

FIELD DEPENDENCE-INDEPENDENCE OF AMERICAN INDIAN STUDENTS ENROLLED IN SECONDARY AGRICULTURAL EDUCATION

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Abstract

With a growing American Indian population, agriculture teachers must be poised to provide effective education. This study sought to determine the learning styles and traditionalism of Navajo students enrolled in a secondary agricultural education program. The Group Embedded Figures Test and a researcher-developed instrument were used to gather the data. The results revealed that students, in general, prefer a field independent style of learning. The style of learning, however, varied by students' gender and degree of traditionalism. Based on the findings, recommendations are offered for teaching American Indian learners.

Introduction

Demographic changes in the U.S. population are accelerating at a rapid pace. Banks (1991) asserted that the growth rate in the nation's population of people of color continues to outpace the growth of the nation's White population. Banks postulated that by the year 2020, students of color will make up about 46% of the nation's school-age youths.

Once known as the "vanishing Americans," the American Indian population has increased at every Census count since 1940 (Banks, 1991). During 1994, the American Indian population (including Alaskan Natives) grew by 1.5% from the 1990 Census, while the White population only grew by 0.8% (Bureau of Census, 1995). In 1990, more than one-half of the American Indian population lived in six western States (Oklahoma, California, Arizona, New Mexico, Alaska, and Washington) (Hodgkinson, 1992).

Major changes in American Indian education have occurred in the past two decades. Tharp and Yamauchi (1994) stated that 85-90% of American

Indians are educated in the public school and the remaining 10-15% are educated in schools operated under private contract or by the Bureau of Indian Affairs. They also stated that American Indian students, as a group, are not succeeding in these schools. In 1990, 66% of the 1,080,000 American Indians 25 years and older were high school graduates or higher. This figure was reported to be below the total U.S. population (75%) (Bureau of Census, 1995). Of the students who stayed in school, they had a greater possibility of being labeled learning disabled or handicapped than students of other ethnic groups (Tharp & Yamauchi, 1994).

These statistics are not only of national concern, but also a concern for agricultural education. With a growing American Indian population, agriculture education teachers must be poised to provide effective education. According to Baruth and Manning (1992), effective education for American Indian learners requires consideration of each individual's learning style. Learning style has been described as "consisting of distinctive behaviors which serve as indicators of how a person learns from and adapts to his/her

environment” (Gregorc, 1979, p. 234)

More (1987) postulated that research and teacher data indicate that important differences in learning style between students and their non-Indian counterparts are often observed. According to Lesser (1976), “people who share a common cultural background will also share, to a certain extent, common patterns of intellectual abilities, thinking styles and interests” (p. 137).

Related Literature

A number of authors (Swisher & Deyhle, 1989; Kaulbach, 1984; Baruth & Manning, 1992; More, 1987) have compared American Indian learners and Caucasian learners. On the basis of their literature review, Swisher and Deyhle (1989) concluded that American Indian learners have strong visual perceptions and learn most effectively through observation, watching, and modeling. Kaulbach (1984) summarized studies on the performance of American Indian learners on visual, auditory, and kinesthetic perceptual tasks. He concluded that American Indian learners are most successful at processing visual information and have the most difficulty with auditory perception.

Baruth and Manning (1992) described the American Indian learning style as preferring to learn using visual/perceptual/spatial information rather than verbal means; using mental images to remember or understand words and concepts rather than word associations; and with strengths in processing information in a global/analytic manner (e.g., they focus on the whole rather than the part).

Similarly, More (1987) examined and synthesized research on American Indian learning styles in four areas: (1) Internal Cognitive Process; (2) External Conditions; (3) Teaching and Communication Styles; and (4) Traditional Learning Styles. He summarized that American Indian learners have:

- a. higher frequency and relative strength in global processing on both verbal and non-verbal tasks;
- b. relative strength in simultaneous processing, but a possibility that sequential processing abilities develop much slower than simultaneous skills because they are not used as the primary grades;
- c. the possibility of using strengths in simultaneous processing to develop sequential processing;
- d. higher frequency and strength in processing visual/spatial information;
- e. higher frequency and relative strength in using imagery for coding and understanding;
- f. lower frequency and relative weakness in verbal coding and understanding; and
- g. relatively more impulsive (or watch-then-do rather than trial-and-error). (p. 24)

Learning styles differences may be attributed to the cultural and early socialization experiences by American Indian learners (Swisher, 1991). Guilmet (1979) attempted to explain the quiet nature of American Indian learners from a cultural perspective. He stated that the learning style of American Indian learners is to be silent in school because they were taught to be this way at home and in their community. Their social structure stresses learning through non-verbal mechanisms such as observation. From this socialization, American Indian learners bring this learning style with them into the classroom.

