SECTION I

Introduction

Creating an effective learning environment is not an easy task in today's world, and it is even more complex in education programs for the health professions. Students entering the fields of health care are extremely diverse, both in age ranges and life experiences. Traditional undergraduates, entering college directly from high school, interact with a vast variety of nontraditional students returning to school after experiences in the workplace and/or having completed previous college degrees. Educators are challenged to recognize different learning needs and respect and utilize the knowledge and experiences that students bring to the learning settings. The teaching strategies and examples throughout this text may be adapted for use in a variety of situations, at undergraduate and graduate levels, taking into account the diversity of learning needs.

The chapters in Section I provide a foundation for understanding, selecting, and adapting specific teaching strategies to the educator's setting and student body. The contributors provide a theory base for learning and applied clinical reasoning, and also bring in various dimensions of effective learning that include creativity, humor, and exploration of varying, sometimes juxtaposed, viewpoints and ways of processing information.

CHAPTER 1

Effective Learning: What Teachers Need to Know

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Knowing is a process, not a product.

—Jerome Bruner (1966)[1]

What brings about effective learning in health professions students? Is it insight on the part of the student? A powerful clinical experience? Perhaps it is the dynamic, creative manner in which the nurse educator presents information or structures the learning experience. Effective learning likely is the culmination of all of these factors, in addition to others. In this chapter, dimensions of effective learning are explored as a foundation for use of the innovative teaching strategies presented in subsequent chapters. The monumental growth in the use of technology has definitely changed the teaching–learning environment. Learners also have changed regarding how they access and use information and their expectations regarding feedback. The field of health professions education is experiencing a difference in learners, yet how individuals learn is essentially unchanged.

■ Theories of Learning

We approach learning individually, based largely on cognitive style (awareness of and means of taking in relevant information) and preferred approaches to learning, or learning style. Some students are aware of their style and preference, some gain insight into these patterns as they become more sophisticated learners, and some students have never been guided to determine how they learn best.

Theoretical underpinnings classify learning as behavioristic or cognitive. Behavioristic learning was the earliest pattern identified through research.

[1]Bruner, J. S. (1966). *Toward a theory of instruction*. Cambridge, MA: The Belknap Press of Harvard University Press. Copyright © 1966 by the President and Fellows of Harvard College.

Psychologists such as Skinner and Thorndike described learning as a change in behavior and used stimulus response actions as an example. Subsequent theorists have described more complex forms of behaviorist learning. Bandura's (1977) theory of social learning describes human learning as coming from others through observation, imitation, and reinforcement. We learn from society, and we learn to be social. This type of learning is evident when we describe the need to socialize students to the health professions.

Robert Gagne (1968) formulated suggestions for sequencing of instruction, conditions by which learning takes place, and outcomes of learning, or categories in which human learning occurs. These learning categories are based on a hierarchical arrangement of learning theories, moving from simple to complex learning, and include intellectual and motor skills, verbal information, cognitive strategies, and attitudes. For example, within the category of intellectual skills are the following stages:

- *Discrimination learning*: Distinguishing differences, so as to respond appropriately
- *Concept learning*: Detecting similarities, so as to understand common characteristics
- *Rule learning*: Combination of two or more concepts, as a basis for action in new situations

Gagne's ideas seem to combine behaviorism and cognitive theories. Use of behaviorism in nursing education was especially popular in the 1970s and early 1980s through the use of concrete, measurable, specific behavioral objectives. Even though nursing education has moved away from the concrete methods of learning and evaluation, use of the hierarchical arrangement is seen in curriculum development and learning outcomes.

