LEARNING STYLES ON THE GILA RIVER INDIAN RESERVATION

by

Lynda Rando

A Master's Research Project Submitted in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

OTTAWA UNIVERSITY
January 1993

LEARNING STYLES ON THE GILA RIVER INDIAN RESERVATION

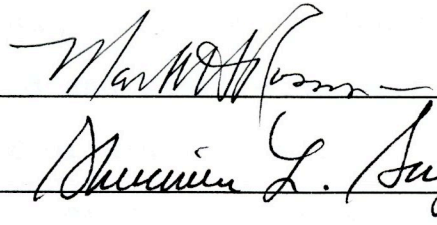
by

Lynda Rando

has been approved

December 1992

APPROVED:



ACCEPTED:

Director of Graduate Studies

ABSTRACT

A study was conducted to determine the learning styles of Indian high school students and their teachers at Estrella Mountain High School, located forty miles south of Phoenix on the Gila River Indian Reservation.

The basis for this researcher's hypothesis comes from previous research findings which claim that teachers are predominantly left brain learners, and that Indian students are predominantly right brain learners.

A review of the literature on the subject of brain dominance and Native American learning styles seems to indicate that when a student's learning style is incompatible with the adult teacher's learning style, students become dissatisfied and frustrated with school, and are more likely to drop out of high school.

A test for brain dominance was administered to fourteen adults and fifty Indian students at Estrella Mountain High School on October 6 and 12, 1992. The results of the study do not support, in totality, the researcher's hypothesis. While the majority of adults did, in fact, test for left brain dominance, Indian students tested for whole brain dominance, not right brain dominance.

ACKNOWLEDGEMENTS

There are several people who deserve to be acknowledged for their help, guidance, leadership, and willingness to be involved in this project.

First, I'd like to extend my appreciation to Dr. Mark Rossman who availed himself to me at any time of the day and who brought vision to the project.

I am also indebted to Dr. Robert Rhodes, who provided me with an abundance of literature on the subject of Native American learning styles and who continually kept me focused on my goal.

Last, but not least, I'd like to extend my heartfelt thanks to the teachers, students and principal at Estrella Mountain High School, who graciously agreed to participate in this study and fully supported me throughout the entire phase of the project.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

THE PROBLEM

Background

For the past thirty years, researchers have suggested that behavioral, social, and economic problems that plague the Native American community are the contributing factors to the high drop-out rate in this country.

While it is true that problems at school, trouble with the law, and substance abuse are all "legitimate" reasons as to why students drop out of school, little weight or credence has been given to other reasons stated by Indian students which include boredom in school, frustration with their teachers, and little relevance between what is being taught and the real world (Brandt 1992, 57).

The national drop-out rate for Native American students dropping out of high school on or before the tenth grade ranks somewhere near 36%; presently a higher drop out rate than any other ethnic group (U.S. Department of Education, 1991).

When we look at the evolution of westernized education, it is no secret that our traditional system of teaching has failed, dismally, in its attempt to reach and educate the Indian student.

The National Education Goals for American Indians require all native students to have the full opportunity to become

competent and proficient in an array of skills and abilities, in particular, reading, listening, and writing (U.S. Dept. of Education, 1991). While these goals are well intentioned, our traditional methods of teaching have not successfully met the needs of the Indian student population.

Westernized school activities and curriculum are designed to accommodate a style of learning in which substance and content are taught in a linear and sequential fashion. Unfortunately, not all students benefit from this teaching style. Equal emphasis on "teaching" to the learning style of the Indian student, must be deemed "as important" to the learning process as is the very substance of what is taught.

In a diverse school setting, it is essential that professional staff have ample opportunities to update their skills in order to effectively meet the needs of an indigenous student population (Brandt, 1992).

In looking at how Indian children learn, one must look at the manner of teaching as well. The tradition of storytelling is used early on in an child's development and is regarded as a form of enrichment. Indian children are taught to listen, reflect and discover his or her own meaning of the spoken word.

Responsibility is an expectation in the Indian world. Children learn the concept of responsibility through observation, incubation, and experimentation (American Indian Education Handbook, 1991).

In most traditional school settings, students are encouraged and rewarded on their individual performance. In the Indian world, much of this behavior presents a direct conflict with their cultural world, in which children learn to work cooperatively with their peers, in which the goal is for the good of the whole, not the individual. Great pressure is placed on the Indian student when classroom activities reinforce and place greater value on the individual contribution rather than the whole.

Cognitive development may differ for the native child where more dependance is placed on holistic forms of learning. Indian children enjoy engaging in holistic, visual and kinesthetic activities and learn best when they understand how the whole picture fits together. These opportunities are present during the Indian child's pre-school days. The majority of the day is spent on telling stories, dressing up, manipulating things and putting them together, drawing and using symbols, and an array of other activities that place greater emphasis on right brain learning (American Education Handbook, 1991).

By the third grade, schooling activities shift and require a different approach to learning. New demands are placed on language abilities. Teaching begins to take the form of linear, sequential presentation of content where the emphasis has shifted to left braining learning. When looking at how individuals process information and learn, we know that

the left side or hemisphere of the brain is responsible for verbal expression and for using sequential and analytical approaches to cognitive learning. Because of what we know about Indian culture, tradition, and child rearing practices, native children seemed to have developed a preference for using their right hemisphere to process information (Ross, 1989). Assuming that Indian children are predominately right brain thinkers and learners, it is easy to hypothesize the difficulty an Indian child can have in school when we know that schools are traditionally designed for left brain learning (Browne, 1990).

For decades members of the Native American community have argued that Indian students must be taught by Indian teachers and that their cultural ties were a major factor for them to experience success in school.

In a recent study undertaken on the Arizona Navajo and Hopi Reservations there was little evidence to support a hypothesis that "students performance would improve or that the drop-out rate would decline by increasing the number of Indian teachers" (Rhodes, 1991).

That being the case, the researcher was led to believe that a conflict exists between the teaching style of the teacher and the learning style of the Indian student.

Purpose

The purpose, therefore, of this study was to test for the dominant learning styles of Indian high school students and school adults, which for the purpose of this study included all teachers, substitute teachers, administrators and teacher aides, from a high school on the Gila River Indian Reservation, and determine if the learning styles of the teachers were compatible or incompatible with their students.

The researcher was not given access to Estrella Mountain High School's drop-out rate records or figures; however, school officials indicated that the enrollment rate during the first semester was high, with students dropping out by second semester and sometimes returning a year later. No specific reasons were cited for students dropping out of school.

