THE INFLUENCE OF TEACHER GENDER ON COLLEGE STUDENT MOTIVATION AND ENGAGEMENT IN AN ONLINE ENVIRONMENT

by

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Liberty University

A Dissertation Presented in Partial Fulfillment Of the Requirements for the Degree Doctor of Education

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ABSTRACT
The purpose of this study was to examine the influence of teacher gender on student motivation and engagement. The study addressed the question: Is there a statistical difference among the motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses? Exploring this topic allowed educators to identify strategies for quality teaching and learning, increase graduation rates, and decrease student delinquency. This quantitative study used a causal-comparative research design and the Motivation and Engagement Scale (MES) to survey 629 undergraduate students enrolled in an online science course at a for-profit university. Data was collected from male teachers, female teachers, and undergraduate students enrolled in an online science course at a leading for-profit university. The instrument used in this study was the Motivation and Engagement Scale. Due to extreme outliers, the violations of normality and variance a Kruskal-Wallis statistical test was used to determine the difference among mean scores of the four groups. Because of these violations caution should be taken when interpreting the results. The study used Kruskal-Wallis statistical tests to determine the difference among mean scores of the four groups. The study determined that male and female students exhibit higher levels of motivation and engagement when taught by male teachers. Future quantitative research needs to be conducted that includes a different population from other colleges and universities to eliminate the broad patterns found among participants.

Keywords: gender gap, motivation, engagement, teacher gender
Dedication

This research article is dedicated to the young men and women struggling to fill the empty void of an absent father and a positive male role model. In life, you will have many gains and losses, but remember, an education is something no one can take away from you. A postsecondary education will provide a strong knowledge base for critical thinking and writing skills that will allow for an opportunity to be a positive role model for other young men and women. The road will seem impossible at times, but remember, you can do all things through Christ Jesus (Philippians 4:13 New International Version).
Acknowledgments

I would like to publicly thank the Lord for his goodness and mercy (Psalm 23:6). His steadfast love (Psalm 25:6) and promise for hope and a future (Jeremiah 29:11) has garnered the support that “I can do all things through Christ which strengtheneth me” (Philippians 4:13, King James Version). Also, I am thankful for my committee members for their continued support, encouragement, and dedication toward my academic success. Also, I would like to thank the late Charlene “Grandma” Simmons for making sure I made it to class on time every day. Grandma, your unconditional love will never be forgotten. Lastly, but not least, I would like to thank my best friend, Michael Lindsey, for his unwavering encouragement throughout the coursework phase and dissertation process.
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List of Abbreviations

Females Taught by Female Teachers (FF)
Females Taught by Male Teachers (FM)
Males Taught by Male Teachers (MM)
Males Taught by Female Teachers (MF)
Motivation and Engagement Scale (MES)
The American Association of University Women (AAUW)
Women’s Educational Equity Act (WEEA)
CHAPTER ONE: INTRODUCTION

Overview

This study addresses the gender gap by determining if teacher-student gender influences student motivation and engagement. Current literature calls for further examination of the influence of student motivation and engagement and for interventions that promote positive attitudes and interest toward STEM courses. Chapter One discusses the background, problem statement, purpose statement, significance of the study, research questions, and related definitions are discussed.

Background

In the last 10 years, there has been a great deal of controversy surrounding if male students perform better when taught by male teachers or female teacher perform better when taught by female teachers. Several studies (Anderson, Leo, & Muelhaupt, 2013; Cook, 2014; Falch & Naper, 2013; Legewie & DiPrete, 2012; Vantieghem, Vermeersch, & Van Houtte, 2014) have shown that boys are falling behind girls in academics. In recent years, authors have referred to the gender gap in books including The Trouble With Boys (Tyre, 2008), The War Against Boys (Sommers, 2013), and Boys Adrift (Sax, 2008). Other research (Antecol, Eren, & Ozbeklik, 2013; Appianing & Van Eck, 2015; Dee, 2007; Penner & Paret, 2008; Rathbun & West, & Germino-Hausken, 2004; Robinson & Lubienski, 2011; West, Denton, & Germino-Hausken, 2000; Zander, Wolter, Latsch, & Hannover, 2014) has shown that male students outperform female students in mathematics and science, while female students outperform boys in reading and writing.

Some critics argue there is no gender gap in academics – girls are just doing better than boys (King, 2006; Mead, 2006; Yakaboski, 2011). It does not matter which way researchers and
authors are leaning toward; any perceived gender gap should be a concern for society and the education community (Buchmann, 2009; DiPrete & Buchmann, 2013; Mortenson, 2006; Sum, Khatiwada, & McLaughlin, 2007). This study sought to find evidence of a gender gap in science classes by examining the impact of teacher-student gender on student motivation and engagement.

More students today are pursuing an online postsecondary education (Adams, 2012; Barrow, Brock, & Rouse, 2013; Liu, 2011; Sull, 2014). However, as shown in Figures 1 and 2, females consistently outnumber males in brick and mortar and online enrollment and completion rates (U.S. Department of Education, 2017). In 2010, females accounted for 78% of all enrolling college freshmen and 62.6% of the graduating student body (U.S. Department of Education, 2012). As of 2015, 57% of the undergraduate student population is comprised of females. Males comprise 43% of this population (U.S. Department of Education, 2015a). This gap between males and females in college enrollment is projected to continue (Hugo-Lopez & Gonzalez-Barrera, 2014; Hussar & Bailey, 2013; Ross et al., 2012; U.S. Department of Education, 2015e).
Figure 1. Enrollment Rates by Gender. Adapted from “Fall Enrollment Survey” by the U.S. Department of Education. Copyright 2017 by the U.S. Department of Education. Reprinted with permission.

Figure 2. Graduation Rates by Gender. Adapted from “Graduation Rates Component” by the U.S. Department of Education. Copyright 2017 by the U.S. Department of Education. Reprinted with permission.
The statistics show males are not enrolling or completing postsecondary degrees at the same rate as females. This is problematic because a postsecondary education is necessary to compete in today’s job market (Bureau of Labor Statistics, 2011; DiPrete & Buchmann, 2013; Tinto, 2012). Researchers argue men can no longer rely on the once abundant blue-collar jobs that did not require a postsecondary education (DiPrete & Buchmann, 2013; Mortenson, 2006). Habley, Bloom, and Robbins (2012) stated in 1973 only 28% of all jobs available to men required a postsecondary degree. However, this figure is projected to grow to 63% by the end of 2018 (Habley et al., 2012). Consequently, men would be less likely to be considered for jobs that require a college degree.

