Differences between Latino Students' Learning Styles and Their Gender

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Abstract

According to the United States Census Bureau (2007), in the year 1910, the total population of the United States consisted of 92.2 million people. Presently, the overall population has increased to 300 million people. This change in population is attributed to an influx of different ethnic groups to the United States (United States Census Bureau). The United States Census Bureau (2007) indicated that about one in three United States residents belongs to a racial group other than White. Latinos are the largest minority group in the United States (United States Census Bureau, 2007), with a population of 44.3 million. Blacks are the second largest minority group, with a total of 40.2 million. This change in demographics has a tremendous impact in the admission of Latino students to Community Colleges around the nation.

In this study differences in learning styles between female and male students at a Community College located in New York City were explored. Descriptive statistics, correlations, and *t*-tests were run to identify relationships between gender, and students' learning styles. Findings of the study indicated that differences in learning styles were found when compared Latino female students with Latino male students.

Introduction

It has been indicated by some researchers that gender plays an important role in the way individuals learn and perceive their own process of learning (Banks & Banks, 2004; Kaenzig, Hyatt, & Anderson, 2007). Furthermore, differences in learning style and construct knowledge were found by Lincoln and Rademacher (2006) when compared the results of a group of students by gender. To conduct this study, they used the Spanish version of the Visual, Aural, Reading and Writing, and Kinesthetic (VARK) learning style inventory. In their study with 69 adult ESL students in the northwest part of Arkansas, they found that 71% of the women and 23% of the males were aural learners, while no difference was found between males and females in regard to the kinesthetic learning preference. Just 4.0% of the participants, males and females, chose visual learning as their preferred way to learn. An analysis of variance indicated that Latino female students chose the visual learning style significantly less often than they chose other learning styles.

In a different study Kaenzig, Hyatt, and Anderson (2007) explored the effect of gender on the learning experiences of a group of students pursuing a degree in business. Using focus groups, they studied gender differences in regard to students' satisfaction with their educational experiences, their attitudes toward their professors, their experiences working in groups, and their classroom assertiveness. In terms of students' satisfaction with their educational experiences, no significant difference was found between female and male students ($t_{(284)} = 1.14$, $p = .25$). On the contrary, both groups of students indicated that they were very satisfied with the quality of instruction that they received.

Regarding students' attitudes toward their professors, no significant differences were found (Kaenzig, Hyatt, & Anderson, 2007). Neither of the two groups reported having a favorite type of professor ($t_{(285)} = 0.87$, $p = .38$). In working in groups, female students reported more negative experiences. Female students indicated that some group members took advantage of them, and they ended up doing the secretarial work and organizing the project. Male students, on the other hand, felt like their team worked well together, and their experience in working in a group was very positive. Overall, a significant difference was found in students' evaluation of their experiences of working in groups, with female students indicating a less positive experience than male students (M = 3.68, SD = 0.68) vs. (M = 4.01, SD = 0.61) ($t_{(132)} = -2.93$, $p < .01$). Kaenzig, Hyatt, and Anderson attributed this difference in satisfaction in working in groups to the differences in learning styles. They concluded that female students tend to have more self-doubt in classroom experiences and require learning approaches that encourage personal development. They also indicated that female students tend to analyze problems in an internal way, while men attribute problems to external causes.

In a different study, Dunn, Dunn, and Price (2003) identified the learning styles of Mexican-American students in a public elementary school in a South Texas school district. The participants in the study were predominantly immigrants and first-generation children of Mexican heritage whose primary language was Spanish. The learning style characteristics of 687 Mexican American children were compared with other groups using discriminant analysis. Participants were categorized as Mexican Americans in general, Mexican American males and females, Anglos in general, and Anglo males and females. Findings from the study indicated that in terms of Persistence, which corresponded to the emotional elements of learning, female students of both groups indicated that they need to stay with a task until completed.