Rationale

Earlier research (Rhodes, 1990, Brandt, 1992) conducted with other Native American groups revealed that students were more likely to achieve success in school, have better communication with their teachers, and be less frustrated with the learning process, if their learning styles were compatible with the learning styles of their teachers.

Conflicts between a student and a teacher's learning style can lead to a high degree of student frustration with school work and lead to poor student-teacher relationships. If dissatisfaction is left to fester, and no action taken to

remedy the situation, it is conceivable to assume that a student may chose to voluntarily to drop out of school.

Findings from various studies discussed in Chapter two, suggest that Indian students are more likely to succeed in school if teaching methods, strategies and curriculum are restructured to effectively meet their individual learning styles.

Swisher and Deyhle (1989, 2) state "people perceive the world in different ways, learn about the world in different ways, and demonstrate what they have learned in different way."

Research Questions

What are the dominant learning styles of the Indian students attending Estrella Mountain High School?

What are the dominant learning styles of the adults at Estrella Mountain H.S.?

Are the learning styles of the Indian students and adults compatible or incompatible?

Significance of the Study

There exists a general misconception that if a classroom of students are taught the same information in the same manner, then all students should learn the information in exactly the same way. The term "learning styles" differs in meaning from researcher to researcher, but has been described

as "conditions and the environment" (Dunn, Dunn, & Price, 1975), "perceptual abilities" (Kaulbach, 1984), "the characteristic or unusual strategies of acquiring knowledge, skills and understanding by an individual" (More, 1989, 17), and the "studying of actual mental activities of the brain" (Brown, 1990, 27).

Consequently, if our educational institutions want to succeed in meeting the National Education Goals for Native Children they must first seek to understand how their children learn best. Schools must make teacher preparation programs a top priority. Effective staff development programs should also teach the value of diversity in the workplace and in the school environment. Skilled administrators, as well as outside consultants, can play a key role in helping educational institutions develop their workforce to effectively meet the special needs of a diverse population.

Schools must also be willing to restructure curricula and utilize materials that challenge the learner. Substance and instructional methodology must meet a variety of learning styles.

Finally, schools must accept full responsibility for responding to the needs of Indian children.

Definition of Terms

Hemisphericity - Two separate hemispheres of the brain that function as two separate thoughts of consciousness.

Each hemisphere stores a separate set of information and each hemisphere has a separate function.

Hemispheric Mode Indicator - Standardized test instrument use to determine learning styles based on the theory of right brain, left brain, and whole brain approach to learning.

Learning Style - Based on brain research, the preferred way in which an individual learns and processes information.

Left Brain - Hemisphere which controls movement on the right side of the body. Side of the brain which expresses itself in words, analyzes information, uses a logical and sequential approach to learning. Portion of the brain where language is believed to be stored.

Right Brain - Hemisphere which controls movement on the left side of the body. Side of the brain that cannot express itself in words. Expresses thoughts in the form of ideas, symbols. Relies on perception and intuition and synthesizes information. Prefers the "whole" to "parts".

Assumptions and Limitations

The study assumes that "teaching style" is analogous with "learning style" for purposes of this study. The study is limited in scope to one educational institution, Estrella

Mountain High School, located on the Gila River Indian Reservation.

Organization of Remainder of Study

Chapter two will discuss articles, books, research, and literature which support the researcher's hypothesis on the hemispheric function of the brain that the adults will test for left brain dominance and Indian students will test for right brain dominance and the relationship to Native American learning styles.

Chapter three will describe the type of research being performed, the methodology to be used, the sample population selected, the instrumentation or diagnostic tool to be used and an explanation of the data collection procedures and analysis.

Chapter four will present an analysis of the research findings using figures 1, 2, and 3 to show demographics and frequency distribution scores. Tables 1-5 will explain the scores and comparison of scores between subgroups.

Chapter five will address the summary of the findings, conclusions reached, and any recommendations to be undertaken.

A copy of the test instrument and technical notes will be located in the appendices section.

CHAPTER TWO

THE LITERATURE REVIEW

There is a vast amount of information, research, and publications on the function of the human brain. For purposes of this study, the literature review was limited in scope to hemisphericity and left/right brain learning. A number of articles and studies on Native American values, cultural norms and learning styles have been reviewed by the researcher to support the concept of right brain dominance among Indian children.

Brain Function and Learning

Clinical experiments conducted among brain-damaged patients brought to the forefront new information regarding the human brain and its function. While the world regarded the brain as one organ, the practice of split-brain operations during the early 19th century had startling results. Conclusions that the brain can be surgically separated in half and function as two separate organs are attributed to the work of Dr. Roger Perry, a 1981 Nobel Prize winner. With the brain separated, researchers were able to determine the specific functions of both hemispheres (Blakeslee, 1980, Springer, Deutch, 1989).

According to Springer and Deutsch "the left hemisphere has been found to be predominantly involved with analytical processes, and the understanding of language" (1989, 6).

Damasio & Damasio (1992, 92) take this further to explain that "the left brain is responsible for sound-based language, word formation and sentence implementation." The left side of the brain thinks in words, approaches problem-solving in a logical, sequential and analytical manner. Reading, writing, and mathematical calculations are tasks which are typical of exercising the left side of the brain.

Not as much research has been conducted on the function of the right hemisphere as has been conducted and published about the left hemisphere. However, findings support that each hemisphere of the brain controls movement in the opposite side of the body, and that the hemispheres themselves have distinct and independent abilities to organize, store, recall, and process information. Each hemisphere stores its own body of knowledge and when called upon to solve a problem the hemisphere which believes it can do a better job will dominate; which is not to say that the correct hemisphere always dominates.

In the article "The Biological Basis of Learning and Individuality" (Kandel, Hawkins, 1992, 79), the authors state that "learning is the process by which we acquire new knowledge and memory is the process by which we retain that

knowledge over time, thus learning and memory are central to our sense of individuality."

The right brain has superior spatial abilities. This hemisphere views problems through a holistic view of the whole situation, and approaches learning and problem-solving in a creative, intuitive, simultaneous, and nonverbal manner (Springer, Deutsch, 1989).

We know from split-brain surgical procedures that the right hemisphere is not capable of expressing its thoughts or consciousness in words. In rare cases, left-brain damage patients have shown language capabilities as a function of the right brain. Spatiality, distance and visual concepts which take on free yet complex forms are predominantly dealt with by the right side of the brain (Blakeslee, 1980).

In trying to envision how a predominantly left brain or right brain person might approach a learning situation, image trying to learn how to play golf.