Historically, males completed a postsecondary education in higher numbers than women. However, in the 20th century, females have made drastic gains toward obtaining a postsecondary education and competing with males in the job market. The statistics show this trend is likely to continue unless politicians and educators adopt a platform that will encourage men to seek postsecondary education at the same rate as their female peers (Hussar & Bailey, 2013; U.S. Department of Education, 2015d). When women were trailing men in academic achievement researchers, politicians, and school administrators worked diligently to combat educational inequality (Sax, 2008). Because of those heroic efforts, females have been flourishing in both the educational and professional arenas. By the 1970s, females and males were running neck and neck in college enrollment rates (Solomon, 1985). By 1979, the number of females enrolling in college was drastically higher than the number of males (Aud et al., 2013; Freeman, 2005). Males are now lagging behind females in college enrollment and completion rates. Therefore, it is believed that the ethical thing to do is exert the same amount of effort toward encouraging males to complete a postsecondary education (Weaver-Hightower, 2003).
In the last 20 years, there has been a great deal of research examining student motivation and engagement (Almas, Harwadt-Heinecke, Kappler, Eckstein-Madry, & Milatz, 2016; Cull, Reed, & Kirk, 2010; Hallinan, 2008; Jang, 2008; Kiefer et al., 2014; & Lopez, 1997). However, most of this research has been performed under the premise that motivation and engagement is a student-level philosophical framework and it does not account for other levels of variation such as teacher-student gender (Martin & Marsh, 2005; Punyanunt-Carter & Carter, 2015; Spilt, Koomen, & Jak, 2012). Researchers in Australia, Canada, Europe, and the United States are worried about the lack of male teachers, especially in primary and secondary learning environments (Carrington, Tymms, & Merrell, 2008; Hugo-Lopez & Gonzalez-Barrera, 2014; Morris, 2012; Tyre, 2006), and the impact the lack of male teachers in primary and elementary schools has on student motivation and engagement (Antecol et al., 2013; Appleton, Christenson, Kim, & Reschly, 2006; Blumenfeld, Kempler, & Krajcik, 2006; Martin & Marsh, 2005), and how this impact carries over into the collegiate learning environment (Hughes, Luo, Kwok, & Loyd, 2008; Zahn-Waxler, Shirtcliff, & Marceau, 2008).

As it relates to this study, attachment theory indicates male teachers are the precondition for increased male and female student motivation and engagement (Basow, Phelan, & Capotosto, 2006; Roorda, Koomen, Split, & Oort, 2011) and academic achievement (Riley, 2011). Attachment theory suggests students feel more secure in online courses taught by males (Lawrenz & Welch, 1983; Stein, 2012) because men are perceived to be assertive teachers who concentrate on the content of the curriculum, whereas females are perceived as timid and their primary focus is on reading and writing (Geerdink, Bergen, & Dekkers, 2011). The added sense of security provided by male teachers decreases the students’ level of anxiety (Ahert, Harwardt-Heinecke, Kappler, Eckstein-Madry, & Milatz, 2012) and increases their level of motivation and
engagement (Bowlby, 1969), especially in males taught by male teachers (Dee, 2007; Rocca, 2010).

Society and the education community should be concerned about the widening gender gap because of the socioeconomics involved. To improve educational equality and socioeconomics, politicians, and college administrators must shift their focus toward eliminating the gender gap. Failure to address the gender gap may result in a decreased incidence of men in professional and managerial careers (DiPrete & Buchmann, 2013; Sum, Fogg, & Harrington, 2003; Whitmire & Bailey, 2010), potentially reducing eliminating their ability to add to their family’s financial stability for their families and resulting in a continued increase in crime, poverty, and dependence on federal subsidies at the cost of taxpayers (Henrichson & Delaney, 2012; NAACP, 2015). Also, the continued gender gap may decrease the United States’ ability to compete in the global market (Mortenson, 2006; Whitmire & Bailey, 2010). One way to encourage males to remain competitive in the open market is by providing male students with positive role models that will influence their level of motivation and engagement in completing a postsecondary education (Pascarella & Terenzini, 2005).

**Problem Statement**

Studies show female students outnumber male students in high school completion rates (Aud et al., 2013; Buchmann, 2009; Hussar & Bailey, 2013; Ross et al., 2012) and college enrollment rates for science professions (Conger & Long, 2010; David, 2016; Smyth & Mcardle, 2004). There have been a lot of studies (Almas et al., 2016; Autor, Figlio, Karbownik, Roth, & Wasserman, 2016; Ball, 2012; Leathwood & Read, 2009; McDaniel, DiPrete, Buchmann, & Shwed, 2011) examining the gender gap, but there is limited research on the influence of teacher-student gender in online science courses. Several authors and researchers acknowledge
the data, which points to the gender gap; however, there has not been enough research examining the cause of the gender gap (Sax, 2008; Sommers, 2013; Tyre, 2008). Ewert (2012) stated, “The bulk of female advantage in college graduation arises at the college level” (p. 826), hinting at the idea that the gender gap is widened because of experiences on college campuses. Ironically, Mead (2006), who disagreed at the notion that males are lagging behind females, stated, “This appears to be the area in which gender-focused concerns are most justified, with men less likely to stay in school and earn a degree” (p. 12). Buchmann (2009) expressed a similar concern at the university level:

    Most research on gender inequalities in education continues to focus on aspects of education where women trail men, such as women’s underrepresentation at top-tier institutions and in science and engineering programs. The paucity of research on the realms where women outpace men, namely college enrollment and completion, constitutes a major gap in the literature. (p. 2320)

Saeed and Zyngier (2012) stated, “quantitative research needs to be done to fully understand the link between students’ motivation and engagement and the gender gap” (p. 263).

This study will fill a gap in the literature by examining the effect of teacher-student gender on student motivation and engagement. The problem is that there is not enough research on teacher-student gender relationships and student motivation and engagement in online science courses.

**Purpose Statement**

The purpose of this causal-comparative quantitative study was to examine the influence of teacher-student gender on student motivation and engagement, as defined by Saeed and Zyngier (2012), as the level and quality of student effort in the learning process. The study sought to determine if the instruction provided by male teachers in online science courses results
in a statistically significant difference in student motivation and engagement compared to science
courses taught by female teachers. The study addressed the growing concern many school
districts and colleges face when it comes to the declining number of male students entering
science professions (Cheryan, Siy, Vichayapai, & Kim, 2011; Ramsay, 2013; Whitmire &
Bailey, 2010).

According to Saeed and Zyngier (2012), quantitative research must be conducted to
examine the influence of student motivation and engagement in online science courses. The
study identified the diminishing number of male students in science by examining the influence
of teacher-student gender on student motivation and engagement in online science courses. A
quantitative, causal-comparative design was chosen for this study to investigate the possible
cause-and-effect relationship between teacher-student gender (independent variable) and student
motivation and engagement (dependent variable) of college students enrolled in an online
science course.

The causal-comparative research design, also known as ex post factor research or
research after the fact examines the causative relationship between the independent and
dependent variables (Wells, Kolek, Williams, & Saunders, 2015). Causal-comparative design
seeks to determine and understand the cause and effect of the studied phenomenon. The causal-
comparative design is a common research method in educational research studies (Gall, Gall, &
Borg, 2007). The causal-comparative design was chosen for this study because it will determine
the extent of the relationship between teacher-student gender and student motivation and
engagement.

The sample in this study included undergraduate students at a for profit online four-year
university, which offers a variety of degree programs, including associate, bachelor, and master
degrees. The researcher selected this university based on availability and the willingness of the university to participate in the study.

**Significance of the Study**

There are limited studies on student academic motivation and engagement and fewer in areas on the influence of teacher-student gender (Conger & Long, 2010; Ewert, 2012). Several researchers have admitted the limitations in their studies and called for further research on motivation and engagement, and the influence of teacher-student gender (Buchmann, 2009; Ewert, 2012; Martin & Marsh, 2005; Mead, 2006; Punyanunt-Carter & Carter, 2015; Spilt et al., 2012), and even suggested a quantitative study (Saeed & Zyngier, 2012). This study contributes to the body of knowledge by building upon Saeed and Zyngier’s (2012) study on gender differences in teacher-student relationships by examining the influence of teacher-student gender on student motivation and engagement.