Purpose of the Study

The purpose of this study was to explore the relationship between learning styles, and the gender of a group of Latino students in an urban community college in the northeastern part of the United States. In order to determine students' learning styles, two learning styles inventories were used in this study. One of the learning styles

inventories utilized was the English and Spanish version, Version 3.0, of the Learning Styles Inventory developed by Kolb (2005). The second inventory that was administered was the Productivity Environmental Preference Survey (PEPS), developed by Dunn, Dunn, and Price (2003).

Methods

The exploration of the relationship between Latino students' learning styles, and their gender was investigated using three surveys to collect and analyze data: The Learning Style Inventory (LSI) developed by Kolb (2000), the PEPS developed by Dunn, Dunn, and Price (2003), and a demographic survey.

Setting

The study took place at Hostos Community College, a college created by an act of the Board of Higher Education on April 22, 1968, in response to the demands of Puerto Rican and other Hispanic leaders who urged the establishment of a college to meet the needs of the South Bronx (College Catalog, 2010-2014). A group of 229 Latino students who were enrolled in Hostos Community College accepted the invitation to participate in the study. Their ages ranged from 17 to 68 years of age. The average age of the participants was 19 years of age.

Data Collection Procedures and Analysis

Participants were recruited from randomly selected classrooms. The study was announced in the college community and students were given letters of invitation explaining the study. This letter of invitation included several dates and times when they could fill out the surveys. An Informed Consent Form was given to those students who wanted to participate in the study. Participation was voluntary, and all information provided is confidential. The three surveys were given to each voluntary participant: (1) the Learning Style Inventory (LSI; Kolb, 2000), (2) the Productivity Environmental Preference Survey (PEPS) (Dunn et al., 2003), and (3) a demographic survey in a 10 by 13 inch folder.

Once the surveys were completed, participants put them back in the same folder and returned them to investigator. The folder had a corresponding code number that was used to match students with their survey results. The code consisted of the first letter of the students' first and last names, followed by the number of the month in which they were born and the day. Students created this code in order to protect their confidentiality.

Data Analysis

In order to identify the learning styles of the students at Hostos Community College, descriptive statistics were used. Descriptive statistics, correlations, and *t*-tests were also run to identify relationships between gender, and students' learning styles. An analysis of variance ANOVA for a repeated measures design was performed to determine the differences in means.

Description of the Inventories

Kolb's Model of Experiential Learning

Kolb (2005) indicated that individuals acquire knowledge from their daily experiences. According to Kolb,

> "People learn from immediate, here-and-now experience, as well as from concepts and books, and learning happens in all human settings—from school to shop floor, from research to laboratory to management boardroom, in personal relationships and in the aisles of the local grocery store. Learning is the method we use to adapt to and cope with world; it keeps us busy through life—from childhood to adolescence, to middle and old age" (p. 1).