A right brain learner would become easily frustrated with having to follow laborious verbal instructions which described the game in a step-by-step logical manner. The right brain learner could easily learn the game given the opportunity to hear some basic instructions, watch a demonstration and than experiment with swing and distance. The right brain learner needs to "feel" the experience. At the same time, a left brain may be equally frustrated because they are trying to learn the game by "talking" their way through the instructions

they were given. While it may help the left brain learner to know what steps are involved, they could probably learn to play the game better if they allowed the right side of the brain to take over.

Most authors are in agreement that knowledge about the abilities and function of the right brain have been, for the most, part ignored. For years, there existed a one sided view that gave more credence to the abilities of the left brain. Today, both Springer and Deutsch (1989) agree that "it is now clear that both hemispheres contribute in important ways to complex mental activity while differing in certain ways in their function and organization" (18).

Native American Learning Styles

From the time we are born, we are constantly learning. Culture and home environment typically play a role in how we learn. In Indian culture, value is placed on group harmony, modesty and cooperation. Traditional Indian religious spiritual ceremonies, music, and art, are all functions and abilities which support the strong use of the right brain hemisphere (Ross, 1989).

The findings from Browne's research in 1984 with 197 Indian children, concluded that Indian children's cognitive pattern of learning differed from the norm, and that "Native American culture encourages the development of a right brain dominant learning style" (1990, 28). Indian children are

central to their own learning and supported through their home environment.

Prior to school age, children are taught to view the world through a holistic perspective and encouraged to interpret meaning on their own. Storytelling enriches the child's creative mind by encouraging creativity and free form ideas. Imagery, visual conceptualization and relationships to time and space are characteristically associated with right brain dominance.

As described earlier, Indian children learn tasks and chores through observation (watch-then-do) before embarking on the task themselves. In Indian culture, it is commonplace to find siblings or cousins helping each other in a cooperative manner. "The needs of the group are considered over those of the individual" (American Indian Education Handbook, 1991, 25).

Beginning in early childhood and upward through the lower elementary grades, there seems to be a greater propensity for placing more emphasis on creativity and kinesthetic learning and less emphasis on the spoken word. Modesty is greatly valued in Indian culture and therefore speaking about personal accomplishments or "bragging" is not looked upon favorably.

By age eight, a conflict may arise in the schooling of the Indian child because the traditional school expectations now call for greater demands and emphasis on language and left brain processing.

This should not be misconstrued to imply that Indian children cannot or do not use their left brain. It merely illustrates that our traditional westernized schools, teaching methodology and curricula require left brain dominance which can present a dilemma for Indian children who have not had the full opportunity to exercise or develop this theoretical model of thinking in their cultural environment.

Schools, curriculum and teaching methods have taken on a left brain approach to teaching. In looking at compatibility between learning styles of students and teachers, Dr. Robert Rhodes, professor at Northern Arizona University in Flagstaff Arizona, conducted a study in 1990 on learning styles on the Navajo Reservation. Rhodes states that "schools are generally concerned with linear presentation of materials and that the concrete holistic, feeling aspects of curriculum are minimized" (35). His findings concluded that Navajo teachers were predominantly left brain and Navajo students were predominantly right brain; both Hopi teachers and students were right brain. Rhodes believes that incompatibility of learning styles can lead to "miscommunication, misunderstanding, frustration and eventually drop out" (35).

Susan Ledlow's article "Is Cultural Discontinuity an Adequate Explanation for Dropping Out?" further supports that the drop-out rate for Native Americans is higher than for Anglos and that "culturally based differences in the communication styles of minority students home and the Anglo

culture of school lead to conflicts, misunderstanding and ultimately failure" (23). The argument that the mode of understanding and the transmission of the verbal messages in the classroom are diametrically opposed to the way in which Indian children learn are also supported by research conducted by Susan Philips at the Warm Springs Reservation in Oregon (1982) in which she stressed "teachers be trained to more effectively serve Indian students" (26-27).

Staff Development

Ongoing opportunities for professional growth must be made available to teachers in order to hone their classroom skills. New competencies and skills will become necessary as the needs of the workforce and work environment change (Burack, Mathys, 1987).

As Malcolm Knowles (1970) points out "an instructor must be enthusiastic about his subject and willing to experiment with new ways to meet the changing needs..." (163).

CHAPTER THREE

METHODOLOGY

Purpose of the Study

The purpose of the study was to test for dominant learning styles of Indian high school students and school adults, which for the purpose of this study included all teachers, substitute teachers, administrators and teacher aides, from a high school on the Gila River Indian Reservation, and determine if the learning styles of the teachers were compatible or incompatible with their students.

Methodology

The descriptive research method has been selected for this study and included testing the sample population.

Sample Population

Estrella Mountain High School is the only public high school located on the Gila River Indian Reservation. Student enrollment is 100% Indian with 83 students enrolled in grades 9-12. There are 15 teachers and other adults working at the high school. The school is jointly governed by the Maricopa County School Superintendent and the Gila River Tribe.

The researcher selected the Gila River Indian Community because of a prior working relationship. The researcher

contacted by telephone the Gila River Indian Director of Tribal Education, explained the purpose of the study and invited the tribe to collaborate on the research.

The researcher was asked to prepare a letter to the Tribal Council explaining the purpose of the study, a sample of the instrumentation to be used, copies of previous studies and literature.

Since the research involved human subjects, the Gila River Tribal Council required that the researcher apply for permission through an Institutional Review Board on Human Subjects Research before permission to conduct the study can be granted. Arizona State University IRB granted approval for such research.

The Director of Tribal Education selected the Estrella Mountain High School as the testing site. Estrella Mountain High school is the only high school (grades 9-12) on the Gila River Indian Reservation. Estrella is governed by the Maricopa County School Superintendent in collaboration with the tribe.

On September 14, 1992 the researcher met with the principal of Estrella Mountain High School to discuss the study, and determined dates and times for administering the test. The testing took place on school premises during the normal course of the school day on October 6 and October 12, 1992.

The principal was responsible for selecting adults and students to participate.

Instrumentation

The researcher received permission from McBer & Company and Excel, Inc., management consulting firms specializing in performance testing, to use their standardized instrument (HMI) in the study (Refer to Appendix A).

The HMI instrument was chosen because it is relatively simple to administer and score. The HMI tests for left brain, whole brain leaning left, whole brain, whole brain leaning right and right brain dominance in learning styles. The instrument is a 32-item test and is self-scoring. Subjects are required to read single words or statements that closely describe the way they might approach a learning situation and chose the answer that best fits that situation. The test takes approximately 10 minutes to administer.