Cognitive theories address the perceptual aspect of learning. Cognitive learning results in the development of perceptions and insight—also called *gestalt*—that bring about a change in thought patterns (causing one to think, "Aha") and related actions. Jerome Bruner (1966) described cognitive learning as processes of conceptualization and categorization. He contended that intellectual development includes awareness of one's own thinking, the ability to recognize and deal with several alternatives and sequences, and the ability to prioritize. Bruner also saw the benefit of discovery learning to bring about insights. Ausubel's (1968) assimilation theory focuses on meaningful learning, in which the individual develops a more complex cognitive structure by associating new meanings with old ones that already exist within the learner's frame of reference. Ausubel's theory relies heavily on the acquisition of previous knowledge. These principles are useful for introducing the new student to the healthcare environment by relating information to what the student knows about health and illness. The same principles are fundamental to curriculum development, based upon transition from simple to complex situations. Having a good grasp of what is known is extremely helpful as learners move into new or unknown patient situations. This can be seen in the chapters on problem-based learning, clinical reasoning, and concept mapping.

Gardner's theory of multiple intelligences recognizes cognition as more than knowledge acquisition. Based on his definition of *intelligence* as "the ability to solve

problems or fashion products that are valued in more than one setting" (Gardner & Hatch, 1990, p. 5), Gardner and Hatch have described the following seven forms of intelligence:

1. *Linguistic:* Related to written and spoken words and language, and use and meaning of language(s)
2. *Musical/rhythmic:* Based on sensitivity to rhythm and beat, recognition of tonal patterns and pitch, and appreciation of musical expression
3. *Logical/mathematical:* Related to inductive and deductive reasoning, abstractions, and discernment of numerical patterns
4. *Visual/spatial:* Ability to visualize an object or to create internal (mental) images, and thus able to transform or re-create the image
5. *Bodily kinesthetic.* The taking in and processing of knowledge through use of bodily sensations; learning is accomplished through physical movement or use of body language
6. *Interpersonal:* Emphasizes communication and interpersonal relationships, recognition of mood, temperament, and other behaviors
7. *Intrapersonal:* Related to inner thought processes, such as reflection and metacognition; includes spiritual awareness and self-knowledge (Gardner & Hatch, 1990)

Some educational programs use assessment tools based upon the work of Gardner and Hatch or similar assessments to guide incoming students on their approaches to learning and to better direct study skills. Faculty can benefit from this information as well and will find that student performance, as a group, is enhanced when a variety of teaching strategies are used. As an example, Slater, Lujan, and DiCarlo (2007) found that among first-year medical students, the females were more diverse in their sensory modalities and thus preferred multiple forms of information presentation.

Cognitive theories addressing learning stages appropriate for college students include Perry's (1970) model of intellectual and ethical development. This model recognizes the following four nonstatic stages in which students progress: (1) dualism (black versus white), (2) multiplicity (diversity and tolerance), (3) relativism (decision made by reasoned support), and (4) commitment to relativism (recognition of value set for decision making). Perry's ideas can be used to explain how critical thinking is developed over time.

A related behavior pattern that can be associated with success in professional education is categorized as executive functions (Lesaca, 2001). *Executive functions* are mental activities that are related to internal self-control and ability to employ goal-directed behavior. These functions then lead the individual to problem-solving ability and flexibility. Consequently, use of executive functions promotes better study skills and enhances the ability to apply content knowledge to purposeful, professional actions.

■ Approaches to Learning

Emerging from learning theories are descriptions of preferred styles or approaches to learning. Categorized as cognitive styles and learning styles, these approaches to

learning are the ways individuals acquire knowledge, and are concerned more with form or process than content (Miller & Babcock, 1996). *Cognitive style* deals with information processing: the natural, unconscious internal process concerned with thinking and memory. It is the stable and enduring manner in which an individual organizes and handles information. The most common example of cognitive style is Witkin and colleagues' field-dependent–field-independent style (Witkin, Moore, Goodenough, & Cox, 1977). The field-dependent–field-independent style describes one's field of perception, or how one takes in information or data.

