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## **Learning styles, online courses, gender, and academic achievement of Hispanic students in higher education**

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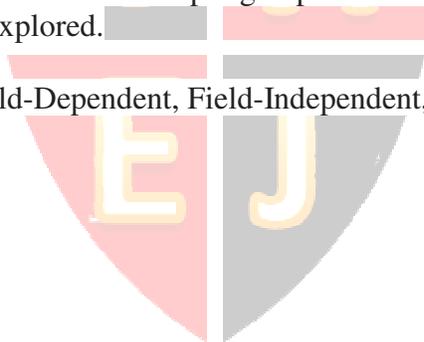
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### **ABSTRACT**

This study aims at identifying learning styles of two groups of online students enrolled in Legal Studies and Corporate Training courses and comparing learning styles and academic achievements in those courses. The learning styles questionnaire was adapted from a learning styles questionnaire in College Study Strategies (Laskey & Gibson, pp. 52-53, 1997) and is a continuation of previous research by the authors. In the fall 2017, the authors administered the adapted questionnaire to undergraduate corporate training and legal studies online students in a Southern Hispanic serving institution. The questionnaire allowed students to identify whether their preferred method of learning was field dependent or field independent. Results of the learning styles questionnaires were compared with academic achievement. A discussion of field dependent and independent learning styles for Hispanic online learners will be presented. Recent research and the evidentiary rationale for attempting to predict academic achievement from specific learning styles will be explored.

Keywords: Online Courses, Field-Dependent, Field-Independent, Learning Styles, Academic Achievement



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## INTRODUCTION

The identification, classification and definition of learning styles varies widely among researchers. “How learners gather, sift through, interpret, organize, come to a conclusion about and store information for further use” is one definition of learning styles (Chick, n.d.). Jantan and Razali (as cited in Othman & Amiruddin, 2010) defined learning styles as the way a student deliberates, as well as how they approach the processing of material, knowledge, and experience. Each individual possesses a different mix of learning styles; some that may be more dominant than others or some that may be used depending on the circumstances and the information to be learned (Learningstyles.com, 2016). In this paper, as in the previous papers of Jones & Blankenship (2017, 2018), the view that has been adopted is that learning styles refer to “the preferential way in which the student absorbs, processes, comprehends and retains information” (Teach.com, 2016). The learning styles upon which this study will be concentrating are the field dependent and field independent models.

“Despite the popularity of learning styles and inventories, it is important to acknowledge that there is no evidence to support the idea that matching activities to one’s learning style improves learning” (Chick, n.d.). Pashler, McDaniel, Rohrer and Bjork (2009) reviewed hundreds of published research studies to determine whether there was credible evidence to support using learning styles in instruction. They concluded that “although the literature on learning styles is enormous,” there is “virtually no evidence” supporting the idea that “instruction is best provided in a format that matches the preference of the learner” (Pashler, McDaniel, Rohrer & Bjork, 2009, p. 105). Despite the fact that the literature on learning styles has indicated no supporting evidence for matching learning styles to successful retention of information, there are similar quantities of literature promoting the use of different types of learning styles to assist students in learning and retaining information

## FIELD DEPENDENCE/FIELD INDEPENDENCE

Many academic research studies have focused on learning styles and learning strategies. Kolb described the concept of learning styles as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38). Weinstein and Mayer offered a broader definition of learning strategies as those “behaviors and thoughts that a learner engages in during learning and that are intended to influence the learner’s encoding process” (Weinstein & Mayer, 1986, p. 315). Witkin, an American psychologist, began his exploration of one-dimensional models of a variation in cognitive styles in the early 1960s (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). Witkin’s theory of field dependent-field independent cognitive styles has been extensively used in research (Saracho, 1998). His Embedded Figures Test (EFT) shows examinees a simple figure and then asks participants to locate that figure which is embedded within a relatively complex design (Goodstein, 1978). As Woolbridge and Haimes-Bartolf (2006) explained, citing Witkin and Goodenough (1981, p. 15), “To locate the simple figure, it is necessary to break up the exposed pattern so as to reveal the figure. It was found that subjects who had difficulty separating the sought-after simple figure from the complex design . . . were the ones who were field dependent. Conversely, people who were field independent . . . found it easy to overcome the influence of the organized complex design in locating the same figure within it.” Thus, the construct of field dependence-field independence refers to “the way individuals respond cognitively to confusing information and unfamiliar situations,” and the

behaviors that the responses produce (Irvine & York, 1995). Griggs and Dunn (1996) stated that, “Field-dependent individuals are more group oriented and cooperative and less competitive than field-independent individuals.” Wooldridge and Haimes-Bartolf (2006) reviewed the literature on field-independence/dependence research and found a common theme: field-dependent learners will “require more structure” than field-independent learners “in order to achieve the same level of learning” (p. 251).