All negative number scores are totalled; all positive number scores are totalled and the difference calculated. The difference becomes the indicator of whole brain, left brain or right brain learning dominance and that number is plotted along a hemispheric mode indicator continuum. The HMI indicator has positive and negative scoring along its indicator that reflect the specified learning style. Scores of -2 to +2 relate to whole brain learning, or no preference for right or left brain dominance. Scores of +3 to +8 relate

to whole brain leaning right. Scores of +9 to +62 are far right brain learners. Consequently, on the left side of the HMI Indicator scores of -3 to -8 relate to whole brain leaning left, scores of -9 to -62 far left brain learners.

A description of learning characteristics appears in the HMI test booklet. The technical notes on reliability and validity are located in the appendices section (Refer to Appendix B).

Data Collection

Complete confidentiality was guaranteed to all subjects. No names or codes were used to identify individuals. The researcher explained the purpose of the study to subjects prior to test administration. The researcher was present at all times to oversee the testing. After the completion of the testing, the researcher presented a brief overview of the learning characteristics of both sides of the brain so that subjects had a general understanding of what their individual scores meant.

Each subject kept the original test booklet. At the conclusion of the test, the researcher distributed a data collection and demographics sheet. Subjects completed the data sheet indicating name of their tribe, age, and gender. All scores were entered on the data collection sheet and collected by the researcher.

Data Analysis

The researcher analyzed the collected data. The data is presented in 3 figures and 5 tables that show frequency distributions on HMI scores and demographic information. The tables are representative of the varied learning style scores of each subgroup and the norm.

CHAPTER FOUR

ANALYSIS OF STUDY

A study was conducted at Estrella Mountain High school to determine the learning styles of Indian High School students attending the school and the learning styles of the adults. The styles of the two groups were then compared for compatibility or incompatibility. The researcher administered the tests to fourteen adults which represented 93% of the adult staff and to fifty students which represented 60% of the total student population.

The test instrument, Hemispheric Mode Indicator (HMI) is a 32-item self-scoring test which tests for whole brain dominance, whole brain leaning left, left brain, whole brain leaning right and right brain dominance. A sample of the instrument may be found in Appendix A.

The sample size was small because the study was limited to the high school on the Gila River Indian Reservation. The data was analyzed by the researcher and explanations follow in Figures 1, 2, and 3 and Tables 1-5, respectively.

Figure 1 represents the total distribution of HMI scores for all subjects.

Figure 2 is a graphic representation of the frequency distribution of HMI scores with the greatest distribution falling between - 2 and + 2 range.

Figure 3 represents a demographical sketch of the sample population by gender and heritage. Anglo adults comprised the largest adult population sampling (71%), and Pima students comprised the largest Indian population sampling (76%). A total of 30 male and 34 female subjects participated in the study.

HMI DISTRIBUTION

Figure 1

HMI	N	HMI	N
-62 to -59	0	+3 to +6	7
-58 to -55	0	+7 to +10	5
-54 to -51	0	+11 to +14	6
-50 to -47	0	+15 to +18	1
-46 to -43	0	+19 to +22	0
-42 to -39	0	+23 to +26	0
-38 to -35	0	+27 to +30	1
-30 to -27	1	+31 to +34	0
-26 to -23	0	+35 to +38	0
-22 to -19	1	+39 to +42	1
-18 to -15	0	+43 to +46	0
-14 to -11	3	+47 to +50	0
-10 to -7	6	+51 to +54	0
-6 to -3	8	+55 to +58	0
-2 to +2	24	+59 to +62	0

