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Theoretical Perspectives, Research Findings, and Classroom Implications of the Learning Styles of American Indian and Alaska Native Students

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DIGEST

Although research on learning styles has found variation between cultural groups in styles of learning (e.g., Park, 2001; Zhang & Sternberg, 2001), great variation has also been found within groups (e.g., Nuby & Oxford, 1998). These findings suggest that even in classrooms consisting exclusively of a single cultural group, as is the case in many reservation schools, teachers must use a variety of instructional strategies. Effective teaching requires teaching individuals.

This Digest begins with a brief discussion of two prominent definitions of learning styles and then describes studies that have found differences between the learning styles of American Indian students and students of other cultural groups. The Digest then presents instructional interventions stemming from learning styles research.

Defining Learning Styles

The research literature on learning styles comes from several disciplines, contributing to the disjointed, inconsistent, and often contradictory information regarding what learning styles are and how they can be measured. According to DeBello (1990), "There are nearly as many definitions of learning styles as there are theorists" (p. 203). Sternberg (2001) reports that most learning styles research studies have yet to be replicated. Further, studies tend to be tied to a particular instrument, often without sufficient evidence of construct validity or internal consistency, and whatever the particular instrument measures is called a style. Sternberg offers his own definition of styles: habitual patterns or preferred ways of doing something that are consistent over long periods and across a variety of activities. He defines five dimensions of learning styles: function (creative, task-oriented, or evaluative), forms (singular or distributed focus, flexible, or prioritized), levels (concrete or global), scope (intrapersonal or interpersonal), and leanings (liberal or conservative).

Another prominent definition was put forth by Riding and Rayner (1998), who saw learning style as an individual's repertoire of learning strategies (the ways in which learning tasks are habitually responded to) combined with cognitive style (the way information is organized and represented). They maintain that while it may be possible for learning *strategies* to change over time, the cognitive *style* dimensions in their model (wholist-analytic, the tendency to either organize information into wholes or parts; and verbal-imagery, the tendency to represent information while thinking either verbally or in images) do not.

While Sternberg maintains that learning styles, by his definition, vary across contexts, may change over time, and are, to some degree, socialized, Riding and Rayner argue that they are relatively fixed and therefore *not* malleable.

Research Findings on the Learning Styles of American Indian Students

Research, based on a variety of theoretical frameworks and using a variety of methodologies and instruments, suggests that among American Indian and Alaska Native students, there is some tendency toward (a) a global, or holistic, style of organizing information, (b) a visual style of mentally representing information in thinking, (c) a preference for a more reflective style in processing information, and (d) a preference for a collaborative approach to task completion. Evidence supporting each of these claims is herewith fully discussed.

Global (holistic) cognitive style. Learners who organize information globally derive meaning from concepts by first developing an understanding of the whole context. In contrast, analytic, or linear, thinkers develop understanding after all the pieces are understood separately then brought together (Tharp, 1989). Much classroom instruction is dominated by an analytic presentation of information, with little consideration of the overall context or meaning (Henderson & Landesman, 1995). Two studies based on this theoretical dichotomy examined the cognitive organization of information of American Indian students. First, Davidson (1992) studied differences in the cognitive strengths of American Indian and White students using the Kaufman Assessment Battery for Children. She found that, on average, students in the American Indian sample scored higher on simultaneous processing (used in global, or holistic, cognition) while students in the White sample scored higher in sequential processing (used in analytic, or linear, cognition). Second, Backes (1993) described two types of learners: the abstract-random learners, who prefer deductive, holistically presented information, and the concrete-sequential learners, who prefer inductive, linear instruction. Global/holistic thinkers benefit from (a) an overview of concepts prior to explanations of segments or details, (b) discussions focusing on overarching themes and use of metaphors, and (c) use of visual presentations. Using the Gregoric Style Delineator, Backes assessed learning style differences between American Indian (Chippewa) and non-Indian students, especially in how they process and organize information. He found that the largest percentage of students in the American Indian sample fell predominantly into the abstract-random range, and the largest percentage of students in the non-Indian sample scored in the concrete-sequential range.

