A Cross culture comparison of learning styles

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A CROSS CULTURAL COMPARISON OF LEARNING STYLES

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Abstract

This study examined differences in learning styles between African-American and Caucasian students while also taking into consideration students' gender. Students in grade 9th through 12th grade completed the Silver-Hanson Learning Preference Inventory (Hanson, Silver & Gulkus, 1984). This inventory is a 125-item questionnaire, which assesses students' preferences for different learning conditions, modes, and areas of interest. The sample included the results of the Learning Style inventory obtained from 95 African-American students and 95 Caucasian Students. This study found that there is substantial evidence that gender has an affect on learning style. However, this study found marginal evidence that ethnicity affects learning style.

Theoretical Background

Claxton and Murrell (1987) defined learning style as a student's consistent way of responding and using stimuli in the context of learning. Canfield (1988) stated that learning style is "the effective component of the educational experience, which motivates a student to choose, attend to, and perform well in a course or training exercise" (p. 19). Litzinger and Osif (as cited in Torres, 1993) described learning styles as the different ways in which children and adults think and learn. In order to better understand the thinking and learning process, they brake it down into several processes: 1) cognition- the way one acquires knowledge; 2) conceptualization- the way one processes information (there are those who always looking for connections among unrelated events, while each event triggers a multitude of new ideas in others); 3) affective- people's motivation, decision making styles, values and emotional preferences will also help to define individual's learning styles.
Kolb (as cited in Claxton & Murell, 1987) showed learning styles on a continuum. This continuum included four dimensions 1) concrete experience - being involved in a new experience; 2) reflective observation - watching others or developing observations about own experience; 3) abstract conceptualization - creating theories to explain observations; 4) active experimentation - using theories to solve problems or make decisions. Hartman (as cited in Claxton & Murell, 1987) expanded Kolb's learning theory and suggested the following strategies to target each learning style. He suggested that students with concrete experience type of learning style would benefit from laboratories, field work, and observations or trigger films, while the reflective observer would learn best when logs, journals or brainstorming strategies are used. For the abstract conceptualized learner, papers and analogies work well, and active experimenter will learn best through simulations, case studies and homework.

Gardner (1993) chose to look at learning styles in a different light. His theory of multiple intelligence suggested that there are a number of distinct forms of intelligence that each individual possesses in varying degrees. Gardner proposed seven primary forms: linguistic, musical, logical-mathematical, spatial, body-kinesthetic, intrapersonal (e.g., insight, metacognition) and interpersonal (e.g., social skills). According to Gardner, the implication of his theory is that learning/teaching should focus on the particular intelligence of each person. Gardner pointed out that the different intelligence represents not only different content domains but also learning modalities. Gardner also emphasized the cultural context of multiple intelligence. Each culture tends to emphasize particular intelligence. For example, Gardner (1993) discusses the high spatial abilities of the
Puluwat people of the Caroline Islands, who use these skills to navigate their canoes in the ocean, or the balance of personal intelligence required in Japanese society.

Field-dependent and field-independent learning styles have been widely and extensively studied and have the broadest application to educational concerns (Witkin & Goodenough, 1981). Witkin and Goodenough (1981) suggested that students who preferred a field-dependent learning style tended to perceive the world globally, found it more difficult to solve problems, were highly sensitive and attuned to the social environment, tended to favor the spectator approach to learning, and would adopt the organization of information to be learned. Additionally, students who preferred a field-dependent learning style were more extrinsically motivated and responsive to social reinforcement. Conversely, students who preferred a field-independent learning style tended to view the world more analytically, found it easier to solve problems, and were more likely to favor "inquiry" and independent study. In addition, field-independent students tended to provide their own structure to facilitate learning, were more intrinsically motivated, and were generally unresponsive to social reinforcement (Witkin & Goodenough, 1981).

Many researchers suggested that in order to understand learning styles, one needs to explore how learning occurs (Rogers, 1969; Price, 1980, & Sahakian, 1970). Rogers (1969) distinguished two types of learning: cognitive and experiential. The former corresponds to academic knowledge such as vocabulary or multiplication tables and the latter refers to applied knowledge such as learning about engines in order to repair a car. The key to the distinction is that experiential learning addresses the needs and wants of the learner. Rogers listed the qualities of experiential learning as personal involvement,
self-initiated, evaluated by learner, and pervasive effects. Rogers (1969) discussed applications of the experiential learning framework to the classroom. He stated that experiential learning actually affects students' learning styles.

