Learning styles and the creation of effective learning environments are of emerging significance in education as the changing nature of work requires higher-order thinking skills. Although learning style may be simply defined as the way people come to understand and remember information, the literature is filled with more complex definitions of the term that tend to reflect the perspectives of different learning styles inventories. Learning style patterns are also defined in various ways. For example, they may be categorized according to perceptual, cognitive, and affective dimensions. The perceptual dimension of learning is influenced by physical and sensory elements that reflect the body's response to external stimuli. Cognitive styles of learning are learners' ways of receiving, storing, processing, and transmitting information. The affective dimension of learning encompasses all aspects of personality, with personality dictating how an individual acquires and integrates information. Finding ways to address different students' learning styles is a challenge. Vocational educators have a history of varied instructional practices through their promotion of hands-on learning and knowledge transfer. The advent of constructivism has expanded this tradition. A number of techniques that vocational educators can use to promote concepts of brain-based learning have been identified. (Contains 13 references) (MN)
Learning Styles and
Vocational Education Practice
Practice Application Brief

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Learning Styles and Vocational Education Practice

Learning styles and the creation of effective learning environments are of emerging significance in education as the changing nature of work requires higher-order thinking. Workers must be able to analyze and interpret information to solve problems for which there are no given answers; connect facts, concepts, and processes; integrate functional capacities and behaviors; and transfer thinking across environments (Brown and Fritz forthcoming). To realize their intellectual capacity, students must become engaged in learning, stimulated by information that is presented to them in personally meaningful ways. Learning styles research identifies a broad range of preferences that individuals have for the way they assimilate information and the implications of those preferences for instructional design. This Practice Application Brief examines the definitions, categories, and characteristics of various learning styles; describes the instruments used to assess learning styles and provides guidelines to help vocational teachers use information on learning style to create effective learning environments.

Definitions of Learning Styles

Although learning style may be simply defined as the way people come to understand and remember information, the literature is filled with more complex variations on this theme. James and Gardner (1995), for example, define learning style as the "complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn" (p. 20). Merriam and Caffarella (1991) present Smith's definition of learning style, which is popular in adult education, as the "individual's characteristic way of processing information, feeling, and behaving in learning situations" (p. 176). Swanson (1995) quotes Reischman's reference to learning style as "a particular set of behaviors and attitudes related to the learning context" and also presents Klee's definition of learning style as "the cognitive, affective, and physiological factors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (p. 2). These definitions have understandable variations as they tend to reflect the perspectives of different learning style inventories. For example, the Grattha-Reichmann Student Learning Style Scale distinguishes among social interaction preferences, which includes behavior and attitude tendencies (ibid.).

Cognitive

Cognitive style of learning refers to learners' ways of "receiving, storing, retrieving, transforming, and transmitting information" (Merriam and Caffarella, 1991, p. 139). This dimension incorporates issues of right brain/left brain functioning (hemisphericity), global/analytical orientation (psychology), and field dependence/field independence (field articulation). It reflects the ways people think about and process information, e.g., the tendency for right-brained, global, and/or field dependent learners to view things broadly and left-brained, analytical, and/or field independent learners to require detailed outlines (ibid.).

Kolb describes learning as a process by which one moves from concrete experiences to reflective observations to abstract conceptualization and finally to active experimentation (Swanson, 1995). Drawing upon Kolb's theory, Swanson describes ways in which people absorb information and make sense of an experience by categorizing learners as divergers, assimilators, convergers, and accommodators. These definitions reflect McCarthy's 4-MAT model, which identifies types of learners as concrete, abstract, reflective, and active (Asselin and Mooney, 1996), correlating how people absorb information (divergers and assimilators) and how they make sense of experience (convergers and accommodators) (Swanson, 1995, p. 5-6):

Divergers perceive information concretely and process it reflectively. They are called imaginative learners because they integrate experiences with the self and need to be personally engaged in the learning process. Assimilators perceive information abstractly and process it actively. They are pragmatists and place a high value on skill development and problem solving. Convergers perceive information abstractly and process it reflectively. They learn by sequen-
tual thinking, and are attentive to detail. Accommodators perceive information concretely and process it actively. They are dynamic learners who relish change, risk-taking, and flexibility.

