

*Learning Styles Research:
Understanding How Teaching
Should Be Impacted by the
Way Learners Learn*



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Abstract: This article examines the important connections between how well students learn new information in response to the classroom environment and social interaction among learners and teachers. Educational research in the field of learning style theory has demonstrated significant improvement in learning achievement when students are taught according to their learning style. Professors and Christian educators can respond to the needs of their students' differing learning styles by incorporating various teaching methods in their classrooms. A biblical basis for incorporating learning style theory into the Christian education environment can be seen by briefly considering some ways in which Jesus demonstrated mastery of these instructional methods as He taught individuals, small groups, and large crowds.

Part I: Understanding How Learners Interact with
Learning Environments and Instructional Practices

Introduction

During the past 30 years, much research has been conducted in the areas of learning style theory and practice. Understanding the differences between the many theories that have been developed can be somewhat daunting to the educator. Additionally, the impact of these theories on the task of Christian educators has seldom been considered. The intent of this series of articles is twofold. First, an overview of the major theorists and their theories will be discussed. Second, practical implications for Christian educators, including suggestions for utilizing teaching methods in the classroom which bridge the gap between theory and practice, will be presented.

The Development of Learning Style Theory

Over the years, educators have asked questions about how people learn. How does a learner receive and process information? How is that information stored within the brain and later retrieved for solving problems and learning new material? How should sequencing and organizing information affect classroom presentation (Keefe, 1988)? Attempts to answer these questions have focused much research in the areas of cognitive styles and learning styles.

Cognitive styles, which attempt to explain how perception is developed, have been defined as “information processing habits representing the learner’s typical mode of perceiving, thinking, problem solving and remembering” (O’Brien, 1994, p. 11). Cognitive styles also have been described as “consistencies in information processing that develop in concert with underlying personality traits” (Merriam & Caffarella, 1999, p. 208). While characteristics of cognitive styles tend to be bipolar, an individual’s personal style falls somewhere along the continuum that exists between both extremes. While these bipolar dimensions have been researched, findings have been unclear in relating cognitive styles to teaching dynamics (Merriam & Caffarella, 1999).

Keefe (1988) defines learning styles to encompass the cognitive domain:

Learning styles is the composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. It is demonstrated in that pattern of behavior and performance by which an individual approaches educational experiences. Its basis lies in the structure of neural organization and personality which both molds and is molded by human development and the learning experiences of home, school and society. (p. 3)

Although learning styles and cognitive styles are often used as synonymous terms, the two are decidedly different concepts. Writings about both concepts can be confusing. Some authors use cognitive styles as a broad term that encompasses learning styles. Others use learning styles as the broader term and include within the concept cognitive styles, affective styles, and physiological styles (Merriam & Caffarella, 1999). Even the concept of learning styles can differ between theorists.

Studies of learning styles give attention both to how a student learns and to how a student prefers to learn. Individual characteristics and preferences grow out of a learner’s genetic makeup, his personality development, his individual motivation to learn, and how the learner adapts to his environment

during learning (Keefe, 1988). While style can change and develop over the years, a learner's preference remains relatively consistent through his life (Pinto, Geiger, & Boyle, 1994). Researchers suggest that learning styles reflect both nature and nurture within the learners' makeup (Dunn, Beaudry, & Klavas, 1989), and conclude that learners tend to adopt one specific style or strategy while engaged in academic learning (Pask, 1988).

Learning style research was documented as an emerging concept during the early 1970s. The writings of Rita and Kenneth Dunn and David Kolb were first published in 1972 and 1971 respectively. Other researchers during these early years include Canfield and Lafferty; Gregorc; Hunt; Ramirez and Castenada; and Schmeck (Dunn, 1984). Each researcher has approached the concept of learning styles from a different vantage point. According to Dunn (1984), "Learning style is the way in which each person absorbs and retains information and/or skills; regardless of how that process is described, it is dramatically different for each person" (p. 12).