Other learning style theories use a continuum on which to chart the characteristics of different styles. Canfield's (1988) theory of learning styles places students on continuums from independent to social and from conceptual to applied learners. Students who are described as social learners are those who prefer peer-contact and cooperative atmospheres. Independent learners learn best alone, dictating their own pace. Conceptual learners prefer to learn from ideas, theories, and concepts whereas applied learners want practical, hands-on experience. Gregroc's (1979) theory of learning styles focuses on the idea that "the human mind has channels through which it receives and expresses information most efficiently and effectively" (Gregroc, 1979, p.5).

Jung's Learning Style Theory

Jung (1971) describes three distinct dimensions critical to profiling an individuals psychological type. These three dimensions each contain bipolar functions which when paired across each dimension make possible eight distinct learning styles. The three dimensions are: (1) the perceptual dimension, two extremes of perceiving or finding out about people, places, or things through one's sense or on the opposite pole through one's intuition; (2) the judgement dimension, two basic and opposite ways of analyzing how we make judgements about information perceived through thinking or feeling; and (3) the two information processing bipolar attitude characteristics, introversion and extraversion (Jung, 1971). According to Jung these dimensions when paired across each function
make four possible distinct learning styles: (1) sensing-thinking, (2) sensing-feeling, (3) intuitive-thinking, (4) intuitive-feeling.

Based on Jung’s theory (1971), Intuitive-Feeler (NF) learners can be characterized as curious, insightful, imaginative, and creative. The NF learners are those who dare to dream and are committed to their values, are open to alternatives and are constantly searching for new and unusual ways to express themselves. The NF learners prefer to look at things with their intuition rather than their senses, and are mainly interested in seeing possibilities beyond what is present, obvious or known. Intuition heightens their understanding, long range vision, insight, and curiosity about new ideas, interest in the future, tolerance for ambiguity and love of books. Since they prefer to make decisions with their feelings, their intuition is geared toward people, values, and artistic expression. This style characterizes a person who is self-expressive and insightful, open and flexible and often non-conforming, looking for new ways to solve problems. The NF thrives in classes with few restrictions where creativity is encouraged (Jung, 1971).

Jung (1971) characterized Sensing-Feeling (SF) learners as sociable, friendly, and interpersonally oriented. These learners are very sensitive to people's feelings, their own and others. They prefer to learn about things that directly affect people's lives rather than impersonal facts or theories. The SF learners perceive with their senses and accept and use the data they find around themselves. They make decisions based on personal feelings of like or dislike rather than impersonal logic. They focus on facts and primarily in terms of people. This combination of functions produces learners who are keen observers of human behavior and who display a great deal of interest in and empathy to others. This learning style characterizes a student who judge's importance on social
relevance but is more interested in the people themselves. The interpersonal SF works best in-groups, they appreciate interaction and tend to learn "friend by Friend" (Jung, 1971).

Based on Jung's theory (1971) Sensing-Thinking (ST) learners are realistic, practical and matter of fact. These learners are efficient and results oriented. They prefer action to words and involvement to theory. They have a high energy level for doing things that are pragmatic, logical, and useful. The ST learners prefer to perceive the world through their senses and thus live in the "here and now". They also rely on thinking to make decisions, and are concerned more about logical consequences than personal feelings. The ST learners perceive the world in terms of tangible to the senses, rather than abstract or symbolic ideas, theories, or models. The ST learners are objective, efficient and goal oriented. This learning style characterizes people who rely on facts and tangibles to make decisions. The ST likes to know exactly what is expected and strive for mastery. The ST appreciates absolute value, right and wrong, and tends to learn step by step (Jung, 1971).

Based on Jung's theory (1971) Intuitive-Thinker (NT) people are also information oriented but tend to question rather than accept direction. NT's appreciate debate and analysis and tend to learn doubt by doubt. These learners are theoretical, intellectual and knowledge oriented. They prefer to be challenged intellectually and to think things through for themselves. The NT learners are curious about ideas, have a tolerance for theory, and a taste for complex problems, and a concern for long-term consequences. The NT learners prefer to look at the world through their intuition rather than through their senses. Therefore, they are interested in abstract ideas, possibilities, and the meanings of
things beyond what is concrete or tangible. They rely on their thinking more than their feelings to make decisions. As a result, their thought processes tend to be logical, analytical, often critical, and generally impersonal. They are unlikely to be convinced by anything but reason.

