A crank is a man with a new idea—until it catches on.

—MARK TWAIN

WHY PSYCHOLOGY?
Whether you have been involved in information literacy instruction (ILI) for 20 years or more or have never taught an ILI session in your life, you are more knowledgeable than you might think regarding the psychology of learning. How can this be? It is because life is full of learning experiences. Whether you are working toward earning a degree, becoming skilled at a craft, or improving your athletic ability, you are experiencing learning from the learners’ perspective. And every time you help a colleague, friend, or family member try to improve his or her professional or recreational skills, you are acting as a teacher. As both a learner and a teacher, you know very well when teaching is effective and when it is not. What you do not know is the “why” that differentiates a successful learning experience from a failed one. That is where the psychology of learning enters the picture. Knowing the theory behind the practice of teaching will encourage us to improve our current material and help us to develop new and effective instructional approaches that incorporate sound educational psychology principles. A basic grounding in psychological learning theory will allow us to create learning environments that enable all of our learners to get the most out of their instructional experiences.

The most effective information literacy (IL) instructors are those who are familiar with a variety of learning theories and the teaching techniques that are based on those theories. Effective instructors remain flexible and are willing to mix and match various techniques as needed. The knowledgeable, skilled teacher can move easily among techniques, is familiar with a variety of options, and can select the technique or combination of techniques that is most appropriate for each situation. These teachers focus on both the content of what they are trying to get across and the differing needs of their learners. This chapter provides a basic overview of the concepts, terminology, techniques, and prominent figures in the area of psychological learning theory. Chapter 4 will put that theory into practice—showing you how you can use what educational psychologists have discovered about learning in your day-to-day ILI efforts.

PSYCHOLOGY OF LEARNING SCHOOLS: DOING, THINKING, AND FEELING
Massive amounts of books, articles, and research papers have been written over the years about how learning happens. There are probably as many different theories of learning as there are researchers and writers in the field. This quantity of information can be overwhelming and may be less than helpful to the IL instructor who is trying to make sense of often confusing and contradictory material. However, an examination of how these theories have evolved over time leads to a possible conceptual framework for dealing with them. Upon closer scrutiny, learning theories seem to fall into three major categories or schools of thought—doing, thinking, and feeling. If we look at the theories this way, we not only have a way to organize them, but we can see what each category of theories has to contribute to the instructional endeavor (Kaplowitz, 2008).
Although there can be wide variations among the predominant themes within each school, the basic underlying principles remain constant. Keep in mind that no school can be considered entirely right or totally wrong. Each has made major contributions to our understanding of learning, and as a result each offers suggestions about how to improve our teaching. Furthermore, if you consider behavior as a whole, including actions, thoughts, and feelings, you can see how each of the three schools has advanced our thinking about learning. Although staunch supporters of each school consider them independent, you may notice that the schools actually share several beliefs (Glasser, 1992).

As you read the following material, try to keep an open mind and look for ideas that inspire you to try something new. Ideas for applying these theories to your ILI practice are covered in Chapter 4.

DOING—THE BEHAVIORIST MODEL

The oldest of the theories falls into the doing school of thought and is generally referred to as behaviorism. In many ways behaviorism was a product of its time and place in the history of psychology. Psychology in the late 1800s was just beginning to establish itself as an independent and more scientific discipline. The field was moving away from its parent discipline of philosophy and was embracing the scientific method as a means to study and understand behavior (Bransford et al., 1999b; Slavin, 2006). In Origin of the Species, Charles Darwin (1859) postulated a continuum between man and the animal kingdom. This opened up the possibilities of using animals in experiments the results of which could then be generalized to human behavior.

In 1879, Wilhelm Wundt established the first recognized laboratory specializing in the study of psychology in Leipzig, Germany (Haynie, 1994). Researchers studied human behavior using a method called introspection that relied on subjects describing their own personal experiences. Behaviorism as a theoretical school developed in part as a reaction to the subjective nature of these self-reports. It was an attempt to create a more scientific approach for the study of behavior and was greatly influenced by the rise of the scientific method in the late 1800s. Ironically it was Ivan Petrovich Pavlov’s (1927, 1928) work on the physiology of digestion that really marks the beginnings of this school of thought (Amsel, 1989; Burton, Moore, and Magliaro, 2004; Elliott et al., 2000; Slavin, 2006).

Based on Pavlov’s work with the salivation reflex in dogs, the behaviorists developed a theory of learning that relied on the links or associations between stimulus and response. Many theorists and researchers are associated with behaviorism—such as Edward L. Thorndike, Edward Chace Tolman, John Watson, and, probably best known of all, B.F. Skinner (Crutickshank, Jenkins, and Metcalf, 2003; Slavin, 2006). Each contributed to the development of the school and its associated theories. Thorndike (1913) expanded Pavlov’s work on conditioning and introduced such concepts for successful learning as readiness to learn, the value of repeating the behavior to be learned, and the relationship between the behavior and subsequent events. Tolman’s (1932) Purposive Behavior in Animals and Men identified the principle of reinforcement by postulating that activities that are followed by a successful outcome or some other reward are more likely to be repeated than those that were not. John Watson expanded the notion of conditioning to human emotional behavior with his famous (or infamous) Albert and the White Rabbit experiment. In this study, a loud noise was associated with the sight of a small furry animal to create a conditioned emotional response in a young child (Watson and Rayner, 1920). Fortunately for Albert, this negative emotional response was reversed also through conditioning techniques, although the long-term effects of this experiment are unknown. Obviously this type of experiment defies current protection of human subject practice (Grassi an and Kaplowitz, 2005). However, it did show that humans are as subject to conditioning as rats, birds, and monkeys. Clearly the concepts being discussed by the behaviorists were not restricted to animal behavior.

But it was B.F. Skinner, with his over 50 years of research and writing, who did the most not only to expand the knowledge base in this area but to also develop links between his theoretical hypotheses and practical classroom applications. It is through Skinner’s work that the principles of active learning, immediate feedback, programmed instruction, task analysis, allowing learners to move at their own pace, and, of course, the value of reward and reinforcement of desired behaviors have been applied to education (Skinner, 1938, 1968, 1974, 1983). Skinner’s emphases on teaching to individual
differences and allowing learners to progress at their own pace also have had great implications for the study of learning styles, a topic we shall return to later in this chapter.

General Characteristics

- Behaviorists deal with observable behavior.
- Behaviorists view environmental factors in terms of stimuli and resultant behavior in terms of responses.
- Behaviorists attempt to demonstrate that every behavior is environmentally controlled and is based on each behavior being externally rewarded.
- Immediate reinforcement/feedback must follow desired behavior for the behavior to be learned.
- Improvements or steps in the right direction should be reinforced, as should the final completed task, in order to help learners proceed at a faster pace.
- Undesirable behavior should never be reinforced.
- Active participation is crucial to learning.
- Learners should be allowed to move at their own pace.
- Learners should be tested for mastery at each stage of learning and should not be allowed to proceed to the next level until they have mastered preceding ones.