Learning style assessment attempts to change learning experiences in two ways. First, assessment of learning styles leads to an effort to match a student's style through the method of information delivery. Second, assessment provides information that can be used in developing the repertoire of learning approaches a student possesses. According to Smith (1990), this development

is achieved in one of two main ways, either via direct instruction or practice or through "metacognitive awareness," wherein it is assumed that a knowledge of one's strengths and preferences (and hence, by implication, of one's weaknesses) is a vital step toward enhanced competence across a range of learning situations. (p. 47)

Curry's Model for Learning Styles

One model for organizing types of learning styles is the Curry model. Curry conducted a survey of 21 recognized learning style theories. From the information received, she initially organized these 21 theories into a three-layered system that can be visualized like the layers of an onion. The center layer, which can be visualized as the core of the onion, focuses on learning behaviors associated with the learner's central personality style. The middle layer of the model focuses on how information is processed. The outer layer of the model describes the way the learner interacts with the learning environment and with instructional practices. Like the layers of an onion, each type of learning style theory describes one part of a learner's behavior (Hickcox, 1995). Curry later updated her research by dividing the outer layer into two layers of theories. The third layer now encompasses theories of how so-

cial interaction affects learning. The fourth and outside layer is now dedicated to instructional preference (Cassidy, 2004). Other studies have corroborated Curry's theory. Marshall (1987) wrote,

This study does provide evidence that the topology has promise as a tool in learning style research and application. As a starting point, the topology can be used for classifying learning style models and instruments into a meaningful structure. It can provide a framework for the re-examination of much of the earlier research and for conducting future research. (as cited in Hickcox, 1995, p. 29)

The outer layer, which documents instructional preferences for learners, is the easiest to research because these preferences are the most observable. Included in this area of learning style research is the work of theorists Canfield and Lafferty; Dunn, Dunn, and Price; Friedman and Stritter; Goldberg; Grasha and Reichmann; Renzulli and Smith; and Rezler and Rezmovic. Because of the close connection of instructional technique and social environment, the work of many of these theorists also appears within the next layer of the model (Cassidy, 2004; Hickcox, 1995).

The second layer focuses on the work of researchers in the area of learners' preferences for social interaction in the learning environment. Included in this area of learning style research is the work of theorists Dunn, Dunn, and Price; Grasha and Reichmann; Ramirez and Castenada; and Keefe and Monks (Cassidy, 2004).

The third layer, which Curry originally designated as the middle layer, documents the work of researchers in the area of how students prefer to receive and process information. Included in this area of learning style research is the work of theorists Biggs; Entwistle, Ramsden, and Tait; Hunt; Kolb; Schmeck, Ribich, and Ramanaih; and Schroeder (Cassidy, 2004; Hickcox, 1995).

The final central layer documents the work of researchers in the area of personality-related preferences while learning. Included in this area of learning style research is the work of Kagan; Myers; Witkin; Gregorc; Holzman and Klein; Pask; Pavio; Kauffmann; Kirton; and Allinson and Hayes (Cassidy, 2004; Hickcox, 1995). These layers provide the framework around which this discussion of learning styles will be arranged.

Reviewing Curry's Outer Layers

Curry identified numerous researchers in the two outer layers of her model and analyzed the reliability and validity of their testing instruments (Hickcox, 1995). Through the years, the learning-style theories of Dunn,

Dunn, and Price as well as Grasha and Reichmann continue to figure prominently in ongoing research by both Curry and others. These theories integrate elements of both instructional preferences and social interaction into a testing instrument that helps learners determine their learning style. Furthermore, each theorist offers suggestions for teachers to modify their instructional practices to match their students' preferred methods of learning. The research of Dunn, Dunn, and Price, as well as Grasha and Reichmann, in the areas of instruction preferences and social interaction will therefore be the focus of this discussion.