The concept of cognitive style is well-established. Messick (1976) provides the most comprehensive definition of this concept. According to Messick, an individual’s cognitive style reflects “stable attitudes, preferences, or habitual strategies determining a person’s typical modes of perceiving, remembering, thinking, and problem solving” (p. 5). In short, cognitive styles reflect individual differences in how information and experience is organized and processed. Schmeck (1988) defined learning style as the cognitive style that a person manifests when confronted with a learning task, and specifically as a predisposition to use a particular learning strategy irrespective of learning task differences. Later, Schmeck (1988) expanded his definition of learning styles to include the concept of learning orientations (motives and personal experiences that influence perception).

Research in the cross-cultural application of general learning principles was mainly shaped by the acceptance of cultural differentiation. This law states that “cultural factors prescribe what shall be learned and at what age; consequently different cultural environments lead to the development of different patterns of ability” (Frisby, 1993, p. 121). Benson & Zaidel (1985) concluded that African American’s world-view is fundamentally different from a European world-view, and that these fundamental differences give rise to cultural differences between those two ethnic groups. These
cultural differences lead to ethnically based differences in how children communicate, learn, and process information.

Black Cultural Learning Styles (BCLS)

Attempts to explain the relative academic underachievement of black children and youth have driven much of social science research since the 1950s. One of the main theories underlying the body of the research in this area, is the Black Cultural Learning Styles (BCLS). The proponents of this theory have argued that traditional educational philosophy has failed to take into account the unique cultural characteristics of black children. It is argued that black children’s unique cultural experience in America has given rise to profound differences in the manner in which black children feel, think, behave, and learn (Benson & Zaidel, 1985; Backman, 1972). Boateng (as cited in Benson and Zaidel, 1985) argued that when African-American children interact with educators who either misunderstand or fail to appreciate these differences, the result is harmful educational practices that prevent these children from achieving their full educational potential. Boating has recommended that an optimal intervention would begin with a shift in the reconceptualization of psychological and educational constructs that would include an appreciation of African-American culture, as well as a shift in educational pedagogy with black children.

According to BCLS theory, black students have academic difficulties because they are forced to learn and compete within a “Eurocentric” academic environment that is essentially antagonistic to their natural cultural characteristics (Boateng, 1990, Benson & Zaidel, 1985, Irvine, 1990). McNeil (as cited in Irvine, 1990) concluded that blacks learn better from materials that have a human/social content and which are characterized by
fantasy and humor. Some authors suggested that black children have a lower tolerance for monotony relative to white children. Therefore, lessons must include high levels of motoric activity, stimulation, and vivacity in order for black students to be motivated to achieve (Backman, 1972; Schmeck, 1988). Thompson & O’Brien (1991) suggested that teachers need to exhibit warmth and incorporate verbal interplay during instruction, a rhythmic style of speech, and distinctive intonation in their speech patterns in order to build good rapport with black students. Benson & Zaidel (1985) argued that black children need intense, group-oriented, and “interpersonal” learning experiences rather than individual seat work oriented and “quiet room” teaching. Robertson (1978) argued that in order to meet the educational needs of “culturally diverse” learners, teachers need to incorporate visual, kinesthetic, and tactile teaching strategies, role playing and sociodramatic teaching strategies, individualized contracts, computer assisted instruction, and one to one tutoring.

Frisby (1993) attempted to show that little support exists for the notion that African American students learn in fundamentally different ways than whites as a function of their ethnic/racial culture. He suggested four major reasons why this may be the case: (1) the perpetuation of broad and unwarranted conclusions derived from flawed research (e.g., researchers’ failure to adequately control for IQ, mental age, or SES in group comparisons.); (2) the use of theories that characterize African-Americans as having a mysterious culture which can be “truly” understood only by a select handful of “experts”.; (3) the academic community that is reluctant to assertively critique BCLS models for fear of being labeled as culturally insensitive; and (4) an inability of modern educators to adopt practices that would ensure quality education for African-American
children which lead to searches for simplistic "new ideas" for solving complex educational problem.