Educational Applications of Behaviorism

The behaviorist believes that people interact with the world through a process of trial and error. Any action or behavior that receives positive reinforcement during this trial and error exchange will be repeated in the future—in other words, that behavior has been learned. Acknowledging that much of human learning goes beyond the simple kind of “pressing a bar to receive food” experiments done with animals, behaviorists developed applications based on animal learning models that they felt could be extrapolated to the human arena (Kaplowitz, 2008; McGregor, 1999; Tennant, 2006).

These applications include the following.

Shaping, Successive Approximations, and Task Analysis

Shaping relies on the behavioral principles of reinforcement and training through successive approximations to reach the desired behavior. The technique starts with describing what you want the learner ultimately to do and breaking down complex skills into component parts—otherwise known as task analysis. Each successive approximation of the desired end product is then reinforced. In the early stages of learning very rough approximations are reinforced. The standard is raised as learning progresses so that more complex levels of behavior are required for reinforcement to occur. The learner gets closer to the intended learning outcome with each successive attempt. Reinforcement is used as a means to move the learner in the right direction toward the final desired behavior. Improvements as well as perfection are reinforced to encourage progress (Elliott et al., 2000; Mager, 1997a; Slavin, 2006).

Mastery Learning

Benjamin Bloom added one more layer to the task analysis idea. Material to be learned is still broken down into small units with clearly specified learning objectives. But mastery of each small unit must be demonstrated before the learner can proceed. Diagnostic progress tests are administered at the end of each learning unit to determine whether each student has mastered the content of that unit. Procedures to assist learners who do not achieve mastery at any level are also developed. A final test is administered after mastery has been exhibited on all of the subunits to ensure that the full task has been learned (Bloom, 1981; Cruickshank, Jenkins,
and Metcalf, 2003; Elliott et al., 2000; Skinner, 1968). Chunking a topic into easily digestible segments that are covered in sequence is a direct application of this shaping idea and as been applied not only in the classroom but in computer-based instruction as well.

**Programmed Instruction**

Programmed instruction is a self-instruction package that presents a topic in a carefully planned sequence. It requires that the learner respond to questions or statements by filling in blanks, selecting from a series of answers, or solving a problem. Programmed instruction packages can be presented either in print or via computer. This technique relies on many of the main principles of behaviorism. Learners proceed at their own pace, are actively involved in the learning process, get immediate feedback on their responses, and receive reinforcement as they succeed with each step of the program. Those who advocate programmed instruction stress that it improves classroom learning by presenting even the most difficult subjects in small steps so that learners can proceed at their own rates. This technique builds on the concepts of task analysis and shaping by successive approximations (Cruickshank, Jenkins, and Metcalf, 2003; Elliott et al., 2000; Slavin, 2006).

**Modeling**

Modeling can be defined as learning through imitation rather than direct instruction. It seems to be based on what psychologists refer to as *vicarious reinforcement*: We observe the pleasure that a behavior gives to the model, and we want that pleasure for ourselves. Advertising success is predicated on this principle. Much of our early learning is based on our parents' modeling of appropriate behaviors. Modeling is also a very useful technique to use when the task to be learned involves some kind of danger or risk. For example, modeling how to drive a car before actually allowing the learner to try is probably a much safer approach than just handing the learner the keys and letting him or her try to learn by trial and error. In teaching by modeling, the instructor demonstrates how to perform the task or skill. The learner observes the behavior and then attempts to imitate the instructor or model. Modeling enables the student to learn complete sequences of behavior in a much shorter time than by successive approximations and shaping (Bandura, 1977a, 1986; Burton, Moore, and Magliaro, 2004; Elliott et al., 2000; Slavin, 2006).

**Behavior Modification**

Behaviorists offer several methods for modifying inappropriate or undesirable classroom behavior. One such approach is the reinforcement of competing behavior. The key to this technique is the successful strengthening of a desirable behavior that will compete with and eventually replace the undesirable one. For example, selectively reinforcing the desired behavior of sitting still and raising one's hand to be called on while ignoring the inappropriate behavior of jumping up and speaking out of turn should decrease the instances of this undesirable behavior. It is important to be consistent when using this technique. Always reinforce the desired behavior and ignore the undesired ones (Cruickshank, Jenkins, and Metcalf, 2003; Elliott et al., 2000; Kazdin, 1994; Slavin, 2006).

**THINKING—THE COGNITIVE MODEL**

The second set of theories deal with thinking. Just as behaviorism was a reaction to the subjective and introspective approach to the study of learning that preceded it, these "thinking" theories were developed as a response to what they viewed as the mechanistic or simplistic view of learning described by the behaviorists. Heavily influenced by Gestalt psychology's studies in perception, early cognitive psychologists were interested in how people perceive, organize, interact with, and respond to elements in their environment by determining how elements, ideas, concepts, and topics relate to one another. They felt that people respond to patterns or whole situations, not to individual stimuli (Kaplowitz, 2008).

Many findings from these early Gestalt psychology perception experiments were difficult to explain in terms of accepted behaviorist principles. For example, Max Wertheimer, an early cognitive psychology researcher, discovered that when two lights are turned off and on at a definite rate, human subjects report the perception of a single light moving back and forth. This report cannot be readily explained in terms of the stimulus–response model (Wertheimer, 1912). Known as the *phi phenomenon*, this behavior implies that when processing the stimulus input humans add something to this incoming
sensory data that results in the perception of movement. Something is happening between the stimulus and the reported result, something that the cognitive psychologists felt needed explanation. In short, we seem to be motivated to impose order on our experiences even if at first glance none seems to exist (Arp, 1993; Bigge and Shermis, 1999; Dembo, 1988b; Driscoll, 1994; Elliott et al., 2000; Slavin, 2006; Svinicki, 1994).

Cognitive psychologists theorized that the behaviorist model of learning was too limited in scope. In their view much of human learning occurs beyond the narrow focus of trial and error, successive approximations, and reinforcement of observable behavior (Winn, 2004). For example, insight, also referred to as the “aha” phenomenon, is a form of learning that takes place without practice. Here the learner solves a problem without practice by thinking about and determining a pattern or relationship between the aspects of the problem to develop the solution.

Wolfgang Köhler's famous experiment illustrates this point (Köhler and Winter, 1925). Monkeys were placed in a room with a bunch of bananas suspended from the ceiling just out of reach. The only other objects in the room were a couple of cardboard boxes. Monkeys in this situation tended to sit quietly for a time, just looking around the room. They then quite suddenly got up and moved the boxes under the bananas and piled them high enough so that the boxes could be used as a means of reaching the bananas. According to the cognitive psychologists, this behavior cannot be explained by a trial and error approach. There were no incorrect and thus unreinforced behaviors and no possibility for reinforcement of successive approximations of the solution to the problem. There was, however, a sudden perception of the relationship between the boxes and the bananas that resulted in the solution to the problem.