Dunn, Dunn, and Price Learning Styles

The Learning Style Inventory (LSI) was first introduced by Rita and Kenneth Dunn in 1974 and has been revised periodically in the years since that date. The validity and reliability of this testing instrument has been demonstrated by several subsequent studies through the 1970s, 1980s, and 1990s (Dunn, Griggs, Olson, Beasley, & Gorman, 1995; Lovelace, 2005). These researchers, in 1995 and 2005 respectively, used meta-analysis of experimental studies conducted using the Dunn and Dunn Learning Style Inventory (LSI) to validate the reliability of this instrument. The Dunn et al. (1995) study was based on 42 experimental studies initially conducted between 1980 and 1990. The Lovelace (2005) study was based on 76 experimental studies conducted between 1980 and 2000. Dunn et al. (1995) concluded, "Matching students' learning-style preferences with educational interventions compatible with those preferences is beneficial to their academic achievement" (p. 353). Lovelace (2005) stated, "Results overwhelmingly supported the position that matching students' learning-style preferences with complementary instruction improved academic achievement and student attitudes toward learning" (p. 176).

The Learning Style Inventory is used to attempt to measure how learners prefer to concentrate while learning difficult information and is based on the premise that learners' academic achievement is often determined by factors other than ability. The research has focused on the interacting elements that affect the concentration of learners based on "(a) the immediate environment, (b) their own emotionality, (c) their sociological needs, and (d) their physical requirements" (Dunn, Dunn, & Price, 1979, p. 40). Within each of these areas are a number of subfactors, each of which is seen along a continuum of extremes (Jonassen & Grabowski, 1993).

Dunn, Dunn, and Price (1985) defined learning style in terms of individual student reactions to 23 elements of instruction environments: Immediate environment (noise level, temperature, light, and design); emotionality (motivation, persistence, responsibility, and structure); grouping

preferences (learning alone, learning with peers, learning with adults present, learning in combined ways, being motivated by the teacher, and being motivated by a parent); physiological characteristics (auditory, visual, tactile, and kinesthetic perceptual preferences, time of day, energy highs and lows, intake, and mobility); and psychological inclinations (global/analytic, hemispheric preference, and impulsive/reflective). Research has demonstrated that teachers are able to identify only a few elements of their students' learning styles through observation; other elements appear to be identifiable through personal interviewing or administration of tests. (Dunn et al., 1990, p. 487)

The Dunn, Dunn, and Price learning style model has at its base several theoretical assumptions. The model assumes that both biological and developmental characteristics are personally involved in an individual's preferred styles of learning and that these preferences vary widely between individuals. The model further assumes that not only can the individual styles be studied, but also the impact of the styles in the classroom can be measured. The model also presupposes that, when learning preferences are accommodated in the classroom, academic achievement will increase as demonstrated through higher achievement and aptitude test scores. Finally, the model recognizes that the less successful a student is academically, the more important it becomes to accommodate the student's learning style within the classroom (Dunn et al., 1995).

Environmental issues include preferences about the noise level, type of lighting, temperature level, and classroom design. Learners prefer either quiet or noise, low or bright lights, and cool or warm temperatures while learning. Environmental preferences also include the design of the classroom and the type of furniture used. Some learners prefer an informal arrangement with lounge chairs, sofas, or even a bed for study. Others learners prefer a more traditional arrangement with wooden or plastic chairs (Jonassen & Grabowski, 1993).

Sociological issues include preferences for the types of learning groups, the presence of authority figures, and how learning is accomplished. For children, the issue of motivation from adults is also included. Learners prefer either learning alone or in groups with peers, with or without authority figures present, and learning through routine or variety (Dunn et al., 1979).

Emotional issues include preferences in the areas of motivation, responsibility, persistence, and structure. Learners approach learning either motivated with a need to succeed academically or unmotivated with no need to succeed. Responsibility includes subfactors of conformity and following through on requirements, and non-conformity as it relates to refusing to follow through because someone asked. Other subfactors include persistently

working until a task is completed and wanting structure (Dunn et al., 1979; Jonassen & Grabowski, 1993).

