning are to enhance intrinsic motivation and skills in problem solving, collaboration, and self-directed lifelong learning. In problem-based learning, students are confronted with a problem that launches their inquiry as they collaborate to find solutions. The process of problem-based learning is similar to the GIsML, shown in
Figure 9.3. The students are confronted with a problem scenario; they identify and analyze the problem based on the facts from the scenario; and then they begin to generate hypotheses about solutions. As they suggest hypotheses, they identify missing information—what do they need to know to test their solutions? This launches a phase of self-directed learning and research. Then, students apply their new knowledge, evaluate their problem solutions, recycle to research again if necessary, and finally reflect on the knowledge and skills they have gained (Huaco-Silver, 2004).

In true problem-based learning, the problem is real and the students’ actions matter. In one example, a teacher capitalized on current affairs to encourage student reading, writing, and social studies problem solving:

Cathie’s elementary class learned about the Alaskan oil spill. She brought a newspaper article to class that sequenced in logbook fashion the events of the oil spill in Prince William Sound. To prepare her students to understand the article, she had her students participate in several background-building experiences. First, they used a world map, an encyclopedia, and library books to gather and share relevant information. Next, she simulated an oil spill by coating an object with oil. By then, the class was eager to read the article. (Espe, Worrer, & Holkevich, 1990, p. 45)

After they read and discussed the newspaper article, the teacher asked the class to imagine how the problem might have been prevented. Students had to explain and support their proposed solutions. The next week, the students read another newspaper article about how people in their state were helping with the cleanup efforts in Alaska. The teacher asked if the students wanted to help, and they replied with an enthusiastic “Yes!” The students designed posters and made speeches requesting donations of clean towels to be used to clean the oil-soaked animals in Prince William Sound. The class sent four large bags of towels to Alaska to help in the cleanup. The teacher’s and the students’ reading, writing, research, and speaking were directed toward solving a real-life problem (Espe, Worrer, & Holkevich, 1990). Other authentic problems that might be the focus for student projects are reducing pollution in local rivers, resolving student conflicts in school, raising money for tsunami or hurricane relief, or building a playground for young children. The teacher’s role in problem-based learning is summarized in Table 9.2.

Some problems are not authentic in the sense that they affect the students’ lives, but they are engaging. For example, the Cognition and Technology Group at Vanderbilt

<table>
<thead>
<tr>
<th>TABLE 9.2</th>
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<table>
<thead>
<tr>
<th>Phase</th>
<th>Teacher Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 Orient students to the problem</td>
<td>Teacher goes over the objectives of the lesson, describes important logistical requirements, and motivates students to engage in self-selected problem-solving activity.</td>
</tr>
<tr>
<td>Phase 2 Organize students for study</td>
<td>Teacher helps students define and organize study tasks related to the problem.</td>
</tr>
<tr>
<td>Phase 3 Assist independent and group investigation</td>
<td>Teacher encourages students to gather appropriate information, conduct experiments, and search for explanations and solutions.</td>
</tr>
<tr>
<td>Phase 4 Develop and present artifacts and exhibits</td>
<td>Teacher assists students in planning and preparing appropriate artifacts such as reports, videos, and models and helps them share their work with others.</td>
</tr>
<tr>
<td>Phase 5 Analyze and evaluate the problem-solving process</td>
<td>Teacher helps students to reflect on their investigations and the processes they used.</td>
</tr>
</tbody>
</table>

University (1990, 1993) has developed a videodisc-based learning environment that focuses on mathematics instruction for the 5th and 6th grades. The series, called The Adventures of Jasper Woodbury, presents students with complex situations that require problem finding, subgoal setting, and the application of mathematics, science, history, and literature concepts to solve problems. Even though the situations are complex and lifelike, the problems can be solved using data embedded in the stories presented. Often the adventures have real-life follow-up problems that build on the knowledge developed. For example, after designing a playground for a hypothetical group of children in one Jasper adventure, students can tackle building a real playhouse for a preschool class.

The Vanderbilt group calls its problem-solving approach anchored instruction. The anchor is the rich, interesting situation. This anchor provides a focus—a reason for setting goals, planning, and using mathematical tools to solve problems. The intended outcome is to develop knowledge that is useful and flexible, not inert. Project-based science is another approach similar to problem-based learning. Table 9.3 compares these three approaches to learning that are situated in problem-solving experiences.

**Research on Inquiry and Problem-Based Learning.** Inquiry methods are similar to discovery learning and share some of the same problems, so inquiry must be carefully planned and organized, especially for less-prepared students who may lack the background knowledge and problem-solving skills needed to benefit. Some research has shown that discovery methods are ineffective and even detrimental for lower-ability students (Corno & Snow, 1986; Mayer, 2004). When Ted Breckerman (1983) analyzed the results of 57 comparisons of activity-based learning and more traditional approaches for teaching science, he concluded that activity-based methods were superior to content-based traditional approaches in terms of students' understanding of the scientific method and creativity, but about the same for learning science content.

**TABLE 9.3**

<table>
<thead>
<tr>
<th><strong>Problem</strong></th>
<th><strong>PBL</strong></th>
<th><strong>Anchored instruction</strong></th>
<th><strong>Project-based science</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Role of problem</strong></td>
<td>Realistic ill-structured problem</td>
<td>Video-based narrative ending with complex problem</td>
<td>Focus for scientific inquiry process leading to artifact production</td>
</tr>
<tr>
<td><strong>Role of teacher</strong></td>
<td>Focus for learning information and reasoning strategies</td>
<td>Provide shared experience so students can understand how knowledge can support problem solving</td>
<td>Driving question</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Identify facts, generate ideas and learning issues, SDL, revisit, and reflect</td>
<td>Video supports problem comprehension</td>
<td>Focus for scientific inquiry process leading to artifact production</td>
</tr>
<tr>
<td><strong>Collaboration</strong></td>
<td>Facilitate learning process and model reasoning</td>
<td>Engage students' prior knowledge, model problem-solving strategies, provide content instruction when needed by students</td>
<td>Prediction, observation, explanation cycles</td>
</tr>
<tr>
<td><strong>Tools</strong></td>
<td>Negotiation of ideas</td>
<td>Negotiation of ideas and strategies within small groups and whole class</td>
<td>Introduce relevant content before and during inquiry</td>
</tr>
<tr>
<td></td>
<td>Individual students bring new knowledge to group for application to problem</td>
<td>Guides inquiry process</td>
<td>Guides inquiry process</td>
</tr>
<tr>
<td></td>
<td>Student-identified learning resources</td>
<td>Negotiation of ideas with peers and local community members</td>
<td>Negotiation of ideas with peers and local community members</td>
</tr>
<tr>
<td></td>
<td>Structured whiteboard</td>
<td>Computer-based tools that support planning, data collection and analysis, modeling, and information-gathering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Video controller</td>
<td>Problem-specific tools (e.g., maps, compasses)</td>
<td></td>
</tr>
</tbody>
</table>

In 1993, a similar comparison was made of problem-based instruction in medical school. Students learning through problem-based instruction were better at clinical skills such as problem formation and reasoning, but they were worse in their basic knowledge of science and felt less prepared in science (Albanese & Mitchell, 1993). In another study, MBA students who learned a concept using problem-based methods were better at explaining the concept than students who had learned the concept from lecture and discussion (Capon & Kuhn, 2004). Students who are better at self-regulation may benefit more from problem-based methods (Evensen, Salisbury-Clemons, & Glenn, 2001), but using problem-based methods over time can help students to develop self-directed learning skills.