Most of the research regarding Hispanics and their preferred learning styles utilizes the construct of field dependence/field independence (Ramirez and Price-Williams, 1974, Ramirez, 1973, Jimenez, 1983). Mestre (1997) cautioned awareness of cultural differences when demonstrating the use of computer accessed information. She stated, “. . . field-dependent learners, such as Latinos, must see the big picture, seek to find personal relevance in the task at hand and require that some sort of personal relationship is established between the instructor and the student” (p. 191).

However, Griggs and Dunn (1996) reviewed research on Mexican-American (i.e., Latino or Hispanic) students’ learning styles and summarized results into five categories: environmental, emotional, sociological, physiological, and psychological. They cautioned teachers to expect larger numbers of their Hispanic students to prefer: “(1) a cool environment; (2) conformity; (3) peer-oriented learning; (4) kinesthetic instructional resources; (5) a high degree of structure; (6) late morning and afternoon peak energy levels; (7) variety as opposed to routines; and (8) a field-dependent cognitive style” (Grigg & Dunn, p. 4).

#### ACADEMIC ACHIEVEMENT & ETHNICITY

The Hispanic face of education in America is changing. Between 1999 and 2017, the number of Hispanics enrolled in all educational venues increased 80% – from 9.9 million to 17.9 million – while the number of Whites decreased from 47.3 million to 40.6 million (Gramlich, 2017).

In 2016, the number of Hispanics enrolled in public and private colleges in the U.S. was 3.6 million – a 180% increase from the 1.3 million who were enrolled in 1999. In that same 1999 year, nearly half (47%) of Hispanic high school graduates ages 18 to 24 were enrolled in college (Gramlich, 2017).

The 2013 Nation’s Report Card showed 12<sup>th</sup> grade performance in math and reading to be unchanged since 2009 with the achievement gap between Hispanic and white students persisting. White students scored 21 points higher in math and 22 points higher in reading than Hispanic students (Lee, 2014).

High school average GPA’s differ with regard to gender and ethnicity. Females have an average 3.1 GPA compared to 2.9 for males. White students have an average GPA of 3.09 compared to an average of 2.84 for Hispanic students (Lindsay, 2015). With regard to high school Standardized Achievement Test (SAT) scores, reading and writing and mathematics are “benchmark scores.” These two scores indicate students have a 75% percent chance of earning a C or higher in various college courses. Looking at 2017 mean SAT scores, only 31% of Hispanic students met both benchmarks compared to 59% of White students (Jaschik, 2017).

The National Center for Education Statistics report (2017) indicated that in Spring 2014, students who began their educational career at a two-year institution in 2011-12 had a persistence rate 23 percentage points lower than student who began at a four-year institution. However, as noted by de Brey (2017), the difference in persistence rates between Hispanic students who

began at a two-year institution was 19 percentage points lower than Hispanic students who began at four-year institutions. This is important because nearly half of all Hispanic students (48%) who go to college, attend a community college (Krogstad, 2016). Looking at community college students, a recent study by Holmes & Slate (2017) examined differences in GPA by gender and ethnicity/race as a function of first-generation status. They used grade ranges to categorize GPAs as highly successful (A); successful (A- to B); moderately successful (B- to C); and not successful (C- and below). No attempt was made to examine differences in gender among ethnicity/race. With regard to Hispanic students, they observed that first-generation Hispanic community college students had statistically significantly lower GPA's than did non-first-generation Hispanic community college students. Non-first generation Hispanic students had a 3.7% higher highly successful (A) GPA and a 4.8% moderately successful GPA (B-C to C) than first-generation Hispanic students. Slightly more than nine percent (9.1%) of first-generation Hispanic students were highly successful (A) compared to 12.8% of non-first generation Hispanic students.