Politicians and educational leaders have little or no concern about the increasing gender gap (Kleinfeld, 2009; Mortenson, 2006; Tyre, 2008). In addition, researchers have limited interest in researching the inequality in higher education (Buchmann, 2009). This has contributed to the increasing educational disparity between males and females and the decline in males leaving high school with a diploma and completing a postsecondary education. This study is important because the results may draw attention to the significance of this study and allow politicians and educators an opportunity to eliminate the gender gap and level the playing field for males entering college and completing a postsecondary degree (Fall & Roberts, 2012; Fitzpatrick, 2014).

Many students are seeking male role models (Buck, 2008). Milner and Tenore (2010) claimed the current literature has “paid scant attention” (p. 561) to issues of teacher-student
gender relationships. Also, the literature has not examined the gender differences in teacher-student relationships and student motivation and engagement in online science courses (Saeed & Zyngier, 2012). Ramsay (2013) claimed the theory behind the trend of males falling behind females in academics is that males lack the feeling of security provided by male role models. Furthermore, school psychologists claimed the problem is a lack of male influence that motivates and engages students to mature into productive, law-abiding citizens, and to excel academically (Appleton et al., 2006).

If researchers identify the cause of the gender gap they may be able to decrease student delinquency (Hirschfield & Gasper, 2011) and increase the number of males graduating from a postsecondary institution, thereby, decreasing crime and strengthening the economy (Bureau of Labor Statistics, 2011; Mortenson, 2006; Tyre, 2008). Failure to fill the gap in the education community may lead to higher levels of inequality in managerial and professional careers and a decrease in the United States’ competence of global competitiveness.

**Research Question**

**RQ1:** Is there a statistical difference among the motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses?

**Definitions**

1. Gender has been defined in different contexts as characteristics of masculinity and femininity; the state of being a male or female; feelings of being a man or a woman, and in the context of cultural roles, gender roles, and social roles. For this study, gender is defined as male or female (American Psychological Association, 2012; Glover & Kaplan, 2009).
2. Motivation is defined as “the reasons underlying behavior” (Guay et al., 2010, p. 712). The reasons Guay et al. (2010) referred to are the “attributes that moves us to do or not to do something” (Broussard & Garrison, 2004, p. 106). The attributes of “intrinsic motivation energizes and sustains activities through the spontaneous satisfactions inherent in effective volitional action. It is manifest in behaviors such as play, exploration, and challenge seeking that people often do for external rewards” (Deci, Koestner & Ryan, 1999, p. 658). Students often find personal enjoyment in this type of motivation because they find pleasure in activities that are satisfying and enjoyable (Vural, 2013). Traditionally, teachers are not fond of extrinsic motivation because it is dependent on reinforcement contingencies, which is counterproductive to increase students’ level of motivation toward academics (Deci et al., 1999).

3. Engagement is defined as “participation in educationally effective practices, both inside and outside the classroom, which leads to a range of measurable outcomes” (Quaye & Harper 2015, p. 2). The measurable outcomes are the “extent to which students are engaging in activities that higher education research has shown to be linked with high-quality learning outcomes” (Krause & Coats, 2008, p. 493). Engagement is further defined as the students’ level of motivation to learn (Toshalis & Nakkula, 2012) and “the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes” (Hu & Kuh, 2001, p. 3). Combined, motivation and engagement is defined as the quality and amount of effort a student exerts toward the learning objectives (Saeed & Zyngier, 2012).

4. Ex post facto is the exploration of possible causal relationships among independent and
dependent variables. The possible causes are examined after they have occurred (Gall et al., 2007). For example, the influence of teacher gender on student motivation and engagement in online undergraduate science courses.

5. Global Booster Thoughts score is defined as the “average of self-belief, learning focus, and valuing” (Lifelong Achievement Group, 2012, p. 7).

6. Global Booster Behavior score is defined as the “average of persistence, planning, and task management” (Lifelong Achievement Group, 2012, p. 7).

7. Global Muffler score is defined as the “average of anxiety, failure avoidance and uncertain control” (Lifelong Achievement Group, 2012, p. 7).

8. Global Guzzler score is defined as the “average of self-sabotage and disengagement” (Lifelong Achievement Group, 2012, p. 7).
CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this literature review is to demonstrate the importance of researching the influence of teacher-student gender on student motivation and engagement. The literature review will provide a context for the study and the history of the gender gap in academia. The first section provides, a conceptual and theoretical framework used to intertwine the concepts of Maslow’s Hierarchy of Needs (Maslow, 1943), the attachment theory (Bowlby, 1969; Collins & Feeney, 2000; Snyder, Shapiro, & Treleaven, 2012; Stein, 2012), and social cognitive theory (Bandura, 2008; Bussey & Bandura, 1999; Lopez, Mauricio, Gormley, Simko, & Berger, 2001) with student motivation and engagement. Second, the literature review will provide a synthesis of previous research and how the existing research supports the significance of this study by emphasizing the growing gender gap. Finally, the summary will address the gaps in existing literature.

Conceptual and Theoretical Framework

In pursuit of fulfilling Maslow’s Hierarchy of Needs, students feel more secure and develop an attachment to learning environments where male teachers create and booster feelings of safety and security, love and belongingness, confidence and positive images of self-worth and self-esteem, and self-actualization. Male teachers may serve as positive role models for students seeking to fill the void of absent fathers, often looking up to them and mimicking their behaviors. These behaviors are believed to increase student motivation and engagement, thus increasing their level of academic achievement and the likelihood of them completing college (Peter & Horn, 2006).
As shown in Figure 3, the foundation for the theoretical framework for this research is a trio of theories. The theories justify researching the influence of teacher-student gender on the level of motivation and engagement. These theories were “drawn on repeatedly as ideas are formulated, tried out, modified, rejected, or polished” (Coffey & Atkinson, 1996, p. 158).

**Figure 3. Theoretical Framework. Adapted by the author.**

**Maslow’s Hierarchy of Needs**

Maslow outlined the hierarchy of human basic needs into five categories: physiological, safety and security, belongingness, esteem, and self-actualization. Maslow suggested these needs occurred in sequential order as human beings developed from birth to adulthood (Lester, 2013). The hierarchy is an arrangement of needs from lowest to highest. According to Maslow (1965), people must satisfy the lower level needs before they can satisfy the higher-level needs.
The lower level needs are deficiency needs, while the higher-level needs represent growth needs. Koltko-Rivera (2006) stated this outline “still stands as a strong statement regarding the structure of human motivation and engagement” (p. 303).

**Physiological needs.** Maslow suggested the most basic need people have is the need for food, water, and shelter. If any of these needs are missing, people are motivated and physically encouraged to satisfy those needs before they can think about anything else. For example, students cannot be expected to focus on the learning objectives if they are hungry, thirsty, or homeless. Thus, free and reduced meal programs have been implemented (Martin & Loomis, 2007) and additional funding for school districts have been allocated to provide direct educational services for homeless children (U.S. Department of Education, 2015c).

**Safety and security needs.** Safety and security are the feelings people internally exhibit when there are no threats of physical, emotional, or mental harm (Martin & Loomis, 2007). More times than not, students feel a greater sense of safety and security when they are in classrooms with male teachers (Bowlby, 1969; Parkes & Hinde, 1982).

**Love and belongingness needs.** When students’ physiological and safety and security needs have been met, they are motivated and encouraged to satisfy the needs of love and belonging. This need is met through positive relationships of acceptance by family, friends, peers, classmates, and teachers (Martin & Loomis, 2007).