**Measurement of Learning Styles**

Evaluating students' preferences through self-report measures is one of the most efficient ways of determining students' learning styles. Blaemore, McCray, & Coker (1984) stated that one common and efficient way of measuring learning style is to ask students their preferences for different teaching methods and elements in learning environments. Dunn, Beaudry, & Klavas (1989) stated:

"When students describe how they are best able to absorb and retain new and/or difficult information, they reveal their learning style preferences. When they then are taught both in the way they said they learn best and alternative ways, they perform significantly better when matched with their preferences. It can only be concluded that their preferences is their strength." (p. 10).

The self-report approach has been used successfully in determining learning styles and making educational decisions which result in increased achievement by students (Dunn, 1987; DeBello, 1985). According to Dunn students' self-reported preferences are a logical and practical method of gathering information about their learning style.

**Factors That may Affect Learning Style**

Theories about the factors which contribute to an individual's learning style have proliferated. Research on learning styles has been conducted at more than 60 universities over the past decade (Dunn, Beaudry, & Klavas, 1988). These investigations have yielded useful findings about the effects of environmental, emotional, sociological, and cognitive preferences on the achievement of students. Research has investigated the connections
between individual preferences and other influences on individual's learning styles. Researches have conducted correlational studies to establish relationships between learning style and birth order (Dunn et. al., 1989), cognitive development and maturation (Giannitti, 1988), hemispherity (Bruno, 1988), and self-concept (Curry, 1987).

In his correlational study of learning preference and hemispherity, Bruno (1988) concluded that there are sets of hemispheric traits that influence students with similar learning preferences. Restak (1979) and Theis (1979) concluded that certain learning style characteristics are biological, whereas others are developed through experience. Restak and Theis concluded that individual responses to sound, light, temperature, design, perception, intake, chronobiological highs and lows, mobility needs, and persistence appear to be biological; whereas sociological preferences, motivation, responsibility, conformity, and need for structure are thought to be developmental.

The significant differences among divers-cultures tend to support this theory (Learning Styles Network Newsletter, 1988). Cultural influences have been shown to be a big factor that shapes an individual's learning styles. Members of ethnic and cultural groups often have worldviews, values, traditions, and practices that differ from those of the mainstream society (Giannitti, 1988). Students may develop a unique learning style that is related directly to their interaction within their cultural groups, and is often different than mainstream students (Benson & Zaidel, 1985). However, school activity too often tends to be hybrid, implicitly framed by one culture, but explicitly attributed to another (Thompson & O’Bien, 1991).
Learning Style as a Factor in School Achievement

Theis (1979) developed a conceptual framework that grouped variables that contribute to the development of cognitive abilities in students into five major factors: 1) teacher-related factors, 2) student-related factors, 3) personal characteristics, 4) learning styles, and 5) other factors such as socioeconomic background. Teacher-related factors included such variables as philosophical beliefs (Bruno, 1988), preparation (Rogers, 1969), cognitive expectation (Schmeck, 1988), and instructional delivery or teaching style (Gregorc, 1979). Student-related factors included such variables as involvement (Bruno, 1988), motivation (Pittenger & Gooding 1971), and student interest in the course enrolled (Schmeck, 1988). While a number of factors have emerged from literature on student cognitive development, an additional factor identified was student learning style. Learning style is one factor researchers claimed influenced student educational performance (Claxton & Murrell, 1987; Dunn, 1987). Gregorc (1979) described learning style as "consisting of distinctive behaviors which serve as indicators of how a person learns from and adapts to his/her environment." (p. 234) Learning style research has been applied at an ever-increasing rate to the problems of education (DeBello, 1985). Claxton and Murrel (1987) suggested that learning style could be an extremely important element in the move to improve curricula and the teaching process.

In their study Torres and Cano (as cited in Thompson & O’Brien, 1991) indicated that approximately 9 percent of the variance in critical thinking abilities in students enrolled in a college of agriculture were uniquely accounted for by learning style. The study also suggested a substantial proportion (91%) of the variance in student critical thinking abilities remained unaccounted for. According to Torres and Cano by most
standards, the ability of one variable to contribute uniquely 9 percent of the variance in a dependent variable suggests learning style is indeed a significant variable that educators need to become familiar with to use in promoting and developing students' educational abilities. They also suggested that educators should develop an educational environment conducive to promoting actions that contribute to critical thinking. Torres and Cano added that this is not to say that teachers change students' preferences for learning (learning style), rather, instructors need to use the students' learning style in planning and delivering instruction.