Socialization, combined with traditionalism contribute to differences in learning styles among American Indian learners. Traditionalism represents individuals’ value and belief system. Understanding American Indian learners’

traditionalism should be given prime consideration in the teaching and learning experiences because their earliest experiences are of home and family, and their language is an important part of this traditionalism (Baruth & Manning, 1992).

In agricultural education, much research has been conducted on learning style. The majority of this research has focused predominately on preservice teacher education (Cano, Garton, & Raven, 1992; Raven, Cano, Garton, & Shelhamer, 1993; Cano & Garton, 1994; Whittington & Raven, 1995), and secondary education students (Cox, Sproles, & Sproles, 1988; Marrison & Frick, 1994; Cox & Connors, 1996; Garton, Thompson, & Cano, 1996). While these studies have provided a better understanding of students' learning styles in agricultural education, no research has been identified that investigates the learning style of American Indian learners enrolled in secondary agricultural education. In his review of American Indian learning style literature, More (1987) concluded that while differences do exist between American Indian and non-American Indian learners, they "are not consistent enough to suggest a unique Indian learning style, but occur often enough to warrant careful attention" (p. 17).

Purpose and Objectives

The purpose of the study was to assess the learning style and traditionalism of American Indian learners. The specific objectives of the study were:

1. To describe the personal characteristics and traditionalism of American Indian learners.
2. To assess the learning style of American Indian learners.
3. To determine if differences exist between American Indian learners' gender and learning style.

4. To determine if differences exist between American Indian learners' traditionalism and learning style.

Procedures

A descriptive research design was used in the study. The target population was American Indian learners enrolled in secondary agricultural education programs. The accessible population was American Indian learners enrolled in agricultural education at Tohatchi High School during the spring semester of 1997. Tohatchi High School is a public institution located on the Navajo reservation which extends across the New Mexico and Arizona state line. The program consisted of four (4) agricultural education classes. The class roster served as the frame for the study. All Dine (Navajo) students enrolled in the agricultural education program were selected for the study ($N=78$).

Two data collection instruments were used in completing the objectives of the study. The Group Embedded Figures Test (GEFT), developed by Oltman, Raskin, and Witkin (1971), and a researcher developed instrument served to gather the data. The GEFT was used to assess the learning style of the subjects using a continuum approach to determine field independence or field dependence. Field independence is measured by the degree to which individuals can separate a figure from its background, a part of the whole, or oneself from the environment and other people. Field independent persons are analytic, dislike rigid systematization and routines, and engage in active learning. Conversely, field dependent persons are less able to separate each part from the whole, engage in spectator approaches to learning, are intuitive and attentive to social cues, and often are described as emotionally receptive (Dunn & Griggs, 1995). It is important to note that the characteristics of field independence/dependence describe the extreme ends of the continuum and persons falling along the continuum may possess characteristics of both a field independent and field

dependent learner. Persons can be scored from 0 to 18 on the GEFT. Persons scoring below the national mean of 11.4 were categorized as field dependent learners, and person scoring above the national mean were categorized as field independent learners (Witkin, Oltman, Raskin, & Karp, 1971).

The GEFT is a standardized test and has been assessed for validity by its developers (Witkin et al., 1971). The reliability of the GEFT was measured by treating each scored section of the test as split halves. Witkin et al. (1971) reported a corrected Spearman-Brown coefficient of .82 as an estimate for reliability for males and females combined.