Physical issues include preferences for modality, intake, mobility, and the time of day for learning. Modality subfactors include auditory or listening, visual or reading, tactile or use of hands, and kinesthetic or use of body preferences. Intake preferences involve the desire for food or drink while concentrating. Time of day preferences address energy levels throughout the day. Mobility subfactors include the need to move or to sit still during learning (Jonassen & Grabowski, 1993). "According to Dunn, the learning-style distribution in an 'average' group is: 30 percent to 40 percent visual, 20 percent to 30 percent auditory, and 30 percent to 50 percent kinesthetic/tactual" (Filipczak, 1995, p. 46).

Research has provided interesting information of the impact of some of these factors and subfactors. For example, reading achievement in the areas of both speed and accuracy is higher when a student's preference for lighting is matched environmentally. Music that has no lyrics has proven to be helpful for studying for those students who prefer a noise level. Additionally, students who were able to match their intake preferences read more rapidly than those who were not able to match these preferences (Jonassen & Grabowski, 1993). "Students exposed to learning-styles responsive instruction have an expected success rate of 70%. Students taught with traditional instructional methods have only a 30% expected success rate and, therefore, a 70% expected failure rate. That finding is true for academic achievement and attitude toward learning" (Dunn et al., 1995, p. 181).

Students from pre-kindergarten through graduate school have participated in studies utilizing the *LSI* test instrument. These studies have supported the theory that

people are not necessarily intelligent because they have a potential, talent, or innate ability. Rather people can demonstrate intelligence because of the manner in which they perceive, comprehend, adapt to new situations, learn from experience, seize the essential factors of a complex matter, demonstrate mastery over complexity, solve problems, critically analyze, and make productive decisions. (Denig, 2004, pp. 100–101)

When learners are taught according to their primary and secondary learning styles, they "achieve statistically higher standardized achievement test scores within 1 year of learning style implementation" (Denig, 2004, pp. 103–104). In addition to greater academic achievement, students also expressed substantial improvement in their attitude toward learning (Lovelace, 2005).

An example of the effectiveness of the proper use of the Dunn and Dunn *LSI* has been demonstrated in Freeport, Illinois, between 1998 and 1999.

When minority students fell significantly behind the Caucasian students in standardized testing, the school system implemented the Learning Styles Model of instruction. Teachers were trained to administer the LSI to students and to interpret the results. Classroom instruction was modified so that students received more instructional time in their primary learning style. As a result of these teaching strategies, students improved their test scores, became involved in learning activities that matched their learning style, and showed greater enjoyment in learning (Burke & Dunn, 2003). In other studies involving low-achieving minority students, the “students earned statistically higher achievement test scores after only one year of a learning style approach. Those students continued that upward trend for the next two to three years” (Burke & Dunn, 2003, p. 169). Other studies have confirmed these results. “When academic underachievers were taught new and difficult (for them) content through instructional approaches that responded to their learning style strengths, they achieved statistically higher standardized achievement test scores than they did when the approach was dissonant from their style” (Denig, 2004, p. 105).

Rayneri, Gerber, and Wiley (2003) conducted a study in 2001 to determine the benefits of using a learning styles model of classroom instruction for both “gifted achievers and gifted underachievers” (p. 199). In general, gifted students bring a high level of personal motivation into the classroom, but often would rather study on their own. Their intrinsic motivation to learn leads them to a greater persistence in completing learning tasks. Many gifted achievers have been found to be more “global/right-brain dominant” than gifted underachievers (Rayneri et al., 2003). In contrast, the underachieving gifted students scored lower levels of persistence in learning, had a greater need for less light and more noise, and required higher levels of tactile learning strategies than achieving gifted students. When these needs were met, the underachieving gifted students demonstrated academic improvement with “more than 80% . . . scoring above the LSI mean” (Rayneri et al., 2003, p. 200).

Complaints lodged against the LSI include the length of the survey and the cost to administer and score it. As a result, Pitts (2002) modified the LSI by developing the Learning Style Preference Inventory (LSPI) to create a reliable test instrument that was easier for a classroom teacher to administer and score. The modified survey, which uses 15 questions requiring an “A” or “B” answer, is used to determine the student’s preference for a global (big picture) or analytic (detailed) approach to learning. By using the LSPI, teachers can simplify the testing process, yet retain the ability to understand the learning preferences of their students so their instructional methods can be modified accordingly (Pitts, 2002).