Dunn, Beaudry, and Klavas (1989) concluded that learning style is a biologically and developmentally imposed set of personal characteristics that make the same teaching method effective for some and ineffective for others. To meet the needs of all students in classrooms, teachers can benefit from information about particular groups of students and how groups differ from one another with regard to their learning preferences. These researchers added that the traditional perception which suggests that children should learn to adapt to their teachers' styles disregard the biological and environmental nature of learning style.

Many studies indicated that when students are taught through methods which match their learning style, increased achievement and improved attitudes are a result (Canfield, 1988; DeBello, 1990; Dunn, 1987; Report of the New York State Board of Regents, 1988). Students whose learning needs are met early on may have a greater chance of having a successful and rewarding long-term educational experience. In addition, researchers have found that when students were permitted to learn or to take tests in setting arrangements that matched their learning style preference, they achieved
significantly higher test scores than when mismatched (Dunn, 1987; Bigge, 1976).
Additionally, when sociological preferences (i.e., independent and cooperative preferences) were matched with instructional factors students achieved at greater rates (Dunn, et al., 1989). When students' unique learning styles were identified and addressed as a legitimate approach towards learning, students were able to use their unique style and learning differences to their benefit.

Cfferty (as cited in Canfield, 1988) found that the closer the match between students' and teachers' styles, the higher the grade point average, and the reverse. Thus, educators can see that learning styles are not lightly held. Identifying learning styles as a basis for providing responsive instruction has never been more important than now, as educators meet the needs of a diverse student population (Dunn, Beaudry & Klavas, 1988). Curry (1987) concluded that when permitted to learn difficult academic information or skills through their identified preferences, children tend to achieve statistically higher test and attitude scores than when instruction is dissonant with their preferences.

Awareness of learning styles and how they are related to cultural diversity is important so that teachers can make effective and appropriate decisions about how best to meet the needs of students. This information also may help educators to view their students' learning differences as tools rather than disabilities or weaknesses. This study seeks to contribute to the body of knowledge on cultural differences in learning styles. In this study African-American and Caucasian high school students' learning styles was compared. Comparisons between cultural groups will add to the existing body of the knowledge about students' learning styles. Educators can use this information in making
decisions about students' needs in the classroom. By identifying typical characteristics of groups of students' learning styles and by matching learning conditions to student preferences, educators can better facilitate students' cognitive development and achievement.

Statement of the Problem

This study examined the influence of ethnicity and gender on student's learning style. It was hypothesized that the learning style of African American students does not differ significantly from the learning style of Caucasian students. In addition, it was hypothesized that male and female students' learning style does not differ significantly.

Methodology

Participants
To examine the above hypotheses existing archival raw data was used. All participants in this study attended a predominately middle class neighborhood senior high school in northeastern United States. About 10% of all students in this school are African American and approximately 83% of students are Caucasian. The Silver-Hanson Learning Style Inventory was administered to 834 ninth through twelfth grade students. Two groups of students were randomly selected from the archival data to participate in the research. All African American students who completed the learning style evaluation were included in the research. This group consisted of 95 African American students. From the 739 Caucasian students who completed the learning style evaluation, a random sample of 95 students was selected. The African American group consisted of 56 female and 39 male students. The Caucasian group consisted of 48 female and 47 male students. Overall, 104 female students and 86 male students were included in this research.
**Instrument**

The Silver-Hanson Learning preference inventory consists of 125 questions that are distributed among four categories, Thinking-Sensing (ST), Sensing-Feeling (SF), Intuitive-Thinking (NT), and Intuitive-Feeling (NF). Each category is a form of learning style.

The Hanson-Silver Learning Preference Inventory is based on Jung's typological theories and the behavioral definitions of the Myers-Briggs type indicator- MBTI (Myres-Briggs, 1962, 1976), and from the developer's observations of student behaviors. The learning style Inventory was developed as a result of the authors' own observations of over a thousand students in learning situation, as well as conducting teacher training in the use of the model. The initial 160 items in the inventory were analyzed and their inter correlation were obtained and the resulting matrix was factor analyzed. Items representing each factor were retained if they showed at least .40 correlation on that factor. Four factors were retained with the following variances accounted for: factor 1 (SF) 23.50%, factor 2 (ST) 15.63%, factor 3 (NF) 16.28%, and factor 4 (NT) 14.90%. Each factor is understood to represent a learning style. These learner types have been described by Jung (1971) and Myres-Briggs (1962, 1976) and have been adopted by Hanson and Silver (1980).