Although one style generally predominates, people possess the capacity for both styles. Field-dependent individuals are global, are open to external sources of information, are influenced by their surroundings, and therefore see the situation as a whole, rather than identifying and focusing on the separate aspects of it. Field-dependent people tend to be social, people oriented, and sensitive to social cues. Learners in which the field-dependent style predominates may be externally motivated and therefore take a spectator or passive role in the learning process, preferring to be taught rather than to actively participate. Field-independent individuals are less sensitive to the social environment than field-dependent individuals, and thus take on a more analytical approach to information. By identifying aspects of the situation separately, they are able to restructure information and develop their own system of classification. Field-independent learners enjoy concepts, challenges, and hypotheses and are task oriented (Miller & Babcock, 1996).

An aspect of learning style related to student behavior is response style. Kagan (1965) pioneered work, with school-age children, on the concepts of reflection and impulsiveness. These dimensions of cognitive response style describe personal tendencies regarding possibilities in solutions and choice selection. Individuals who have the impulsivity tendency prefer the quick, obvious answer, especially for highly uncertain problems, thus selecting the nearly correct answer as first choice. Reflective individuals identify and carefully consider alternatives before making a decision or choice. The implications for education in the health professions are apparent and will be discussed further. One problem that emerges with individuals who have a strong tendency in one of these dimensions is for the impulsive individual to act too quickly, based on an instant decision. Conversely, the reflective individual may be immobilized in decision making, which has obvious implications for outcomes.

Reflection, as associated with learning, was described as early as 1916 by John Dewey as being a process of inquiry (Miller & Babcock, 1996). To reflect on a situation, experience, or collection of information is to absorb, consider, weigh, speculate, contemplate, and deliberate. Such reflection serves either as a basis for reasoned action or to gain understanding or attach meaning to an experience. The most notable descriptions of reflection, especially as related to nursing, have been presented by Schön (1983). In his work, Schön related reflection to problem solving—and traditional means of teaching and learning result in structured problem solving where the ends are clear and fixed. In the reality of health care, such ends are not always so concrete or discernible.

Schön also believed that professionals in practice demonstrate a unique proficiency of thinking, and he has described the following three aspects of this thinking: (1) knowing-in-action (use of a personally constructed knowledge base), (2) reflection-in-action (conscious thinking about what one is doing, awareness of use of knowledge), and (3) reflection-on-action (a retrospective look at thoughts and actions, to conduct self-evaluation and make decisions for future events). Reflection results in synthesis. This outcome is evident when the individual carries over thoughts, feelings, and conclusions to other situations. Teaching includes reflection-in-action, in which the teacher spontaneously adapts to learner reactions. Thus, reflection is the foundation for growth through experience. Reflection, as a form of thinking and learning, can be cultivated. Educators improve their teaching when they reflect upon episodes of teaching that were successful as well as those that were failures (Pinsky, Monson, & Irby, 1998).

One of the best-known descriptions of learning styles is Kolb's, which emerged from Dewey's seminal theory on experiential learning (Kolb, 1984). Dewey pioneered educational thinking regarding the relationship between learning and experience. The relationship between the learning environment and personal factors such as motivation and goals can lead the learner through a stream of experiences that, once connected, bring about meaningful learning (Kelly & Young, 1996). Using these ideas, Kolb went on to describe learning as occurring in the following stages: concrete experiences, observation and reflection on the experience, conceptualization and generalization, then theoretical testing in new and more complex situations. Learning is cyclical, with new learning coming from new experiences. Consequently, learning occurs in a comprehensive means, beginning with performance (concrete experience) and ending with educational growth. Kolb further explained that individuals go about this learning along the following two basic dimensions: grasping experiences (prehension), with abstract–concrete poles; and transforming, with action–reflection poles (Kelly & Young, 1996). Applying his experiential learning theory to his dimensions, Kolb identified these four basic learning styles:

1. *Convergers:* Prefer abstract conceptualization and active experimentation. These individuals are detached and work better with objects than people. They are problem solvers and apply ideas in a practical manner.
2. *Divergers:* Prefer concrete experience and reflective observation. Individuals with this tendency are good at generating ideas and displaying emotionalism and interest in others. Divergers are imaginative and can see the big picture.
3. *Assimilators:* Prefer abstract conceptualization and reflective observation. Assimilators easily bring together diverse items into an integrated entity, sometimes overlooking practical aspects or input from others. Theoreticians likely are assimilators.
4. *Accommodators:* Prefer concrete experience and active experimentation. These individuals, while intuitive, are risk takers and engage in trial-and-error problem solving. Accommodators are willing to carry out plans, and they like and adapt to new circumstances (Miller & Babcock, 1996).