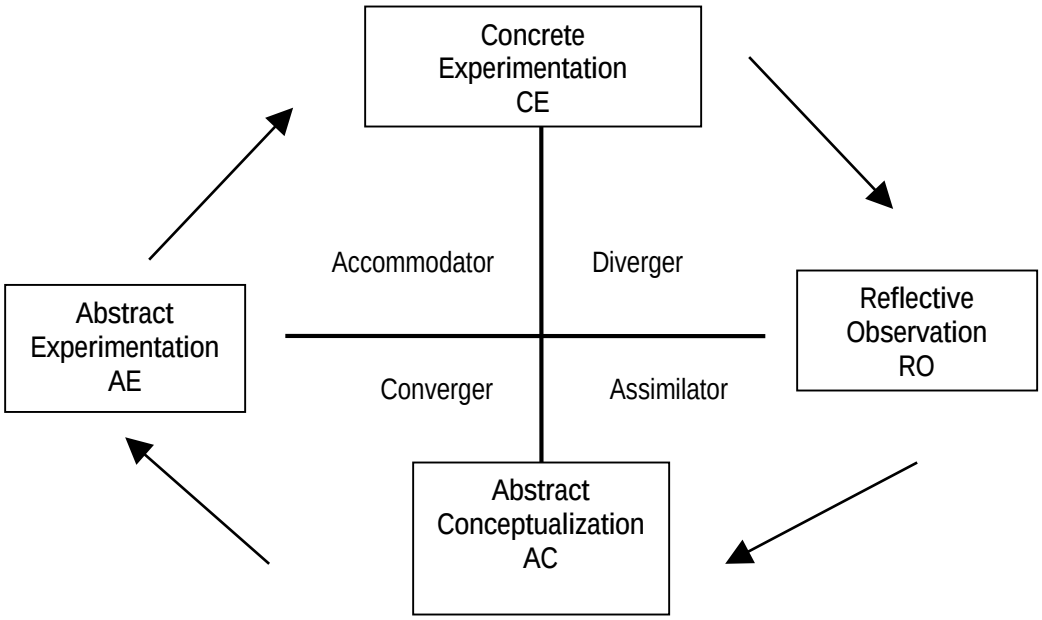
Kolb's (2008) work was primarily influenced by Piaget's (1970) model of learning and cognitive development, Lewin's (1969) model of action research, and Dewey's (1933, 1938) model of experiential learning. Kolb introduced his experiential learning theory, emphasizing the tendencies that people have to input and to process information. According to Kolb's model of experiential learning, the learning process should integrate four dimensions (see Figure 1). These four dimensions were identified by Kolb as: (1) Concrete Experience (CE); Reflective Observation (RO); Abstract Conceptualization (AC); and Active Experimentation (AE).

In the first of these dimensions, Concrete Experience (CE), Kolb described a type of learning in which the individual needs to become involved in actual tangible situations. People who prefer the second dimension, Reflective Observation (RO), were described by Kolb as being individuals who were able to reflect upon the information that was presented, analyzing it from different perspectives (Atkinson & Murrell, 1998). In the third dimension, Abstract Conceptualization (AC), Kolb referred to those individuals who prefer to logically analyze and evaluate ideas. Ultimately, with Active Experimentation (AE), learners actively engage in the process of learning and are able to learn and understand the information by trying things out or by doing things (Kolb, 2005).

In his theory, Kolb (1984) described the concept of effective learning as a cyclical process. Based on Kolb's theory, an effective learner is someone who is able to apply skills from each of the modalities, depending on the learning situation (Maldonado Torres, 2011). This process does not happen automatically. Kolb (2005) suggested that the teacher or the leader must guide the student through the process of "watching (CE), feeling (RO), thinking (AC), and doing (AE)" (p. 79). Students can be guided through the process by teachers who provide them with exercises that are geared to help them both develop and use the four stages of learning (Kolb, 2005). Alternatively, Kolb analyzed the process of learning by combining the abstract-concrete and the active-reflective dimensions in an orthogonal relation to each other (see Figure 1).

In order to come up with this combination of dimensions, Kolb (1984; see Figure 1) compared a person's scores on the different axes, including Active Experimentation (AE) versus Reflective Observation (RO), and Concrete Experience (CE) versus Abstract Conceptualization (AC). Someone with higher AE and higher CE would be classified as an Accommodator. Conversely, an individual who has high scores on CE and RO would be classified as a Diverger (Kolb, 2005). If a person possesses high scores on the RO and AC dimensions, this individual will be categorized as an Assimilator (Kolb, 2005). Finally, if an individual scores high in the AC and AE dimensions, this person will be known as a Converger. Kolb (1984) classified these combinations as learning styles.

Figure 1. Kolb's (1984) Modalities of Learning and Learning Styles.



NOTE. From Experiential learning: Experience as the source of learning and development (p. 145), by Kolb, 1984, New Jersey: Prentice Hall. Copyright 1984 by [David A. Kolb]. Adapted with permission.