Another concern about the LSI has been voiced by Stellwagen (2001) who believes that classifying students according to their learning styles leads to stereotyping and labeling students. McCarthy (1997), whose work will be discussed in more detail in article two of this series, also acknowledges that students develop a preferred method for learning new information. However, she believes that “to learn successfully, a student also needs expertise in other learning styles” (p. 46). She emphasizes the need to take students through a multi-step learning process using feeling, thinking, reflecting, and acting upon the learning experience while incorporating activities which involve both right brain and left brain functions (McCarthy, 1997).

The Dunns have drawn implications from the results of their studies. First, they emphasize that every individual has a learning style, or at least a learning preference, which is brought into the classroom. This style or preference is impacted both by biological and experiential development. Second, to expect a learner to adapt to his or her teacher’s teaching style while learning disregards the biological nature of the style within the learner. In fact, findings have indicated a learner’s grade-point average will be higher when his style most naturally matches the style of the teacher (Dunn et al., 1989).

Grasha-Reichmann Learning Styles

Research conducted by Grasha and Reichmann is classified in Curry’s outer layers as well. They developed the Grasha-Reichmann Student Learning Styles Scale (GRSLSS) to discover why some college students perform tasks at different levels than other students. Focusing on a social interaction scale, they attempted to measure how the interaction of students with teachers and fellow students affected learning. Research was conducted in the three dimensions of avoidant/participant, collaborative/competitive, and dependent/independent. Most students fell somewhere between each of these polar dimensions except in the area of avoidant/participant (Jonassen & Grabowski, 1993).

The avoidant/participant scale measures how much an individual wishes to become involved in the classroom environment, reactions to classroom procedures, and attitudes toward learning. The collaborative/competitive dimension measures the motivations behind an individual’s interactions with others (i.e., whether or not fellow students are viewed as competitors or colleagues). The dependent/independent scale measures attitudes toward teachers and how much the learner desires freedom and control in the learning environment (Jonassen & Grabowski, 1993).

The collaborative student views his classmates as colleagues. He is eager to discuss what he is learning with other students. He is a cooperative student in the classroom. He is pleased when the course includes small group discus-

sion and collaboration on group projects. In contrast, the competitive student sees the classroom as an environment in which each student strives to earn recognition for his own achievements. Therefore, he likes to draw attention to himself and seeks any honors offered by the instructor. While he prefers teacher-led instruction, he adapts to group discussions/projects when he assumes the leadership role in the group (Grasha, 1996).

Students classified as avoidant are not interested in engaging in the classroom activities or with the instructors or other students. They are unconcerned with the subject matter and do not really want to be in the class. On the other hand, participatory students exhibit dramatically opposing characteristics. They enjoy attending class and typically complete all required assignments and many of the additional learning exercises. They enjoy lectures and class discussion and prefer to learn from teachers who know the subject matter very well (Grasha, 1996).

The dependent learner prefers a highly structured learning environment and requires frequent encouragement from the instructor. He performs better when the instructor makes several smaller assignments and provides many reminders that work needs to be completed. Meanwhile, the independent learner is capable of monitoring his own academic progress. He completes assignments without reminders and demonstrates self-motivation to learn the material, requiring little supervision and preferring to work on his own. He performs well in independent, self-directed courses and does not enjoy participating in group discussions or projects (Grasha, 1996).

Zelazek (1986) surveyed more than 500 graduate students by administering the GRSLSS. He divided the students into age categories based upon Levinson's groupings within the adult lifespan. He discovered that male students tended to be avoidant learners while female students more often demonstrated participatory learning characteristics. He also found that as students age, they move toward independent and participatory learning styles.