So, how do cognitive psychologists explain this behavior? In keeping with their roots in perceptual research, they discuss learning as it relates to patterns. Learners (in this case banana-deprived monkeys) look for order and patterns in their world. If perceived patterns are consistent with their current worldview, these patterns serve to reinforce that worldview. If, however, situations or experiences are at odds with an individual's current ways of perceiving and/or thinking about the world (often referred to as mental models), a tension or ambiguity results. Learners (human and monkeys alike) have a strong desire to reduce this tension. Faced with a disconnect between new experiences and old mental models, learners feel the need to reexamine or reconstruct their worldview in order to incorporate the new information. If successful, a revised worldview is developed, and the information becomes part of the learners' new mental model. In the case of those hungry monkeys, the cardboard boxes' basic function was revised to create a ladder to reach the bananas. Extrapolating this result to human learning, cognitive psychologists theorized that learning occurs when people reconsider input in new and creative ways in order to solve problems presented to them (Driscoll, 1994; Kaplowitz, 2008; Piaget, 1954; Slavin, 2006).

Exactly how mental models come to be reconstructed has been the subject of much research and discussion. Two particular viewpoints have had the most impact on educational psychology. Both deal with the growth and development of thinking, and both offer explanations about how knowledge is acquired and how information is perceived, organized, stored, and retrieved. However, the mechanisms behind those processes differ. One, most notably associated with the works of Jean Piaget and his associates, explains the process in terms of stages of development or maturation. The alternative explanation, known as constructivism, concentrates on the idea that learners actively build, create, or construct new mental models as a result of their interactions and experiences.

Both have their roots in the basic principles of cognitive psychology. It is the interpretation of how these principles apply to learning that differs. The strict Piagetian developmental model postulates that children move from concrete to abstract thinking in a precise chronological order. Constructivists counter that learning is more dependent upon the types of opportunities or experiences offered than on the learners' maturational stage of development. Learning for the constructivist is viewed as a process in which learners construct meaning rather than merely take in ideas and memorize them (Barr and Tagg, 1995; Bransford et al., 1999a; Gatten, 2004; Kaplowitz, 2008; Magolda, 2006; Oberg, 1999). The constructivist model depends quite a bit on social interactions that allow learners to test their understandings against those of others. Social construction of knowledge occurs when communities of learners collaborate to formulate ideas and test the validity of those ideas (Burton,
Cognitive Development According to Piaget
Jean Piaget and his collaborators (Inhelder and Piaget, 1958; Piaget, 1952, 1954) were interested in exploring the ways children think at various steps or stages in their development. The sequence of stages is said to be the same for all children, although the ages when a child passes from one stage to the next can vary somewhat. Progress through the stages is one from concrete, irreversibility, and subjective egocentrism (viewing everything from one's own perspective) to the ability to see the world as others see it. Furthermore, a person's stage of cognitive development sets limits for the type of learning that can take place. We will return to this idea when we discuss the concept of learning readiness later in this chapter.

Piaget studied the ways children extract rules from their interactions with objects in the world and how they build mental models that can be used to interpret, organize, and make predictions about future interactions. Once built, these models are assimilated or incorporated into the child's worldview and used to make sense of other experiences. The driving force behind this model building is accommodation. New experiences that do not fit into the old worldview create a feeling of disequilibrium and discomfort in the learner. In cognitive psychology language, this is referred to as ambiguity. This feeling of discomfort drives the learner to rethink his or her understanding of the world in order to accommodate the new information. Once new mental models are developed to account for the mismatch between current knowledge and new information, a new assimilation framework is developed that will be used until the learner experiences the next mismatch or ambiguity between knowledge and information. This continually recurring cycle between assimilation and accommodation accounts for the development of more complex modes of thinking (Fenwick, 2000; Johnson and Cooper, 2007; Piaget, 1952).

William Perry expanded and extended this work by examining cognitive development in college students. His research showed that development continues during these young adult years. Students typically enter college with the idea that all knowledge is certain and rely on their professors and on their textbooks to share this knowledge with them. As they progress through college, students learn to question this view. They evolve from what Perry called dualistic (right/wrong) thinking to one in which they acknowledge different perspectives and learn to evaluate these perspectives in a relativistic world (Boud, 1988; Magolda, 2006; Perry, 1981, 1988).

Cognitive Development—The Constructivist Approach
Studies beginning in the 1960s on how children think and learn have resulted in constructivism, a variation on the Piagetian themes. Although retaining the idea of stages of cognitive development, the constructivist theories stress experience over maturation as the impetus for moving through these stages. The constructivist view, with its emphasis on learning in context, has called into question the Piagetian notion that cognitive growth is unidirectional moving from the concrete to the abstract (Ackerman, 1996). It does, however, owe much to another aspect of Piagetian theory—assimilation and accommodation.

Although both the constructivist and Piagetian theorists agree on the importance of the assimilation/accommodation cycle, they disagree on how this cycle affects the development of thinking and thus how people learn. To Piaget and his followers, the process is one of maturation. More complex assimilations occur at different stages in the child's growth and development. To the constructivist, however, change occurs solely as a result of interactions with the environment and can happen at any age or level of development. Knowledge is not viewed as simply passing from teacher to learner; knowledge is actually constructed in the learner's mind, thus the name constructivism. The learner does not get ideas; he or she makes ideas. Learners are thought to actively construct and reconstruct knowledge out of their experiences in the world (Driscoll, 1994; Freiberg and Driscoll, 2005). Constructivists propose that learners are particularly likely to develop new ideas when they are actively involved in making some kind of external artifact like a poem or a computer program that causes
them to reflect upon what they are learning and share that learning with others.

Constructivists stress the role of affect or feelings as well as cognition in their principles. Learners are more likely to become intellectually engaged when they are working on something that has personal meaning to them. This idea also appears in the humanist approach to learning, which is covered later in this chapter. The constructivist and the humanist approaches both contend that creating new ways of connecting to the material is as important as forming new mental representations of it. In addition, both of these schools of learning emphasize diversity of approaches to learning. They recognize that learners can make connections with knowledge in many different ways and encourage multiple approaches to the presentation of the information so as to accommodate this diversity (Kafai and Resnick, 1996). The notion that variations exist in how people learn is also tied to the research into learning styles that are discussed in more detail later in this chapter.

General Characteristics

- Cognitive psychology is interested in the organization of information.
- The cognitive psychologist delves into the internal processes by which an individual tries to deal with the complexity of his or her environment.
- The cognitive psychologist studies the ways in which a person perceives and conceptualizes his or her physical and social world.
- The cognitive psychologist organizes learning into patterns, not parts. He or she is interested in how various elements, ideas, and topics relate to one another.
- Behavior is based on cognition, which is defined as the act of knowing about the situation in which behavior occurs.
- Insight and the motivation to reduce ambiguity are viewed as underlying learning rather than the building up of stimulus–response connections proposed by behaviorists.
- Cognitive psychologists who adhere to the work of Jean Piaget examine development of thinking across the life span. Those working in this area stress that different types of thinking accompany different stages of development.
- The constructivists counter that mismatches between new experiences and the learner’s current mental models force the learner to develop more complex modes of thinking.