Gregorc's (1979) categorization of learning styles is similar to Kolb's, except that Gregorc believes that an individual's style is static, even in light of the changing educational setting. Thus, even after maturity and further learning, an individual still approaches learning in the same way. Gregorc uses the learning style categories of concrete sequential, concrete random, abstract sequential, and abstract random. In his research, Gregorc determined that individuals have preferences in one or two categories. In studying both first-year and fourth-year baccalaureate nursing students, Wells and Higgs (1990) discovered that these students have preferences in the concrete sequential and abstract random categories (total 81% of first-year students, 74% of fourth-year students).

■ Use of Learning Styles and Preferences

Theoretical foundations regarding learning and descriptive studies of cognitive and learning styles provide insight and understanding of self. It would be difficult to address research on all modes of learning in this one chapter. A summary application of information from the vast field of knowledge about learning theory and cognitive and learning styles has been developed by Svinicki (1994) as six operating principles, which are:

1. If information is to be learned, it must first be recognized.
2. During learning, learners act on information in ways that make it more meaningful.
3. Learners store information in long-term memory in an organized fashion related to their existing understanding of the world.
4. Learners continually check understanding, which results in refinement and revision of what is retained.
5. Transfer to new contexts is not automatic but results from exposure to multiple applications.
6. Learning is facilitated when learners are aware of their learning strategies and monitor their use. (p. 275)

To understand one's own learning styles helps to understand one's own thinking, to be aware of a fit between style and strategies for learning, and thus to select the most effective and efficient means to go about learning. Some students are aware of how they learn best and gravitate toward that strategy. Instructors see this process in students who choose to sit in the front row of the class, take many notes, and feel involved with the topic; or students who prefer online learning, choose not to come to class but instead read course material, watch Internet clips or videos, and acquire information as it pertains to a clinical assignment. Some students adhere to tradition-bound forms of learning, such as lecture and reading, yet do not maximize their learning. This result explains why these students benefit more from direct clinical experiences. Many students find learning to be more powerful when they experience something new or significant in a clinical environment, then explore information and reflect on the experience. Learning experiences can be adapted to the environment and are influenced by the environment in which they occur. Awareness and

comprehension of one's style of learning enables one to tailor the learning environment for optimal outcomes. A simple test to guide the student in discovering his or her learning style(s) is presented in the teaching example at the end of this chapter.

Feedback from an observer, such as the instructor, can heighten awareness of personal styles. The knowledgeable educator also can guide the student in enhancing predominant styles or in beginning to cultivate additional dimensions of thinking and responding. For example, a student who is predominantly impulsive in decision making should be guided to explore outcomes of decisions and encouraged to increase reflection time as appropriate. Conversely, the student who is highly reflective may need to explore reasons that bring about hesitancy or prolonged deliberation and the outcomes of such behaviors.

■ Effective Teaching for Effective Learning

A knowledgeable and insightful educator is the key to effective learning in many situations. Consequently, the educator should call upon a knowledge base in learning and teaching as well as an extensive repertoire of useful strategies to reach learning goals. Faculty in health professions education are challenged to be directive in their teaching, addressing measurable learning outcomes that are directly linked to professional standards. This is juxtaposed with the importance of freeing the student from linear thinking and encouraging broader approaches to learning that are accomplished through dialogue, expression, and attribution of meaning. Instructors must determine best use of time, both for themselves and for students. So, difficult decisions must be made regarding what to leave in and what to omit from teaching episodes. In the health professions, faculty have to choose between teaching for practical judgment or for disciplinary knowledge. Specialized knowledge from within the discipline can clarify issues involved in practical situations, but it cannot determine judgment or a course of action (Sullivan & Rosin, 2008). This is where the role of the instructor, as a seasoned practitioner, is indispensable.