**Self-worth and self-esteem needs.** Feelings of love and belongingness leads to positive images of self-worth and self-esteem. When students have a positive image of themselves and they feel good about who they are, they are internally motivated and encouraged to take pride in their work (Martin & Loomis, 2007).
**The need to know and understand.** Students are not motivated and encouraged to satisfy the need of knowing and understanding until the deficiency needs have been met. The need of knowing and understanding is the primary focus for teachers. The primary role of teachers is to motivate and encourage students to know and understand (Martin & Loomis, 2007).

**Aesthetic needs.** Aesthetics refers to the need to be creative. Students are often motivated and encouraged to satisfy their aesthetic needs through creative dance, washing a car, decorating a room, and keeping up with the latest trends and fashion styles (Martin & Loomis, 2007). Students must have something aesthetically pleasing to advance to self-actualization.

**Self-actualization needs.** Self-actualization needs are defined as “experiencing fully, vividly, selflessly, with full concentration and total absorption” (Maslow, 1965, p. 111). Self-actualization needs are a person’s desire to realize his full potential to be anything he wants to be (Martin & Loomis, 2007). A high level of self-actualization is inclusive to having high grades and the feelings of realizing one’s full potential (Petty, 2014).

It is imperative to understand that students must first feel they are in a safe and secure learning environment before feelings of belongingness can occur, before the development of positive self-esteem and images of self-worth, and before the student can begin to realize his full potential, but also because students are motivated to fulfill the missing need of an absent positive male role model, they cannot progress beyond the level of love and belonging.

**Attachment Theory**

Stein (2012) suggested, based on his interpretation of the attachment theory, that students feel more secure in classrooms with male teachers. The attachment theory, formulated by Bowlby (1969), is a psychological theory of human connection. Proponents of the attachment
theory suggests human beings are designed to form emotional connections with one another (Konrah, Chopik, Hsing, & O’Brien, 2014; Snyder et al., 2012). Although Bowlby’s primary focus was on infants and children, he acknowledged the attachment process extends into adulthood and continues across the life span (Collins & Feeney, 2000).

Likewise, the sense of security provided by male teachers may reduce students’ stress levels (Ahert et al., 2012) and increases student motivation and engagement (Bowlby, 1969). The emotional security provided by male teachers is the precondition for student motivation and engagement (Basow et al., 2013). Attachment theory supports the proposition that male teachers have a positive influence on student achievement (Riley, 2011).

Current research on the attachment theory is limited to teacher-student relationships during elementary school, but male teachers can influence students at all levels of academia (Baker, Grant, & Morlock, 2008). According to Lopez (1997), the attachment theory has been extended to non-intimate adult relationships. Hallinan (2008) stated the level of attachment to college has been shown to affect college students’ levels of motivation and engagement in academic performance.

The theoretical construct of attachment theory has shown increased levels of perceived trust and security. Aligned with attachment theory, Bowlby (1969) and Parkes and Hinde (1982) claimed male teachers enable students to feel safe, thus increasing their opportunities to develop social and academic skills. Male teachers who provide this haven for students have a positive impact on their academic achievements, which is important for their development into manhood as productive, law-abiding citizens (Baker et al., 2008). This evidence suggests students who have developed a positive attachment with male teachers have “significantly more favorable
academic attitudes and stronger feelings of social integration and connectedness within the university community” (Lopez, 1997, p. 271).

Social Cognitive Theory

Social cognitive theory emphasizes the importance of positive male role models in academia (Bandura, 2008). Social cognitive theory implies children learn behaviors through the observation of other children (Bussey & Bandura, 1999), but children are more likely to seek and repeat rewarded behaviors demonstrated by adults (Bandura, 1986). This leads to the development of motivation and engagement for children to model the same behavior to achieve a similar reward. Lopez et al. (2001) believe the influence of male teachers determines the children’s level of academic motivation and engagement. This influence and the psychological attachment is intensified at the collegiate level (Collins & Feeney, 2000). As a result, when these students reach the collegiate learning environment they have an innate sense of security and motivation and engagement when taught by male teachers that is not present when taught by female teachers (Ahert et al., 2012; Bowlby, 1969; Dee, 2007; Rocca, 2010).

Related Research

There is widespread controversy of the view that there is a gender gap in academia stems from the lack of research on the influence of teacher gender on student motivation and engagement (Saeed & Zyngier, 2012). Research (Hugo-Lopez & Gonzalez-Barrera, 2014; King, 2006; Mead, 2006; Morris, 2012; Tyre, 2006; Whitmire & Bailey, 2010; Williams, 2014; Yakaboski, 2011) suggests that male students are lagging behind female students. Also, research suggests male students in feminized classrooms struggle with delinquency issues (Gurian & Stevens, 2007; Hirschfield & Gasper, 2011; Sax, 2008; Sommers, 2013; Tyre, 2008). As a result, female students make better grades; take college entrance exams, enroll and graduate from
college (Ewert, 2012; Reynold & Burge, 2008; Sommers, 2013). These factors contribute to low levels of motivation and engagement and high dropout rates among male students (Kimmel & Mahler, 2003).

A study conducted by Martino, Mills, and Lingard (2005) aimed to shed light on strategies for addressing boys’ educational and social needs shows students prefer same gender teachers. A later study conducted by Punyanunt-Carter and Carter (2015) supported the claim students prefer same gender teachers. Martin and Marsh (2005) also supported the notion “boys fare better in classes taught by males and girls fare better in classes taught by females” (p. 332). The data from the study conducted by Martin and Marsh (2005) revealed motivation and engagement did not vary much for boys and girls as a function of the teacher’s gender, but out of 68 classes there were only two male teachers involved in the study, and consequently, this study was unable to make an adequate assessment of the influence of teacher gender on student motivation and engagement.

Also, attempts have been made to evaluate the claims of Ehrenberg, Goldhaber, and Brewer (1995) about the limited influence of teacher gender on student motivation and engagement in a university setting. For example, Butler and Christenson (2003) conducted a study with 669 political science students. Their findings, at best, limit the support for the role model hypothesis. However, the population sample for this study were taught by graduate assistants, and even then, the results show the female dropout rate was lower among female students taught by female students.

According to Morris (2012), “the headline of Newsweek Magazine shouts: *Education: Males Falling Behind Females in Many Areas, What to Do?”* (p. 1). Tyre (2006) stated this is just one of many headlines drawing attention to the “new gender gap” in academics (para. 1).
Hugo-Lopez and Gonzalez-Barrera (2014) reported “in 1994, 63% of female high school graduates and 61% of male recent high school graduates were enrolled in college in the fall following graduation” (para. 2). By 2012, the enrollment rate for females increased to 71%, but it remained steady for young men (Hugo-Lopez & Gonzalez-Barrera, 2014). Researchers believe the gap in male and female achievement rates is attributed to the changing demographics of the nation’s public school student population (Williams, 2014).

Scholars argue economic factors, the decrease in workforce barriers for women, and the increased benefits of a college education are contributing factors to the widening gender gap in educational attainment. However, scholars have not been able to identify why males are not leaving high school with a diploma and pursuing a postsecondary education at a similar rate as women. Also, scholars have produced limited studies that examine the influence of teacher-student gender on student motivation and engagement and academic achievement (Habley et al., 2012; Reynolds & Burge, 2008; Whitmire & Bailey, 2010).