Because of its emphasis on the social environment, the GRSLSS has been used to predict the success rate of students enrolled in online or distance learning courses. Since online and distance learning courses, by nature, tremendously limit the social interaction among students and instructors, some students enjoy the courses while others perform poorly. Diaz and Cartnal (1999) found that successful students in online or distance learning courses scored higher ratings as independent learners and lower ratings as dependent and collaborative learners. "It is not surprising that students who prefer independent, self-paced instruction would self-select into an online class. It may be that they are well suited to the relative isolation of the distance learning environment" (p. 134). By contrast, students who scored higher ratings as dependent, participatory, and collaborative learners were more suc-

cessful in the traditional classroom setting. Since they “prefer structure and guidance, it is not difficult to understand why they might view the isolation and need for self-reliance in a distance education environment with some apprehension” (p. 134).

Findings suggest, however, that students who require social interaction to improve their ability to learn can be successful in online courses when the delivery methods are modified to permit more discussion between students and instructors. When instructors include the use of chat rooms, discussion boards, or listservs as a key component of the online course, socially driven students have the opportunity to interact with others. In some online courses, students actually have more opportunities to interact with their peers than they would experience in a lecture class with hundreds of students. Ross and Schulz (1999) explained,

Independent learners can choose to limit their time collaborating with others, while social learners can choose to spend as much time as necessary on course chat boards, exploring relevant issues and internalizing course material in ways that would not have been possible if it were not for the Web medium. (p. 126)

Although Grasha developed the GRSSLS instrument, he did not fail to point out its potential flaws. Since the results depend upon the students’ self-rating, the instrument is susceptible to error. Students may answer the questions based upon their opinion of a certain class rather than their preference for a specific learning environment. At other times, students may answer questions based upon how they believe they should respond rather than responding honestly. In addition, their responses might indicate what they perceive to be preferred learning characteristics, which they really do not use at all (Jonassen & Grabowski, 1993, p. 283).

The Teaching of Jesus

What significance does this information have for Christian educators? Should the teaching methodology of Christian educators reflect learning styles theory in their classroom setting? The answer to these questions can be found in considering the teaching example of Jesus.

Jesus demonstrated a variety of methods in His teaching. He used stories and illustrations, parables, questions, discussion, lecture, object lessons, and debates to communicate His message in a way that connected to His learners. “There is nothing stereotypical about the patterns of Christ’s teaching. It’s difficult to find Jesus ever doing the same thing in the same way” (Gangel & Hendricks, 1988, p. 25). Why was He willing to use a variety of methods in or-

der to communicate His message? When Jesus' teaching is considered, four characteristics can be identified.

First, Jesus adapted His teaching style to fit the specific situation. For example, when teaching the multitude on a mountainside, He addressed His learners using lecture (Matt 5–7). However, when He was alone with the disciples, He used object lessons, such as the washing of their feet to demonstrate servant leadership (John 13:5–20). He demonstrated that the number of learners in a teaching situation should determine the choice of teaching methodology.

Second, Jesus matched His teaching method with the message He needed to communicate. For example, in His encounter with the Samaritan woman at the well, He used questions to lead her to explore the truth of His message (John 4:7–30). When He wanted to help the disciples visualize His teaching, He led them to experience the Lord's Supper (Matthew 26:26–29; Mark 14:22–25; Luke 22:17–20).

Third, Jesus led His learners in moving from concrete experiences to abstract principles. For example, He used stories to connect common life events to spiritual truths. In the story of the Good Samaritan, He taught His learners what it meant to be a good neighbor (Luke 10:30–37). In the Parable of the Sower, He demonstrated how the kingdom of God would develop (Matthew 13:3–23).

Fourth, Jesus taught to transform lives rather than to impart information. For example, He used mentoring assignments to teach His disciples how to share their faith (Luke 10:1–20). Furthermore, He never became anxious about trying to cover too much information in His short 3-year ministry. Often, "teachers are interested in how much a student can cram into his head and then regurgitate onto a piece of paper. . . . That's not education" (Hendricks, 1987, p. 38). Instead, Jesus understood that receiving information was not as important as seeing lives changed (see John 16:12–13). Ultimately, Jesus was concerned with the needs of His learners. He understood their culture, their traditions, and their life needs. All of these elements were taken into consideration in His teaching process. Christian educators should be no less concerned with teaching the total person the truths of God's Word.