The Silver-Hanson Learning Inventory produces four different possible scores for Sensing-Feeling (SF), Sensing-Thinking (ST), Intuitive-Thinking (NT), and Intuitive-Feeling (NF). These scores may range from zero to 100 (M=50, SD=10). Students' highest score on any category is presumed to represent his/her preferred learning style.
Procedure

The Silver-Hanson Learning Style Inventory was administered to a predominately middle-class neighborhood high school in northeastern United States. This inventory was administered in the 1995-1996 school year to 470 and again in 1997-1998 school year to additional 364 ninth through twelfth grade students. Different classes were chosen by the school administrators to participate in the evaluation. Participation of individual students in each class was determined in voluntary basis. The completed learning preference inventories were scored and stored in the school’s archives. After obtaining the district’s assistant superintendent’s permission this archival data was gathered and used in this study. For the purposes of this study only the students’ ethnic background, gender, grade, and scores for each learning style was gathered.

Variables

The analysis involved two predictor variables and four criterion variables. The predictor variables were ethnicity (coded as 1=black, 2=white), and gender (coded as 1=female, 2=male). The four criterion variables were sensing-thinking, sensing-feeling, intuitive-thinking, and intuitive-feeling, and all were measured on an interval scale.

Results

Tables 1 through table 4 present means, standard deviations, and N’s for each learning style by gender and ethnicity. Overall, female students’ mean score was lower than the male students’ mean score on the sensing-thinking learning style. However, overall female students’ mean score was higher than male students’ mean score on sensing-feeling learning style. Both males’ and females’ overall scores on the intuitive-thinking learning style were low in comparison to the other three learning styles. Female
African-American students’ mean score on intuitive-learning learning style was higher than the mean score of African-American male students. However, Caucasian male students’ mean score was higher than Caucasian female students’ mean score on this learning style. Female and male’s mean scores were not significantly different on intuitive-feeling learning style. However, Caucasian students’ overall intuitive-feeling mean score was higher than African-American students’ overall intuitive-feeling mean score.

A two way (gender x ethnicity) MANOVA analysis was performed on learning styles scores. Results showed an overall main effect for students’ gender on their learning style (Wilks’ Lambda = .84, F (4,183)= 8.65, P< .0005, eta-squared=.16). No multivariate effect for ethnicity was found, nor any multivariate interactions. Univariate analyses were also performed and the results are presented in table 5. Significant differences were found for gender effects on sensing-thinking and sensing-feeling learning style score. Males scored higher than females on sensing-thinking (F (1, 186)= 14.50, P< .0005, eta-squared=.07). Females scored higher than males on sensing-feeling (F (1, 186)=19.91, P< .0005, eta-squared=.10). In addition, univariate analysis found that Caucasians scored higher than African American students on intuitive-feeling (F (1,186)=5.84, P< .02, eta-squared=.03).

Discussion

Based on the findings of this study, male students are more likely to prefer the sensing-thinking learning style. Based on the Silver-Hanson Learning Preference Inventory (1984) this type of learning style can be characterized as an efficient and result oriented. Male students are more likely to prefer action to words and involvement than
theory. They are more likely to have a high energy level for doing things that are pragmatic, logical and useful. Male students are more likely to be concerned about logical consequences than personal feelings. They put what they have learned into immediate use and they need to see tangible results from their efforts. Male students are more likely to prefer to study about practical things that have immediate use, and they prefer to be asked questions for which there are correct answers rather than open-ended questions requiring opinions. They learn best from doing something rather than reading about it or being told about it. Male students learn best from drilling, programmed instruction, demonstration, practice, mastery learning, direct and actual tasks and experiences. Male students' motivating activities include: repetitive learning games, concrete exploration and manipulation, programmed tasks, workbooks, making real-life models, reading biographies, how to do it books and adventure stories, dramatizing important events, making things that can be used in school, at home, or at play, demonstrating what they know, and assignments that have a clearly defined conclusion. Male students are likely to dislike activities that require sitting still and listening for long periods.