Flecher and Tienda (2010) examined the college achievement gap between white and under-represented minority students at four Texas public universities over a ten year period. They found support for their hypothesis that differences in high school quality attended by minority vs. majority students contributed to college achievement gaps. At the University of Texas at San Antonio (UTSA), where Hispanics comprise over two-fifths of the freshman cohort and blacks comprise an additional five percent, their fixed effects model indicated that both minority groups outperformed their white counterparts who attended the same high school (although the black coefficient is imprecisely estimated)

Battle & Pastrama (2007) found socioeconomic status to be 10 times more powerful in predicting student academic achievement in race and, when controlling for socioeconomic status, Latino students outperformed their White counterparts.

## **ACADEMIC ACHIEVEMENT & GENDER**

Looking at 28 selective U.S. colleges and universities and extending previous research on racial performance gaps, Massey and Probasco (2010) found that blacks and Hispanic males attained significantly lower grades than other race-gender groups. Grades of black females and Hispanic males did improve through their sophomore and junior years, only to falter in the senior year. However, the grade performance of Hispanic females improved rapidly and steadily across all four years of college and their average GPA was in the same range as whites and Asians by the senior year.

The University of Texas at Austin Fall 2013 grades showed female students to have an average GPA of 3.21 while males had an average GPA of 3.12 (Wilts, 2014). Similarly, Gasman, Baez, and Turner (2008) looked at minority-serving institutions and observed that Latino (Hispanic) males had slightly lower GPA's and course completion ratios than Latinas (Hispanic) females or Whites.

The bottom line is that Latino women are more likely to apply to college; more likely to adjust to college; and more likely to graduate from college than Latino males (Souberbielle, 2015).

## **METHODOLOGY**

This study expands research published by the authors (Jones & Blankenship, 2017; 2018) that focused on field-dependent and field-independent aspects of learning styles and analyzed which of these two styles are more dominant for Hispanic learners. In both previous studies, the majority of Hispanic students participating listed themselves as field independent learners while up to that point, studies had identified the majority of Hispanic students as being field dependent learners (Griggs & Dunn, 1996). In this study, the authors now look at whether learning style preferences differ with ethnicity, gender, and academic performance. An adapted version of the field dependent and field independent inventory from Laskey and Gibson's (1997) *College Study Strategies: Thinking and Learning* (pp. 52-53) was incorporated as part of the orientation section of the authors' courses. Students enrolled in the authors' legal and corporate training online courses during the fall 2017 semester were provided the opportunity to take this learning styles inventory at the beginning of the semester if they wished to find out which style was dominant for their learning. No grades, rewards or penalties were offered for taking or not taking this inventory. This survey was included as part of the students' orientation into their undergraduate courses. Fall 2017 grades of those students completing the field dependent and field independent inventory were then examined for differences between academic achievement, gender, and ethnicity between the two learning styles.

## FINDINGS

Jones and Blankenship's previous studies (2017, 2018) focused on field-dependent and field-independent aspects of learning styles and which of these two styles may be more dominant for Hispanic learners. Consequently, this study of field independent and field dependent learners, in addition, also examines differences between academic achievement, gender, and ethnicity between the two learner categories See Appendix for Table 1: Participants.

Out of approximately 146 possible participants, 84 participants or 58% of the inventories were completed for a total of 84 responses or 58% completed responses to the fall 2017 survey (Table 1). Of these 84 participants (table 2), 35 were male and 49 were female. See Appendix – Table 2: Gender.

Table 3 provides the numbers of Hispanic students and Non-Hispanic students completing the survey. Since this study took place at a Hispanic-Serving Institution in South Texas, the results for students that are Hispanic and those that are Non-Hispanic were expected.

Table 4 depicts the number of participants that identified with a particular learning style or that had no dominant learning style. Researchers have found field-dependent learners share a common theme in that they “require more structure” than field-independent learners “in order to achieve the same level of learning” (Wooldridge & Haines-Bartolf, p. 251). In establishing the number of responses for a particular learning style, an aggregate number is reported for each category: Field Dependent Learners, Field Independent Learners, and Equally Dependent-Independent Learners or tied learning styles. In this study, there were 45 Field Independent participants identified, 21 Field Dependent Participants and 18 that had equal independent-dependent or no dominant learning style reported. See Appendix – Table 4: Learning Styles.