In terms of the goals of problem-based learning listed earlier, Cindy Hmelo-Silver (2004) reviewed the research and found good evidence that problem-based learning supports the construction of flexible knowledge and the development of problem-solving and self-directed learning skills, but there is less evidence that participating in problem-based learning is intrinsically motivating or that it teaches students to collaborate. In addition, most of the research has been done in higher education, especially medical schools.

The best approach in elementary and secondary schools may be a balance of content-focused and inquiry or problem-based methods (Arends, 2004). For example, Eva Toth, David Klahr, and Zhe Chen (2000) tested a balanced approach for teaching 4th graders how to use the controlled variable strategy in science to design good experiments. The method had three phases: (1) in small groups, students conducted exploratory experiments to identify variables that made a ball roll farther down a ramp; (2) the teacher led a discussion, explained the controlled variable strategy, and modeled good thinking about experiment design; and (3) the students designed and conducted application experiments to isolate which variables caused the ball to roll farther. The combination of inquiry, discussion, explanation, and modeling was successful in helping the students understand the concepts.

Another constructivist approach that relies heavily on interaction is instructional conversations.

**Dialogue and Instructional Conversations**

One implication of Vygotsky's theory of cognitive development is that important learning and understanding require interaction and conversation. Students need to grapple with problems in their zone of proximal development, and they need the scaffolding provided by interaction with a teacher or other students. Here is a good definition of scaffolding that emphasizes the knowledge that both teacher and student bring—both are experts on something: "Scaffolding is a powerful conception of teaching and learning in which teachers and students create meaningful connections between teachers' cultural knowledge and the everyday experience and knowledge of the student" (McCaslin & Hickey, 2001, p. 137). Look back at the beach conversation between Ben and his father at the beginning of the previous section. Notice how the father used the abalone sandwich and the necklace—connections to Ben's experience and knowledge—to scaffold Ben's understanding.

**Instructional conversations** are instructional because they are designed to promote learning, but they are conversations, not lectures or traditional discussions. Here is a segment of conversation from a literature group in a bilingual 3rd-grade classroom (Moll & Whitmore, 1993). The conversation shows how the participants mediate each other's learning through dialogue about the shared experience.

**T:** *Sylvester and the Magic Pebble*. What did you think about this story?
**Rita:** I think they cared a lot for him.
**T:** What do you mean? You mean his parents?
**Rita:** Yes.
**T:** What made you think that when you read the story?
**Rita:** Because they really worried about him.
**T:** Who else wants to share something? I'd like to hear everybody's ideas. Then we can decide what we want to talk about. Sarah?

**Connect and Extend to PRAXIS II**

**Dialogue and Conversation (II, A2)**

Engaging discussions and instructional conversations are often students' most memorable and valuable learning experiences. Understand the principles involved in utilizing conversations and dialogue as an instructional strategy.

**Instructional conversation** Situatin in which students learn through interactions with teachers and/or other students.
Sarah: I think he got the idea of it when he was little, or maybe one of his friends got lost or something.
T: What do you mean, he got the idea?
Sarah: He got the idea for his parents to think that Sylvester got lost.
T: You’re talking about where William Steig might have gotten his ideas.
Sarah: Yes.
T: That maybe something like this happened to him or someone he knew. A lot of times authors get their ideas from real life things, don’t they? Jon, what did you think about this story?
Jon: It was like a moral story. It’s like you can’t wish for everything. But, in a sense, everything happened to him when he was panicking.
T: When did you think he panicked?
Jon: Well, when he saw the lion, he started to panic.
Richard: And he turned himself into a rock.
Jon: Yeah. He said, “I wish I were a rock.”
T: Right. And it happened, didn’t it?
Richard: It was stupid of him.
T: So maybe he wasn’t thinking far enough ahead? What would you have wished instead of a rock? (pp. 24–25)

The conversation continues as the students contribute different levels of interpretation of the story. The teacher notes these interpretations in her summary: “Look at all the different kinds of things you had to say. Rita talked about the characters in the story and what they must be feeling. Sarah took the author’s point of view. And you saw it as a particular kind of story, Jon, a moral story.”

In instructional conversations, the teacher’s goal is to keep everyone cognitively engaged in a substantive discussion. In the above conversation, the teacher takes almost every other turn. As the students become more familiar with this learning approach, we would expect them to talk more among themselves with less teacher talk. These conversations do not have to be long. Even taking up lunch money can be an opportunity for an instructional conversation:

During the first few minutes of the day, Ms. White asked how many children wanted hot lunches that day. Eighteen children raised their hands. Six children were going to eat cold lunches. Ms. White asked, “How many children are going to eat lunch here today?”

By starting with 18 and counting on, several children got to the answer of 24. One child got out counters and counted out a set of 18 and another set of 6. He then counted all of them and said “24.”

Ms. White then asked, “How many more children are eating hot lunch than are eating cold lunch?”

Several children counted back from 18 to 12. The child with the blocks matched 18 blocks with 6 blocks and counted the blocks left over.

Ms. White asked the children who volunteered to tell the rest of the class how they got the answer. Ms. White continued asking for different solutions until no one could think of a new way to solve the problem. (Peterson, Fennema, & Carpenter, 1989, p. 45)

Ms. White created an environment in which students can make sense of mathematics and use mathematics to make sense of the world. To accomplish these goals, teaching begins with the student’s current understanding. Teachers can capitalize on the natural use of counting strategies to see how many different ways students can solve a problem. The emphasis is on mathematical thinking, not on math “facts” or on learning the one best (teacher’s) way to solve the problem. The teacher is a guide, helping students construct their own understandings through dialogue (Putnam & Borko, 1997).

Table 9.4 summarizes the elements of productive instructional conversations.

**Cognitive Apprenticeships**

Over the centuries, apprenticeships have proved to be an effective form of education. By working alongside a master and perhaps other apprentices, young people have learned
TABLE 9.4

Elements of the Instructional Conversation

Good instructional conversations must have elements of both instruction and conversation.

**Instruction**

1. **Thematic focus.** Teacher selects a theme on which to focus the discussion and has a general plan for how the theme will unfold, including how to "chunk" the text to permit optimal exploration of the theme.