The concept of a gender gap has sparked a heated debate about the influence of teacher-student gender on student achievement in the last 10 years. Whitmire and Bailey (2010) claimed although there were years of concern that females were falling behind in male-dominated schools, especially in STEM courses, there is now growing concern that males are the ones falling behind in female-dominated classrooms. Berns (2013) argued critics reject these concerns citing “ingrained sexism and gender roles hamper both males and females” (p. 246). On the other end of the spectrum, opponents contend females are completing high school, graduating from college, and entering graduate programs in higher numbers than males (King, 2006; Mead, 2006; Yakoboski, 2011).
Gender

The definition of gender is constantly changing (Drescher, 2009). To study the impact of male teacher role models on student motivation and engagement it is necessary to define ‘gender’ in present day terms. According to Glover and Kaplan (2009), the term gender refers to an individual’s feelings of being a man or woman. Gender identity and gender roles further define gender. Kerr and Multon (2015) claimed gender identity is a “spectrum of beliefs and emotions rather than the traditional sense of a dichotomy of male and female” (p. 183). The perception of one’s maleness or femaleness is further defined by the gender roles in cultural contexts (Drescher, 2009).

Gender gap. The concept of the gender gap is a highly debatable topic. Critics argue the gender gap is attributed to gender identity (Kerr & Multon, 2015), teacher-student gender (Antecol et al., 2013), fine motor skills (Tyre, 2006; Whitmire & Bailey 2010), and race and income (Morris, 2012; Whitmire & Bailey, 2010). Conversely, the common denominator in all four hypotheses is the role of the male teacher and the influence male teachers can have on student motivation and engagement.

According to Dee (2007), boys and girls entering kindergarten have similar reading and mathematics test scores, but by the time the boys reach third grade they outperform girls in mathematics, whereas, girls outperform boys in reading. The differences between gifted girls and gifted boys are attributed to genetics, abilities, personality characteristics, social experiences, learning styles, and attitude toward learning (Burusic, Babarovic, & Serie, 2012; Siegle, Rubenstein, & Mitchell, 2014). Tyre (2006) claimed the gender gap for boys entering kindergarten is attributed to a lack of fine motor skills; as a result, boys have difficulty holding a pen or a pencil, which makes it difficult for them to write. Whitmire and Bailey (2012) claimed
that evidence suggests gifted boys lack fine motor as well. This is the number one contributing factor to boys scoring lower than girls on standardized writing tests.

Antecol et al. (2013) claimed girls excel in reading because this subject is often taught by female teachers, and boys excel in science and mathematics because these subjects typically are taught by male teachers. Tyre (2006) claimed girls are more fluent than boys and can sight-read more words, but boys have stronger hand-eye coordination, but because their fine motor skills have not yet developed by the time they reach kindergarten they avoid reading. Therefore, boys lag behind girls in reading and writing. The subject-specific gender gaps continue to grow as boys and girls progress through elementary and secondary grades.

Morris (2012) stated “achievement must be understood as intertwined with circumstances of gender, race, class, and location” (p. 1). Whitmire and Bailey (2010) maintained it is all about race, class, and location, not gender. Monteiro (2013) said it is not about race, class, and location, but gender. Monteiro suggested young boys are looking to fill an empty void – the void of the absent father. Monteiro claimed young boys have an inherent nature to draw near to the male figures in their lives. This is nature’s way of teaching young boys how to be strong men. Monteiro suggested public schools need more positive male role models to combat the negative imagery instilled in the minds of young boys by a society that has rejected them because of their absent fathers. In addition, Monteiro maintained positive male role-models can motivate young boys to graduate from high school and complete a postsecondary education.

Gender bias. As boys and girls advance in primary and secondary grades, the gender gap in science becomes more prominent. Lawrenz and Welch (1983) suggested the learning environment is the primary contributing factor to the difference in courses taught by male and female teachers. According to a study conducted by Ottoboni, Boring, and Stark (2016),
students perceive courses taught by female teachers differently than courses taught by male teachers. The primary difference is female teachers are perceived to have a more positive attitude toward change, but male teachers were perceived as more knowledgeable in the field of science. The students perceived female teachers as more diverse because of their willingness to change, but male teachers were viewed as harder because they had a stronger understanding of science. Likewise, male and female teachers perceived male students as smarter because they are masculine.

Because of gender bias, male students have a traditional attitude toward female teachers and they hold them to a greater criterion than they do male teachers. Most female students are not concerned about the gender of their teacher. A study conducted by Basow et al. (2006) examined students’ choices of their best and worst teachers. The results of the study indicate, “71% of the nominated best teachers were male, but male students were more likely (84.4%) than female students (63.1%) to nominate a male as best teacher” (Basow et al., 2006, p. 29). These statistics show gender bias is present in the teachers’ perception of strong students versus weak students (Martin, 2006; Taqi, Al-Darwish, Akbar, & Al-Gharabali, 2015). Likewise, gender bias is present in male and female students’ evaluations of the best and worst teachers (MacNell, Driscoll, & Hunt, 2015; McAllister, 2013; Mulhere, 2014; Ouazad & Page, 2013; Shen, 2015; Svokos, 2014).

**Student Motivation and Engagement**

Student motivation is defined as the “students’ willingness, need, desire, and compulsion to participate in, and be successful in, the learning process” (Bomia et al., 1997, p. 1). Student motivation is further defined as the amount of effort students exert toward mastering the learning objectives, their level of enthusiasm, optimism, curiosity, and interest (Skinner, Kindermann, &
Furrer, 2008). Research indicates student motivation leads to student engagement (Green et al., 2012; Irvin, Meltzer, & Dukes, 2007; Van Ryzin, 2011). Student motivation and engagement is the amount of effort students exert toward the learning objectives and the quality of their participation in the learning activities (Saeed & Zyngier, 2012). Student motivation is separated into two classes: intrinsic motivation and extrinsic motivation. Students are defined as intrinsically motivated when they are motivated from within: they actively engage in learning out of curiosity, interest, and enjoyment (Tripathi & Chaturvedi, 2014). Students are defined as extrinsically motivated when they engage in learning for a reward (Dev, 1997).

It is a daunting task to keep students motivated and engaged, especially in the online learning environment (Cull et al., 2010). Because motivation leads to engagement, motivation is where the learning process begins (Green et al., 2012; Irvin et al., 2007; Van Ryzin, 2011). As humans, students are motivated to engage in the learning objectives when their hierarchy of needs has been met (Maslow, 1965), there is a healthy connection with their peers and teachers (Bowlby, 1969), and they have an opportunity to learn from others (Bussey & Bandura, 1999). However, research has not thoroughly examined the influence of teacher-student gender on student motivation and engagement. The connection to increased levels of student motivation and engagement may be linked to teacher-student gender relationships.

**Historical Context**

For the past 20 years, research has illustrated that the level of anxiety among female science teachers is leading to poor achievement among students (Antecol et al., 2013; Cruise, Cash, & Bolton, 1985; Sartorius, 1990; Williams, 2010). As a result, students perceive male teachers are better in areas of STEM, whereas female teachers are better in areas like reading and writing (Antecol et al., 2013; Appianing & Van Eck, 2015; Dee, 2007; Zander et al., 2014).
Also, research indicates that “male students perform better when they are taught by men” because male students crave the attention of positive male role models (Burusic et al., 2012, p. 524). School districts have not been able to identify the ideology behind the achievement gap in STEM courses between male and female students (Cheryan et al., 2013). Whitmire and Bailey (2010) claimed school districts cannot identify the cause of the achievement gap because conversations of educational equality result in one group of students being singled out.