The second instrument was used to gather personal characteristics and traditionalism data from the subjects. Characteristic data gathered included age, gender, number of siblings, and current grade level. Traditionalism data was gathered using a series of questions related to the topic. Traditionalism was operationally defined as students' use or non-use of the Athapaskan language, more commonly known as "Navajo", their alliance with grandparent(s), and participation in traditional ceremonies. The instrument was assessed for face and content validity by a panel of five professors at New Mexico State University considered to be well versed in instrument development. Because the students' characteristics were considered to be stable, reliability estimates were not calculated on this instrument. The questionnaire was formatted according the suggestions provided by Dillman (1978).

Arrangements for data collection were made with the proper authorities at Tohatchi High School a priori. The data were collected on a Thursday, February 27, 1997. Careful consideration for this date was given to avoid absenteeism, holidays, and/or special school events. All data were collected on-site by one of the researchers.

During the administration process, each class of students was first given a brief explanation of the purpose of the study and assurance of confidentiality. Ensuing the explanation, the GEFT was administered following the strict guidelines provided by the developers (Oltman, et al., 1971). The researcher and the agriculture education teacher remained in the classroom during the data collection to assist students when needed and to ensure the integrity of the data gathered.

At the end of the data collection period, data were gathered from 62 subjects yielding an 80% response rate. Non-respondent error was attributed to absenteeism of students. No effort was made to control non-response error, thus the data hold true only for those who responded.

Data were analyzed using SPSS/pc Windows Version. Frequencies, percentages, and measures of central tendencies and variance were reported. Because the subjects in the study did not comprise a probabilistic sample, no effort was or should be made to extrapolate the findings.

Findings

Characteristics of students enrolled in Tohatchi High School agricultural education program are presented in Table 1. Characteristic data included age, gender, number of siblings and high school grade level.

It was found that the average age for subjects was 16.8 with a standard deviation of 1.2. Male students accounted for 80.6 percent ($n=50$) of the subjects, while 19.4% ($n=12$) were female. Approximately 95% of the students reported having one or more siblings. Of those who reported having a sibling ($n=59$), approximately 66% had one to four siblings, whereas, 29% of the subjects had reported having more than four siblings. With regard to grade level of the students, 8.1% ($n=5$) were Freshmen, 21.0%

($n=13$) were Sophomores, 33.9% ($n=21$) were Juniors, and 37.1% ($n=23$) were Seniors.

Traditionalism was measured using a series of questions that probed the students' home environment. Students' use or non-use of their native language, their association with the grandparent(s), and practice of traditional Navajo ceremonies were used as proxies to traditionalism. If students responded "Yes" to the questions, they were considered to exhibit traditionalism. Table 2 presents the items associated with traditionalism. It was found that approximately 94% ($n=58$) of the students reported that their families speak Navajo at home, whereas 37.1% ($n=23$) considered themselves fluent Navajo speakers.

With regards to friends and school, a relatively small percent (15.8%; $n=9$) indicated they speak fluent Navajo with their friends and at school.

However, when questioned whether or not their families follow traditional Navajo beliefs, the majority (72.6%; $n=45$) of the students reported "Yes." Similarly, 71% ($n=44$) of the students indicated their family actively participated in traditional Navajo ceremonies. When questioned about their alliance with their grandparent(s), approximately 36% ($n=22$) of the students reported that their grandparent(s) live with their immediate family. Additionally, the majority (75.8%; $n=47$) of the students reported to spend time with their grandparent(s).

The GEFT was used to assess students' learning style (Table 3). Students scoring greater than the national mean of 11.4 were said to possess field independent characteristics, whereas those scoring below the national mean were said to possess field dependent characteristics (Witkin et al., 1971).

Table 1 Characteristics of Students Enrolled in THS Agricultural Education Program ($n=62$)

Variable	f	%	M	SD
Age			16.8	1.2
Gender				
Male	50	80.6		
Female	12	19.4		
Number of Siblings				
None	3	4.8		
One	6	9.7		
Two	8	12.9		
Three	11	17.7		
Four	16	25.8		
More than four	18	29.0		
High School Grade level				
Freshman	5	8.1		
Sophomore	13	21.0		
Junior	21	33.9		
Senior	23	37.1		

Table 2 Traditionalism of Students Enrolled in THS Agricultural Education Program (n=62)

Item	Yes		No	
	f	%	f	%
Family speak Navajo at home	58	93.5	4	6.5
Speak fluent Navajo	23	37.1	39	62.9
Speak fluent Navajo at friends ^a	9	15.8	49	84.5
Speak fluent Navajo at school ^a	9	15.8	48	84.2
Family follow Navajo beliefs	45	72.6	17	27.4
Family actively participate in Navajo ceremonies	44	71.0	18	29.0
Grandparent(s) live in household	22	35.5	40	64.5
Spend time with grandparent(s)	47	75.8	15	24.2

^a Frequency reflects missing data.