Figure 2

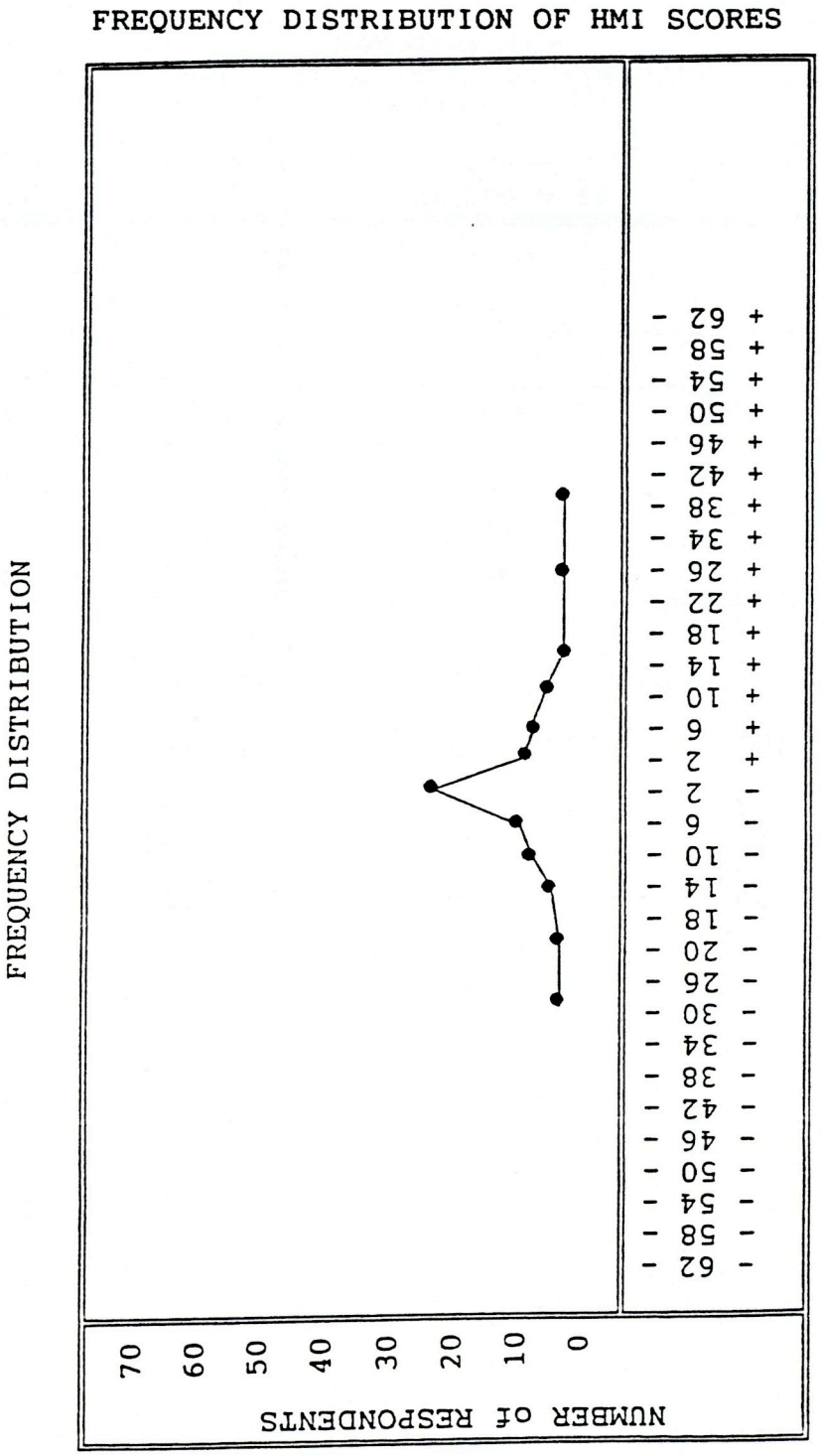


Figure 2

Figure 2

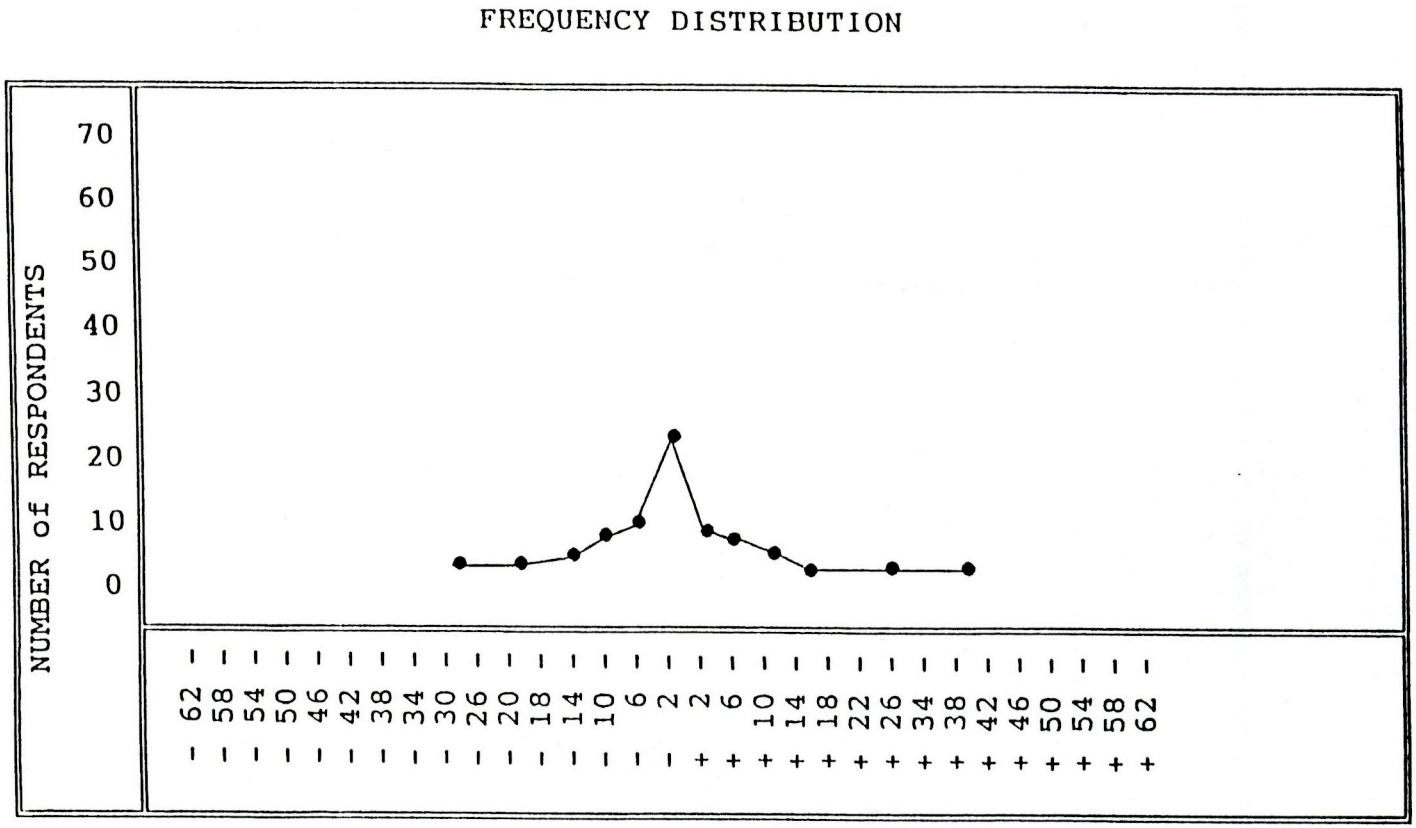


Figure 2

FREQUENCY DISTRIBUTION OF HMI SCORES

Demographics
SAMPLE POPULATION BY HERITAGE
PERCENT

Figure 3

HERITAGE	ADULTS N=14	STUDENTS N=50
ANGLO	71.0	0
APACHE	0	4.0
MARICOPA	7.0	10.0
NAVAJO	7.0	2.0
PAPAGO	0	8.0
PIMA	14.0	76.0
TOTALS	100.0	100.0

Sample Population (Counts)

	ADULTS	STUDENTS	TOTALS
MALE	6	24	30
FEMALE	8	26	34
	---	---	---
	14	50	64

Table 1 represents the four learning styles; left brain (-62 to-9) whole/brain leaning left (-8 to -3), whole/brain or no preference for left or right brain dominance (-2 to +2), whole/brain leaning right (+3 to +8), or right brain dominance (+9 to +62).

Brain Dominance
SAMPLE POPULATION
PERCENT

Table 1

LEARNING STYLE	N=64	PERCENT
Left	8	12.5
Whole/Left	11	17.2
Whole	24	37.5
Whole/Right	9	14.0
Right	12	18.8
TOTALS	64	100.0

Table 1 indicates that almost 38% of the sample population tested for whole brain dominance; 30% tested for whole brain leaning left to left brain dominance, and approximately 33% tested for whole brain leaning right to right brain dominance.

Table 2 breaks out learning styles by gender and includes all adult and student subjects.

Brain Dominance
SAMPLE POPULATION BY GENDER
PERCENT

Table 2

LEARNING STYLE	MALES N=30	FEMALES N=34
Left	10.0	14.7
Whole/Left	16.7	17.6
Whole	43.3	32.3
Whole/Right	10.0	17.7
Right	20.0	17.7
TOTALS	100.0	100.0

In this table, female scores were split equally between whole brain dominance (32.3%) and whole/left to left brain dominance (32.3%); with 35% falling into the whole/right to right brain dominance category.

Greater variances appear in the learning styles of male subjects. More than 43% of males scored in the whole brain category; approximately 27% scored whole/left to left brain category, and 30% scored whole/right to right brain dominance.

Table 3 compares the learning styles of each subgroup; male students, male adults, female students, female adults.