In their research to discover attributes of successful teachers at the rank of full professor, Rossetti and Fox (2009) developed these four categories for teaching success:

1. *Presence of the teacher*: Being there or available for the students, becoming acquainted with students, and cultivating mutual respect and trust
2. *Promotion of learning*: Interest in students' learning and finding meaning in their education
3. *Teachers as learners*: Staying current in the discipline and teaching strategies, and continually updating and refreshing courses
4. *Enthusiasm*: Conveying an interest in the subject and passion for the work

Regardless of setting, whether it be a traditional classroom, clinical care, synchronous or asynchronous electronic instruction, these principles of teaching success are applicable.

As students advance in their education, their established, comfortable ways of knowing, thinking, and reflection are challenged. This is especially true in the health

professions, where students explore value systems that differ from their own and identify ethical dilemmas in practice or circumstances in which there is more than one right answer or no clear choice. In situations in which the research evidence diverges from existing paradigms that are known to students, and thus cause conflict in thinking, the instructor should be prepared to adapt and modify teaching to address this conflict (Fryer, 2008). Therefore, the instructor needs to be patently aware of his or her own teaching style and how to amend that style for the circumstances.

Regarding the teaching strategies presented in this text, each strategy will have different effects on the attainment of learning outcomes in each student, based on the attributes and use of the strategy, in addition to learning and cognitive styles and learning preferences. Here are some broad suggestions for applying information about learning in teaching situations. The specific strategies addressed in subsequent chapters provide detailed information to enable faculty to use each method in an optimal way.

Underlying assumptions regarding the nature of professional education are derived in part from principles of adult learning, as formulated by Knowles (1978). Key principles include assuming responsibility for one's own learning and recognition of meaning or usefulness of information to be learned. Students in health professions are career oriented and need to see practical value in their educational endeavors. As consumers, adult students need to believe that they are receiving the maximum benefit from learning experiences. Furthermore, taking charge of one's own learning is empowering. Students who gain a sense of self-responsibility can feel empowered in other areas of their lives, such as professional practice. Faculty, in turn, have the responsibility to cultivate empowerment and to affect learning outcomes.

The teaching–learning experience, whether it is in a classroom environment or online, should be fresh and challenging each time the class convenes. Faculty should endeavor to provide variety in the manner in which they teach, rather than the same, predictable, albeit comfortable method of telling rather than teaching. As providers of information, instructors need to remember that learning is best brought about by a combination of motivation and stimulation. The effective instructor should be the facilitator of learning in the students. In professional education, motivation is gained when the relationship to the well-being of the client is pointed out. The value of faculty experience is evident when the nurse-teacher shares from his or her own professional experiences and uses these anecdotes as examples of client outcomes. Nursing students and faculty agree that nontraditional strategies such as collaborative or cooperative learning, active involvement, and participation in the learning experience are desirable for effective learning. Students in professional education programs do respond positively to opportunities to choose or structure some of their learning experiences (Melrose, 2004). This approach should be used frequently by the teacher, not only to promote active learning but also to instill in students a sense of empowerment, which is an important attribute for the clinical setting. Technology-based learning activities direct the student to engage in independent learning, research, and use of visual cues, such as video, to enhance comprehension.

As can be seen from the information on learning styles, students are more likely to remember information with which they can agree or relate and if they can attach meaning to the item or information. Disagreement or disharmony should be explored in an objective fashion. Viewpoints can then be strengthened or altered. Questioning and discussion should be based on the diversity that exists among the students. An instructor who is able to establish a sense of trust and confidence with the students can promote the expression of different perspectives likely to be found in the group. Professional educators should support students who are at various levels of cognitive growth, looking upon students from a criterion framework rather than a normative one. Faculty should show that various viewpoints are welcome, legitimate, and worthy of discussion.