Educational Applications of Cognitive Psychology

Readiness

Readiness, an outgrowth of Piaget’s work, proposes that learning cannot occur unless a person is at the appropriate stage of cognitive development. According to Piaget, children pass through four major stages of development (Piaget and Inhelder, 1969):

1. The sensorimotor period (birth to 18–24 months)
2. The preoperational period (2–7 years)
3. The concrete operational period (7–11 years)
4. The formal operational period (over 11 years)

Each child passes through these stages in order; however, the age at which a child enters a particular stage might vary. Particular types of thinking are associated with each stage of cognitive development. For example, the child in the sensorimotor period does not have a sense of object permanence; so, to the sensorimotor child, out of sight is really out of mind. That is why the peek-a-boo game works so well with very young children. When they cover their eyes and you are no longer in their line of sight, you actually have disappeared for this child.

The preoperational child has begun to use symbols but is not yet able to mentally manipulate these symbols. So, when water is poured from a tall, thin glass into a short, fat one, the preoperational child believes that the amount of water has changed in some fashion. He or she is totally dependent on concrete examples and cannot extrapolate beyond these examples to alternative solutions to problems.

In the concrete operational stage, the child develops the ability to mentally manipulate symbols. But he or she can do this with only concrete, tangible objects. The child in this stage can put objects into order by size or sort them into categories by shape and understands that the amount of water in the previous example remains constant regardless of the shape of the container into which it is poured. However, working with abstract concepts remains difficult. Thus, solving word problems is beyond the grasp of the concrete operational child.
The fourth stage, formal operational, is associated with the ability to think abstractly and is the beginning of adult thinking patterns. The child no longer is dependent on concrete manipulation of objects. He or she can use mental imagery and can consider a variety of possible solutions to problems, even those that may seem improbable or impossible. The formal operational child can now deal with the "what if" and is not totally dependent on the "here and now." Children at this stage can try out various solutions in their minds, determine possible outcomes, weigh the relative merits of the solutions, and then select the best ones. A major characteristic of this stage is the ability to accept the fact that there can be multiple solutions to a problem and to deal with these options in a logical and systematic manner.

According to Piagetian theory, no amount of teaching will cause the child to change his or her perceptions and ways of thinking until he or she reaches the appropriate stage of cognitive development. Teachers must take the child's cognitive developmental stage into account when attempting to present new concepts and ideas. The constructivist also talks about readiness but does not tie it to maturation. Instead, readiness is a result of an accumulation of experiences. Children simply acquire more and more information about the world through their interactions with it and as a consequence are better able to apply that knowledge to the problems at hand. Studies based on this experience view have shown that if children are shown simple versions of problems they are quite capable of the types of thinking that Piaget thought developed only at later stages (Fox, 1995). Although the means of developing more complex ways of thinking differ in these two approaches, proponents of both viewpoints agree that learning cannot occur until the child is in the appropriate state of readiness. Regardless of how we define readiness, it cannot be ignored without great risk. Anyone who is pressed to learn something for which he or she is not ready will fail and thus lose interest in the process. Learners may even become so frustrated that they will avoid the subject in the future.

Relevance
The cognitive psychologist further postulates that the more engaged learners are with their environment, the more motivated they will be to deal with any ambiguities between the experience and their worldview. This will lead to active problem solving in an attempt to incorporate what they are experiencing into their worldview. Learners will be more engaged if they can relate to their experiences in some way. Learners are more apt to work on problems that have some relevance or significance to them. The notion of authentic instruction, and problem- or case-based learning can be seen as having its foundations in this concept of relevance (Cruickshank, Jenkins, and Metcalf, 2003; Elliott et al., 2000; Slavin, 2006).

The Discovery Method
Just as B.F. Skinner helped to shape the behaviorist view of teaching, Jerome S. Bruner provided major insight into how the cognitive perspective can be applied in the classroom. Bruner emphasizes the role of discovery in learning. In this approach, the instructor offers learners opportunities to discover solutions to problems and by extension the concepts, skills, or strategies needed to formulate these solutions. Learners are allowed to try different solutions and possibilities. The teacher who uses this method acts as a catalyst, letting learners find their own meanings. As learners interact with the problems or situations presented to them, they learn how to organize problems rather than attacking them in a hit and miss fashion. Discovery emphasizes intrinsic motivation (the learner's own desire to learn without the need for external reward). Self-fulfillment is the reinforcer here rather than any extrinsic or external reward from others (Bruner, 1963; Driscoll, 1994; Elliott et al., 2000; Kaplowitz, 2008; Postman and Weingarten, 1971).

Teachers who use this technique need to redefine themselves. This means they must be willing to step back from center stage and allow learners to find their own ways to solutions. The success or failure of this approach depends on the teacher creating situations that allow learners to interact with the material in a way that will facilitate the "discovery" of the solution. Teachers help guide learners through the process by asking thought-provoking questions or providing illustrative examples, thus shifting the role of the teacher from that of leader to one of facilitator (Bruner, 1966; Mayer, 2004).

Using the discovery method means letting go of a measure of control during instruction and allowing learners to move through the material in ways that are meaningful to them. However, the teacher is still in
control in the sense that the use of this method requires a lot of planning and coordination. The development of effective discovery experiences requires that teachers be observant and flexible in order to continually monitor learners’ progress and offer alternative approaches and gentle guidance if learners seem to be bogged down in the process. Teachers must also accept that the discovery method of teaching frequently takes more time than the traditional teacher-centric approach. However, the time is well spent, as this method offers learners the opportunity to incorporate their learning discoveries into their individual mental models and thereby own what they have learned in a real way. Furthermore, because the information is stored in a way that is meaningful to the learner, it is more likely that learners will be able to retrieve this information in the future when it is needed.

Small group exercises and class discussions are especially suited to the discovery method (see also Chapter 6 for more on active learning approaches). The teacher sets the stage, describes the problem, and perhaps offers some possible methods for its solution. The learners, either as the entire group or split into subgroups, work on the problem for a set period of time. The teacher acts as a facilitator for these discussions rather than as an expert who has all the answers.

Cerise Oberman and Rebecca Linton’s (1982) work on the guided design method is a good example of the application of the discovery method to the field of ILI. This method uses an open-ended, problem-solving exercise, consisting of seven stages that lead the learners through the information-gathering research process. However, be warned that, if you plan to do the guided design exercise with your learners, it can take an hour or more to complete.

**Expository Teaching and Advance Organizers**

How do we teach concepts that seem too complex for learners to discover on their own? David Ausubel’s idea of Advance Organizers addresses this concern. Advance Organizers offer a general overview of the information to be presented in advance of the learning experience and so provide a framework into which the learner can fit new information or material. Advance Organizers are most effective when they serve as a bridge between what is known—that is, what is already a part of the learner’s worldview—and the new knowledge, skill, or strategy being presented (Ausubel, 1960; Ausubel, Novak, and Hanesian, 1978; Ausubel and Robinson, 1969; Elliott et al., 2000; Kaplowitz, 2008; Richards, 1978). These Organizers, sometimes referred to as conceptual frameworks, offer the learner a way to structure the new material in a meaningful way and places new information into a context to which the learner can relate.

To help your learners acquire meaning, identify relevant anchoring ideas that your learners already possess. In other words, relate new, potentially meaningful material to some topic with which they are already familiar. In the case of ILI, comparing the similarities and differences between resources already familiar to the learner and the new ones being introduced can help provide a framework for the instruction.