The Diverger learns by combining CE with RO (Kolb, 1984). These types of learners are those who prefer concrete learning situations instead of abstract learning situations, and reflection to active involvement. They have the capacity to visualize concrete situations from different perspectives and points of view (Maldonado Torres, 2011).

On the other hand, the Assimilators are the sum of the RO and AC (Kolb, 1984). This type of learner likes abstract ideas and concepts, creating conceptual models, designing experiments, using learning problem solving, considering alternative solutions, reading, reflecting, developing theories, analyzing quantitative information, and engaging in structured activities (Kolb, 2005). This type of learner enjoys a systematic approach to teaching, detailed directions, and computer-assisted instruction (Kolb, 2005).

The Convergers combine the skills of AC and AE. This type of learner prefers to actively experiment with ideas and theories (Maldonado Torres, 2014). This type of learner is able to solve problems and make decisions based on finding solutions to questions and problems (Kolb, 1984). Individuals who possess this type of learning style prefer to deal with technological problems rather than with social and interpersonal issues.

Finally, Kolb (1984) described the Accommodators. Accommodators are those learners who combine skills of CE and AE. Accommodators are those who need to have active involvement in concrete situations. They tend to like having hands-on experience, learning actively, carrying out solutions, taking risks, using trial and error, being flexible, and sharing information with others. This type of learner likes class discussions, debates, presentations, and group activities.

The Dunn and Dunn Learning Styles Model

Dunn and Griggs (2005) declared that the theory developed by Kolb (1984) was focused on only one or two learning variables. They suggested that the learning style theory is more complex in nature and should encompass a multidimensional perspective. Dunn and Griggs (2005) indicated that a multidimensional perspective is required to reflect individual differences resulting from each individual's "biological, developmental, and psychological experiences" (p. 8). The learning process is impacted by many variables. In other words, "when using only a single- or dual- dimensional model, the very variable that might produce the most achievement gains for one individual could be the variable *not* included in that model" (p. 8). Dunn and Griggs indicated that Kolb's theory was focused on just two dimensions of the learning spectrum. According to Dunn and Griggs (2000), the Dunn and Dunn model is more multidimensional since it combines both— biological and developmental characteristics that makes the model very effective for any type of learner. The Dunn and Dunn model

was designed for determining not only the learning preferences of elementary students, but the secondary and adult population, as well (Dunn & Griggs, 2000).

The Productivity Environmental Preference Survey (PEPS) was developed by Dunn, Dunn and Price (2005) to identify adults' learning preferences for each of 20 different elements (Dunn et al., 2005). They indicated that the PEPS includes individuals' "reactions to the immediate instructional environment (sound, temperature, light and design)" (p. 5). Individuals' emotions are also included in the PEPS as elements of "motivation, persistence, responsibility, and the preference for a structure or a flexible learning environment" (p. 5). Individuals' sociological preferences for learning are also included in the PEPS. Among the sociological preferences are "learning alone, with peers, with an authoritative figure, and in a variety of ways as opposed to patterns and routines" (Dunn & Griggs, 2000, p. 9). Physiological characteristics or strengths are also measured in the PEPS based on the perceptual strengths of an individual (Dunn & Dunn, 2005). These physiological characteristics are identified in the PEPS as auditory, visual, tactile, and kinesthetic.

The PEPS physiological elements are also measured by considering the individuals' preferred time of the day for studying, intake (food consumption), energy levels, and needs for mobility while learning. The 20 areas included in the PEPS are: (1) sound, (2) light, (3) warmth, (4) formal design, (5) motivated/unmotivated, (6) persistent, (7) responsible, (8) structure, (9) learning alone/peer-oriented, (10) authority-oriented learner (i.e., the preference of having an authority figure present while learning), (11) several ways (referring to presenting the information in different ways), (12) auditory preferences, (13) visual preferences, (14) tactile preferences, (15) kinesthetic preferences, (16) requires intake, (17) evening/morning, (i.e., preference in time of the day for studying), (18) late morning, (19) afternoon, (20) needs mobility.