Effective educators guide students to see how their thought processes occur. They ask, "What do you know about ____?" or "How did you arrive at that answer/conclusion?" Teachers cultivate further development in the individual learners by demonstrating how to critique a theory, develop a rationale, or work through the steps of problem solving. These strategies will facilitate growth in students who are in an early cognitive stage such as dualism or will challenge more advanced students to a commitment to realism (Perry, 1970).

Delivery of information should be based on instructional theory in addition to content expertise. Using Ausubel's (1968) principles of advanced organizer, the teacher can develop inductive discovery by which students can build on previously acquired, simplistic knowledge to develop new or broader concepts. Effective learning experiences emerging from identified styles should be developed and used in both class and clinical settings. Information from Kolb's four dimensions serves as an excellent example. Students who are convergers readily become bored with straight lecture, especially with topics that are abstract in nature. These individuals work better by themselves, so they are less likely to participate well in group projects. Learners with the diverger style learn from case studies and will actively participate in discussion, but they may have difficulty detaching personal values from the issue. These students often are visionary group leaders. Individuals with the assimilator style manipulate ideas well, so they will participate well in discussion or write comprehensive papers; however, these students may be less practical and have difficulty with some of the realism of clinical practice. Accommodators usually enjoy case studies, new or unusual teaching strategies, skills labs, and tinkering with new equipment. These learners will be most responsive to a challenging, complex client. With the multitude of learning opportunities available through electronic resources and patient simulation, teachers can readily craft a learning experience that meets most learning styles and preferences.

Skiba, Connors, and Jeffries (2008) cite nursing education as the field considered by many to be a pioneer in the use of educational technology. Nursing, along with the other health professions, must face the challenges of incorporating core competencies, use of emerging technologies, and practice in informatics-intensive healthcare environments. However, one-way learning, such as web-based instruction, will not fully replace the competency-based instruction and verification that is needed in the applied disciplines of health care (Knapp, 2004).

In the clinical setting, the instructor may wish to provide introductory motivation through discovery learning. One way to accomplish this goal is to have each student observe or follow an individual in the clinical setting to gain exposure to the myriad tasks and responsibilities of a professional healthcare provider. Whereas students may have some rudimentary ideas of what healthcare providers do, they discover the depth and demands required in day-to-day work by observing actual practice. This strategy should broaden their perspectives and set the stage for meaningful learning, which includes increased retention of material and greater inquiry.

As students develop clinical written summaries about their clients, instructors should be flexible with the type of written work submitted. Traditionally, nursing students develop some form of a care plan based on the nursing process. The structured, linear method has taken criticism when regarded as the only way to look at clients. As a concrete, methodical strategy, the nursing process care plan is effective for students who are field independent and who can readily discern the data and related information needed for each step.

Additional methods of client summary or analysis should be introduced, and students should be encouraged to try each method. In doing so, students may broaden their ways of seeing clients and nursing problems, thus setting the stage for increased insight, analysis, and confidence. For example, use of the concept map is a way in which a student can envision the client or care situation in a holistic manner. Concept maps provide a fluidity that enhances the ability to determine relationships and make connections. Therefore, this strategy likely will be used positively by students who demonstrate Gardner's categories of visual/spatial or interpersonal intelligence. Learners who are field dependent also should do well with the concept map strategy because of their tendency to see the situation as a whole. Concept mapping should be effective for learners with all of Kolb's styles, but for different reasons and with different outcomes.