Although Ausubel promoted the idea of introducing the Organizer before presenting new material, Organizers can be placed at almost any point in the session. Organizers can also be used as a way of pulling material together after it has been presented. The Organizer then serves as a summary of the material rather than an introduction to it. The placement of the Organizer has implications for learning styles theory. Learners who prefer getting the big picture first will appreciate an advanced look at the structure of the material. Those who like to build the big picture for themselves will prefer having the organization presented after the fact.

Advance Organizers or conceptual framework techniques are most effective for assisting learners in what Ausubel called the reception learning process, best represented by the lecture and textbook approach of instruction. The key to successful reception learning is to encourage learners to go beyond rote memorization to real meaningful learning. It is up to the teacher to organize and present this information in such a way that learners are helped to make these connections. Information being presented either via the lecture method or in readings must be tied to what the learner already knows. The ability to relate new information to ideas already possessed by the learner is crucial for retention. The structure imposed on the information by the writer or the framework in which the instructor presents the information will allow the learner to make these crucial connections (Ausubel, 1960; Cruickshank, Jenkins, and Metcalf, 2003). Many frameworks exist in ILI. The publication sequence, controlled versus natural language searching, primary versus secondary sources, or popular versus scholarly sources are just a few examples.
of how Advance Organizers or conceptual frameworks have been used to teach IL. Chapter 5 further discusses conceptual frameworks and mental models.

Ausubel also promoted the use of what he called expository techniques to enhance learning. These techniques include asking meaningful questions as material is presented, pausing for learners to reflect on material, having them share their thoughts with their neighbors, and requiring learners to paraphrase what has just been presented. All these methods avoid the trap of rote learning by causing learners to continually put new ideas into their own words (Ausubel, 1977; Cruickshank, Jenkins, and Metcalf, 2003). One technique that can be used to check for comprehension and encourage the learner's meaningful incorporation of new ideas is the one-minute paper. Just prior to instruction the teacher tells the group they will be asked to respond to the following two questions at the end of the session (Angelo and Cross, 1993): What were the main points of this session? What is your main unanswered question? This might be done verbally or in writing. The one-minute paper serves as a summary of the important points covered during the session and highlights what concepts seem to be most meaningful and relevant to the learners. It can also serve as an informal assessment of the session. See Chapter 11 for more information on this technique.

**Metacognition**

The concept of metacognition—or thinking about thinking—plays an important role in the cognitive approach to learning. In order to really learn, individuals must not only interact with the material to be learned but they must also reflect on the learning process itself (Marzano et al., 1988). Reflection empowers learners to develop strategies for learning how to learn in addition to learning the material that is being presented.

The cognitive approach places great emphasis on the learning process itself. Successful learners are able to manage their own learning. To help learners acquire these self-management skills, teachers might wish to model the process. Teachers should present examples of a variety of strategies and provide time during the learning experience for people to reflect on their own learning as well as on the content being presented (Bransford et al., 1999a; Svinicki, 1994). Requiring learners to write about the process in some kind of research journal can also help them acquire the necessary skills. Virginia Rankin's (1988) article presents an excellent example of incorporating a metacognitive approach to IL. The one-minute paper and other classroom assessment techniques (CATs), when used as a means of summarizing the learning experience, can also be viewed within this framework. They provide learners with an opportunity to reflect upon and reorganize their thinking based on the material that was presented (Angelo and Cross, 1993; Copperstein and Kocevar-Weidinger, 2004; Driscoll, 1994; Kaplowitz, 2008). See Chapter 6 for more on metacognition.

**FEELING—THE HUMANIST MODEL**

This brings us to the last of our main theories of learning—the humanist model. Rooted in the free-spirited, “express yourself” nature of the 1960s, the humanist approach looked at learning from a different perspective than its predecessors and examined the affective side of learning. The humanist emphasized that we must teach to the whole person and stressed the importance of recognizing that our learners' emotional, affective, or feeling states influence their educational successes. How learners feel about themselves and the material to be learned is as important as what they think about that material. Along with the cognitive psychologist, those following the humanist path insist that material must have personal meaning or it will not be learned (Dembo, 1988a; Elliott et al., 2000; Kaplowitz, 2008; Rogers, 1969; Tennant, 2006).

With its strong emphasis on the affective side of learning, it is not surprising that humanist psychology is extremely concerned with what motivates people to learn. The key player here is Abraham Maslow, who developed what he called the hierarchy of needs to help explain human motivation. Basic needs in this hierarchy are food, shelter, and sex. Next come needs such as safety, love, belonging, and self-esteem. Self-actualization, a person's ability to maximize his or her potential, is at the highest level of needs in this paradigm. According to Maslow, needs lower in the hierarchy must be satisfied before the individual can be motivated to address higher ones. Because learning seems to be motivated by self-actualization needs, Maslow suggested that learning does not occur until those needs that are lower on the hierarchy are met. It is easy to see how being hungry or sick might interfere with a person's ability to learn. But the idea that feelings of love, belonging, and esteem can
affect learning was a new and somewhat revolutionary idea that greatly influenced ideas about teaching and learning (Driscoll, 1994; Kaplowitz, 2008; Maslow, 1987; Slavin, 2006; Tennant, 2006).

Because how people feel about themselves is the cornerstone of the humanist approach to learning, it comes as no surprise that the work of Albert Bandura also played an important role in the development of this model. Bandura's work on self-efficacy, or an individual's belief in his or her own possibility for success, was particularly influential. To the humanist, encouraging learners to believe in themselves should be an integral part of the educational process (Bandura, 1977b, 1982; Candy, 1990; Driscoll, 1994; Slavin, 2006).

The humanists endorse the creation of a different kind of learning environment in which learners are encouraged to believe in themselves, are given opportunities to succeed, and are treated with respect. In this environment teachers exhibit by words and deeds that they believe everyone can succeed. These teachers do not grade on a curve because this pits learner against learner. They are supportive of all their learners and promote collaboration and cooperation. Humanist teachers believe in their learners, and, as a result, learners begin to believe in themselves and their feelings of self-confidence and self-efficacy grow (Cruickshank, Jenkins, and Metcalf, 2003; Kaplowitz, 2008; McGregor, 1999). Furthermore, Kuhlthau's (1988) work indicates that learners become more confident and comfortable with the information search process when their teachers help them to acknowledge that feelings of uncertainty and anxiety are a natural part of research and not a reflection of their own abilities.

General Characteristics

The humanist school is concerned with the affective side of learning:

- Feelings and concerns are as important as thinking and behaving.
- Basic needs must be satisfied before self-actualization or working to the learner's full potential can be accomplished.
- The educational environment should foster self-development and understanding, which will lead to self-actualization.
- The humanist psychologist believes that people are determiners of their own behavior. They are not merely acted upon by the environment. People are free to make choices about the quality of their lives.
- Learning situations should be learner centered and oriented toward developing self-efficacy.
- Material must have personal meaning or relevance for the learners in order to be learned.
- Learners are thought to be intrinsically motivated rather than working for external rewards.