Brain Dominance
COMPARISON BY SUBGROUP
PERCENT

Table 3

LEARNING STYLE	MALE STUDENTS N=24	MALE ADULTS N=6	FEMALE STUDENTS N=26	FEMALE ADULTS N=8
LEFT	8.3	16.7	7.7	37.5
WHOLE/LEFT	16.7	16.7	19.2	12.5
WHOLE	41.7	50.0	38.5	12.5
WHOLE/RIGHT	12.5	0	23.1	0
RIGHT	20.8	16.6	11.5	37.5
TOTALS	100.0	100.0	100.0	100.0

In this table, approximately 42% of male students tested for whole brain dominance, as compared to 39% of female students. Less than 13% of female adults tested for whole brain dominance, while 50% of male adults fell into this category.

Only 25% of male students tested for whole/left to left brain dominance, while more than 33% of male adults fell into this category. Less than 27% of female students tested for whole/left to left brain dominance, while 50% of female adults fell into this category.

Approximately 35% of female students tested for whole/right to right brain dominance, with less than 17% of male adults testing for whole/right to right brain dominance. More than 33% of male students tested for whole/right to right brain dominance and nearly 38% of female adults fell into this category.

Neither male adults nor female adults tested for a dominant whole brain leaning right learning style.

Table 4 compares learning styles by heritage.

Brain Dominance
COMPARISON BY HERITAGE TO NORMS
PERCENT

Table 4

Group	N	Left	W/L	W/B	W/R	Right	Total
Anglo Adults	10	40	10	20	-	30	100
Apache Students	2	-	50	50	-	-	100
Maricopa Adults	1	-	-	-	-	100	100
Maricopa Students	5	-	20	60	20	-	100
Navajo Students	1	-	-	100	-	-	100
Papago Students	4	25	-	25	25	25	100
Pima Adults	3	-	33	67	-	-	100
Pima Students	30	11	16	37	18	18	100
Norms	1504	40	9	8	10	33	100

The majority of adults who participated in the study were Anglo and tested for left brain dominance. Four adults were Native with one testing for right brain dominance and the remaining Native adults testing for whole brain dominance.

The majority of Indian students who participated in the study are from the Pima tribe. With the exception of Apache and Papago students, most students tested for whole brain dominance.

Although the sample population is too small in comparison to the norms to draw any conclusions, the table still seems to indicate that the norming data shows that the majority of adults (teachers) tested for left brain dominance.

Table 5 compares the learning styles of adults to the learning styles of students.

Brain Dominance
COMPARISON OF LEARNING STYLES OF ADULTS AND STUDENTS
PERCENT

Table 5

LEARNING STYLE	ADULTS N=14	STUDENTS N=50
Left	29.0	8.0
Whole/Left	14.0	18.0
Whole	29.0	40.0
Whole/Right	0	18.0
Right	29.0	16.0
Total	101.0	100.0

This table indicates that 43% of adults tested for a whole/left to left brain dominant learning style, and 40% of students tested for whole brain dominant learning style.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The study assumed that all adults would test for a left brain dominant learning style, and that all Indian students would test for a right brain dominant learning style.

Interestingly enough, nearly 38% of the total sample population tested for whole brain dominance with no learning style preference. Less than 30% of the sample population tested for whole/left to left brain dominance, while less than 33% of the total sample tested for whole/right to right brain dominance as indicated in Table 1.

When the scores of the male and female population are isolated, we see that more than 43% of all males tested for whole brain dominance, while 35% of all females tested for whole/right to right brain dominance as indicated in Table 2.

Table 3 shows that the majority of male students (42%) and female students (39%) tested for whole brain dominance. Overall, male adults (50%) are predominantly whole brain learners making their styles the most compatible with the learning styles of the majority of female and male students.

There appears to be a lesser degree of compatibility of learning styles between female adults and students since 50% of female adults tested for whole/left to left dominance and

less than 30% of female and male students are whole/left to left brain dominant.

Almost 35% of female students and 33% of male students tested for whole/right to right brain dominance, but less than 17% of male adults are whole/right to right brain learners. These findings seem to infer that male adults may experience a certain degree of difficulty when communicating and working with predominately right brain students.

As stated earlier in the study, there is greater potential for miscommunication and student frustration with school and the educational process when the learning style of the teacher is incompatible with the learning style of the student.

Conclusions

The findings seem to suggest that the learning styles of male adults and male students appear the most compatible, with some degree of compatibility noted for female students who are whole brain learners. However, female students who are right brain dominant may encounter problems with male adults since less than 17% have a right brain dominant learning style.

Because the majority of female adults (50%) tested for whole/left to left brain dominance, and because less than 17% of the male adults tested for whole/right to right brain dominance, special attention must be given to strengthening

the instructional approach to teaching the student population who tested for whole/right to right brain dominance.

The final results of the study concluded that the majority of adults tested for a whole/left to left brain dominance, and that the majority of Indian students tested for whole brain dominance. The findings, however, do not fully support the original hypothesis which stated that adults would test for left brain dominance and students would test for right brain dominance.

Recommendations

It is recommended that further study of learning styles be undertaken. A retest of the HMI should be administered to all adults and all students at Estrella Mountain High school with an accompanying test instrument known as the Learning Style Inventory (LSI) developed by David A. Kolb. The LSI measures individual learning styles using an experiential learning model in a four-stage cycle moving from concrete experience to reflective observation, abstract conceptualization and active experimentation.

The addition of the LSI would increase the reliability of the data and the results of the second study could be utilized in developing and enriching professional staff development programs.

A second recommendation is that steps be taken to implement staff development programs at Estrella Mountain High

School that focus on cultural diversity since 71% of the teaching staff are Anglo. The programs should be designed to address new and alternative approaches to instructional methodology. Estrella Mountain curriculum specialists should revisit their curricula to assess the impact with which the subject matter challenges the various learning styles of the Indian student population at Estrella Mountain High School.

LIST OF REFERENCES

Blakeslee, Thomas R. 1980. The right brain: a new understanding of the unconscious mind and its creative powers. Anchor Press/Doubleday, Garden City: New York.

Brandt, Elizabeth A. January, 1992. The Navajo area student dropout study: findings and implications. Journal of American Indian Education, 31(2).

Browne, Dauna Bell. 1990. Learning styles and Native Americans. Canadian Journal of Native Education, 1F(1).

Burak, Elmer H. & Mathys, Nicholas J. 1987. Human resource planning: a pragmatic approach to manpower staffing and development. Brace-Park Press, Lake Forest: Il.

California State Department of Education. Sacramento: California. 1991. American Education Handbook.

Crowder, William. April, 1968. Teaching about the American Indian. Civic Leader, 46(4).