It was found (Table 3) that, in general, students tended to be more field independent (\underline{M} = 13.3; \underline{SD} =3.8). Individual learning styles scores ranged from 0 to 18. Additionally, it was found that 24% (\underline{n} =12) of the males were field dependent, while the majority (76%; \underline{n} =38) were field independent. Learning style scores for males ranged from 2 to 18. Conversely, females comprised both field dependence (50%; \underline{n} =6) and field independence (50%; \underline{n} =6) equally. Learning style scores for females ranged from 0 to 17. Comparatively, male students (\underline{M} =13.8) tended to be more field independent than their female (\underline{M} =11.4) counterparts (Table 4).

With respect to traditionalism, students' whose families did not speak Navajo (\underline{M} =15.2) at home tended to be relatively more field independent than students whose families did (\underline{M} =13.2) speak Navajo at home (Table 4). Students who did not speak fluent Navajo (\underline{M} =13.5) tended to be relatively more field independent than students who did speak fluent Navajo (\underline{M} =12.9). However, students who spoke Navajo with their friends (\underline{M} =14.6) tended to be relatively more field independent than those who did not (\underline{M} =13.4).

Similarly, students who spoke Navajo at school (\underline{M} = 14.9) tended to be relatively more field independent than those who did not (\underline{M} =13.4).

Regardless of whether or not students' families followed traditional Navajo beliefs or participated in traditional Navajo ceremonies, students tended to be field independent (Table 4). Similarly, students tended to be field independent whether or not students' grandparent(s) resided in their home. However, students who did not spend time with their grandparent(s) (\underline{M} =14.1) tended to be relatively more field independent than students who did (\underline{M} =13.1).

Conclusions/Recommendations/Implications

Based on the findings, the following conclusions, recommendations and implications were made. Characteristically, it was concluded that students enrolled in Tohatchi High School agricultural education program tended to be male upper-class with the majority having four or more siblings.

Students, in general, were field independent.

Given the related literature, this conclusion appears to be counter intuitive. One might hypothesize that American Indian learners would be field dependent because of their strong social structure. However, upon further consideration of the nature of the course of study in which students were enrolled, one must factor in the discipline of the course - agriculture. At Tohatchi High School, as with other schools, agricultural education courses are student electives. Witkin, Moore, Goodenough, and Cox (1977) noted that field independent learners tend to prefer mathematic and science-related disciplines. Thus, students will self-select themselves into a discipline which they would perceive to enjoy. In her study of Athapaskan and Algonquin Indian cultural groups, Weitz (1971) found the overall group were more field independent.

Categorically, male students were more field independent than female students. Weitz (1971) found that females were more field independent than males.

When considering the multitude of differences among American Indian people, Baruth and Manning (1992) warn that “to assume that all American Indian learners have similar learning styles shows a disregard for nations, tribes, and individuals, as well as educational and

socioeconomic backgrounds” (p. 49). Swisher (1991) indicated that over-generalization can contribute to 1) stereotypic notions about the relationship between learning style and cultural group membership; 2) discriminatory practices (e.g., inappropriate grouping); and 3) inappropriate excuses for failure in teaching and learning.

While a single index cannot be calculated for traditionalism, one can conclude there are degrees of traditionalism exhibited by students. For example, items pertaining to family or grandparent(s) tend to reflect patterns of traditionalism. However, items pertaining more directly to student behaviors tend to reflect a removal from traditionalism. This would imply that students perceive their family to be traditional, but generally do not link themselves to the family’s traditionalism.