Educational Applications of Humanist Psychology

Self-directed or Self-regulated Learning

With humanism's emphasis on the affective side of learning, it is not surprising that humanists wish to encourage a self-reflective attitude in learners. For the humanist, it is not enough to learn the material. Learners are encouraged to examine how they feel about the material they are studying and how the learning experience has impacted their attitudes and values. This approach not only stresses the acquisition of knowledge about the subject matter but also encourages learners to examine their own work habits, perceptions, values, and potential. Learners are encouraged to gain a better understanding of themselves and others as learners and to take control of their own lives and destinies. Instructors involved in self-directed learning help learners use a variety of strategies and perceptual skills so that they can direct or regulate their own learning and gain insight into that learning as it takes place (Areglado, Bradley, and Lane, 1996; Boud, 1988; Slavin, 2006; Sternberg and Grigorenka, 2002, 2004).

In some ways this idea is reminiscent of the cognitive psychology idea of metacognition. However, the humanists are interested in learners developing a better understanding of their own feelings, attitudes, and values associated with learning as well as understanding the cognitive processes related to it. Furthermore, humanist teachers want their learners to reflect upon the learning process itself. How did they go about learning? Were certain types of learning experiences more enjoyable and productive than others? To the humanist, the more we understand about our own learning preferences, the better we can frame our learning experiences and increase our possibilities for success. The research on learning styles, which is discussed in a later section of this chapter, is a direct outgrowth of this idea. Know
thyself and your learning preferences, and you can become a more successful learner.

Although we cannot always control our learning experiences, knowing how we learn best can help us relate better to any learning experiences in which we find ourselves. And some things are actually under our control. For example, if you know that you are a "morning person," you can try to schedule classes or work on projects in the early hours of the day. If, on the other hand, you work best later on in the day, sleep in (if possible) and do your heavy thinking/learning during the late afternoon or evening. If you are truly a "night person," you may find you do your best work after dark.

Knowing what works best for you can also help you adjust to learning experiences that do not suit you. If you are someone who likes active involvement but you are in a lecture-intensive situation, try to develop some active note-taking and self-reflection techniques that help you stay engaged even though the learning situation is mostly a passive one. See some of the techniques in the next chapter for more about turning passive learning experiences into more active ones.

Self-directed learners set goals and achievement standards for themselves, so the material to be learned becomes highly meaningful and relevant to them. The instructor's role becomes one of support, offering suggestions about how learners can reach their goals in the most effective way possible. This can require a good deal of advanced planning and a high degree of flexibility in dealing with the learners. Instructors who wish to teach in this fashion must be willing to view situations from their learners' perspectives. They must develop a high degree of empathy for their learners' feelings and points of view, and they must always treat their learners with respect. This approach flourishes when both learner and teacher see one another not only as mutually helpful human beings with resources to share but also as self-reliant human beings who care for themselves and others. Educators who work in this type of environment act as models, coaches, and mentors who validate learning and encourage the development of self-confidence on the part of the learner.

Learner-centered Teaching

The movement toward a more learner-centered approach to teaching is a natural outgrowth of humanist ideas about learning. In the learner-centered teaching environment, learning is viewed as a shared responsibility with the teacher cast in the role of facilitator rather than lecturer. Humanist teachers rely on many of the same techniques supported by their cognitive counterparts. They, too, wish to create experiences in which the learners can interact with the material on their own and discover, create, or construct personal meanings. As a result, behavior is intrinsically (for learning's sake) motivated rather than based on extrinsic (external) rewards. Learners are interacting with the material in their own ways and in order to please themselves (Areglado, Bradley, and Lane, 1996; Fister, 1990; Kaplowitz, 2008).

Humanists, however, go a step further with this idea. In the humanist learning environment, learners are given choices in how they will interact with the material to be learned. They also might be given a say in how their learning will be assessed or graded. Learners could choose between taking a test on the material, writing a paper on a topic, creating a Web page or video, or making a live presentation. In some cases learners may even be allowed to decide how much each of their assignments will count toward a total grade. They may also be invited to assess their own or their fellow learners' work. Learning contracts are an outgrowth of this idea and allow learners to take responsibility for their own learning and to feel a sense of ownership in the process. Whenever we let learners pick their own topics for in-class exercises or for papers and projects, we are following the humanist approach to teaching. Using the humanist approach requires quite a leap of faith on the part of the teacher. It asks us to believe that, if given the chance, learners will both take charge of their own learning and be able to succeed in achieving their goals (Barr and Tagg, 1995; Boud, 1988; Candy, 1990; Cornwall, 1988; Kaplowitz, 2008; Weimer, 2003; Zimmerman, 1990).

A learner-centered approach to teaching may or may not result in self-directed learners. Although both approaches give learners more responsibility for and control over their learning, the self-directed learning environment actively promotes the idea of self-reflection and an examination of the more affective side to learning. It asks learners to examine why they interacted with the material in the way in which they did and how that interaction might impact them in the future. The learner-centered teaching approach gives the learner
more freedom in deciding how to learn. It lets learners apply what they learned from their self-directed learning—inspired reflection to craft learning situations that offer the greatest opportunities for success.

**PSYCHOLOGY OF LEARNING SCHOOLS: COMMON THREADS**

Now that we have examined each school independently, it might be useful to look for common threads or themes among the three schools. Although each school seems to have been developed in part to refute its predecessors, a closer look at the principles associated with each school points out some interesting congruencies.

For example, both behaviorists and cognitive/constructivists view active participation as crucial to the learning process. The difference lies in how each explains the necessity of that active participation. The behaviorist would say that active participation increases the opportunity to "stumble" upon the correct solution through trial and error and gives the instructor the chance to shape behavior in the desired direction via positive reinforcement and immediate feedback. The cognitive psychologist (especially one who supports the constructivist model) says active participation is an opportunity for learners to discover new ways of knowing and enables learners to construct or reconstruct mental models. External reinforcement does not have a role here. The learner is internally or intrinsically motivated to fit new knowledge into his or her world. If this assimilation fails, the learner is driven to change his or her view of the world to accommodate the new information. Therefore, the result of active engagement with the data is that the learner constructs mental models that are consistent with this new information. The Piagetian or maturational model also supports active participation, because children need to experience disconnects between their current stage of development and their experiences in the world in order to stimulate the movement into the next, more complex or abstract stage of development (Kaplowitz, 2008; Sparks-Langer, 2000).

Next there is the concept of readiness. Behaviorists discuss readiness in terms of mastery and cautions teachers against moving learners to more complex concepts until they have mastered the more basic ones or, in other words, not until they are ready to do so. Although the cognitive psychologist agrees, readiness from this perspective is based on the level of complexity in the learners' mental models rather than the mastery of concepts. Both Piagetian theorists and constructivists agree that trying to force learners to acquire knowledge, skills, or abilities before they are ready to do so is doomed to fail (Kaplowitz, 2008). The humanist would also agree with this idea of readiness and with the types of techniques that allow learners to move through material at their own pace. Furthermore, the heavy emphasis on the importance of feedback that is seen in both the cognitive/constructivist and humanist ideas harkens back to the behaviorists' principle of reinforcement.