Damasio, Antonio R. & Damasio, Hanna. September, 1992. Brain and language. Scientific American, 267(3).

Hadley, Lynch R. & Benally, AnCita & Wallace, Stephen. March, 1991. Classroom inquiry and Navajo learning styles. Anthropology & Education Quarterly, 22(42).

Kandel, Eric R. & Hawkins, Robert D. September, 1992. The biological basis of learning and individuality. Scientific American, 267(3).

Knowles, Malcolm S. 1970. The modern practice of adult education. Association Press, New York: New York.

Rhodes, Robert W. Fall, 1989. Native American learning styles. Journal of Navajo Education, 7(1).

Rhodes, Robert W. May, 1990. Measurement of Navajo & Hopi brain dominance and learning styles. Journal of American Indian Education, 29(29).

Rhodes, Robert W. Fall, 1991. Framing student outcomes: educators' ethnicity and longevity on the Navajo and Hopi Reservations. Journal of Navajo Education, 91(1).

Roessel, Robert A., Jr. 1979. Navajo education, 1948-1978: Its progress and its problems. Rough Rock, Navajo Nation, Arizona: Navajo Curriculum Center, Rough Rock Demonstration School.

Ross, Allen Chuck. August, 1989. Brain Hemispheric Functions and the Native American. Journal of American Indian Education Special Issue.

Sawyer, Don. 1990. Native learning styles: shorthand for instructional adaptations? Canadian Journal of Native American Education, 18(2).

Soldier, Lee Little. Spring, 1992. Building optimum learning environments for Navajo students. Childhood Education, 68(3).

Springer, Sally P., Deutsch, George. 1989. Left brain, right brain. Third edition. W.H. Freeman, New York: New York

Swisher, Karen. & Deyhle, Donna. August, 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.

Thompson, Hildegard. 1975. The Navajos' long walk for education: a history of Navajo education. Tsaile: Navajo Nation, Arizona: Navajo Community College Press.

U.S. Department of Education. October, 1991. Final report of the Indian nations at risk task force. Indian nations at risk: an educational strategy for action.

APPENDIX A

HEMISPHERIC MODE INDICATOR TEST INSTRUMENT

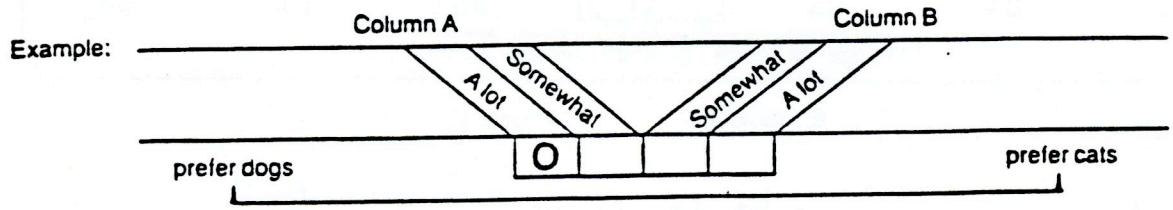
HEMISPHERIC MODE INDICATOR (HMI)

Right and left brain approaches to learning

EXCEL, INC.
200 W. Station St.
Barrington, IL 60010 312/382-7272
Bernice McCarthy, Ph.D., Director

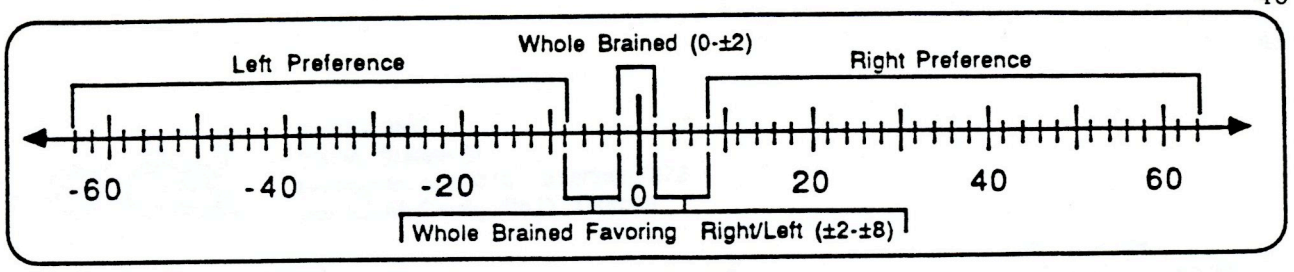
HEMISPHERIC MODE INDICATOR (HMI)

INSTRUCTIONS: For each numbered item there are four possible choices. Either choose "a lot" or "somewhat" from the column A side, or "a lot" or "somewhat" from the column B side. For example: I prefer dogs "a lot" or "somewhat" – or – I prefer cats "a lot" or "somewhat." Choose one answer for each numbered item. Place an O in the appropriate blank.



Column A	A lot	Somewhat		Somewhat	A lot	Column B
1. bases decisions on facts						bases decisions on feelings
2. prefers organized structure in a work setting						prefers open-ended work setting
3. carefree, spontaneous						careful, deliberate
4. understands how the pieces fit together						understands from experience
5. tries hunches						approaches problems logically
6. like an athlete or artist						like an accountant or chemist
7. like a tax lawyer						like a criminal lawyer
8. neat						sloppy
9. process oriented						product oriented
10. improvising new ideas						thoughtful, both feet on the ground
11. prefers change and the unusual						prefers order and stability
12. recalls information, names						recalls faces, dress, actions
13. precise in language						free, sweeping terms
14. focus on words said and the message						takes in body language, emotional tone
15. holistic, intuitive						orderly, sequential
16. words and numbers						space and form
17. synthesizing						analyzing
18. abstract						concrete
19. emotional						rational
20. objective						subjective
21. waking						dreaming
22. timebound						timeless
23. realistic						idealistic
24. lead by the heart						lead by the mind
25. specific						ambiguous
26. community						agency
27. outlook						insight
28. cause and effect						resemblances
29. lumper						splitter
30. intellectual rigor						imagination
31. soft						sharp
32. persist						encompass

HEMISPHERIC MODE INDICATOR SCORING KEY



	Column A	Column B
1.	−2	−1 +1 +2
2.	−2	−1 +1 +2
3.	+2	+1 −1 −2
4.	−2	−1 +1 +2
5.	+2	+1 −1 −2
6.	+2	+1 −1 −2
7.	−2	−1 +1 +2
8.	−2	−1 +1 +2
9.	+2	+1 −1 −2
10.	+2	+1 −1 −2
11.	+2	+1 −1 −2
12.	−2	−1 +1 +2
13.	−2	−1 +1 +2
14.	−2	−1 +1 +2
15.	+2	+1 −1 −2
16.	−2	−1 +1 +2
17.	+2	+1 −1 −2
18.	−2	−1 +1 +2
19.	+2	+1 −1 −2
20.	−2	−1 +1 +2
21.	−2	−1 +1 +2
22.	−2	−1 +1 +2
23.	−2	−1 +1 +2
24.	+2	+1 −1 −2
25.	−2	−1 +1 +2
26.	+2	+1 −1 −2
27.	+2	+1 −1 −2
28.	−2	−1 +1 +2
29.	+2	+1 −1 −2
30.	−2	−1 +1 +2
31.	+2	+1 −1 −2
32.	−2	−1 +1 +2

1.) Total all the minus numbers.