Several well-known instruments that define cognitive ability include Kolb's Learning Style Inventory, Gregorc's Style Definition, McCarthy's Hemispheric Model of Indicator, and Hermann's Brain Dominance Inventory (James and Gardner 1995).

Affective

The affective dimension of learning encompasses all aspects of personality, with personality traits that are initiating the evolutionary process of learning (Swanson 1995). Personality sets the stage for how one acquires and integrates information. It reflects genetic influences as well as the influences of culture, environment, and experiences. Two learning style models that emphasize personality are Hermann Witting's bipolar construct of field dependence and field independence, which measures the extent to which the learner is influenced by a surrounding field, and the Myers-Briggs Type Indicator (MBTI), which assesses the relative strength of the processes of introversion versus extraversion, sensing versus intuition, thinking versus feeling, and judging versus perceiving.

The ways students interact in the classroom and deal with the elements of attention, emotion, and value are reflective of the affective dimension of learning. They reveal an individual's preferences for social setting and social constructs of learning, e.g., working alone, in pairs, on a team. The Grau-Reichmann Student Learning Style Scale addresses these preferences by asking students to respond to questions concerning their orientation toward learning, views of instructor and/or peers, and reactions to classroom activities, like those done by James and Gardner (1995). Other instruments that address affective dimensions of learning include the Kiersey Temperament Sorter and Honey and Mumford's Learning Styles Questionnaire (James and Gardner 1995). Instruments that have proved to be effective in addressing all three dimensions of learning—perceptual, cognitive, and affective—are the Productivity Environment Preference Survey, Learning Styles Inventory Reliability Report, and the Learning Style Profile (Ibid.).

Applications and Instructional Strategies

Whether assessing individuals or cultural groups, it is apparent from the literature that learning styles differ. Finding ways to address these differences is a challenge to educators. Vocational educators have a history of using instructional practices through the promotion of hands-on learning and knowledge transfer. This tradition is now expanded through the advent of constructivism, which attests that people construct knowledge based on the shaping of internal mental models, using previous experience, taking into account sociological/emotional issues, and building problem-solving skills (Bruch 1996). Constructivist pedagogy is reflected in current school-to-work initiatives that require students to be active learners who draw upon perception, cognitive, and affective learning dimensions as they "test academic theories via tangible real world application" (Loring 1998, p. 1). It implies that instructors need to develop connections between brain functions and to teach in accordance with the way the brain operates. As Parnell (1996) notes, the brain tends to discard information for which it finds no connection or meaning for which the meaning is obscure.

Brain research shows that the brain performs many functions simultaneously—thoughts, emotions, imagination, and predispositions—which are continually interacting within social and cultural contexts (Brown and Fritz forthcoming). This functioning for each individual is as unique as a human fingerprint, which is individual brain structure (Koslow 1997, p. 59). Therefore, brain-based learning supports the proposition that students must expand their repertoire of techniques for accommodating the students' diverse learning styles. It reflects the concept of multiple intelligences, which suggests that individuals have logical-mathematical intelligences can no longer be "given preferential treatment over musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and natural intelligences" (ibid., p. 10). Strategies for applying knowledge of diverse learning styles in the classroom may be developed by drawing upon the following techniques for promoting concepts of brain-based learning suggested by Caine and Caine (1995, pp. 66-70):

- Coordinate student learning experiences to draw upon and reflect the simultaneous processing of all brain functions.
- Introduce novelty, discovery, and challenge into the learning environment.
- Engage students in active learning processes, such as problem solving and critical thinking to help them develop personally relevant learning patterns.
- Create a supportive emotional climate.
- Provide learning experiences that engage the functions of both left and right brain hemispheres.
- Extend the learning environment beyond that of the learner's immediate focus.
- Incorporate awareness and reflection as part of the learning process.
- Draw upon the personal world of the learner to expand memory functions.
- Enhance spatial memory through experiential learning activities.
- Create in learners a state of relaxed alertness.
- Use a multifaceted approach to teaching that allows for uniqueness.

References


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