Visual cognitive style. Many studies have shown that there are greater proportions of visual information processors (as opposed to verbal) among Native American groups of students than among students from other groups (e.g., Rougas, 2000; Morton, Allen, & Williams, 1994). For example, Rougas used the Woodcock-Johnson Psycho-Educational Battery Test of Cognitive Ability to examine differences between Mohawk and White adolescents' visual abilities. Her study found significant differences, with students in the Mohawk sample demonstrating greater strength in visual processing. Though there were also differences found between the samples in long-term retrieval, short-term memory, auditory processing, comprehension-knowledge, and broad cognitive ability, the means for both samples in all areas fell within the average range on all these subscales.

Morton, Allen, and Williams (1994) used the Wechsler Intelligence Scale for Children to test differences in language and nonlanguage tasks with English monolingual Ojibwa and non-Indian adolescents. They found that students in the American Indian sample performed better on subtests linked with visual/spatial processing, and that the control group did better on the language subtests.

In a study linking style to achievement, Riding and Rayner (1998) found that, given a choice of learning material, verbalizers will choose the text version and imagers will choose a version with illustrations. Imagers almost double their learning performance if they are presented with information that includes text and illustration compared to just text, while the performance of verbalizers remains the same.

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Reflective information processing. Some students learn by observing the tasks they are to perform, referred to by Nelson-Barber and Estrin (1995) as a watch-then-do approach. The Myers-Briggs Type Indicator was used to examine the learning styles of Native American and African American secondary students (Nuby & Oxford, 1998), revealing significant differences: Students in the African American sample scored higher on the "judging" scale, associated with quick decision making, while students in the Native American sample scored higher on "perceiving," associated with a more relaxed, reflective decision-making style.

Collaboration. According to many American Indian and Alaska Native observers, in traditional Native communities and homes, children usually collaborate with others to accomplish tasks and solve problems (see, for example, Chavers, 2000). However, in most classrooms, students are expected to complete much of their work individually. According to sociocultural theory, children naturally and often effortlessly develop into competent members of their families and communities by engaging in dialogue and shared activity with more experienced members (Vygotsky, 1978). Riding and Read (1996; as cited in Riding and Rayner, 1998) found that while all students in their self-report study preferred pair or group work to individual work, "wholists" (global/holistic thinkers) were especially partial to group work, lower-ability "wholist-imagers" in particular.

Research on Instructional Interventions

Though disparate and often confusing, the research literature on learning styles has given rise to a variety of instructional interventions aimed at improving the learning of American Indian students. For example, Hilberg, Tharp, and DeGeest (2000) studied Native American middle school students in a two-week unit on fractions, decimals, and percentages. Students first generated survey questions of interest, then collaborated in small groups to analyze and depict survey results. They found that students in the experimental group retained more mathematics and reported more positive attitudes toward mathematics than students in the control groups.

In a quasi-experiment involving sixth-grade mathematics classes on an Indian reservation in New Mexico over eight weeks, students in the experimental condition formed self-selected student-led groups in which they rotated to learning stations to engage in a variety of tasks. In addition to allowing self-direction, these activities emphasized visual, tactile, and auditory materials. Students in the self-directed, peer-learning condition outperformed their peers in achievement in mathematical concepts and skills (Cardell, Cross, & Lutz, 1978).

Hopkins and Bean (1999) examined the effects of a verbal-visual word association strategy for word root instruction with middle and high school students on the Cheyenne Reservation in southeastern Montana, using a think-aloud procedure to model the strategy followed by guided practice and informal collaboration. Students created a word graph for each word consisting of the root, its definition, a personal association, and a visual of the association. Authors reported that students demonstrated increased achievement on quizzes and improved interest and engagement.

Hayes and Allinson (1993) performed a review of studies that examined the interactions between individual learning styles and instructional strategies. Ten of 17 studies support the hypothesis that the instructional strategies used will influence the achievement of students with different learning styles. Swailes and Senior (2001) propose that learning styles research would benefit from development of a better, unified theory, and that more research is needed on the differences between preference, styles, and strategies. Riding and Rayner (1998) stated that much of the work on learning styles to date has been exploratory, and that we now must systematically investigate the aspects, nature, role, and applications of learning styles.

Conclusion

While there are many theories, models, and instruments that purport to measure learning styles, there seems to be evidence to support two useful conclusions based on research conducted to date. First, there are some differences in learning styles between cultural groups. Second, there is growing evidence that instruction for both Native and non-Native students that includes observational and collaborative activities, and in which information is presented holistically and with visuals, produces gains in student achievement.