The cognitive/constructivists have other ideas in common with their humanist counterparts. Metacognition is a major component of both schools of thought. However, while the cognitive/constructivist is interested in learners reflecting on the cognitive aspects of their learning, the humanist encourages learners to think about their learning from a more affective angle. Theorists from both persuasions would agree that, in order to really learn, learners must not only interact with the material to be learned but they must also reflect on the learning process itself. This empowers them to develop strategies for learning how to learn in addition to learning the material that is being presented.

Because some of the basic tenets of becoming information literate include learning how to learn and becoming lifelong learners, the ideas of metacognition and self-reflection should really resonate with the IL instructor. Learners can be encouraged to think about their learning process through being asked to reflect upon their experiences. Instructors may wish to document the learning process by asking the learners to develop research journals in which they discuss how they looked for and retrieved the information they needed for their projects or papers and how they felt about the process itself. As previously mentioned, the one-minute paper and other CATs can also provide learners with opportunities to reflect on the material (Angelo and Cross, 1993; Kaplowitz, 2008).

Both humanists and cognitive/constructivists support the idea of relevance and personal meaning as crucial to the learning process. Each approach advocates offering learners the opportunity to actively experiment with the material to be learned and, in the case of the humanist, the ways in which they interact with it. Learners are encouraged to seek out their own
answers to questions and/or problems. Authentic, real-life, meaningful, and relevant examples are utilized in order to really engage and motivate the learner. Abstract concepts become meaningful, transferable, and retained through active engagement with problems that matter to the learner (Kaplowitz, 2008; Woodard, 2003).

Humanist and cognitive/constructivists alike endorse the move from "sage on the stage" to "guide on the side." The instructor acts as a facilitator who orchestrates learning experiences in order to assist the learner to discover his or her own truth. Because the social nature of learning is also a prominent feature of both approaches, experiences, collaborative learning, and group work tend to be favored as teaching techniques. Learners are given time to exchange ideas. Together they formulate questions and look for ways of answering these questions. Teachers support the process by asking questions that challenge the learners, arouse their curiosity, and move them forward. Educational trends that emphasize shifting responsibility for learning from the teacher to the learner are consistent with this aspect of both humanist and cognitive/constructivist thinking (Barr and Tagg, 1995; Higgs, 1988; Kaplowitz, 2008; McGregor, 1999; Oberg, 1999; Weimer, 2002, 2003).

**LEARNING STYLES: THE LEARNERS' PERSPECTIVE**

Becoming familiar with the tenets of the three schools of learning is an important first step to improving our instructional endeavors. This familiarity can help us understand what lies behind the various techniques we use in our teaching. However, learners are far from a homogenous bunch and vary greatly in the ways in which they prefer to learn. If we wish to be effective, we must try to understand these variations so that we can design instructional experiences that will help us reach and teach everyone. Furthermore, we need to become familiar with our own style so that we can move beyond it and reach out to those with styles different from our own. We must try to avoid the very human tendency of only teaching in our own favored style. We tend to gravitate toward the teaching methods that reflect how we most like to learn. Consciously or unconsciously, we feel that "if it is good for me, it must also be good for you." However, when we stick to our own style we end up disenfranchising at least some of our learners (Kaplowitz, 2008; Keefe, 1982).

The literature on learning styles is rich and abundant. Teachers are often overwhelmed and wonder how they could possibly address all of these styles in their teaching when they are first introduced to this concept and to the multitude of styles that seem to exist. One way to deal with all this is to look at styles as falling into three fairly unique categories: physiological, cognitive, and affective (Keefe, 1982). Furthermore, these three categories can be seen as reminiscent of the doing, thinking, feeling paradigm used earlier to discuss the three models or schools of thought regarding learning. Physiological learning styles are "doing" styles that deal with how learners interact with or behave in relation to the material to be learned. These styles, therefore, are most aligned with behaviorist ideas about learning. Cognitive styles with their emphasis on how learners perceive, think about, organize, and retain the material seem connected to the cognitive/constructivist or "thinking" model. Finally, affective styles, which deal with how learners feel about the material to be learned, can be linked to the humanist school of thought (Kaplowitz, 2008).

The massive amount of literature that has appeared on learning styles over the years goes beyond the scope of this book. Therefore, the following is a very brief, cursory overview of the topic. Readers who want a more detailed description of the various styles and references to additional readings can refer to "A Brief Overview of Learning Styles" on the CD-ROM that accompanies this publication. One thing to keep in mind as you delve into this topic is that styles represent a preference for learning. They do not describe aptitude, personality traits, or values. Although an individual may prefer one way of learning to another, most of us learn to cope with nonpreferred modes when circumstances demand it. However, we may not be at our best if we are forced to work in a nonpreferred manner and may have to expend additional effort to gain from the experience. It may take longer to absorb the material under these circumstances as we try to take in material that is being presented in a way that does not fit in to how we think. Furthermore, unless we can figure out how to reorganize the material so that it does fit with our mental models, we may have difficulty retaining the material for very long.
Physiological Styles—How Learners Interact with the World

Physiological styles describe the ways that learners react to the world around them. These styles describe variations in tolerance for learning under varying environmental conditions such as illumination, temperature, and noise levels. They also deal with issues of health and nutrition—people's tolerance for working when hungry, tired, or ill. Mobility needs, how often a person needs to get up and move around during learning, falls into this style category. Finally, we have “time of day” preferences. Some people seem to be at their learning best early in the day, while others prefer the evening or even nighttime hours.

Although discussions of gender differences in learning and the idea that people may be either right or left brained would both fall into this category, the research surrounding these topics is quite controversial and has come under question. In terms of gender differences, if they do exist, it is unclear if they are innate or develop through socialization. Current advances in the ability to measure brain functions during learning have led researchers to question whether there really is, in fact, evidence to support the right/leef brain differential. Furthermore, some researchers now hypothesize that characteristics traditionally associated with gender and hemispheric differences seem more connected to cognitive and affective styles (Berninger and Richards, 2002; Cruickshank, Jenkins, and Metcalf, 2003; Winn, 2004).

Cognitive Styles—How Learners Think About the World

Cognitive styles deal with information-processing habits. In other words, they relate to the ways people observe, think, problem solve, and remember, and they describe how learners prefer to perceive, organize, and retain information. The most well known is commonly referred to as perceptual modality preference or the way a person prefers to absorb information—visually through reading, aurally through hearing, and kinesthetically through doing (Barbe and Milone, 1982; Barbe and Swassing, 1988; Keefe, 1987; Messick, 1978). Cognitive styles also deal with the bottom-up versus top-down approaches to learning. Some learners like to start with the broad, holistic, or abstract view of the topic, while others prefer to begin with a more narrow, specific, and focused approach that relies heavily on specific examples (Cruickshank, Jenkins, and Metcalf, 2003; Messick, 1978; Rayner and Riding, 1997; Riding and Cheema, 1991; Witkin, 1978; Witkin et al., 1977).