2. **Activation of background knowledge.** Teacher either "hooks into" or provides students with pertinent background knowledge necessary for understanding a text, weaving the information into the discussion.

3. **Direct teaching.** When necessary, teacher provides direct teaching of a skill or concept.

4. **Promotion of more complex language and expression.** Teacher elicits more extended student contributions by using a variety of elicitation techniques: invitation to expand, questions, restatements, and pauses.

5. **Promotion of bases for statements or positions.** Teacher promotes students' use of text, pictures, and reasoning to support an argument or position, by gently probing: "What makes you think that?" or "Show us where it says ______."

**Conversation**

6. **Fewer "known-answer" questions.** Much of the discussion centers on questions for which there might be more than one correct answer.

7. **Responsiveness to student contributions.** While having an initial plan and maintaining the focus and coherence of the discussion, teacher is also responsive to students' statements and the opportunities they provide.

8. **Connected discourse.** The discussion is characterized by multiple, interactive, connected turns; succeeding utterances build on and extend previous ones.

9. **Challenging, but non-threatening, atmosphere.** Teacher creates a challenging atmosphere that is balanced by a positive affective climate. Teacher is more collaborator than evaluator and students are challenged to negotiate and construct the meaning of the text.

10. **General participation, including self-selected turns.** Teacher does not hold exclusive right to determine who talks; students are encouraged to volunteer or otherwise influence the selection of speaking turns.


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**Connect and Extend**

To Your Teaching/Portfolio

Add Table 9.4, "Elements of the Instructional Conversation" to your Teaching Resources file.

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many skills, trades, and crafts. Knowledgeable guides provide models, demonstrations, and corrections, as well as a personal bond that is motivating. The performances required of the learner are real and important and grow more complex as the learner becomes more competent (Collins, Brown, & Holm, 1991; Collins, Brown, & Newman, 1989; Hung, 1999). With guided participation in real tasks comes participatory appropriation—students appropriate the knowledge, skills, and values involved in doing the tasks (Rogoff, 1995, 1998). In addition, both the newcomers to learning and the old-timers contribute to the community of practice by mastering and remastering skills—and sometimes improving these skills in the process (Lave & Wenger, 1991).

Allan Collins and his colleagues (1989) suggest that knowledge and skills learned in school have become too separated from their use in the world beyond school. To correct this imbalance, some educators recommend that schools adopt many of the features of apprenticeships. But rather than learning to sculpt or dance or build a cabinet, apprenticeships in school would focus on cognitive objectives such as reading comprehension, writing, or mathematical problem solving. There are many cognitive apprenticeship models, but most share six features:

- Students observe an expert (usually the teacher) model the performance.
- Students get external support through coaching or tutoring (including hints, feedback, models, and reminders).
- Students receive conceptual scaffolding, which is then gradually faded as the student becomes more competent and proficient.
- Students continually articulate their knowledge—putting into words their understanding of the processes and content being learned.
- Students reflect on their progress, comparing their problem solving to an expert's performance and to their own earlier performances.
- Students are required to explore new ways to apply what they are learning—ways that they have not practiced at the master's side.

**Cognitive apprenticeship** A relationship in which a less experienced learner acquires knowledge and skills under the guidance of an expert.
Cognitive apprenticeship approaches may use knowledgeable guides or "masters" to provide models, demonstrations, and corrections in learning tasks, as well as a personal bond that is motivating to younger or less experienced "apprentices" as they perform and perfect the tasks.

As students learn, they are challenged to master more complex concepts and skills and to perform them in many different settings (Roth & Bowen, 1995; Shuell, 1996).

How can teaching provide cognitive apprenticeships? Mentoring in teaching is one example. Another is cross-age grouping. In the Key School, an inner-city public elementary school in Indianapolis, Indiana, students of different ages work side-by-side for part of every day on a "pod" designed to have many of the qualities of an apprenticeship. The pods might focus on a craft or a discipline. Examples include gardening, architecture, and "making money." Many levels of expertise are evident in the students of different ages, so students can move at a comfortable pace, but still have the model of a master available. Community volunteers, including many parents, visit to demonstrate a skill that is related to the pod topic.

Another successful example of cognitive apprenticeships, the reciprocal teaching approach for reading comprehension, is discussed in Chapter 13.

A Cognitive Apprenticeship in Learning Mathematics. Schoenfeld's (1989, 1994) teaching of mathematical problem solving is another example of the cognitive apprenticeship instructional model. Schoenfeld found that novice problem solvers began ineffective solution paths and continued on those paths even though they were not leading toward a solution. In comparison, expert problem solvers moved toward solutions using various cognitive processes such as planning, implementing, and verifying, altering their behavior based on judgments of the validity of their solution processes.

To help students become more expert problem solvers, Schoenfeld asks students three important questions: What are you doing? Why are you doing it? and How will success in what you are doing help you find a solution to the problem? These questions help students control the processes they use and build their metacognitive awareness. Here is an example:

Problem sessions begin when I hand out a list of questions. . . . Often one student has an "inspiration." . . . My task is not to say yes or no, or even to evaluate the suggestion. Rather it is to raise the issue for discussion. . . . Typically a number of students respond [that they haven't made sense of the problem]. When we have made sense of the problem, the suggestion [X] simply doesn't make sense. . . . When this happens, I step out of my role as moderator to make the point to the whole class: If you make sure you understand the problem before you jump into a solution, you are less likely to go off on a wild goose chase. (Schoenfeld, 1987, p. 201)

This monitoring of the understanding of a problem and the problem-solving process help students begin to think and act as mathematicians. Throughout this process, Schoenfeld repeats his three questions (What are you doing? Why? How will this help?). Each of these components is essential in helping students to be aware of and to regulate their behaviors.
Apprenticeships in Thinking

Many educational psychologists believe that good thinking can and should be developed in school. But clearly, teaching thinking entails much more than the standard classroom practices of answering “thought” questions at the end of the chapter or participating in teacher-led discussions. What else is needed? One approach has been to focus on the development of thinking skills, either through stand-alone programs that teach skills directly, or through indirect methods that embed development of thinking in the regular curriculum. The advantage of stand-alone thinking skills programs is that students do not need extensive subject matter knowledge to master the skills. Students who have had trouble with the traditional curriculum may achieve success—and perhaps an enhanced sense of self-efficacy—through these programs. The disadvantage is that the general skills often are not used outside the program unless teachers make a concerted effort to show students how to apply the skills in specific subjects (Mayer & Wittrock, 1996; Prawat, 1991).