**History of Higher Education.** As shown in Tables 1 and 2, before the dawn of the 19th century, there were limited opportunities for women in higher education (U.S. Department of Education, 2015a). Society considered a woman’s role as a domestic housewife and mother (Solomon, 1985). Therefore, a postsecondary education was only feasible for young girls from wealthy families who could afford to hire private tutors (Thelin, 2004). In the early 19th century, there was a shift in perceptions, which opened the door for women to pursue a postsecondary education. As a result, this movement set the precedent for colleges and universities in the country to allow women to pursue a college degree (Rudolph & Thelin, 1990; Thelin, 2004). This movement resulted in a continuous upward trend in college enrollment and graduation rates for women, so much so, women now outnumber men in college enrollment and graduation rates (Buchmann, 2009; Sum et al., 2003).
Table 1

**Historical Summary of Students: Selected Years 1869 – 1930**

<table>
<thead>
<tr>
<th></th>
<th>1869-70</th>
<th>1879-80</th>
<th>1889-90</th>
<th>1899-1900</th>
<th>1909-10</th>
<th>1919-20</th>
<th>1929-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fall enrollment</td>
<td>52,286</td>
<td>115,817</td>
<td>156,756</td>
<td>237,592</td>
<td>355,213</td>
<td>597,880</td>
<td>1,100,737</td>
</tr>
<tr>
<td>Males</td>
<td>41,160</td>
<td>77,972</td>
<td>100,453</td>
<td>152,254</td>
<td>214,648</td>
<td>314,938</td>
<td>619,935</td>
</tr>
<tr>
<td>Females</td>
<td>11,126</td>
<td>37,845</td>
<td>56,303</td>
<td>85,338</td>
<td>140,565</td>
<td>282,942</td>
<td>480,802</td>
</tr>
<tr>
<td>Earned degrees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate's, total</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Males</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Females</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Bachelor's, total</td>
<td>9,371</td>
<td>12,896</td>
<td>15,539</td>
<td>27,410</td>
<td>37,199</td>
<td>48,622</td>
<td>122,484</td>
</tr>
<tr>
<td>Males</td>
<td>7,993</td>
<td>10,411</td>
<td>12,857</td>
<td>22,173</td>
<td>28,762</td>
<td>31,980</td>
<td>73,615</td>
</tr>
<tr>
<td>Females</td>
<td>1,378</td>
<td>2,485</td>
<td>2,682</td>
<td>5,237</td>
<td>8,437</td>
<td>16,642</td>
<td>48,869</td>
</tr>
<tr>
<td>Master's, total</td>
<td>0</td>
<td>879</td>
<td>1,015</td>
<td>1,583</td>
<td>2,113</td>
<td>4,279</td>
<td>14,969</td>
</tr>
<tr>
<td>Males</td>
<td>0</td>
<td>868</td>
<td>821</td>
<td>1,280</td>
<td>1,555</td>
<td>2,985</td>
<td>8,925</td>
</tr>
<tr>
<td>Females</td>
<td>0</td>
<td>11</td>
<td>194</td>
<td>303</td>
<td>558</td>
<td>1,294</td>
<td>6,044</td>
</tr>
<tr>
<td>Doctor's, total</td>
<td>1</td>
<td>54</td>
<td>149</td>
<td>382</td>
<td>443</td>
<td>615</td>
<td>2,299</td>
</tr>
<tr>
<td>Males</td>
<td>1</td>
<td>51</td>
<td>147</td>
<td>359</td>
<td>399</td>
<td>522</td>
<td>1,946</td>
</tr>
<tr>
<td>Females</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>23</td>
<td>44</td>
<td>93</td>
<td>353</td>
</tr>
</tbody>
</table>

*Notes.* Historical Summary. Adapted from “Historical Summary of Faculty, Students, Degrees, and Finances in Degree-Granting Institutions: Selected Years, 1869-70 through 2005-06.” Copyright 2015 by the U.S. Department of Education. Reprinted with permission.
Table 2

Historical Summary of Students: Selected Years 1939 – 2006

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fall enrollment</td>
<td>1,494,203</td>
<td>2,659,021</td>
<td>3,639,847</td>
<td>8,004,660</td>
<td>11,569,899</td>
<td>13,538,560</td>
<td>14,791,224</td>
<td>17,487,475</td>
</tr>
<tr>
<td>Males</td>
<td>893,250</td>
<td>1,853,068</td>
<td>2,332,617</td>
<td>4,746,201</td>
<td>5,682,877</td>
<td>6,190,015</td>
<td>6,490,646</td>
<td>7,455,925</td>
</tr>
<tr>
<td>Females</td>
<td>600,953</td>
<td>805,953</td>
<td>1,307,230</td>
<td>3,258,459</td>
<td>5,887,022</td>
<td>7,348,545</td>
<td>8,300,578</td>
<td>10,031,550</td>
</tr>
</tbody>
</table>

Earned degrees

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate's, total</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>206,023</td>
<td>400,910</td>
<td>455,102</td>
<td>564,933</td>
<td>713,066</td>
</tr>
<tr>
<td>Males</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>117,432</td>
<td>183,737</td>
<td>191,195</td>
<td>224,721</td>
<td>270,095</td>
</tr>
<tr>
<td>Females</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>88,591</td>
<td>217,173</td>
<td>263,907</td>
<td>340,212</td>
<td>442,971</td>
</tr>
<tr>
<td>Bachelor's, total</td>
<td>186,500</td>
<td>432,058</td>
<td>392,440</td>
<td>792,316</td>
<td>929,417</td>
<td>1,051,344</td>
<td>1,237,875</td>
<td>1,485,242</td>
</tr>
<tr>
<td>Males</td>
<td>109,546</td>
<td>328,841</td>
<td>254,063</td>
<td>451,097</td>
<td>473,611</td>
<td>491,696</td>
<td>530,367</td>
<td>630,600</td>
</tr>
<tr>
<td>Females</td>
<td>76,954</td>
<td>103,217</td>
<td>138,377</td>
<td>341,219</td>
<td>455,806</td>
<td>559,648</td>
<td>707,508</td>
<td>854,642</td>
</tr>
<tr>
<td>Master's, total</td>
<td>26,731</td>
<td>58,183</td>
<td>74,435</td>
<td>208,291</td>
<td>298,081</td>
<td>324,301</td>
<td>457,056</td>
<td>594,065</td>
</tr>
<tr>
<td>Males</td>
<td>16,508</td>
<td>41,220</td>
<td>50,898</td>
<td>125,624</td>
<td>150,749</td>
<td>153,653</td>
<td>191,792</td>
<td>237,896</td>
</tr>
<tr>
<td>Females</td>
<td>10,223</td>
<td>16,963</td>
<td>23,537</td>
<td>82,667</td>
<td>147,332</td>
<td>170,648</td>
<td>265,264</td>
<td>356,169</td>
</tr>
<tr>
<td>Doctor's, total</td>
<td>3,290</td>
<td>6,420</td>
<td>9,829</td>
<td>29,866</td>
<td>32,615</td>
<td>38,371</td>
<td>44,808</td>
<td>56,067</td>
</tr>
<tr>
<td>Males</td>
<td>2,861</td>
<td>5,804</td>
<td>8,801</td>
<td>25,890</td>
<td>22,943</td>
<td>24,401</td>
<td>25,028</td>
<td>28,634</td>
</tr>
<tr>
<td>Females</td>
<td>429</td>
<td>616</td>
<td>1,028</td>
<td>3,976</td>
<td>9,672</td>
<td>13,970</td>
<td>19,780</td>
<td>27,433</td>
</tr>
</tbody>
</table>

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Early American History (1636 – 1800)

Harvard University, established in 1636, was the first American university geared toward the educational pursuits of men, followed by the College of William and Mary in 1693 (Thelin, 2004). During this period, women were considered intellectually inferior to men. The ideology was that women had smaller brains (Solomon, 1985). Thus, “her place was in the home” (Rudolph, 1962, p. 308) and women accepted this role of a servient housewife and mother (Solomon, 1985). During the debate for equal educational rights, women could be taught by
private tutors in sciences, art, and literature (Solomon, 1985), but this was difficult for many young women (Thelin, 2004).