Suggestions for Teaching

In considering the research presented thus far, several teaching suggestions can be drawn. First, educators can recognize the influence of the learning environment on the students. Professors can evaluate their classrooms for effective lighting, sound, and room arrangement to determine if the environment supports the learning process. In addition, the environment can be modified periodically to support a variety of teaching activities.

Second, educators can evaluate their own teaching methodology to determine how effectively students become participants in the learning process. Educators who create learning activities that involve students can strengthen even a lecture-based session.

Third, during the length of a course, an educator can use different types of learning groups in order to build on the sociological needs of the learners. Since learners respond differently to the size of learning groups (small, medium, or large), offering a variety of learning group activities will involve the largest number of learners over the duration of the course.

Fourth, the educator needs to recognize his own learning style since this style will impact his preferred teaching methods. Additionally, an educator needs to identify the learning preferences of his students. The bringing together of these two styles can help create an effective atmosphere for transformation learning.

Questions and Implications Drawn from Learning Styles Theories for Christian Teaching

A review of learning styles raises as many questions as it answers. For instance, what difference does it make to understand a learner's preferred learning style? Should understanding learning styles impact how a teacher teaches? If a teacher accepts that individual styles are a reality and chooses not to use that information effectively in teaching, has he fulfilled the task of teaching? Can students identify their own learning styles? If so, what impact will that knowledge have on the student's motivation in the classroom?

While these questions are not yet completely answerable from the research conducted to date, several implications about learning styles can be drawn. First, if we accept that individual preferences as well as biological and environmental issues affect how someone learns, we must begin to rethink teaching and learning strategies. Gregorc (1984) suggests a sense of urgency is necessary:

Perhaps teachers set a "tone" in their classrooms which favors certain styles, systems of thought, and mind qualities. Those learners who comply with the teacher's preferred style may receive favoritism while their counterparts are reprimanded for their individualities. Perhaps learners and teachers can develop stylistic behaviors which they do not now demonstrate. (p. 54)

Second, too strong an emphasis on an individual's learning style can lead the learner to boredom. Grasha (1984) questioned, "How long can people tolerate environments that match their preferred learning style before they be-

come bored?" (p. 51). He emphasized the need for every student to be stretched occasionally beyond the point of comfort. "Learning involves stress, tension, and anxiety" (p. 51). When the learning environment and methodology matches the learner's style, the challenge to learn can be missing. Stretching the learner involves exposing him to unfamiliar or alternative learning styles deliberately with both learning goals established and the cooperation of the learner obtained (Grasha, 1984).

Third, if we are not careful in using our knowledge of learning styles, we run the risk of viewing learners with a perspective limited by stylistic concepts. Learners often meet our expectations, even when the expectations are inaccurate or unjustified. Grasha (1984) warned that if we see people only through the narrow focus of learning styles, "people are led to believe that they have certain preferences for how they learn. Finally, the possibility of self-fulfilling prophecies is substantial" (p. 52). The use of learning styles should be focused on providing a balance for learners. Learners need to learn within the comfort of their style while still being stretched and encouraged to try other styles as well.

Fourth, older learners will be more motivated and self-directed in the learning process than younger learners will. However, studies on the university level suggest that most colleges teach on a pedagogical (the learner is dependent upon the teacher) rather than an andragogical (the learner is motivated to learn on his own) format. Findings recommend the adoption of a variety of methods and the redirection of classroom styles to move students toward an andragogical approach (Sheehan, McMenamin, & McDevitt, 1992).

Dunn and Dunn (1979) found that teachers often fall back into predictable patterns of teaching. "In our investigations into individual teaching styles, we found that instructors believe that the way they learn is the 'easy' or 'right' way, and that they therefore direct their students, offspring, and spouses toward mastering knowledge in much the same manner" (p. 241). Learning styles research can help us transfer the emphasis from the ways teachers teach to the ways learners best learn. As learning styles research from other layers of Curry's model is considered in Part II and Part III of this series, these questions and implications should guide our study.

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