

Impact of Learning-Style Instructional Strategies on Students' Achievement and Attitudes: Perceptions of Educators in Diverse Institutions

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Abstract: Educators from various institutions responded to key questions concerning learning style as it was implemented in their institutions and communities. Among those items explored were the impact of learning styles on teaching practices, syllabi, and values and whether the construct improved instruction or student outcomes, how it improved students' perceptions of their learning outcomes, and how it contributed to the profession of education.

Keywords: international learning-style network centers, learning style, student outcomes, teaching practices

Almost thirty years ago, St. John's University and the National Association of Secondary School Principals (NASSP) cooperated to explore the possible impact of learning-style instructional strategies on student achievement and attitudes. In five years, that initial effort expanded into a national network that continued expanding to include thirty centers on four continents by 1994. The group, the International Learning Styles Network, currently includes one or more centers in Australia,

Bermuda, Brunei, Denmark, Finland, the Philippines, Singapore, Sweden, Turkey, and the United States.

Originally, the researchers implemented many theorists' learning-style models, examined their effects, and analyzed their results (Gregorc 1982; Hill 1971; Kolb 1976; McCarthy 1982; NASSP 1999, ctd. in Thomson 1980). After several years of experimentation, the Network board unanimously decided to focus on the Dunn and Dunn learning-style model because of its extensive research base (Shea Doolan 2004). Today, the International Learning Styles Network (2008) Web site highlights a bibliography that includes more than 870 studies on this model that researchers at more than 135 institutions of higher education worldwide have conducted. The site also alerts educators to conferences, seminars, workshops that individual centers conduct, and an annual international institute to which participating centers contribute. It is important to highlight the comments of the educators who have been involved at the forefront of this network over time and to summarize the research concerned with the effects of learning style on students in multiple locations.

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The Dunn and Dunn Learning-Style Model

The Dunn and Dunn model defines learning style as the way individuals begin to concentrate on, process, internalize, and retain new and difficult information (Dunn and Dunn 1993). It incorporates twenty to twenty-one elements dependent on the age-appropriate assessments administered. Those elements are subdivided into five strands that include individuals' immediate *environment* (sound, light, temperature, and seating design), *emotionality* (motivation, task persistence, responsibility, and structure), *sociological preferences* (learning alone, in pairs, with peers, as part of a team, with either an authoritative or collegial teacher, or with social variety or in patterns), *physiological preferences* (perceptual strengths, such as auditory, verbal/kinesthetic, visual text or visual picture, tactual, and/or kinesthetic; and intake, time-of-day energy levels, and mobility requirements), and *cognitive processing inclinations* (analytic versus global and impulsive versus reflective characteristics; see figure 1).

With this model, individuals are either analytic or global processors or a combination of both called *integrated*. The majority of school-age pupils that have been tested are global. According to international findings, most learners have between zero to six perceptual modalities or *strengths*—auditory, visual/picture, visual/print, tactual, kinesthetic and/or verbal kinesthetic. Perceptual strengths enable children to learn easily, with difficulty, or not at all—depending on how they are introduced to new and challenging information or skills (Dunn and Dunn 1992, 2005). Students officially classified with Attention Deficit Disorder have no well-developed perceptual strengths prior to their high-school years (Brand, Dunn, and Greb 2002).

Identification of each individual's learning style does not lend itself to observation alone; results obtained that way are likely to be inaccurate (Beaty 1986). Researchers can use valid and reliable instruments to assess learning styles for preschool children, for grades three to five and six to twelve, and for adults. Learning-style variables do not affect learners equally. Some students are impacted