Developing Thinking in Every Class. Another way to develop students' thinking is to provide cognitive apprenticeships in analysis, problem solving, and reasoning through the regular lessons of the curriculum. David Perkins and his colleagues (Perkins, Jay, & Tishman, 1993) propose that teachers do this by creating a culture of thinking in their classrooms. This means that there is a spirit of inquisitiveness and critical thinking, a respect for reasoning and creativity, and an expectation that students will learn and understand. In such a classroom, education is seen as enculturation, a broad and complex process of acquiring knowledge and understanding consistent with Vygotsky’s theory of mediated learning. Just as our home culture taught us lessons about the use of language, the culture of a classroom can teach lessons about thinking by giving us models of good thinking; providing direct instruction in thinking processes; and encouraging practice of those thinking processes through interactions with others.

Critical Thinking. Critical thinking skills are useful in almost every life situation—even in evaluating the media ads that constantly bombard us. When you see a group of gorgeous people extolling the virtues of a particular brand of orange juice as they frolic in skimpy bathing suits, you must decide if sex appeal is a relevant factor in choosing a fruit drink.

Stand-alone thinking skills programs Programs that teach thinking skills directly without need for extensive subject matter knowledge.

Critical thinking Evaluating conclusions by logically and systematically examining the problem, the evidence, and the solution.
Point/Counterpoint

Should Schools Teach Critical Thinking and Problem Solving?

The question of whether schools should focus on process or content, problem-solving skills or core knowledge, higher-order thinking skills or academic information has been debated for years. Some educators suggest that students must be taught how to think and solve problems, while other educators assert that students cannot learn to “think” in the abstract. They must be thinking about something—some content. Should teachers focus on knowledge or thinking?

POINT Problem solving and higher-order thinking can and should be taught.

An article in the April, 28, 1995, issue of the Chronicle of Higher Education makes this claim:

Critical thinking is at the heart of effective reading, writing, speaking, and listening. It enables us to link together mastery of content with such diverse goals as self-esteem, self-discipline, multicultural education, effective cooperative learning, and problem solving. It enables all instructors and administrators to raise the level of their own teaching and thinking. (p. A-71)

How can students learn to think critically? Some educators recommend teaching thinking skills directly with widely used techniques such as the Productive Thinking Program or CoRT (Cognitive Research Trust). Other researchers argue that learning computer programming languages such as LOGO will improve students’ minds and teach them how to think logically. For example, Papert (1980) believes that when children learn through discovery how to give instructions to computers in LOGO, “powerful intellectual skills are developed in the process” (p. 60). Finally, because expert readers automatically apply certain metacognitive strategies, many educators and psychologists recommend directly teaching novice or poor readers how to apply these strategies. Michael Pressley’s Good Strategy User model and Palincsar and Brown’s (1984) reciprocal teaching approach are successful examples of direct teaching of metacognitive skills. Research on these approaches generally shows improvements in achievement and comprehension for students of all ages who participate (Pressley, Barkowski, & Schneider, 1987; Rosenshine & Meister, 1994).

COUNTERPOINT Thinking and problem-solving skills do not transfer.

According to E. D. Hirsch, a vocal critic of critical thinking programs:

But whether such direct instruction of critical thinking or self-monitoring does in fact improve performance is a subject of debate in the research community. For instance, the research regarding critical thinking is not reassuring. Instruction in critical thinking has been going on in several countries for over a hundred years. Yet researchers found that students from nations as varied as Israel, Germany, Australia, the Philippines, and the United States, including those who have been taught critical thinking continue to fall into logical fallacies. (1996, p. 136)

The CoRT program has been used in over 5,000 classrooms in 10 nations. But Polson and Jeffries (1985) report that “after 10 years of widespread use we have no adequate evidence concerning the effectiveness of the program” (p. 445). In addition, Mayer and Wittrock (1996) note that field studies of problem solving in real situations show that people often fail to apply the mathematical problem-solving approaches they learn in school to actual problems encountered in the grocery store or home.

Even though educators have been more successful in teaching metacognitive skills, critics still caution that there are times when such teaching hinders rather than helps learning. Robert Siegler (1993) suggests that teaching self-monitoring strategies to low-achieving students can interfere with the students’ development of adaptive strategies. Forcing students to use the strategies of experts may put too much burden on working memory as the students struggle to use an unfamiliar strategy and miss the meaning or content of the lesson. For example, rather than teach students strategies for figuring out words from context, it may be helpful for students to focus on learning more vocabulary words.

WHAT DO YOU THINK?

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(remember Pavlovian advertising from Chapter 6). As you can see in the Point/Counterpoint, educators don’t agree about the best way to foster creative thinking in schools.

No matter what approach you use to develop critical thinking, it is important to follow up with additional practice. One lesson is not enough. For example, if your class examined a particular historical document to determine if it reflected bias or propaganda, you should follow up by analyzing other written historical documents, contemporary advertisements, or news stories. Until thinking skills become overlearned and relatively
TABLE 9.5

Examples of Critical Thinking Skills

<table>
<thead>
<tr>
<th>Defining and Clarifying the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify central issues or problems.</td>
</tr>
<tr>
<td>2. Compare similarities and differences.</td>
</tr>
<tr>
<td>3. Determine which information is relevant.</td>
</tr>
<tr>
<td>4. Formulate appropriate questions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Judging Information Related to the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Distinguish among fact, opinion, and reasoned judgment.</td>
</tr>
<tr>
<td>6. Check consistency.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solving Problems/ Drawing Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Identify unstated assumptions.</td>
</tr>
<tr>
<td>8. Recognize stereotypes and clichés.</td>
</tr>
<tr>
<td>9. Recognize bias, emotional factors, propaganda, and semantic slanting.</td>
</tr>
<tr>
<td>10. Recognize different value systems and ideologies.</td>
</tr>
<tr>
<td>11. Recognize the adequacy of data.</td>
</tr>
<tr>
<td>12. Predict probable consequences.</td>
</tr>
</tbody>
</table>

Source: From "California Assesses Critical Thinking," by P. Kneeler, in A. Costa (Ed.), Developing Minds: A Resource Book for Teaching Thinking, p. 277. Copyright © 1986 by the Association for Supervision and Curriculum Development and author. Reprinted with permission of the ASCD. All rights reserved.

automatic, they are not likely to be transferred to new situations. Instead, students will use these skills only to complete the lesson in social studies, not to evaluate the claims made by friends, politicians, toy manufacturers, or diet plans. Table 9.5 provides a representative list of critical thinking skills.

STOP | THINK | WRITE | How many different words can you list that describe aspects of thinking? Try to “think” of at least 20.