Total minus = _____

2.) Total all the plus numbers.

Total plus = _____

3.) Compute the difference.

= [ ]

4.) Mark your score above.

EXCEL, INC.
200 W. Station St.
Barrington, IL 60010 312/382-7272
Bernice McCarthy, Ph.D., Director

RIGHT/LEFT MODE CHARACTERISTICS

LEFT MODE

Rational
Responds to verbal instructions
Controlled, systematic experiments
Problem solves by logically and sequentially looking at the parts of things
Makes objective judgements
Looks at differences
Is planned and structured
Prefers established, certain information
Analytic reader
Primary reliance on language on thinking and remembering
Prefers talking and writing
Prefers multiple choice tests
Controls feelings
Responsive to structure of environment
Prefers hierarchial (ranked) authority structures

Sequential
Is a splitter: distinction important
Talks, and talks, and talks
Is logical, sees cause and effect

Draws on previously accumulated, organized information

RIGHT MODE

Intuitive
Responds to demonstrated instructions
Open-ended, random experiments
Problem solves with hunches, looking for patterns and configurations
Makes subjective judgements
Looks at similarities
Is fluid and spontaneous
Prefers elusive, uncertain information
Synthesizing
Primary reliance on images in thinking and remembering
Prefers drawing and manipulating objects
Prefers open-ended questions
Free with feelings
Essentially self-acting
Prefers collegial (participative) authority structures

Simultaneous
Is a lumper: connectedness important
Is mute - uses pictures, not words
Is analogic, sees correspondences, resemblances

Draws on unbounded qualitative patterns that are not organized into sequences, but that cluster around images of crystallized feelings

APPENDIX B

HEMISPHERIC MODE INDICATOR

TECHNICAL NOTES

The Hemispheric Mode Indicator

Technical Notes

Marcus G. Lieberman, Ph.D.

September, 1986

EXCEL, INC.
200 West Station Street
Barrington, IL 60010
312-382-7272

Content Validity

From a review of the literature in the area of brain hemisphere dominance (see Bibliography), forty items were prepared which reflected themes that the various authors had attributed to right or left hemisphere laterality. They reflect a range of dimensions of thought, behavior and feelings.

An empirical test of the left/right scoring of each question was performed on the original items by correlating each item with the total test score, corrected by removing that item's score from the total. Thirty-two items produced responses that corresponded to the expected direction of scoring. Those 32 items were tested in further analyses.

Concurrent Validity

Total scores from the 32 item test were correlated with the Torrance measure, (SOLAT-C) Your Style of Learning and Thinking, Form C. Forty-nine subjects took both measures during a workshop on learning styles and hemispheric laterality. For those subjects, the Spearman rank correlation coefficient was 0.819. (The Pearson Product-moment correlation is 0.659.) These results show the HMI measure to be similar to the Torrance measure, but not identical or measuring something completely different.

Reliability (Internal Consistency)

Items were rescored so that high negative scores are related to a left hemisphere mode and high positive scores are related to a right hemispheric mode. Choices were coded in the following manner:

Left Mode Choices:	A lot like you	-2
	Somewhat like you	-1
Right Mode Choices:	A lot like you	+1
	Somewhat like you	+2

A score of zero might be interpreted two ways, no preference or equal preferences to each mode. A frequency distribution of the 76 subjects who took the HMI showed consistent clustering near the center or to one side rather than a U-shaped curve.

Cronbach's alpha was calculated for the 76 subjects' responses resulting in a coefficient of 0.90.

Correlations between each item score and the total test score are given in Table 1. The total score is corrected by removing each item considered, and left-brain item scores were reversed so that all item scores were positive.

Reliability (Test-Retest)

A sample of 47 subjects were administered the HMI twice, approximately two months apart. The Pearson Product Moment Correlation coefficient between the two testings was 0.904.

Table 1: Item-Total Correlations (Corrected)

Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation
1	0.663	9	0.159	17	0.577	25	0.526
2	0.575	10	0.416	18	0.433	26	0.291
3	0.484	11	0.433	19	0.441	27	0.268
4	0.268	12	0.377	20	0.439	28	0.392
5	0.643	13	0.424	21	0.415	29	0.465
6	0.515	14	0.216	22	0.484	30	0.608
7	0.425	15	0.596	23	0.539	31	0.373
8	0.311	16	0.468	24	0.541	32	0.276

Bibliography

Bogen, J.E. "The other Side of the Brain: Parts I, II, III." Bulletin of the Los Angeles Neurological Society

Dixon, John Philo. The Spatial Child. Springfield, Illinois: Charles C. Thomas Publishing, 1983.

Goldberg, Philip. The Intuitive Edge: Understanding and Developing Intuition. Los Angeles, CA: Jeremy P. Tarcher, Inc., 1983.

Hampden-Turner, Charles. Maps of the Mind: Charts and Concepts of the Mind and Its Labyrinths. New York: Macmillan Publishing, 1981.

Torrance, E.P., Reynolds, C.E., Riegel, T., and Ball, O.E. Your Style of Learning and Thinking: Preliminary norms, abbreviated technical notes, scoring keys, and selected references. Gifted Child Quarterly, 1977, 21.

Torrance, E.P., and Reynolds, C.E. Preliminary norms--technical manual for Your Style of Learning and Thinking-Form C. Athens, Georgia: Georgia Studies of Creative Behavior, University of Georgia, 1980.

BIOGRAPHICAL SKETCH

Lynda Rando was born in Brooklyn, New York on September 5, 1951. She completed her elementary and secondary education in New York. Shortly after marrying, Lynda and her spouse relocated to Phoenix, Arizona. She attended the University of Phoenix and received her Bachelor of Science degree in Business Administration in July, 1987. She entered Ottawa University's graduate program in 1988. Lynda's career has been exclusively devoted to the field of legal education. She is a member of the National Association of Bar Executives.

1 29408 THS
039OTT 2/93 5030