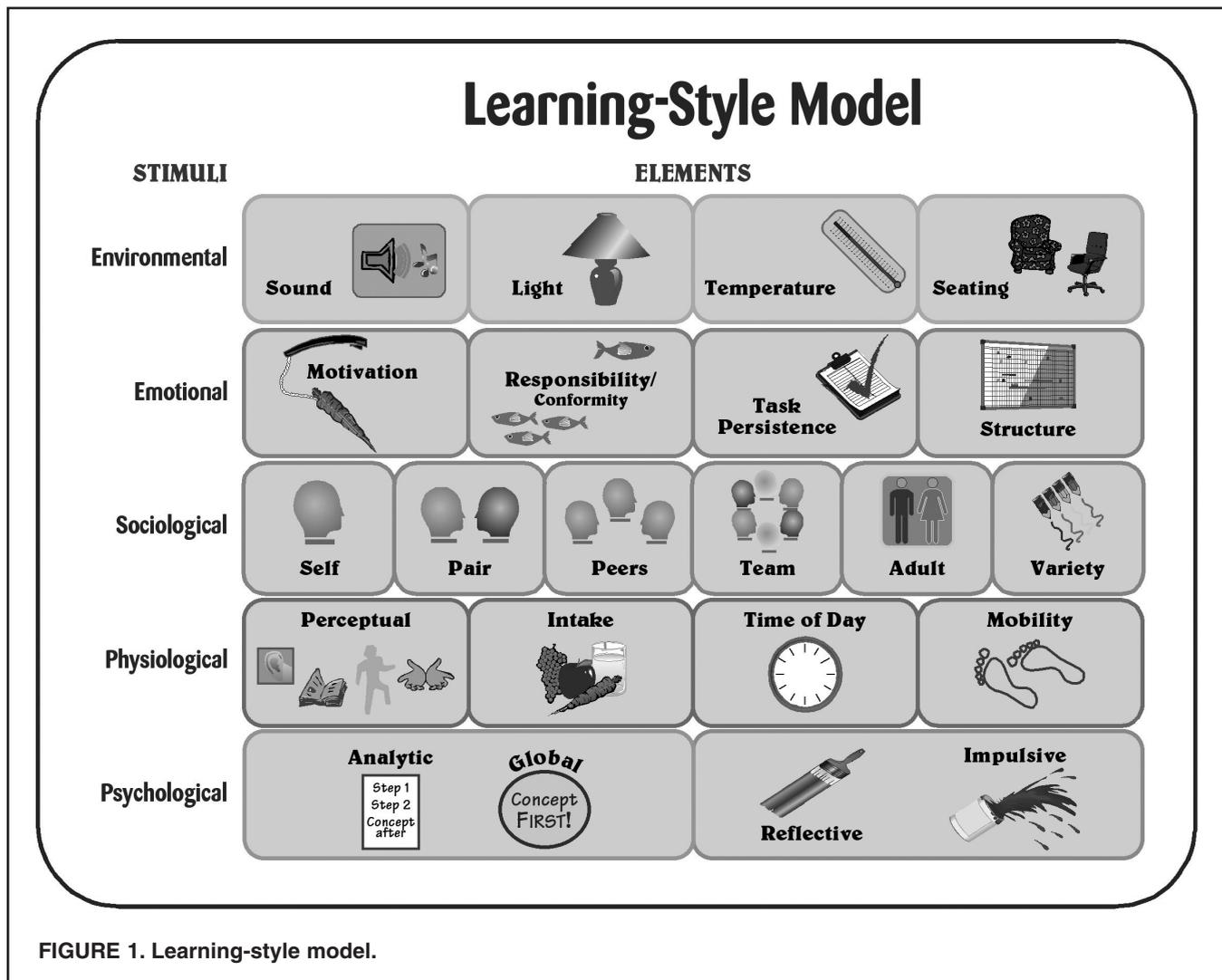


FIGURE 1. Learning-style model.

by between one and six elements, others by as many as seventeen. The majority of learners, however, are affected by between six to fourteen elements.

Over four decades, Dunn and Dunn and colleagues developed and experimented with a variety of instructional methods that gradually demonstrated their effectiveness with students' selected learning-style characteristics (Dunn and Griggs 2007). Each of these strategies has proven beneficial for people with unique abilities and limitations such as mildly and emotionally handicapped (Brunner and Majewski 1990); learning disabled (Hill 1987); multiculturally diverse (Dunn 1993a); in special education (Alberg et al. 1992; Dunn and De Bello 1999; Fine 2003); in regular education (Andrews 1990; Braio et al. 1997; Favre 2007a, 2007b); and gifted (Dunn 1993b, 1993c; Milgram, Dunn, and Price 1993; Milgram, Price, and Dunn 1995; Wasson 1980).

Key Questions Asked and Answered

Question 1: What Has Been the Impact of Learning Styles on Teaching Practices?

In one institution, instructors provided all Child Study majors information about the Dunn and Dunn model and assessed for their learning-style preferences. During student-teaching seminars, instructors discussed and demonstrated examples of environmental accommodations, global introductions, tactual and movement-oriented strategies, and sociological groupings. Student teachers then incorporated responsive techniques into their lesson plans for kindergarten to sixth graders. Throughout their student-teaching placements, they used this information to plan and deliver lessons. Many students reported that their cooperating teachers were so impressed that they asked to keep the lessons and materials intact for their future use.

Several colleges and universities identify the learning styles of every entering freshmen group with *Building Excellence* (Rundle and Dunn 2007) and provide seminars on how to capitalize on the information. This knowledge was particularly valuable for at-risk students and the professors in whose classes they were enrolled. At the completion of those seminars, student evaluations reflected their increased self-awareness and improved study skills.