The Language of Thinking. My computer’s thesaurus just found over 100 more words when I highlighted “thinking.” The language of thinking consists of natural language terms that refer to mental processes and mental products—“words like think, believe, guess, conjecture, hypothesis, evidence, reasons, estimate, calculate, suspect, doubt, and theorize—to name just a few” (Tishman, Perkins, & Jay, 1995, p. 8). The classroom should be filled with a clear, precise, and rich vocabulary of thinking. Rather than saying, “What do you think about Jamie’s answer?” the teacher might ask questions that expand thinking such as, “What evidence can you give to refute or support Jamie’s answer?” “What assumptions is Jamie making?” “What are some alternative explanations?” Students surrounded by a rich language of thinking are more likely to think deeply about thinking. Students learn more when they engage in talk that is interactive and that analyzes and gives explanations. Talk that just describes is less helpful in learning than talk that explains, gives reasons, identifies parts, makes a case, defends a position, or evaluates evidence (Palincsar, 1998).

An Integrated Constructivist Program: Fostering Communities of Learners

Fostering Communities of Learners (FCL) is "a system of interacting activities that results in a self-consciously active and reflective learning environment" (Brown & Campione, 1996, p. 292). This is an entire instructional program grounded in constructivist learning theories.

It is tempting to reduce the complex processes and understandings of FCL into a simple set of steps or procedures. But the inventors, Ann Brown and Joseph Campione, caution in considering FCL, our emphasis should be on philosophy and principles, not procedures and steps. At the heart of FCL is a three-part process: Students engage in

Connect and Extend to Your Teaching/Portfolio
List all the different words related to thinking that you hear during one of your college classes. You might contrast the “thinking language” in a class that seems to challenge you to think with that of a class that focuses on skills and facts.
independent and group research on one aspect of the class inquiry topic—for example, animal adaptation and survival. The goal is for the entire class to develop a deep understanding of the topic. Because the material is complex, class mastery requires that students become experts on different aspects of the larger topic and share their expertise. The sharing is motivated by a consequential task—a performance that matters. The task may be a traditional test or it may be a public performance, service project, or competition. Thus, the heart of ICL is research, in order to share information, in order to perform a consequential task (Brown, 1997; Brown & Campione, 1996).

This inquiry cycle may not seem that new, but what sets ICL apart, among other things, is having a variety of research-based ways of accomplishing each phase and paying careful attention to teaching students how benefit intellectually and socially from each step. Research can take many forms, such as reading, studying, research seminars, guided writing, consulting with experts face-to-face or electronically, or peer and cross-age tutoring. In order to do research, students are taught and coached in powerful comprehension-monitoring and comprehension-extending strategies such as summarizing and predicting for younger students, and for older students, forming analogies, giving causal explanations, providing evidence, and making sound arguments and predictions. Students are taught explicitly how to share information by asking for and giving help, majoring (developing special interest and expertise in an area), learning from each others’ exhibitions, participating in cooperative groups, and joining in whole-class cross-talk sessions to check the progress of the research groups. Performing consequential tasks includes publishing, designing, creating solutions to real problems, setting up exhibitions, staging performances; and taking tests, quizzes, and authentic assessments that can hardly be distinguished from ongoing teaching.

Thoughtful reflection and deep disciplinary content surround and support the research, share, perform cycle. FCL teachers create a culture of thinking—self-conscious reflection about important and complex disciplinary units. As Brown and Campione (1996) point out, we “cannot expect students to invest intellectual curiosity and disciplined inquiry on trivia” (p. 306). In FCL classrooms, the teachers’ main ploy is to “trap students into thinking deeply” about complex content (Brown & Campione, 1996, p. 302).

Dilemmas of Constructivist Practice

Years ago, Larry Cremin (1961) observed that progressive, innovative pedagogies require infinitely skilled teachers. Today, this might be said about constructivist teaching. We have already seen that there are many varieties of constructivism and many practices that flow from these different conceptions. We also know that all teaching today happens in a context of high-stakes testing and accountability. In these situations, constructivist teachers face many challenges. Mark Windschitl (2002) identified four teacher dilemmas of constructivism in practice, summarized in Table 9.6. The first is conceptual: How do I make sense of cognitive versus social conceptions of constructivism and reconcile these different perspectives with my practice? The second dilemma is pedagogical: How do I teach in truly constructivist ways that both honor my students’ attempts to think for themselves, but still instill that they learn the academic material? Third are cultural dilemmas: What activities, cultural knowledge, and ways of talking will build a community in a diverse classroom? Finally, there are political dilemmas: How can I teach for deep understanding and critical thinking, but still satisfy the accountability demands of parents and the requirements of No Child Left Behind?

Diversity and Convergences in Theories of Learning

WHAT WOULD YOU SAY?

As part of your interview for a job in a large district, the superintendent asks, “What is your conception of learning? How do students learn?”

Chapter 9: Social Cognitive and Constructivist Views of Learning

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TABLE 9.6

Teachers’ Dilemmas of Constructivism in Practice

Teachers face conceptual, pedagogical, cultural, and political dilemmas as they implement constructivist practices. Here are explanations of these dilemmas and some representative questions that teachers face as they confront them.

Teachers’ Dilemma category

I. **Conceptual dilemmas:** Grasping the underpinnings of cognitive and social constructivism; reconciling current beliefs about pedagogy with the beliefs necessary to support a constructivist learning environment.

II. **Pedagogical dilemmas:** Honoring students’ attempts to think for themselves while remaining faithful to accepted disciplinary ideas; developing deeper knowledge of subject matter; mastering the art of facilitation; managing new kinds of discourse and collaborative work in the classroom.

III. **Cultural dilemmas:** Becoming conscious of the culture of your classroom; questioning assumptions about what kinds of activities should be valued; taking advantage of experiences, discourse patterns, and local knowledge of students with varied cultural backgrounds.

IV. **Political dilemmas:** Confronting issues of accountability with various stakeholders in the school community; negotiating with key others the authority and support to teach for understanding.

Representative Questions of Concern

- Which version of constructivism is suitable as a basis for my teaching?
- Is my classroom supposed to be a collection of individuals working toward conceptual change or a community of learners whose development is measured by participation in authentic disciplinary practices?
- If certain ideas are considered correct by experts, should students internalize those ideas instead of constructing their own?
- Do I base my teaching on students’ existing ideas rather than on learning objectives?
- What skills and strategies are necessary for me to become a facilitator?
- How do I manage a classroom where students are talking to one another rather than to me?
- Should I place limits on students’ construction of their own ideas?
- What types of assessments will capture the learning I want to foster?
- How can we contradict traditional, efficient classroom routines and generate new agreements with students about what is valued and rewarded?
- How do my own past images of what is proper and possible in a classroom prevent me from seeing the potential for a different kind of learning environment?
- How can I accommodate the worldviews of students from diverse backgrounds while at the same time transforming my own classroom culture?
- Can I trust students to accept responsibility for their own learning?
- How can I gain the support of administrators and parents for teaching in such a radically different and unfamiliar way?
- Should I make use of approved curricula that are not sensitive enough to my students’ needs, or should I create my own?
- How can diverse problem-based experiences help students meet specific state and local standards?
- Will constructivist approaches adequately prepare my students for high-stakes testing for college admissions?