Lastly, to complete the grades that were awarded at the end of the fall 2017 semester, Table 5 reflects grade distribution by letter grade. A represents a grade between 90 – 100; B between 80 – 89; C between 70 – 79; D between 60 – 69; and F anything below 59. See Appendix – Table 5.

In Table 6, all participants are Hispanic. Table 6 depicts a composite of characteristics identifying gender, race, learning style, and course grades. Five females that identified with a dependent learning style had 60% of the A grades while the 24 females identifying with an independent learning style had 20% of A grades. The nine females with equal or no dominant learning style had 33% of A grades.

Using this same table but focusing on the ten males with a dependent learning style, the highest grade of A was earned by one (10%) of the participants; a grade of B was awarded to 40% of the participants. The eight males identifying with an independent learning style garnered 63% of the A grades awarded. Of the males with Equal or No Dominant Learning Style, three (60%) received an A grade.

Comparing the 15 females and 10 males with dependent learning styles, 60% of females scored an A compared to only 10% of the males scoring an A. Females in all three learning styles scored nearly two times more F's (seven) than their male counterparts (four).

Combining all learning styles and comparing the 38 Hispanic females with the 23 Hispanic males, the females earned 55% of the As while the males earned 45%. The females earned 65% of the Bs and the males earned 35%. The females earned 70% of the Cs and the males earned 30%. The females earned 67% of the Ds while the males earned 33%. Lastly, the Hispanic females earned nearly two times more Fs (seven = 64% than the males (four = 36%). See Appendix – Table 6: Hispanic Students by Gender, Learning Style and Grade.

In Table 7, all participants are Non-Hispanic and information for 11 females and 12 males is included. Table 7 depicts a composite of characteristics by gender, race, learning style and course grades. There were four Non-Hispanic females identifying with a dependent learning style who had 25% of the A grades and 75% of the B grades. The six females identifying with an independent learning style scored higher with 83% of the A grades, no B grades, and 17% of the Fs. The one female with equal or no dominant learning style was awarded an A grade.

Using this same table but focusing on the two Non-Hispanic males with a dependent learning style, the highest grade of B was awarded to both participants (100%) while the seven males identifying with an independent learning style garnered 17% of the As, 57% of the Bs, 14% of the Cs and 14% of the Fs. Of the three males with equal or no dominant learning style all received an A grade (100%).

Comparing the four females and two males with dependent learning styles, all (100%) scored a C or above.

Comparing the six females and seven males with independent learning styles, 83% (five) of females scored above a C grade compared to 85% (six) of males scoring a C or above.

Non-Hispanic females and males with independent learning styles scored an equal number of F's (one).

Combining all learning styles and comparing the 11 Non-Hispanic females with the 12 Non-Hispanic males, the females earned 64% of the As while the males earned 36%. The females earned 33% of the Bs and the males earned 67%. The females earned no Cs and the males earned one (100%). No Ds were earned. Lastly, the females earned and males each earned one F. See Appendix – Table 7: Non-Hispanic Students by Gender, Learning Style and Grade.

Combining all participants, regardless of learning style or ethnicity, and comparing the 49 females with the 35 males, the females earned 58% of the A's while the males earned 42%. The females earned 54% of the B's and the males earned 46%. The females earned 58% of the C's and the males earned 46%. The females earned 67% of the D's and the males earned 33%.

Lastly, the females earned 67% of the F's and males earned 33%. See Appendix – Table 8: Non-Hispanic Students by Gender, Learning Style and Grade.

The higher grades earned by all female participants in our study is not surprising. The meta-analysis by Voyer and Voyer (2014) found that females have outperformed men for nearly a hundred years (from 1914 to 2011) and these gender differences favored females in all fields of study.

## DISCUSSION

While Griggs and Dunn (1996) found Hispanic students to be field dependent, Jones and Blankenship (2016, 2017) found Hispanic students to be more field independent. This study also finds Hispanic students to be more field independent.

Part of this difference might be attributed to the upper level status of participants in this study, considering that most high school graduates who begin their post-secondary educational journey at a community college do not transfer to a four-year institution (Schneider & Stevenson, 1999). In addition, while Hispanics are more likely than White students to initially enroll at a community college, only about 25 percent will go on to a four-year institution or eventually complete a bachelor's degree (Fry, 2004).