Results

One hundred seventy-six of the participants (75%) were female, while 56 (24.5%) of the participants were male (see Table 3). Participants in the study included Dominicans (66.4%), Puerto Ricans (11.4%), Ecuadorians (6.6%), Peruvians (4.4%), Mexicans (3.9%), Colombians (1.3%), Salvadorians (1.3%), Hondurans (1.3%), Venezuelans (.9%), Costa Ricans (.4%), Cubans (.4%), Guatemalans (.4%), Nicaraguans (.4%) and Paraguayans (.4%). In addition, 75.5% of the participants spoke Spanish at home, 5.2% of them spoke English at home, and 18.8% spoke both Spanish and English. As noted in Table 1, more female students than male students participated in the study. Dominican students represented the majority of the student body at the Community College. In addition, more than half of the students indicated that they spoke more Spanish at home than English.

Table 1

Participants' Gender, Country of Origin, and Language Spoken at Home

Variable	%	N
Gender		
Female	75.0	176
Male	24.5	56
Not Reported	.4	1
Country of Origin		
Dominicans	66.4	152
Puerto Ricans	11.4	26
Ecuadorians	6.6	15
Peruvians	4.4	10
Mexicans	3.9	9
Colombians	1.3	3
Salvadorians	1.3	3
Hondurans	1.3	3
Venezuelans	.9	2
Costa Ricans	.4	1
Cubans	.4	1
Guatemalans	.4	1
Nicaraguans	.4	1
Paraguayans	.4	1
Language Spoken at Home		
English	5.2	12
Spanish	75.5	1173
Both	18.8	143

Table 2 includes descriptive statistics for Kolb's four modalities of learning by students' gender. Higher mean scores were found for the Reflective Observation (RO) modality of learning for both groups (females, M = 34.02, SD = 5.64; males, M = 32.57, SD = 5.72). The lowest mean scores for both gender groups were in the Concrete Experience modality of learning (females, M = 23.73, SD = 6.78; males, M = 23.82, SD = 6.08).

Table 2

Means and Standard Deviations by Gender and Kolb's Modalities of Learning

	Female N=172		Male N=56		Overall N=228	
	M	SD	M	SD	M	SD
CE	23.73	6.78	23.82	6.08	23.75	6.60
RO	24.02	5.64	32.57	5.72	33.67	5.68
AC	31.78	5.54	33.30	5.97	32.17	5.68
AE	31.40	5.70	30.16	5.88	31.10	5.75

Note. RO = Reflective Observation; CE = Concrete Experience; AC = Abstract Conceptualization; AE = Active Experimentation.

The observed difference for gender was not significant ($F_{(1, 226)} = 12.294$, $p = .169$), nor was the observed interaction of Kolb's modalities of learning by gender ($F_{(3, 226)} = 2.246$, $p = .084$); however, the observed differences within Kolb's modalities of learning were significant ($F_{(3, 226)} = 55.118$, $p = .001$) (Table 3).

Table 3

Analysis of Variance for a Repeated Measures Design by Gender for Kolb's Modalities of Learning

Source	df	MS	F	*p*
Between Gender	1		12.294	.169
Error	226	6.470		
Within Kolb	3		55.118	.001
Within Kolb & Gender	3		2.246	.084
Error	678	44.787		

Table 4 shows the elements of the PEPS and the participants' preferences by gender**.** The element of Structure had the highest scores in both gender groups: female (M = 60.40, SD = 6.41), and male (M = 57.82, SD = 7.55). Conversely, the element of Responsible/ Conforming (M = 46.68, SD = 9.80), as well as the element of Temperature (M = 46.43, SD = 7.17), had the lowest overall mean scores. Female students (M = 53.29, SD = 8.14) scored higher in the element of Light than male students (M = 50.43, SD = 7.75). Male students scored higher in the element of Noise Level (M = 52.36, SD = 10.02) than female students (M = 47.82, SD = 8.56). Female students, on the other hand, scored higher on the element of Auditory (M = 57.49, SD = 10.12) than male students (M = 54.86, SD = 9.08).