While the items in the study selected to measure traditionalism do not represent the universe of items measuring traditionalism, they do provide a beginning for understanding how traditionalism influences learning style. With some exception, it was concluded that students who are less traditional tend to be relatively more field independent than those who are traditional. The exceptions are students who speak fluent

Table 3 Learning Style of Students Enrolled in THS Agricultural Education Program (n=62)

	Learning style			
	<u>Field dependence</u>		<u>Field independence</u>	
Gender	<u>f</u>	<u>%</u>	<u>f</u>	<u>%</u>
Male	12	24	38	76
Female	6	<u>50</u>	6	<u>50</u>
All Students	18	29	44	71

Note. M=13.3; SD=3.8; Range=0 to 18

Table 4 Students' Learning Style by Gender and Traditionalism (n=62)

Variable	f	M	SD	Range
Gender				
Male	50	13.8	3.29	2to 18
Female	12	11.4	5.24	0 to 17
Family speak Navajo at home				
Yes	58	13.2	3.84	Oto 18
No	4	15.2	3.59	Oto 18
Speak fluent Navajo				
Yes	23	12.9	4.12	2to 18
No	39	13.5	3.68	Oto 18
Speak fluent Navajo at friends ^a				
Yes	9	14.6	2.92	10 to 18
No	49	13.4	3.52	2to 18
Speak fluent Navajo at school ^a				
Yes	9	14.9	3.02	Oto 18
No	48	13.3	3.52	8to 18
Family follow Navajo beliefs				
Yes	45	13.2	4.01	Oto 18
No	17	13.8	3.27	8to 18
Family actively participate in Navajo ceremonies				
Yes	44	13.3	4.08	2to 17
No	18	13.6	3.24	Oto 18
Grandparent(s) live in household				
Yes	22	13.6	3.84	Oto 18
No	40	13.2	3.86	8to 18
Spend time with grandparent(s)				
Yes	47	13.1	4.08	Oto 18
No	15	14.1	2.92	8to 18

^aFrequency reflect missing data.

Navajo with friends and at school, and students whose grandparent(s) live in the household. This was contradictory to Weitz (1971), who found that traditional Athapaskan and Algonquin Indian cultural groups were more field independent.

It is recommended that educators at Tohatchi High School recognize the variation of student learning styles and degrees of traditionalism among students. Cox and Ramirez (1981) recommended that teachers use direct observation and classroom experiences for instruction that

takes account of learning styles. They recommend 1) assessing students' preferred ways of learning and the way(s) in which students' behaviors change from situation to situation; 2) planning learning experiences that incorporate the students' preferred ways of learning--using teaching methods, incentives, materials, and situations that are planned according to student preferences; 3) evaluating the learning experiences in terms of attainment of conceptual or other goals, as well as in terms of observed student behaviors and involvement; 4) as the year progresses, plan and implement student participation in learning experiences that require behaviors that the student has previously avoided; and 5) continue to provide familiar, comfortable, successful experiences, as well as to gradually introduce the student to learning in new ways (Cox & Ramirez, 1981).

Swisher and Deyhle (1989) provided more specific recommendations for teaching American Indian learners. They suggest 1) get to know the norms and values of the community; 2) be aware of the student's background knowledge and experiences; 3) discuss students' learning styles with them and help them understand why they do what they do in learning situations, 4) be aware of the pacing of the activities within a time framework that may be rigid and inflexible; 5) be aware how questions are asked - think about the communication style of the students; 6) remember that some students do not like to be spotlighted in front of the group; 7) provide time for observation and practice before performance; and 8) provide feedback that is immediate, consistent, and private, if necessary.

It is recommended that further research be conducted on the learning style of students of color. As the nation's population of people of color continues to grow, agricultural education will see an increase in enrollment from this population. With this knowledge will come understanding. With understanding, appropriate adjustments can be made in the curriculum and delivery of instruction in agricultural education.

References

Banks, J.A. (1991). Teaching strategies for ethnic studies (5th ed.). Boston: Allyn and Bacon.

Baruth, L.G., & Manning, M.L. (1992). Multicultural education of children and adolescents. Boston: Allyn and Bacon.

Bureau of Census (1995). Population profile of the United States. Current population reports, series P23-189, U.S. Government Printing Office, Washington, D.C.

Cano, J., & Garton, B.L. (1994). The relationship between agriculture perservice teachers' learning style and performance in a methods of teaching agriculture course. Journal of Aericultural Education. 35(2), 6-11.