At a recent gathering of educators and researchers working with Native students (Chavers, 2000), it was asserted that improving education for Native students will require long-term commitments and funding for research on student learning styles and their impact on student achievement. We propose that this research must also include additional tests of classroom interventions that accommodate differences in learning styles.

References

Backes, J. S. (1993). The American Indian high school dropout rate: A matter of style? *Journal of American Indian Education, 32*(3), 16-29.

Cardell, G. W., Cross, W. C., & Lutz, W. J. (1978). Peer learning among Indian students: Extending counselor influence into the classroom. *Journal of American Indian Education, 17*(2), 7-12.

Chavers, D. (Ed.). (2000). *Deconstructing the myths: A research agenda for American Indian education*. Albuquerque, NM: Catching the Dream. (ERIC Document Reproduction Service No. ED447985)

Davidson, K. L. (1992). A comparison of Native American and White students' cognitive strengths as measured by the Kaufman Assessment Battery for Children. *Roeper Review, 14*(3), 111-115.

DeBello, T. C. (1990). Comparison of eleven major learning styles models: Variables, appropriate populations, validity of instrumentation, and research behind them. *Journal of Reading, Writing, and Learning Disabilities International, 6*(3), 203-222.

Hayes, J., & Allinson, C. W. (1993). Matching learning style and instructional strategy: An application of the person-environment interaction paradigm. *Perceptual and Motor Skills, 76*(1), 63-79.

Henderson, R. W., & Landesman, E. M. (1995). Effects of thematically integrated mathematics instruction on students of Mexican descent. *Journal of Educational Research, 88*(5), 290-300.

Hilberg, R. S., Tharp, R. G., & DeGeest, L. (2000). The efficacy of CREDE's standards-based instruction in American Indian mathematics classes. *Equity & Excellence in Education, 33*(2), 32-40.

Hopkins, G., & Bean, T. W. (1999). Vocabulary learning with the verbal-visual word association strategy in a Native American community. *Journal of Adolescent & Adult Literacy, 42*(4), 274-281.

Morton, L. L., Allen, J. D., & Williams, N. H. (1994). Hemisphericity and information processing in North American Native (Ojibwa) and non-Native adolescents. *International Journal of Neuroscience, 75*(3/4), 189-202.

Nelson-Barber, S., & Estrin, E. T. (1995). *Culturally responsive mathematics and science education for Native students (Information Analyses)*. San Francisco, CA: Far West Laboratory for Educational Research and Development. (ERIC Document Reproduction Service No. ED388483)

Nuby, J. F., & Oxford, R. L. (1998). Learning style preferences of Native American and African American secondary students. *Journal of Psychological Type, 44*, 5-19.

Park, C. C. (2001). Learning style preferences of Armenian, African, Hispanic, Hmong, Korean, Mexican, and Anglo students in American secondary schools. *Learning Environments Research, 4*(2), 175-191.

Riding, R., & Rayner, S. (Eds.). (1998). *Cognitive styles and learning strategies: Understanding style differences in learning and behaviour*. London: David Fulton Publishers.

Rougas, M. E. (2000). *A cognitive profile of Mohawk adolescents using the Woodcock-Johnson Tests of Cognitive Ability-Revised*. Unpublished Dissertation, State University of New York, Albany, NY.

Sternberg, R. J. (2001). Epilogue: Another mysterious affair at styles. In R. J. Sternberg & L. F. Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles* (pp. 249-252). Mahwah, NJ: Lawrence Erlbaum Associates.

Swailes, S., & Senior, B. (2001). The learning styles questionnaire: Closing comments? *International Journal of Selection and Assessment, 9*(3), 215-216.

Tharp, R. G. (1989). Psychocultural variables and constants: Effects on teaching and learning in schools. *American Psychologist, 44*(2), 349-359.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. (J. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds. and Trans.). Cambridge, MA: Harvard University Press.

Zhang, L. F., & Sternberg, R. J. (2001). Thinking styles across cultures: Their relationships with student learning. In R. J. Sternberg & L. F. Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles* (pp. 197-226). Mahwah, NJ: Lawrence Erlbaum Associates.

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