Guided reflection, especially reflection-on-action, helps the student bring closure to the clinical experience, as well as conduct self-evaluation and gain from the experience. Journal writing is one of the most effective means by which the student can capture thoughts and responses and preserve these ideas in writing for subsequent consideration. This strategy is particularly useful as a means by which students can identify and modify impulsive-reflective tendencies. Journal writing will have the best results with divergers and assimilators, and some students may benefit from open discussion about the experiences entered into their journals. Again, feedback from the faculty is crucial and should be as thoughtful as the entries provided by the student. Faculty who are reading these journals should guide the students in growth of insight and patterns of reflection.

Effective teachers in the health professions are those who possess content expertise, create an active learning environment, and use carefully selected teaching strategies (Wolf, Bender, Beitz, Wieland, & Vito, 2004). One of the greatest challenges for faculty is in developing a blend of strategies to bring about effective learning in all students. Part of the challenge is the fit between the faculty's styles and learning preferences and the styles and preferences of each of the learners. Faculty especially

should be on guard against favoritism to students who possess the same attributes as the instructor. Conversely, the congruency between styles of the teacher and of the student may enhance a relationship that is especially meaningful and may evolve into professional mentoring.

■ Future Considerations

From this chapter, many ideas that are worthy of more detailed scrutiny emerge. The majority of research on cognitive styles, learning style, and learning preferences was conducted in the 1970s and 1980s. This was before the widespread accepted use of electronic technology. Use of technology in teaching and learning may be influenced by learning preferences, such as in visual and kinesthetic learners. Have some students learned to modify their preferences to become more comfortable with technology? Online education is widely accepted, and the role of the instructor is changing. The extent to which learners continue to value the presence of the instructor for spontaneous teaching is worthy of investigation. Currently, there is a shift in education toward student-centered, active learning for the development of critical thinking, coupled with generations of students who are used to immediate feedback and a variety of stimulation types. Educators must determine if selected strategies are useful for genuine learning or, if not used properly, merely providing entertainment.

■ Conclusion

Effective learning is more than merely the result of good teaching. It is enhanced by a learning environment that includes active interactions among faculty, students, and student peers. Effective learning is achieved through the use of creative strategies designed not to entertain but to inform and stimulate. The best ways faculty can bring about effective learning are by recognizing students as individuals, with unique, personal ways of knowing and learning; by creating learning situations that recognize diversity; and by providing empowering experiences in which students are challenged to think.

Teaching Example:
How Do I Learn Best?

This instrument typically takes 4 to 6 minutes to complete and can be self-scored. The style categories are visual, aural, read/write, and kinesthetic, which correspond with categories found in Gardner's multiple forms of intelligence. Students are directed to answer the brief questions, then are shown the learning modalities that best fit predominant styles.

How Do I Learn Best?

This test is to find out something about your preferred learning method. Research on left-brain/right-brain differences and on learning and personality differences suggests that each person has preferred ways to receive and communicate information.

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Choose the answer that best explains your preference and put the key letter in the box. If a single answer does not match your perception, please enter two or more choices in the box. Leave blank any question that does not apply. Once you have completed the test, find the totals for each of the letters (*V*, *A*, *R*, *K*) that correspond with a learning preference. Then look at the table of learning modalities (**Table 1-1**) to see which strategies best support your learning preference.

Table 1-1 Learning Modalities

	In Class	**When Studying**	**For Exams**
Visual	Underline Use different colors Use symbols, charts, arrangements on a page	Recall visual aspects of presentation Reconstruct images in different ways Redraw pages from memory Replace words with symbols and initials	Recall the pictures on the pages Draw, use diagrams where appropriate Practice turning visuals back into words
Aural	Attend lectures and listen Discuss topics with students Use a tape recorder Discuss overheads, pictures, and other visual aids Leave space in notes for later recall	May take poor notes because of preference for voices Expand notes by talking out ideas Explain new ideas to another student Read assignments out loud	Speak the answers/ tutorials Practice writing answers to an old exam Read questions to yourself or have someone read them to you
Reading/Writing	Use lists, headings Write out lists and definitions Use handouts and textbooks	Write out the words Reread notes silently Rewrite ideas in other words Use lecture notes/read	Practice with multiple-choice questions Write paragraphs, beginnings, endings Organize diagrams into statements
Kinesthetic: use all of the senses	May take notes poorly because topics do not seem relevant Go to lab, take field trips Use trial-and-error method Listen to real-life examples	Put examples in note summaries Talk about notes, especially with another kinesthetic person Use pictures and photos to illustrate	Write practice answers Role play the exam situation in one's head

Data from Gardner, H., & Hatch, T. (1990). *Multiple intelligences go to school: Educational implications of the theory of multiple intelligences* (Technical Report No. 4). New York, NY: Center for Technology in Education.