Based on the finding of this study female students are more likely to prefer a sensing-feeling learning style. According to the Silver-Hanson Learning Preference Inventory (1984) this learning style can be characterized as sociable, friendly, and interpersonally oriented. Female students are more likely to be sensitive to people and their own feelings. They prefer to learn about things that directly affect people's lives rather than impersonal facts and theories. Female students are more likely to learn when working with a friend or sharing personal thoughts and opinions with other students.
Female students prefer to learn about things that directly affect people's lives rather than impersonal facts or theories. They learn best while thinking out loud with other students and being in a relaxed, comfortable and personally pleasing environment. Female students' learning rate is likely to increase with teachers' attention and encouragement. They learn best from modeling or when helping other students to learn. Female students learn best when they are personally experiencing what they are learning. Activities that are more likely to increase female students learning rate include, group experiences, personal expression, group dynamics activities, personal encounter, imitation, role-playing, peer tutoring, and interactive strategies. Female students' motivating activities' include, “show and tell”, sharing personal experiences, listening to, and reading stories about how people feel, helping others, direct art activities allowing for personal expression of feelings, writing and talking about things they love, group games and activities, team work, small group discussions, dramatics, messy activities (e.g., clay, paint), and concrete exploration and manipulation. Female students are very likely to dislike complex games of strategy, long periods of working alone silently, abstract activities, emphasis on factual detail, highly competitive games where someone loses, and detailed and demanding routine.

In addition, based on the findings of this study, Caucasian students are more likely to prefer a intuitive-feeling learning style. Based on the Silver-Hanson Learning Preference Inventory (1984) these learners are more likely to be theoretical and knowledge oriented. Students with this type of learning style learn best from creative problem solving and creative writing activities. These students are more likely to prefer activities that involve self-discovery and free association. Their motivating activities
include, problem-solving issues of personal and social importance, opportunity to expound on how to improve things, and working with a rich variety of resources.

Limitations and Future Trends

This study used a sample of students who attend a senior high school in a middle class neighborhood in northeastern United States. The student’s social and economic situations were homogeneous. Therefore, the findings of this study are limited to students from similar socioeconomic background. The Silver-Hanson learning style inventory is based on the authors’ own observations. Although a factor analysis of the items in the inventory showed fair inter-correlation, the validity of the instrument needs further investigation. Although this study found marginal evidence indicating that the learning styles of African American students are different than those of Caucasian students, more research is needed to further substantiate this finding. Furthermore, more research is required to determine the influence of age on student’s learning style. The findings of this study are based only on high school students.

Summary

Some research suggested that each student develops a preferred and consistent set of behaviors or approaches to learning. When students’ preferred way of learning is targeted they are more likely to benefit from instruction. In order to enable teachers to target students learning style, this study examined the learning style preferences of male and female African American and Caucasian students. The finding of this study indicated that while gender has a great impact on students’ learning style, there was marginal evidence that ethnicity affects students’ learning style. Analysis of the data in this study indicated that male students are more likely to have a high energy level, and to be
interested in doing things that are pragmatic, logical and useful. Male students are also more likely to be concerned about logical consequences than personal feelings. Female students’ learning style can be characterized as sociable, friendly, and interpersonally oriented. Caucasian students overall learning style can be characterized as more theoretical, intellectual and knowledge oriented.

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Sensing-Thinking Learning Style by Gender and Ethnicity

Table 1
Means (+SD, +I) by Gender and Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
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<td>52.77</td>
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<td>51.09</td>
<td>46.98</td>
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<td>(13.26, 104)</td>
<td>(10.30, 86)</td>
<td>(12.40, 190)</td>
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Sensing-Feeling Learning Style by Gender and Ethnicity

Table 2
Means (+SD, +n) by Gender and Ethnicity

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## Intuitive-Thinking Learning Style by Gender and Ethnicity

### Table 3

**Means (+SD, n) by Gender and Ethnicity**

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<td>(Mean, SD, n)</td>
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Intuitive-Feeling Learning Style by Gender and Ethnicity

Table 4
Means (+SD, +n) by Gender and Ethnicity

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### Table 5

**Univariate Analyses of Gender and Ethnicity Effects**

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*  \( p < .05 \)

**  \( p < .001 \)