As a result of the impact on freshmen, administrators conducted college-wide presentations and professional development seminars for faculty to increase their understanding of learning style. In one community college in Florida, researchers experimented with training professors through their learning style (Hart 2005). At one campus in New York, administrators introduced the concept and teachers related its practices to preschool and kindergarten families. At another New York site, the researcher showed parents of first

graders how to help their children study through tactual and kinesthetic resources (Ferdenzi, Griggs, and Dunn 1998/1999).

In several states, administrators established university-school partnerships to provide in-service for K-12 teachers and field-testing opportunities for researchers. In addition, those administrators provided the Special Education Parent Teacher Association learning-style approaches to help their children with homework assignments. Finally, many faculty worldwide conducted studies to determine whether patterns existed among the learning styles of students by age, achievement, ethnicity, gender, and nationality (Dunn and Griggs 2007).

Question 2: What Has Been the Impact of Learning Styles on Syllabi?

At two universities (New York and Connecticut), doctoral programs were established in Instructional Leadership emphasizing learning styles. In Oklahoma, one state university infused several masters- and doctoral-level courses focused on learning style into their degree requirements. In both undergraduate and graduate courses in Brunei, Denmark, Norway, the Philippines, Sweden, and the United States, learning style serves as both the theoretical basis and practical application of required learning and assignments. The range of disciplines and courses extends to business, foundations of education, instructional methods, integrated language arts, legal writing, English as a second language and multicultural approaches, reading, and thesis seminars.

Learning-style based assignments are required for content mastery. Topics are often taught through a Contract Activity Package (CAP) or Programmed Learning Sequence approach. In one of the doctoral programs cited earlier, all learning-style courses are designed as CAPs. Brainstorming, case studies, circles of knowledge, and team learning have become an integral component of course delivery and content mastery. One of the major contributions of learning style is that options are available for course assignments, examinations, projects, and quizzes. In addition, many courses have been designed for online delivery in which students are tested for their learning-style strengths and are encouraged to work through their perceptual and time-of-day characteristics in their most favored learning environment.

Question 3: What Has Been the Impact of Learning Styles on Values?

Learning style has impacted students beyond the classroom (Dunn and Griggs 1998; 2000). Some points survey respondents cited were:

1. Learning style, as a dimension of diversity, encourages everyone to respect and accept a variety of appropriate behaviors in the teaching and learning process.
2. Teachers become self-motivated to internally

reflect on their philosophy of education as it impacts everyday interactions with students and colleagues.

3. Staff awareness is sensitized to the point that it increases self-directed autonomous learning.

4. Students accept responsibility for their learning regardless of their instructor's teaching style.

5. The concept makes the delivery of subject matter value driven and personal.

6. The concept promotes a sense of social justice and equity.

7. Knowledge of style and brain processing inevitably reduces bias.

Question 4: How Have Learning Styles Improved Instruction?

Teachers deliver content in ways that better match students' strengths. This leads to increased academic performance and improved attitudes toward school (Lovelace 2005). Exposure to learning style requires recognition of the need for diverse strategies designed to complement individual differences. As a result, teachers make a concerted effort to eradicate the one-size-fits-all approach and acknowledge the need to modify their classrooms, instructional practices, and assessments (Favre 2007a, 2007b; Fine 2003; Shea Doolan 2004). Education stakeholders recognize that these modifications are essential for academic success. Textbooks and materials are slowly changing from being essentially analytic, auditory, and visual to becoming increasingly global, kinesthetic, and tactual (Fine 2003).

Question 5: How Have Learning Styles Improved Student Outcomes?

At-risk students are an international problem, as evidenced by the participation of so many centers in the International Learning Styles Network (2008); however, viable solutions have been available in the learning-style literature for more than three decades. Furthermore, research supporting those solutions is published in refereed research journals and many professional books (International Learning Styles Network). The strength of those solutions is corroborated in two separate meta-analyses that demonstrate the effects of matching specific teaching strategies with individual students' learning-style strengths.

The first meta-analysis of forty-two experimental studies conducted at thirteen universities between 1980–90 using the Dunn and Dunn learning-style model revealed eight coded variables that produced sixty-five individual effect sizes (Dunn et al. 1995). The overall, unweighted group effect size value (r) was .384, and the weighted effect size value was .353, with a mean difference (d) of .755. Referring to the standard normal curve, this suggested that students whose learning styles were accommodated could be expected to

achieve 75 percent of a standard deviation higher than students who had not had their learning styles accommodated. This indicated that matching students' learning styles with compatible educational interventions positively impacted their academic achievement.