This difference might also be attributed to the fact that students were in online classes and these online classes may require more of a field independent learner. This difference could also be attributed to the rising English proficiency of Latinos. The English proficiency percentage of U.S. born Latinos rose 17.7% in the 35 years from 1980 to 2015 (89.7% in 2015 compared to 71.9% in 1980) (Flores, 2017).

The difference might also be attributed to the dramatic decrease in Hispanic high school dropout rates (34% in 1999 to 10% in 2016) and their increasing college enrollment (32% of Hispanics ages 18-24 in 1999 to 47% in 2016) with 3.5 million Hispanics enrolled in public and private U.S. colleges in 2016 compared with 1.3 million enrolled in 1999 (Gramlich, 2017). Nevertheless, even with these increases, Hispanics are still less likely than other groups to obtain a four-year college degree (Gramlich, 2017). Online undergraduate Hispanic enrollment has also increased from 8% in 2012 to 11% in 2016 (Clinefelter & Aslanian, 2016) and black and Hispanic college graduates are more likely than whites to have taken a class online (35% v. 21%) (Parker, Lenhart & Moore, 2011).

While Witkin and his fellow researchers (1971) considered field dependency to be stable throughout the growth period of 10-24 years, Murphy and Doucette (1997) found business undergraduates became increasingly more field independent as they continued their educational journey. Thus, it can be suggested that our greater incidence of field independent learners might be attributed to analytical skills gained in other courses as well as the fact that our participants are juniors and seniors.

This study did not ask if participants were first-generation college students. However, a recent study by Holmes & Slate (2017) examined differences in GPA by gender and ethnicity/race as a function of first-generation status. They used grade ranges to categorize GPAs as highly successful (A); successful (A- to B); moderately successful (B- to C); and not successful (C- and below). No attempt was made to examine differences in gender among ethnicity/race. Non-first generation Hispanic students had a 3.7% higher highly successful (A) GPA and a 4.8% moderately successful GPA (B-C to C) than first-generation Hispanic students.

For highly successful and moderately successful female students, non-first-generation students had a 4% higher success rate than did the first-generation female students.

While this study did not inquire about GPA status, the Hispanic females did earn 11 A's compared to 9 A's for the males. They also earned eleven Bs compared to only six Bs for the males. The higher grades earned by Hispanic females might be attributed to their increasing college enrollment and success. In 1994, 52% of Hispanic men and 52% of Hispanic women who graduated from high school immediately enrolled in college. In 2010, that rate had soared to 76% for Hispanic females but had only risen to 62% for Hispanic males (Lopez & Gonzalez-Barrera, 2014). After the first semester, males earned lower grades and fell further behind than females in both grades and credits (Conger & Long, 2010). During the past 20 years, the percentage of Latina (Hispanic) females receiving a bachelor's degree or higher almost doubled—from 8.4% in 1995 to 14.9% in 2010. However, during the same time period, the percentage of Latino (Hispanic) males receiving a bachelor's degree or higher modestly increased from 10.1% to 12.9% (Saenz & Ponjuan, 2011).

It must be noted that there is research that downplays the importance of learning styles. In 2009, *Psychological Science in the Public Interest* commissioned four prominent psychologists to dispassionately assess, “the scientific evidence underlying practical application of learning-style assessment in school contexts” (Pashler, McDaniel, Rohrer & Bjork, 2009). The researchers were charged with the task of determining whether scientific evidence supported current learning-style practices. They acknowledged dominance of the meshing hypothesis, according to which “instruction is best provided in a format that matches the preferences of the learner. . .” (Pashler, McDaniel, Rohrer & Bjork, 2009, p. 105). After an extensive review of the literature, they found most learning style research scientifically lacking and noted, “very few studies have even used an experimental methodology capable of testing the validity of learning styles applied to education. Moreover, of those that did use an appropriate method, several studies found results that flatly contradict the popular meshing hypothesis” (Pashler, McDaniel, Rohrer & Bjork, 2009).