Diversity

The power and value of diversity is part of the theoretical frameworks of social cognitive and constructivist theories of learning. Social cognitive theory describes the unique reciprocal interactions among personal, environmental, and behavioral factors that shape the individual's learning and motivation. Culture, social context, personal history, ethnicity, language, and racial identity—to name only a few factors—all shape personal characteristics such as knowledge and beliefs, environmental features such as resources and challenges, and behavioral actions and choices. And a major tenet of constructivist theories is that knowing is socially constructed—shaped by the culture and the families in which the knowers learn, develop, and create their identities.

One of the political dilemmas for teachers indicated in Table 9.6 is that families often question and criticize educational reforms. Many teachers using nontraditional approaches to learning find that they must explain these approaches to students’ families.
**Guidelines:** Communicating about Innovations

Be confident and honest.

**EXAMPLES:**

1. Write out your rationale for the methods you are using—consider likely objections and craft your responses.
2. Admit mistakes or oversights—explain what you have learned from them.

Treat parents as equal partners.

**EXAMPLES:**

1. Listen carefully to parents’ objections, take notes, and follow up on requests or suggestions—remember, you both want the best for the child.
2. Give parents the telephone number of an administrator who will answer their questions about a new program or initiative.
3. Invite families to visit your room or assist in the project in some way.

Communicate effectively.

**EXAMPLES:**

1. Use plain language and avoid jargon. If you must use a technical term, define it in accessible ways. Use your best teaching skills to educate parents about the new approach.
2. Encourage local newspapers or television stations to feature stories about the “great learning” going on in your classroom or school.

3. Create a lending library of articles and references about the new strategies.

**EXAMPLES:**

- Have examples of projects and assignments available for parents when they visit your class.

4. Encourage parents to try math activities. If they have trouble, show them how your students (and their child) are successful with the activities and highlight the strategies the students have learned.

5. Keep a library of students’ favorite activities to demonstrate for parents.

**EXAMPLES:**

- Once a month, send families, via their children, descriptions and examples of the math, science, or language skills to be learned in the upcoming unit. Include activities children can do with their parents.
- Make the family project count, for example, as a homework grade.

Source: From “Addressing Parents’ Concerns over Curriculum Reform,” by M. Moyer, M. Delgardelle, and J. Middleton. Educational Leadership, 55(7). Copyright © 1998 by the American Association for Supervision and Curriculum Development. Reprinted with permission from ASCD. All rights reserved. The Association for Supervision and Curriculum Development is a worldwide community of educators advocating sound policies and sharing best practices to achieve the success of each learner. To learn more, visit ASCD at www.ascd.org.

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**Connect and Extend to Your Teaching/Portfolio**

Can different formats, such as lecture or seashell, be used in the service of different models, such as direct instruction or constructivist approaches?

The Guidelines give ideas for communicating with parents about innovative constructivist teaching and learning.

For the past four chapters, we have examined different aspects of learning. We considered behavioral, information processing, social cognitive, constructivist, and situated learning explanations of what people learn and how they learn it. Table 9.7 presents a summary of several of these perspectives on learning.

**Convergences**

Rather than debating the merits of each approach, consider their contributions to understanding learning and improving teaching. Don’t feel that you must choose the “best” approach—there is no such thing. Chemists, biologists, and nutritionists rely on different theories to explain and improve health. Different views of learning can be used together to create productive learning environments for the diverse students you will teach. Behavioral theory helps us understand the role of cues in setting the stage for behaviors and the role of consequences and practice in encouraging or discouraging behaviors. But much of humans’ lives and learning is more than behaviors. Language and higher-order thinking require complex information processing and memory—something the cognitive
models of the thinker-as-computer have helped us understand. And what about the person as a creator and constructor of knowledge, not just a processor of information? Here, constructivist perspectives have much to offer.

I like to think of the three main learning theories in Table 9.7 as three pillars for teaching. Students must first understand and make sense of the material (constructivist); then they must remember what they have understood (cognitive—information processing); and then they must practice and apply (behavioral) their new skills and understanding to make them more fluid and automatic—a permanent part of their repertoire. Failure to attend to any part of the process means lower-quality learning.

**TABLE 9.7**

<table>
<thead>
<tr>
<th>Four Views of Learning</th>
<th>Cognitive</th>
<th>Psychological/Individual</th>
<th>Social/Situated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td>Behavioral</td>
<td>Information Processing</td>
<td>Psycholocial/Individual</td>
</tr>
<tr>
<td>Skinner</td>
<td>Fixed body of knowledge to acquire</td>
<td>J. Anderson</td>
<td>Piaget</td>
</tr>
<tr>
<td>Fixed body of knowledge to acquire</td>
<td>Stimulated from outside</td>
<td>Prior knowledge influences how information is processed</td>
<td>Changing body of knowledge, individually constructed in social world</td>
</tr>
<tr>
<td>Stimulated from outside</td>
<td>Prior knowledge influences how information is processed</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>Acquisition of facts, skills, concepts</td>
<td>Acquisition of facts, skills, concepts, and strategies</td>
<td>Active construction, restructuring prior knowledge</td>
</tr>
<tr>
<td>Occurs through drill, guided practice</td>
<td>Occurs through the effective application of strategies</td>
<td>Occurs through multiple opportunities and diverse processes to connect to what is already known</td>
<td>Occurs through socially constructed opportunities</td>
</tr>
<tr>
<td><strong>Teaching</strong></td>
<td>Transmission Presentation (Telling)</td>
<td>Transmission</td>
<td>Challenge, guide thinking toward more complete understanding</td>
</tr>
<tr>
<td>Manager, supervisor</td>
<td>Guide students toward more “accurate” and complete knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct wrong answers</td>
<td></td>
<td>Facilitator, guide</td>
<td>Facilitator, guide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listen for student’s current conceptions, ideas, thinking</td>
<td>Co-construct different interpretations of knowledge; listen to socially constructed conceptions</td>
</tr>
<tr>
<td><strong>Role of Teacher</strong></td>
<td>Not usually considered</td>
<td>Not necessary but can influence information processing</td>
<td>Not necessary but can stimulate thinking, raise questions</td>
</tr>
<tr>
<td>Passive reception of information</td>
<td>Facilitator, guide</td>
<td>Active construction (within mind)</td>
<td>Active co-construction with others and self</td>
</tr>
<tr>
<td>Active listener, direction-follower</td>
<td>Active construction (within mind)</td>
<td>Active thinker, explainer, interpreter, questioner</td>
<td>Active thinker, explainer, interpreter, questioner</td>
</tr>
<tr>
<td>Role of Peers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of Student</td>
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</tbody>
</table>

Social Cognitive Theory
(pp. 330–333)

Distinguish between social learning and social cognitive theories. Social learning theory expanded behavioral views of reinforcement and punishment. In behavioral views, reinforcement and punishment directly affect behavior. In social learning theory, seeing another person, a model, reinforced or punished can have similar effects on the observer’s behavior. Social cognitive theory expands social learning theory to include cognitive factors such as beliefs, expectations, and perceptions of self.