1. You are about to give directions to a person. She is staying in a hotel in town and wants to visit your house. She has a rental car. Would you:
   V) draw a map on paper?
   A) tell her the directions?
   R) write down the directions (without a map)?
   K) collect her from the hotel in your car?

2. You are staying in a hotel and have a rental car. You would like to visit a friend whose address/location you do not know. Would you like them to:
   V) draw you a map on paper?
   A) tell you the directions by phone?
   R) write down the directions (without a map)?
   K) collect you from the hotel in their car?

3. You have just received a copy of your itinerary for a world trip. This is of interest to a friend. Would you:
   A) ring her immediately and tell her about it?
   R) send her a copy of the printed itinerary?
   V) show her on a map of the world?

4. You are going to cook a dessert as a special treat for your family. Do you:
   K) cook something familiar without need for instructions?
   V) thumb through the cookbook looking for ideas from the pictures?
   R) refer to a specific cookbook where there is a good recipe?
   A) ask for advice from others?

5. A group of tourists have been assigned to you to find out about national parks. Would you:
   K) drive them to a national park?
   V) show them slides and photographs?
   R) give them a book on national parks?
   A) give them a talk on national parks?

6. You are about to purchase a new stereo. Other than price, what would most influence your decision?
   A) A friend talking about it
   R) Reading the details about it
   K) Listening to it
   V) It looks really upmarket

7. Recall a time in your life when you learned how to do something like playing a new board game. Try to avoid choosing a very physical skill, e.g. riding a bike. How did you learn best? By:
   V) visual clues—pictures, diagrams, charts?
   R) written instructions?
   A) listening to somebody explaining it?
   K) doing it?

(continues)

8. Which of these games do you prefer?
   V) Pictionary
   R) Scrabble
   K) Charades
9. You are about to learn to use a new program on a computer. Would you:
   K) ask a friend to show you?
   R) read the manual which comes with the program?
   A) telephone a friend and ask questions about it?
10. You are not sure whether a word should be spelled 'dependent' or 'dependant.' Do you:
    R) look it up in the dictionary?
    V) see the word in your mind and choose the way it looks best?
    A) sound it out in your mind?
    K) write both versions down?
11. Apart from price, what would most influence your decision to buy a particular textbook?
    K) Using a friend's copy
    A) A friend talking about it
    R) Skim reading of parts of it
    V) How it looks
12. A new movie has arrived in town. What would most influence your decision to go (or not to go)?
    A) Friends talked about it.
    R) You read a review about it.
    V) You saw a preview of it.
13. Do you prefer a lecturer/teacher who likes to use:
    R) handouts and/or a textbook?
    V) flow diagrams, charts, slides?
    K) field trips, labs, practical sessions?
    A) discussion, guest speakers?

Reproduced from Fleming, N. D., & Mills, C. (1992). Not another inventory, rather a catalyst for reflection. *To Improve the Academy*, 11, 137–155.

Discussion Questions

1. Reflect on the learning theorists mentioned in the chapter (Bandura, Skinner Thorndike, Gagne, Bruner, Ausubel, Gardner). Which theorist informs your own learning? Describe your own learning and how this theorist influences your classroom or clinical teaching.
2. Should the classroom teacher create learning activities or assignments tailored to all of the VARK learning styles as described by Fleming and Mills?
3. Are traditional learning theories still relevant in today's technology-based educational system?

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