**Middle American History (1800 – 1940)**

In the 19th century public opinion toward females in higher education began to change (Solomon, 1985). Between 1800 and 1860, 14 colleges and universities opened their doors to women (Thelin, 2004). In 1821, the first female seminary was established in New York. In 1832, Hartford Female Seminary in Connecticut (Solomon, 1985) and Mount Holyoke in Massachusetts was established (Thelin, 2004), followed by Oberlin College in Ohio in 1837 (Rudolph, 1962).

**Civil War.** The Civil War was a historical event that paved the way for the education of women. During the war and afterwards, men realized women have the intellectual and physical capacity of sustaining the home front (Rudolph, 1962). During the Civil War, the Morrill Land Grant Act of 1862 paved the way for women to obtain a postsecondary education. The act provided financial incentives to build public colleges and universities. However, the only means of sustainability was to increase enrollment. Because the men were at war, women were the target population (Rudolph, 1962).

**Modern American History (1940 – Present)**

After the Civil War, during the Women’s Movement of the 1960s and 1970s, the National Organization for Women fought for equality for women in all areas of life. As a result, the “barriers to female careers were lowered and their access to higher education was expanded” (Goldin, Katz, & Kuziemko, 2006, p. 153) because all-male colleges and universities were prompted to begin admitting women (Solomon, 1985). Consequently, women did not anticipate
that they would follow their mother’s footsteps (Goldin et al., 2006). By 1970, women surpassed men in college enrollment and completion rates (Thelin, 2004).

**Title IX.** There were several pieces of legislation aimed at increasing the number of women completing a postsecondary education. The Education Amendment Act of 1972 bolstered the women’s movement for educational equality under Title IX (Ladda, 2012; Solomon, 1985). Title IX prohibited colleges and universities receiving federal financial assistance from discriminating against women based solely on their gender (U.S. Department of Education, 2015d). This piece of legislation provided colleges and universities with the resources needed to recruit and retain female students.

**Women’s Educational Equity Act (WEEA).** The Women’s Educational Equity Act was a federal program launched in 1974 to help colleges and universities comply with Title IX. The program was enacted to implement policies and procedures to guarantee equal access to women pursuing a postsecondary education. Through grants and federal funds, colleges and universities could foster policies and practices to combat bias toward women seeking a postsecondary education (Tyre, 2008; U.S. Department of Education, 2013). Also, the additional funding paved the way for staff training and development and curricular materials geared specifically toward the advancement of women (U.S. Department of Education, 2004).

**The American Association of University Women (AAUW).** In 1992, despite the fact females had outnumbered males in enrollment and graduation rates, the AAUW published a report, *How Schools Shortchange Girls*, claimed teaching strategies favored boys and hindered the learning process for girls. As a result, the AAUW claimed the alleged teaching strategies resulted in lower levels of self-esteem for female students. The report, based on non-existent
data was so compelling, the federal government pledged additional funds into the educational system to further the educational advancement of female students (Sommers, 2013; Tyre, 2008).

**Summary of the Gains in Women’s Education**

The extent of the women’s movement is to be applauded for the success of the legislation enacted to guarantee women equal educational opportunities. As a result, women are now surpassing men in all levels of education. It seems plausible that the current gender gap is a result of the Women’s Rights Movement and legislation enacted to level the playing field for women. However, males have not been afforded the same opportunities.

The Cornwell study discovered primary and secondary “school teachers generally graded boys lower than girls, even though the boys scored similarly or better than girls on standardized tests” (National Science Teachers Association, 2013, p. 19). Researchers claimed this misalignment is because teachers factored in student behavior when grading standardized tests (Lehigh University, 2016). These teachers failed to realize the impulsive nature of boys is not aggression, but normal behavior (Sax, 2008; Sommers, 2013). The influence of these female teachers’ assessments on male students in primary and secondary learning environments affects their ability to enroll in college and their academic performance (National Science Teachers Association, 2013). As a result, boys have lower GPAs and credits in their first semester of college. After the first semester, male students continue to fall further behind in comparison to female students. Conger and Long (2010) claimed the “gender differences in college…plays a substantial role in explaining the gaps in credits, grades, persistence, and graduation” (p. 184).

Society has supported the educational advancements of women for decades. It is now time that we do the same thing for the men that we did for the women. Researching the
influence of teacher-student gender on student motivation and engagement is the first step toward achieving equality for all students.

According to the U.S. Department of Education (2015b), enrollment for males in a postsecondary institution increased to 42% between 1996 and 2010 and is projected to increase 10% between 2010 and 2021. However, enrollment for women during the same period increased 49% and is projected to increase 18% between 2010 and 2021 (U.S. Department of Education, 2015b). According to the National Center for Education Statistics, (2010), in 2010 females represented 57.4% (Figure 1) of the graduating baccalaureate student body and 62.6% (Figure 2) of the graduating master level student body (U.S. Department of Education, 2012). As shown in Figures 4 – 7, the gender gap in college enrollment and completion rates is expected to continue at all levels (Hugo-Lopez & Gonzalez-Barrera, 2014; Hussar & Bailey, 2013; Ross et al., 2012; U.S. Department of Education, 2015b).


Education’s Response to the Gender Gap

Unfortunately, “the looming prospect of an underclass of badly educated, barely literate American boys has yet to become a cause for open concern among American educators or political leaders” (Sommers, 2013, p. 151). However, researchers, authors, and the media have noticed the increasing gender gap in higher education (DiPrete & Buchmann, 2013; Yakaboski, 2011), but the research remains limited on the influence of teacher-student gender on student motivation and engagement (Butterfield & Pemberton, 2012). Politicians, colleges, and universities have intentionally avoided acknowledging the gender gap because they are afraid of retaliation from the feminist movement (DiPrete & Buchmann, 2013).
Colleges and universities have directed their attention toward inequalities of race, ethnicity, and income (Yakaboski, 2011). It will be difficult, if not impossible, to argue there has not been any racial disparities in educational equality. However, there has been a plethora of resources allotted to eliminating the gap in educational attainment for minorities based on race, ethnicity, and income (Seidman, 2012). Despite the resources poured into education to eliminate the gap for minorities and low-income families, there is still a gender gap between males and females of all races (Garibaldi, 2007; Sommers, 2013). Minority women still outnumber minority men in college enrollment and graduation (McDaniel et al., 2011). In fact, minority women have outnumbered minority men in college enrollment and graduation rates for over 70 years (McDaniel et al., 2011). Although the race gap in education persists, society cannot maintain sole focus on issues of racial disparities. Society must begin to direct its focus toward eliminating gender bias and eradicating the gender gap.