What is reciprocal determinism? Personal factors (beliefs, expectations, attitudes, and knowledge), the physical and social environment (resources, consequences of actions, other people, and physical settings), and behavior (individual actions, choices, and verbal statements) all influence and are influenced by each other.

What is self-efficacy, and how is it different from other self-schemas? Self-efficacy is distinct from other self-schemas in that it involves judgments of capabilities specific to a particular task. Self-concept is a more global construct that contains many perceptions about the self, including self-efficacy. Compared to self-esteem, self-efficacy is concerned with judgments of personal capabilities; self-esteem is concerned with judgments of self-worth.

What are the sources of self-efficacy? Four sources are mastery experiences (direct experiences), level of arousal as you face the task, vicarious experiences (accomplishments are modeled by someone else), and social persuasion (a “pep talk” or specific performance feedback).

Applying Social Cognitive Theory (pp. 333–343)

How does efficacy affect motivation? Greater efficacy leads to greater effort, persistence in the face of setbacks, higher goals, and finding new strategies when old ones fail. If sense of efficacy is low, however, people may avoid a task altogether or give up easily when problems arise.

What is teacher’s sense of efficacy? One of the few personal characteristics of teachers related to student achievement is a teacher’s efficacy belief that he or she can reach even difficult students to help them learn. Teachers with a high sense of efficacy work harder, persist longer, and are less likely to experience burn-out. Teachers’ sense of efficacy is higher in schools where the other teachers and administrators have high expectations for students and where teachers receive help from their principals in solving instructional and management problems. Efficacy grows from real success with students, so any experience or training that helps you succeed in the day-to-day tasks of teaching will give you a foundation for developing a sense of efficacy in your career.

What factors are involved in self-regulated learning? One important goal of teaching is to prepare students for lifelong learning. To reach this goal, students must be self-regulated learners; that is, they must have a combination of the knowledge, motivation to learn, and volition that provides the skill and will to learn independently and effectively. Knowledge includes an understanding of self, subject, task, learning strategy, and contexts for application. Motivation to learn provides the commitment, and volition is the follow-through that combats distraction and protects persistence.

What is the self-regulated learning cycle? There are several models of self-regulated learning. Winnie and Hadwin describe a 4-phase model: analyzing the task, setting goals and designing plans, enacting tactics to accomplish the task, and regulating learning. Zimmerman notes three similar phases: forethought (which includes setting goals, making plans, self-efficacy, and motivation); performance (which involves self-control and self-monitoring); and reflection (which includes self-evaluation and adaptations, leading to the forethought/planning phase again).

How can teachers support the development of self-efficacy and self-regulated learning? Teachers should involve students in complex meaningful tasks that extend over long periods of time; provide them control over their learning processes and products—they need to make choices. Involve students in setting criteria for evaluating their learning processes and products, then give them opportunities to make judgments about their progress using those standards. Finally, encourage students work collaboratively with and seek feedback from peers.

Teachers’ sense of efficacy A teacher’s belief that he or she can reach even the most difficult students and help them learn.
Self-regulation Process of activating and sustaining thoughts, behaviors, and emotions in order to reach goals.

Volition Will power; self-discipline; work styles that protect opportunities to reach goals by applying self-regulated learning.

Self-regulated learning A view of learning as skills and will applied to analyzing learning tasks, setting goals and planning how to do the task, applying skills, and especially making adjustments about how learning is carried out.

Agency The capacity to coordinate learning skills, motivation and emotions to reach your goals.

Radical constructivism Knowledge is assumed to be the individual's construction; it cannot be judged right or wrong.

Appropriate Internalize or take for yourself knowledge and skills developed in interaction with others or with cultural tools.

Second wave constructivism A focus on the social and cultural sources of knowing, as in Vygotsky's theory.

Community of practice Social situation or context in which ideas are judged useful or true.

Situated learning The idea that skills and knowledge are tied to the situation in which they were learned and difficult to apply in new settings.

Complex learning environments Problems and learning situations that mimic the ill-structured nature of real life.

Social negotiation Aspect of learning process that relies on collaboration with others and respect for different perspectives.

Intersubjective attitude A commitment to build shared meaning with others by finding common ground and exchanging interpretations.

Multiple representations of content Considering problems using various analogies, examples, and metaphors.

Spiral curriculum Bruner's design for teaching that introduces the fundamental structure of all subjects early in the school years, then revisits the subjects in more and more complex forms over time.

Cognitive and Social Constructivism

(pp. 343–360)

Describe two kinds of constructivism. And distinguish these from constructionism. Psychological constructivists such as Piaget are concerned with how individuals make sense of their world, based on individual knowledge, beliefs, self-concept, or identity—also called first wave constructivism. Social constructivists such as Vygotsky believe that social interaction, cultural tools, and activity shape individual development and learning—also called second wave constructivism. By participating in a broad range of activities with others, learners appropriate the outcomes produced by working together; they acquire new strategies and knowledge of their world. Finally, constructionists are interested in how public knowledge in academic disciplines is constructed as well as how everyday beliefs about the world are communicated to new members of a sociocultural group.

In what ways do constructivist views differ about knowledge sources, accuracy, and generality? Constructivists debate whether knowledge is constructed by mapping external reality, by adapting and changing internal understandings, or by an interaction of external forces and internal understandings. Most psychologists posit a role for both internal and external factors, but differ in how much they emphasize one or the other. Also, there is discussion about whether knowledge can be constructed in one situation and applied to another or whether knowledge is situated, that is, specific and tied to the context in which it was learned.

What are some common elements in most constructivist views of learning? Even though there is no single constructivist theory, many constructivist approaches recommend complex, challenging learning environments and authentic tasks; social negotiation and co-construction; multiple representations of content; understanding that knowledge is constructed; and student ownership of learning.

Constructivism View that emphasizes the active role of the learner in building understanding and making sense of information.

First wave constructivism A focus on the individual and psychological sources of knowing, as in Piaget's theory.

Applying Constructivist Perspectives

(pp. 350–362)

Distinguish between inquiry methods and problem-based learning. The inquiry strategy begins when the teacher presents a puzzling event, question, or problem. The students ask questions (only yes-no questions in some kinds of inquiry) and then formulate hypotheses to explain the event or solve the problem; collect data to test the hypotheses about casual relationships; form conclusions and generalizations; and reflect on the original problem and the thinking processes needed to solve it. Problem-based learning may follow a similar path, but the learning begins with an authentic problem—one that matters to the students. The goal is to learn math or science or history or some other important subject while seeking a real solution to a real problem.