People can also differ in their decision-making speed and how fast they respond to input. Some learners are described as “impulsives,” who are quick to process and respond to information. They are all about speed, being done first, and moving quickly to the next new thing—often at the cost of accuracy in their responses. “Reflectives” prefer a slow pace. They want to be given time to absorb and think about new material (Cruickshank, Jenkins, and Metcalf, 2003; Kagan, 1966; Messick, 1978). They tend to be the quiet ones in your classroom and can be overwhelmed by the behavior of their more impulsive classmates. However, keep in mind that they are still engaged in the learning process. It is just that they are not ready to respond as quickly as the more impulsive learners.

Affective Styles—How Learners Feel About the World

Finally, we come to those styles that deal with feelings or the emotional aspects of learning. These “affective” styles focus on how we relate to and value information. Curiosity, perseverance, risk taking, and competition/cooperation fall into this category, as do styles relating to motivation, attention, structural needs, and tolerance for frustration (Gaines and Coursery, 1974; Keefe, 1987). Also included in this category is the style known as internal/external locus of control. Internal-oriented people feel they are responsible for the consequences of their own actions, while external-oriented individuals see circumstances as beyond their control (Rotter, 1971, 1975). Having an internal locus of control would probably be associated with learners who are intrinsically motivated (learn for learning’s sake), while those who have a more external locus would more likely be extrinsically motivated (work for external rewards). For more on motivation, see Chapter 4.

MEASURING LEARNING STYLES

It is clear that people vary widely in the ways they like to learn, but how does all this information help us teach? How can we possibly vary our teaching in order to appeal to all these different types of learners? And how
do we even know the types of learners we are dealing with? A practical application of this research has been the development of various instruments to determine an individual’s learning style. The early literature concentrated on individual styles such as impulsive/reflective, abstract/concrete, and locus of control. However, it soon became apparent that it would be more useful to take a broader, more global look at styles. With this in mind, several researchers developed inventories that measure groupings of styles—rather than individual ones. The two inventories discussed here characterize learners in terms of sets of behaviors. Each set includes elements of physiological, cognitive, and affective styles.

The most famous and widely used inventory is David Kolb’s experiential learning model measured by the Learning Style Inventory (LSI). The inventory looks at learning behaviors in terms of two pairs of polar opposites or dimensions—concrete/abstract and active experimentation/reflective observation. The concrete/abstract dimension refers to how the learner prefers to process information. The active experimentation/reflective refers to how the learner prefers to interact with information and how he or she feels about that interaction. In order to get the full picture of someone’s style, it is necessary to measure where he or she falls on each of these axes. Once this is done, the learner can be described in terms of four possible combinations or styles: Divergers (concrete and reflective), Convergers (abstract and active), Assimilators (abstract and reflective), and Accommodators (concrete and active) (Kolb, 1976, 1984; Kolb and Fry, 1975; Wilcoxson and Prosser, 1996).

Kolb goes on to offer suggestions about how to model instruction that can create opportunities for each type of learner. The method consists of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Kolb’s LSI and his experiential learning model have gained a great deal of popularity in instructional circles. However, the inventory itself is somewhat difficult to administer and score. Furthermore, the terminology used to describe the four style types is not that easy to understand. People can find it difficult to relate to such words as diverger, converger, accommodator, and assimilator. In addition, although Kolb’s experiential learning method stresses the necessity of integrating all four experiences, some researchers question whether this model is necessary in all types of learning situations (Kaplowitz, 2008; Tennant, 2006).

The Learning Styles Questionnaire (LSQ) developed by Peter Honey and Alan Mumford (accessed 2008) offers an alternative approach. This questionnaire differs from LSI in both terminology and methodology. Learning styles are referred to as activists, reflectors, theorists, and pragmatists—a far more understandable set of categories. Furthermore, as opposed to the Kolb single-style approach, the LSQ provides not one score, but a score in each of the four styles. While one or two might stand out as having the highest score, a complete picture of the learner develops as he or she reviews how much or how little of each style contributes to the overall picture (Kaplowitz, 2008). We will discuss how to use both the Kolb and the Honey-Mumford learning styles perspective in an instructional setting Chapter 4.

**FINAL REMARKS**

So what did this excursion into the psychology of learning and learning styles tell us? All of the theories and research discussed have influenced the education process and have served to inform us about how people learn. No one single researcher or theorist can be singled out as having the complete, right answer. Each offers something for the IL instructor to think about and use. If we approach instruction with a grounding in, and appreciation for, the theoretical basis for teaching and learning, we will gain a greater understanding of the many practical applications that are used in educational settings.

Familiarity with a variety of methods and the theories behind those methods can give us insight into experiences that will appeal to different types of learners. The more familiar we are with our instructional options, the more prepared we are to create a varied instructional experience that has the best chance of appealing to all our learners. Providing varied learning opportunities within the classroom as well as in our online environment enhances the usefulness of these experiences. Combining in-person with virtual instruction broadens our reach and our effectiveness. Creating instruction that appeals to various learning styles also has another benefit. This type of instruction with its mix of methods and techniques tends to result in a more dynamic and interesting experience for both the learner and the teacher (Bligh, 2000; Holmes, 2002; Kaplowitz, 2008). In the next chapter, we will go into more detail about how to put these theoretical principles into practice.

Having a firm understanding of the theory behind
the practice will also allow instructors to be more flexible and effective teachers, who are quick on their feet and can adjust their methodologies and approaches on the spot if things are not going well. The most thorough and well-prepared IL instructor in the world can discover a situation or a virtual instructional experience is just not working and having one—if not more—backup plans based on different theoretical approaches that consider our learners’ potential stylistic differences allows the IL instructor to turn an unsuccessful situation into a triumph.

EXERCISES

1. Start with an IL topic that you have been responsible for teaching. If you have not had this responsibility yet, use some situation in which you have been the learner.

   Analyze the experience by looking at all the different types of instruction that were used during the training. Some possibilities would be lectures, hands-on practice, self-paced workbooks or worksheets, readings, projects or papers, group work, journals, role-playing, and brainstorming.

   Match each technique that was used to one of the approaches to learning described in this chapter. Explain why that technique belongs in that approach and what principles the technique illustrates. If a technique seems to illustrate principles from a variety of theorists or schools, explain how the technique fits into all appropriate theoretical frameworks.

2. Think about training someone in an IL skill, such as searching a database or finding biographical information about a living person. Design an instructional experience that incorporates an example of one technique for each of the following approaches to learning: behaviorist, cognitive, and humanist. Explain how each example illustrates the theoretical principle associated with a particular theory or theorist.

3. Do a bit of self-reflection. What type of learner are you? You can decide based on the results of a learning styles instrument, or just think about what types of learning experiences are most effective for you. Now examine the ways you teach. Do you tend to teach in a way that is most like the way you like to learn? If so, try to develop some alternative approaches that move you out of your own comfort zone for learning.

Note: Keep in mind that although you might not find some of these techniques appealing as a learner, you need to include opportunities in your instruction that will appeal to all learners—those like you and those who learn in ways that are different from your own favored approach. Also be aware that learning styles instruments that are freely available on the Internet may not be completely reliable or valid. For more on validity and reliability, see Chapter 11.

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