Lovelace (2005) completed the second meta-analysis of seventy-six experimental studies conducted at multiple universities. The total sample size (N) was 7,196 and the total number of individual effect sizes was 168. Four PhD candidates completed dissertations on the meta-analysis at the university at which it was conducted; twenty-one candidates completed dissertations on it from seventeen other universities. The overall data reported significantly higher test scores when teachers employed the Dunn and Dunn learning-style strategies compared with traditional teaching, irrespective of the university at which the study was conducted. Most effect sizes were medium to large, dependent on the elements tested. Few effect sizes were small, but some elements affected students more than others.

Lovelace (2005) reported that doctors decided it was unethical to not provide a treatment for all patients that had an effect ten times smaller than the effect of prescribing learning-styles responsive instruction. In stronger terms, physicians opted to prescribe aspirin to prevent heart attacks on the basis of a randomized, double-blind experiment that achieved an average effect size of only $r = .034$; therefore, educators should implement learning-style based instruction since it averages effect sizes ten times greater than those of the aspirin experiment. Considering these findings, should the educational profession consider regular education unethical? It does seem "immoral and illegal for certified teachers to negatively classify children who learn differently, instead of teaching them the way they learn" (Dunn et al. 1991, 1).

Question 6: How Have Learning Styles Improved Students' Perceptions of Their Learning Outcomes?

All contributors (the authors collected surveys from other center directors) reported that the majority of their students described knowledge of their learning styles as a helpful tool. It improved perceptions of their personal abilities and empowered them to strive beyond what they had previously accomplished. When students understand how they learn best, they inevitably adjust conditions and devise strategies for facilitating their progress. They become able to study more effectively and realize that it is not what, but how they study that really counts (Geiser 1998).

Academically underperforming adults benefited most when they realized that the school system misjudged them and failed to adapt instruction to their unique ways of learning. College students acknowledged that discovering their learning styles assisted

them in becoming better learners and increased their self-efficacy. When teachers and students enjoyed teaching and learning, it improved their relationships, students' performances, and overall achievement.

Question 7: How Do Learning Styles Contribute to Education?

Decades before state education departments began adopting the phrases *active* or *engaged learning* as an instructional mandate or standard, learning-style researchers demonstrated that children learn significantly more, and more easily, when they are actively participating instead of listening. In collaboration with learning-style pioneers during the early 1980s, when the NASSP's members received information on the learning-style construct, many sought instructional modifications that led to the impetus of governmental change (Shea Doolan 2004). Hence, at the national level, rehabilitation legislation mandated the learning-style assessment of all clients with disabilities that the Vocational and Educational Services for Individuals with Disabilities serviced. In Virginia, the Departments of Labor, Health and Human Services, Education, and the Related Agencies Appropriations Act appropriated \$750,000 specifically for learning-styles research, and its teaching licensing policy included the learning-styles construct. In Oklahoma, twelve higher education presidents agreed and publicly announced that teachers would be warranted in the learning-styles construct. In Michigan, in 2000, an increasing number of districts began emphasizing learning style, and when state policies impacted educational mandates in Florida, Georgia, Michigan, New Jersey, New York, Oklahoma, and Texas, students who required remediation had to be taught with instructional methods congruent with their learning-style strengths (Shea Doolan).

Learning style has become a well-known concept in the Nordic nations and a pedagogical platform for recognizing and responding to individual differences. Politicians and publishing firms have recognized and supported the concept (Boström 2004). Learning style generated political debates and legislative mandates—that is, the federal requirement that all special education students be provided individualized educational plans based on their learning styles.

In the United States, the No Child Left Behind (2001) legislation shifted educators' focus onto standardizing and measuring student performance. Everyone recognizes that student diversity has increased substantially, costs more than education for native-born Americans (Read 2000), and is more difficult to deliver. Differentiated instruction has become part of every school systems' lexicon but without learning styles as its cornerstone, no one knows how to differentiate instruction or on what to base differentiation. Few educators are trained in the effective implementation of any styles other than conventional teaching.

The American Association of Colleges for Teacher Education (2008) established thirteen essential knowledge bases to prepare preservice and in-service teachers for culturally and linguistically diverse classes. One of those is the recognition of learning-style theory and research (Smith 1998). Teacher training must accomplish clear processes for differentiating instruction on the basis of learning style so that each individual is taught effectively. To teach effectively, instructors must know how to teach individuals on the basis of their identified brain processing, environmental requirements, sociological inclinations, perceptual strengths, and interests or talents. That is exactly what learning-style identification provides.

As early as 1980, Scott Thomson, executive director of NASSP, said, "the ability to map learning styles is the most promising development in curriculum and instruction in a generation. It is the most scientific way we know to individualize instruction" (1). Almost three decades ago, he was right on target.

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