What are instructional conversations? Instructional conversations are instructional because they are designed to promote learning, but they are conversations, not lectures or traditional discussions. They are responsive to students' contributions, challenging but not threatening, connected, and interactive—involving all the students. The teacher's goal is to keep everyone cognitively engaged in a substantive discussion.

Describe six features that most cognitive apprenticeship approaches share. Students observe an expert (usually the teacher) model the performance; get external support through coaching or tutoring; and receive conceptual scaffolding,
which is then gradually faded as the student becomes more competent and proficient. Students continually articulate their knowledge—putting into words their understanding of the processes and content being learned. They reflect on their progress, comparing their problem solving to an expert’s performance and to their own earlier performances. Finally, students explore new ways to apply what they are learning—ways that they have not practiced at the master’s side.

**What is meant by thinking as enculturation?** Enculturation is a broad and complex process of acquiring knowledge and understanding consistent with Vygotsky’s theory of mediated learning. Just as our home culture taught us lessons about the use of language, the culture of a classroom can teach lessons about thinking by giving us models of good thinking; providing direct instruction in thinking processes; and encouraging practice of those thinking processes through interactions with others.

**What is critical thinking?** Critical thinking skills include defining and clarifying the problem, making judgments about the consistency and adequacy of the information related to a problem, and drawing conclusions. No matter what approach you use to develop critical thinking, it is important to follow up activities with additional practice. One lesson is not enough.

**What is FCL?** Fostering Communities of Learners is an approach to organizing classrooms and schools. The heart of FCL is research, in order to share information, in order to perform a consequential task that involves deep disciplinary content. Students engage in independent and group research so the entire class can develop an understanding of the topic. Because the material is complex, class mastery requires that students become experts on different aspects of the larger topic and share their expertise. The sharing is motivated by a consequential task—a performance that matters.

- Inquiry learning: Approach in which the teacher presents a puzzling situation and students solve the problem by gathering data and testing their conclusions.
- Problem-based learning: Methods that provide students with realistic problems that don’t necessarily have “right” answers.
- Anchored instruction: A type of problem-based learning that uses a complex interesting situation as an anchor for learning.
- Instructional conversation: Situation in which students learn through interactions with teachers and/or other students.
- Cognitive apprenticeship: A relationship in which a less experienced learner acquires knowledge and skills under the guidance of an expert.
- Stand-alone thinking skills programs: Programs that teach thinking skills directly without need for extensive subject matter knowledge.
- Critical thinking: Evaluating conclusions by logically and systematically examining the problem, the evidence, and the solution.
- Fostering communities of learners (FCL): A system of interacting activities that results in a self-consciously active and reflective learning environment and uses a research, share, perform learning cycle.

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Teachers’ Casebook: Connections to PRAXIS II™

One influential idea from the constructivist perspective on learning is that visiting materials in different contexts for different purposes can enhance the acquisition of knowledge. In a sense, the teacher and students “crisscross” a learning landscape. This chapter’s Teachers’ Casebook is a landscape especially well suited for several visits. Thoughtful learning activities about such topics as motivation, learning environments, evaluation, and instructional strategies could well be explored through the instructional challenges here.

For a first excursion through this landscape, let’s examine student-centered models of instruction, one of the major topics of this chapter. A problem you seem to face in this scenario is a mismatch between the students and the curriculum that exists for them. Most of the students appear unmotivated. Perhaps they see your activities as unconnected to their lives or they feel that they have no responsibility for their own learning. Knowledge of student-centered models of instruction can help you address those concerns and draw your students into active, meaningful learning in your classroom.

What Would They Do?

Here is how some practicing teachers responded to the awful “book reviews.”

Mark H. Smith  Teacher, Grades Nine–Twelve, Medford High School, Medford, Massachusetts

Experience is the best teacher. In an ideal world you can plan your course with what you think would be great material and be ready with a curriculum to meet the level you expect. But reality sets in when you see the true level of the class. High standards and expectations are great goals but they must be reasonable for the students in your class. The education profession is one that needs constant flexibility and adjustment to situations. Students learn in different ways and teachers who can adapt to classes and curricula have a better chance of succeeding.

Because this class has many different levels it will be important to find some common ground that will interest them as well as get them involved in learning. It will probably be a good idea to do different activities and even let the three top students help teach some of the others. It will not be easy to get everybody on the same page and you will probably have to spend lots of time planning, but with patience and effort you can find the level that fits and get the students to respond.

Thomas W. Newkirk  Eighth Grade Teacher, Hamilton Heights Middle School, Arcadia, Indiana

It would be wonderful from the outset to have a class enthralled with world literature, but you are more likely to have a class frustrated with the prospect of reading another “lame” book. Therefore, it is important to find books with themes relevant to your students. Fortunately, on the reading list there are already some selections related to recent films, and probably there are some selections related to music, television, or even commercials. The more connections I can make between the literature and my students’ lives, the more likely I am to motivate them.

Jeff D. Horton  Seventh–Tenth Grade Teacher, Colton School, Colton, Washington

One problem may be the materials that the teacher planned to use. I do believe that students need to be introduced to the “classics” in literature. However, teachers are self-motivated to read and study these writings. We must remember that most students do not feel the same way. The teacher in this scenario must present the “classics” in a way that will hold the students’ interest. Instead of reading a whole book, pick out parts that reflect the writing style or message of the author. Then present other parts of the book using other teaching tools. There are movies available that are presented in a more current style that will appeal to students. Whatever the teaching tool used, there must always be a learning activity connected to it.

While three students in the class demonstrate a sophisticated understanding of literature, every student in the class can bring a fresh insight into a discussion and be recognized for his or her contribution. In addition to class discussion, individual and group projects can be designed to encourage students to respond to the material. Considering the diversity of the class, I would evaluate student achievement with grading contracts that challenge students performing at different levels.

Michael J. Ellis  Tenth and Eleventh Grade English Teacher, Quincy High School, Quincy, Massachusetts

It seems the purpose behind the curriculum for this class is to expose the students to a wide array of great literature. That is a noble goal. In teaching, however, nobility must frequently give way to practicality. A teacher’s first duty is to guide his students in the acquisition of necessary skills. Sometimes having them read Dickens isn’t the best way to do that. The curriculum worked up over the summer will probably work well with the three standouts in the class. I’d try splintering them off from the rest. This can be a logistical nightmare and it effectively doubles your prep time for the class, but it’s the best way to be sure that the students of a particular ability level don’t stagnate while you cater to another group.

With the rest of the class, it’s time to shift on the fly and ditch the original reading list. Emphasizing longer novels in a class dominated by poor readers is nothing less than a suicide attempt spread over 40 weeks. If you rely instead on shorter selections and young adult fiction titles with catchy plot lines, then you’ve at least given yourself a fighting chance at a class that actually finishes the books. It’s also never a bad idea to throw video material into the mix.

What Would They Do?