Cano, J., Garton, B. L., & Raven, M. R. (1992). The relationship between learning and teaching styles of student performance in a Methods of Teaching Agriculture course. Journal of Aericultural Education. 33(3), 8- 15.

Cox, B., & Ramirez, M. (1981). Cognitive styles: Implications for multiethnic education. In J. Banks (Ed.), Education in the 80s: Multiethnic Education, 6 1-7 1. Washington, D.C. : National Education Association.

Cox, D.E., & Connors, J.J. (1996). Learning styles and cognitive performance of secondary school pupils. Proceedings of the National Agricultural Education Meeting. 23(1), 15-22.

Cox, D.E., Sproles, E.K., & Sproles, G.B. (1988). Learning style variations among vocational agriculture students. Journal of AATEA. 29(1), 1 1-19, 44.

Dillman, D. A. (1978). Mail and teleuhone surveys: The total design method. New York: John Wiley & Sons.

Dunn, R., & Griggs, S.A. (1995).

Multiculturalism and learning styles: Teaching and counseling adolescents. Westport, CT: Praeger.

Garton, B.L., Thompson, G.W., & Cano, J. (1996). The learning styles of secondary agriculture teachers and students: Similar or Different? Proceedings of the National Agricultural Education Meeting, 23(1), 153- 16 1.

Gregorc, A.F. (1979). Learning/teaching styles: Potent forces behind them. Educational Leadership, 36, 234-236.

Guilmet, G.M. (1979). Maternal perceptions of urban Navajo and Caucasian children's classroom behavior. Human Organization, 38, 87-9 1.

Hodgkinson, H. (1992). The current condition of Native Americans. Eric Digest. ERIC Clearinghouse on Rural Education and Small Schools, Charleston, WV. (ERIC Document Reproduction Services, No. ED 348 202)

Kaulbach, B. (1984). Styles of learning among Native children: a review of the research. Canadian Journal of Native Education, 11(3), 27-37.

Lesser, G. (1976). Cultural differences in learning and thinking styles. In Messick, S. (Ed.), Individuality in learning. San Francisco: Jossey-Bass.

Marrison, D.L., & Frick, M.J., (1994). The effect of agricultural students' learning style on achievement and their perceptions of two methods of instruction. Journal of Agricultural Education, 35(1), 26-31.

More, A.J. (1987). Native Indian learning styles: A review for researchers and teachers. Journal of American Indian Education, 27(1), 17-29.

Oltman, P.K., Raskin, E., & Witkin, H.A. (1971). Group Embedded Figures Test. Palo Alto, CA: Consulting Psychologist Press.

Raven, M. R., Cano, J., Garton, B. L., & Shelhamer, V. (1993). A comparison of learning styles, teaching styles, and personality styles of preservice Montana and Ohio agriculture teachers. Journal of Agricultural Education, 34(1), 40-50.

Tharp, R.G., & Yamauchi, L.A. (1994). Effective Instructional Conversation in Native American Classrooms. National Center for Research on Cultural Diversity and Second Language Learning, Santa Cruz, CA. (ERIC Document Reproduction Services, No. ED 372 896)

Swisher, K. (199 1). American Indian/Alaskan Native learning styles: Research and practice. Eric Digest. ERIC Clearinghouse on Rural Education and Small Schools, Charleston, WV. (ERIC Document Reproduction Services, No. ED 33 5 175)

Swisher, K., & Deyhle, D. (1989). The styles of learning are **different**, but the teaching is just the same: Suggestions for teachers of American Indian youth. Journal of American Indian Education, Special Issue (August), 1-1 1.

Weitz, J.M. (1971). Cultural change and Field Dependence in two Native Canadian linguistic families. Unpublished Doctoral Dissertation. University of Ottawa.

Whittington, M. S., & Raven, M. R. (1995). Learning and teaching styles of students in the northwest. Journal of Agricultural Education, 35(4), 61-66

Witkin, H.A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. Review of Educational Research, 47(1), 1-64.

Witkin, H.A., Oltman, P.K., Raskin, E., & Karp, S.A. (1971). A manual for the embedded figures tests. Palo Alto, CA: Consulting Psychologist Press.