## RECOMMENDATIONS

Chick (n.d.) offered a succinct summary of the learning style debate: “Despite the popularity of learning styles and inventories . . . it's important to know that there is no evidence to support the idea that matching activities to one's learning style improves learning.” As Pithers (2002) also pointed out, teachers need not slavishly adopt field dependent styles and behaviors to match field dependent students. When students enter the work place, they may need to adopt a different style or information approach to achieve the most appropriate or the ‘best’ quality decision or solution.

Nonetheless, instructors can easily incorporate certain universal design for learning (UDL) principles into their curriculum. Universal design for learning guides educational practice that “provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged. . .” (Higher Education Opportunity Act of 2008). Burgstahler (2015) offers UDL examples that are as simple as having class outlines and notes on an accessible website; allowing students to turn in parts of a large project for feedback before the final project is due; using multiple delivery methods to motivate and engage all learners; and using examples that appeal to students with a variety of characteristics.

Regardless of the field learning style, gender, or ethnicity, the bottom line advocated by Jones and Blankenship in 2017 and 2018 still remains and is worthy of repeating: “students need more discipline to succeed in an online course than in a face-to-face course” (Allen & Seaman, 2005). It is also comforting for teachers to remember that field dependent students may in fact become more field independent as they advance through their studies.

Finally, the authors remind online educators, “Teaching fully online takes time. Learning fully online takes time” (Matias, 2015).

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**APPENDIX**

Table 1: Participants		
Fall 2017 Participants	Total Actual Respondents	Percentage
146	84	58%

Table 2: Gender		
Male	Female	Total
35	49	84
42%	58%	100%

Hispanic Participants	Non-Hispanic Participants	Total
61	23	84
73%	27%	100%

Learning Styles	Participants	Percentage
Field Independent	45	54%
Field Dependent	21	25%
Equal or No Dominant Style	18	21%
Total	84	100%

Letter Grade	Participants	Percentage
A	31	37%
B	26	31%
C	12	14%
D	3	4%
F	12	14%
	84	100%

Gender	Learning Style	Grade	Number	Percentage
F	Dependent	A	3	60%
F	Dependent	B	2	40%
F	Dependent	C	0	0%
F	Dependent	D	0	0%
F	Dependent	F	0	0%
F	Independent	A	5	20%
F	Independent	B	8	33%
F	Independent	C	3	13%
F	Independent	D	2	8%
F	Independent	F	6	25%
F	Equal or No Dominant Style	A	3	33%
F	Equal or No Dominant Style	B	1	11%
F	Equal or No Dominant Style	C	4	45%
F	Equal or No Dominant Style	D	0	0%
F	Equal or No Dominant Style	F	1	11%
M	Dependent	A	1	10%
M	Dependent	B	4	40%
M	Dependent	C	2	20%

M	Dependent	D	1	10%
M	Dependent	F	2	20%
M	Independent	A	5	63%
M	Independent	B	1	12%
M	Independent	C	1	12%
M	Independent	D	0	0%
M	Independent	F	1	25%
M	Equal or No Dominant Style	A	3	60%
M	Equal or No Dominant Style	B	1	20%
M	Equal or No Dominant Style	C	1	20%
M	Equal or No Dominant Style	D	0	0%
M	Equal or No Dominant Style	F	0	0%
			61	

**Table 7: Non-Hispanic Students by Gender, Learning Style and Grade  
N=23 or 25% of Participants**

Gender	Learning Style	Grade	Number	Percentage
F	Dependent	A	1	17%
M	Dependent	A	0	0%
F	Dependent	B	3	50%
M	Dependent	B	2	100%
F	Dependent	F	0	0%
M	Dependent	F	0	0%
F	Independent	A	5	80%
M	Independent	A	1	0%
F	Independent	B	0	0%
M	Independent	B	4	67%
F	Independent	C	0	0%
M	Independent	C	1	17%
F	Independent	F	1	20%
M	Independent	F	1	17%
F	Equal or No Dominant Style	A	1	100%
M	Equal or No Dominant Style	A	3	100%
			23	

**Table 8: All Students by Gender and Grade**

Letter Grade	Participants	Percentage
A	18 Females	58%
N=31	13 Males	42%
37%		
B	14 Females	54%
N=36	12 Males	46%
31%		
C	7 Females	58%
N=12	5 Male	42%
14%		

D N=3 4%	2 Females 1 Male	67% 33%
F N=12 14%	8 Females 4 Males	67% 33%
	84	