Table 4

Means and Standard Deviations by Gender for the Elements of PEPS

PEPS Categories	Gender					
	Female N= 171		Male N= 56		Overall N= 227	
	M	SD	M	SD	Mean	SD
Noise Level	47.82	8.56	52.36	10.02	48.94	9.13
Light	53.29	8.14	50.43	7.75	52.59	8.12
Temperature	46.32	6.92	46.77	7.93	46.43	7.17
Design	48.26	7.56	47.82	6.82	48.15	7.37
Motivation	51.63	6.69	51.63	6.00	51.63	6.52
Persistent	53.55	6.12	51.98	6.83	53.16	6.32
Responsible/ Conforming	46.94	9.66	45.89	10.27	46.68	9.80
Structure	60.40	6.41	57.82	7.55	59.76	6.82
Alone/Peers	53.37	10.02	51.98	9.57	53.03	9.91
Authority Figures	53.52	9.29	54.66	8.14	53.80	9.02
Several Ways of Learning	47.89	9.37	46.41	8.97	47.53	9.27
Auditory	57.49	10.12	54.86	9.08	56.84	9.92
Visual	49.44	8.30	49.89	7.64	49.56	8.13
Tactile	52.80	9.68	53.04	7.56	52.85	9.19
Kinesthetic	52.50	6.45	52.61	5.01	52.53	6.11
Food Intake	51.64	8.26	52.04	8.34	51.74	8.27
Time of Day	47.53	8.34	47.43	7.88	47.50	8.21
Late Morning	50.15	10.74	50.36	10.21	50.20	10.59
Afternoon	55.98	10.10	55.34	10.06	55.82	10.07
Needs Mobility	53.08	8.02	52.21	7.63	52.87	7.92

Table 5 shows that a statistically significant difference was found in the elements of the PEPS ($F_{(19, 225)} = 1.157$, $p \leq .001$), as well as a difference between gender ($F_{(1, 225)} = 1.598$, $p = .048$). A statistically significant effect between gender ($F_{(1, 225)} = 1.157$, $p < .001$) was found. Additionally, a statistically significant difference was found among the elements of the PEPS ($F_{(19, 225)} = 27.542$, $p < .001$).

Table 5

Analysis of Variance for a Repeated Measures Design by Gender for the Elements of the PEPS

Source	df	MS	F	*p*
Between Gender	1		1.157	<.001
Error	225	119.51		
Within PEPS	19		27.542	<.001
Within PEPS & Gender	19		4.598	.048
Error	4275	69.59		

Since an interaction between the gender of the participants and the elements of PEPS was found, *t*-tests were run in order to determine possible differences in learning preferences among the two groups, female and male students (Table 6).

Table 6 includes the element of the PEPS that was significantly different among the two groups of students, females and males. As shown in Table 22, female students had a lower preference for the element of Noise level. Female students (M = 47.82, SD = 8.56) indicated a lower preference than male students (M = 52.36, SD = 10.02) (t = 2.311; p = .001).

Table 6

T- test of Equality of Means Scores by Participants' Gender for the Elements of the PEPS

Elements of PEPS	M	SD	Overall Mean N=225	*t*	*p*
Noise Level					
Females	47.82	8.56			
Males	52.36	10.02		2.311	.001

Discussion

The purpose of this study was to explore the relationships between Latino students' learning styles, and their gender. Approximately 60% of the population at HCC Community College are students who were originally from the Dominican Republic, and more than half of the population consisted of female students. For this study, student learning preferences were compared by gender. Female students indicated having a higher preference for the Reflective Observation (RO) modality of learning. Male students, on the other hand, showed a higher preference for the Abstract Conceptualization modality of learning. For the elements of the PEPS, female and male students showed a higher preference for the element of Structure while learning.

Gender and differences in learning preferences.

When males and females were compared on Kolb's LSI (Kolb, 2008), females preferred the Reflective Observation (RO) modality of learning (M = 34.02, SD = 5.64) over males (M = 32.57, SD = 5.72). This preference in learning means that female students need to provide personal meaning to the material that they are learning (Kolb, 2008). Males indicated a higher preference for the Abstract Conceptualization (AC) modality of learning (M = 33.30, SD = 5.97) than females (M = 31.78, SD = 5.54). This preference in learning implies that male students tend to learn best by understanding abstract concepts and theories (Kolb, 2008).

The Concrete Experience (CE) modality of learning was the least preferred among the two groups of students, female (M = 23.73, SD = 6.78) and male (M = 23.82, SD = 6.08). This preference in learning means that students need to experiment with concrete, tangible situations in order to learn (Kolb, 2008). A possible explanation for this might be that the majority of the students participating in the study are in their first year of college and are English as Second Language learners (ESL). First-year students, as well as ESL students, need to be familiarized with the culture of the place, as well as with the new environment (Ellis, 2012).

This study concurred with the findings of Kolb (2005) when he indicated that males have the tendency to prefer the Abstract Conceptualization modality of learning more than the females. According to Kolb, "women are often taught and socially rewarded for relating to feelings, men are often taught and socially rewarded for developing a more interpersonal, logical, less feeling-oriented way of doing things" (p. 10). On the PEPS (Dunn et al., 2003), female students also scored higher in the element of Light (M = 53.29, SD = 8.14) than male students (M = 50.43, SD = 7.75). This preference in learning indicates that in order to effectively learn, female students are more likely to need a bright light (Dunn et al., 1996).

Results

Results of this study contradicted the results of Carlson (2002), who found that Latino students, in general, had a high preference for dim light rather than bright light. Similarly, Sarantopoulos (2005) found that Latina students had a high preference for the element of Light. Nevertheless, Dunn et al. (2005) indicated that female students had the tendency to score higher in the element of Light, regardless of their country of origin.

Male students, on the contrary, scored higher in the element of Noise level (M = 52.36, SD = 10.02) (t = 2.311, p = .001) than Female students (M = 47.82, SD = 8.56). This preference indicates that the male students in this study did not find noise distracting (Dunn et al., 2005). Instead, they could incorporate noise as part of their learning process.

For the element of Structure, females indicated a higher preference (M = 60.40, SD = 6.41) than males (M = 57.82, SD = 7.55). The results of this study corresponded with the findings of Sarantopoulos (2005), who found that female students preferred the element of Structure over male students. In the same way, Warren (1997) found that Latina students had a high preference for the element of Structure while learning.

Conclusion

Consider your students' demographic background.

Students' learning differences based on their gender, age, and language could indicate the ways in which they learn best. For instance, gender has an impact on the preferences that individuals exhibit in learning (Banks & Banks, 2004). Educational experiences have a direct relationship with the way that females and males are socialized (Banks & Banks, 2004). Kaenzig, Hyatt, and Anderson (2007) indicated that female students need to have educational experiences that deal with self-development and feelings. The results of this study showed that Latino female students had the tendency to learn best if they could relate the information to their lives, or if it had a personal meaning. Latino male students in the study had the ability to understand abstract concepts and theories, which suggests that they could be successful in classes such as Mathematics and Natural Sciences.

According to Dewey (1938), knowledge is constructed by individuals as a consequence of their interactions with the environment. Play activities have a great impact on the way that children construct knowledge (Schunk, 2004). Male children are continually involved with play team activities that require numerical actions (Schunk, 2004). As a consequence, male children develop the ability to understand abstract concepts and difficult theories (Schunk, 2004). Female children, on the other hand, tend to play alone or with a friend. This way of playing develops the ability of retrospection and analysis, according to Schunk (2004). Once educators understand the differences in learning between females and males, initiatives to attract underrepresented groups in careers related to Mathematics and Science could be developed.

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