To circumvent the feminists, colleges and universities have quietly tried to recruit and retain more male students, but nothing else has been done to address the gender gap (Kleinfeld, 2009). In 2009, feminist groups alleged there was an increase in college enrollment rates for males, and they alerted the Civil Rights Commission some colleges might be accepting less-qualified male students over female applicants (De Vise, 2009). As a result, the Civil Rights Commission launched an investigation to determine if colleges were discriminating against females in the admission process (Wilson, 2010), but the investigation was abandoned because of concerns about data quality (Lederman, 2011). Two years later, the feminist groups launched the same allegation (Heriot & Somin, 2011). This time the results of the investigation revealed a slight increase in male enrollment, but the Civil Rights Commission determined the colleges and
universities were not discriminating against females in the admission process because females still outnumbered males in college enrollment rates (De Vise, 2009).

**Summary of Education’s Response to the Gender Gap**

Considering the media’s attention toward the gender gap, many colleges and universities have placed a superficial focus on increasing the enrollment and graduation rates for males. However, without pressuring educational leaders to acknowledge the gender gap, they may continue to succumb to the fallacy that gender inequality does not exist and continue applying superficial measures. If primary, secondary, and postsecondary learning environments acknowledge the gender gap, politicians will be pressed to pass legislation allocating financial resources toward implementing measures to level the playing field for males.

**Reasons for the Gender Gap**

**Lack of male role models.** Monteiro (2013) stated “30% of households are run by single parents, and nearly 80% of those homes are headed by women” (para. 5). Students thirst for positive male role models (Buck, 2008). However, only 20% of teachers in primary and secondary learning environments are male (Ramsay, 2013), and in most schools, they make up the physical education department. According to Buck (2008), school psychologists contend that positive male influence is critical for males to mature into productive, law-abiding citizens, and to excel academically. Frisby (2013) stated school psychologists believe males with positive male role models are more likely than males without a positive male role model to believe academic achievement is important. Therefore, they have higher grades, and they are not prone to bullying, fighting, lying, or cheating.

The lack of positive male teachers is the contributing factor for low student motivation and engagement and high dropout rates. Kimmel and Mahler (2003) claimed most dropouts are
from single parent homes with fathers who are not present. These students are “three and half times more likely to be arrested and eight times as likely to be incarcerated” (*School of Library Journal*, 2008, para. 1). Sum and Morial (2009) claimed the alarming statistics show one in every ten male dropouts is in jail compared with one in 35 young male graduates.

**Feminized classrooms.** Boys in feminized classrooms struggle with delinquency issues in the primary and secondary learning environments (Gurian & Stevens, 2007; Hirschfield & Gasper, 2011; Sax, 2008; Sommers, 2013; Tyre, 2008). Boys are less verbal, more impulsive, and more tactile than girls (Sax, 2008). This normal behavior in boys are viewed as aggression by teachers and administrators (Sax, 2008; Sommers, 2013). In addition, the teaching strategies employed by female teachers are often geared toward girls (Tyre, 2008). Teachers acknowledge that boys learn differently from girls, but the curriculum and teaching strategies have not been tailored to meet the learning needs of boys (Greene & Dorankamp, 2008; Gurian, 2001; Gurian & Stevens, 2007; Rivers & Barnett, 2013; Sax, 2006). As a result, boys become disengaged in the learning environment at an early age. Therefore, girls begin to outperform boys (Sax, 2008; Tyre, 2008; Whitmire & Bailey, 2010).

**Primary and secondary learning environments.** According to Gurian and Stevens (2007), boys are falling behind girls because primary and secondary learning environments do not meet their social cognitive needs, putting boys at a disadvantage. Sax (2008) claimed the lack of social cognition is manifested in the primary and secondary learning environments. Pascarella and Terenzini (2005) claimed this manifestation is strengthened in the postsecondary learning environments. Sommers (2013) said primary and secondary schools have eliminated recess from the school day, contributing to the boys’ short attention span, difficulty sitting still, and impulsive behavior (Gurian & Stevens, 2007), and directed that time toward academic areas
where girls are naturally strong, e.g., reading and writing (Antecol et al., 2013; Appianing & Van Eck, 2015; Dee, 2007; Penner & Paret, 2008; Rathbun, West & Germino-Hausken, 2004; Robinson & Lubienski, 2011; Zander et al., 2014), with the expectation that rambunctious boys will excel academically in reading and writing (Sax, 2008). On the other end of the spectrum, critics argue boys excel in mathematics and sciences (Ross et al., 2012). However, this has always been the trend, but that too is diminishing (Sommers, 2013). The primary and secondary learning environments push girls to make better grades; take college entrances exams; and enroll and graduate from college (Ewert, 2012; Reynold & Burge, 2008; Sommers, 2013). The lack of focus toward the learning needs of boys in primary and secondary learning environments contributes to their lack of motivation and engagement (Sax, 2008; Sommers, 2013). As a result, boys are leaving high school without a diploma or GED at an 8% higher rate than girls (Ross et al., 2012).

**Psychological factors.** Some critics argue, the primary and secondary learning environments are not to blame for the gender gap (King, 2006; Mead, 2006; Ross et al., 2012). They claimed the male culture is the major contributing factor for the gender gap. According to a qualitative study conducted by Morris (2012), the masculine culture encourages a relaxed attitude toward education. Excelling in academics was perceived as inconsistent with masculinity. Kleinfeld’s (2009) qualitative study found girls viewed themselves as high achievers and boys as lazy. The study indicated girls spend more time devoted toward homework and planning their futures, while boys spent their time playing video games. The girls had realistic goals about their futures, while boys were focused on creating video games, becoming a rap star, acting, and playing sports. Blackhurst and Auger (2008) stated, “the emphasis on celebrity wealth may inhibit career development by preventing boys from
formulating realistic, long-range career plans” (p. 150). According to Kleinfeld (2009), “many male seniors from working-class backgrounds were drifting, saying they would ‘take time off; or postpone planning in hopes that some lucrative opportunity would eventually present itself” (p. 178). This expectation is the epitome for the decrease in male academic achievement and is the contributing factor for their delinquent behavior toward education.

**Economic factors.** Historically, the market for women with only a high school education, produced low-wage jobs. As a result, women were inclined to complete a postsecondary education to increase their salaries (King, 2006). Research conducted by Jacob (2002) shows female college graduates earn 55% more than females with only a high school diploma and 40% more than men. However, Pascarella and Terenzini (2005) claimed several studies indicate there is no difference in wage earnings for men and women, with and without a college degree, but the authors did not take into consideration the once abundant high paying blue-collar jobs available to men (Mortenson, 2006). Failure to factor in the blue color jobs is a cause of inconsistency in prior studies that indicate there is no difference in wage earnings between men and women (DiPrete & Buchmann, 2013).

Also, women today consider a professional career as a viable lifestyle versus that of a domesticated house wife and mother (Goldin et al., 2006). Because of the birth control pill, women have been able to delay marriage and child bearing to devote time toward their educational and career pursuits (DiPrete & Buchmann, 2013; Goldin et al., 2006). In addition, women must consider the increasing divorce rate. They can no longer rely on the financial support from a man. The advantage of obtaining a postsecondary education creates more financial security for women if they should get a divorce (Goldin et al., 2006) and because the
financial return from a higher education is greater for females than for males it the logical thing to do (Ge & Yang, 2013).

**Teacher-student interactions.** Rimm-Kaufman, Baroody, Larsen, Curby, and Abry (2015) examined teacher-student interactions to determine if the level of interaction increases motivation and engagement differently in boys and girls. Three main findings emerged from the study. First, students were inclined to demonstrate high levels of motivation and engagement. Second, the link between teacher-student interaction and student-reported motivation and engagement emerged. That is, students who were in classrooms with warm and caring teachers worked harder and enjoyed learning. Third, the results showed higher levels of motivation and engagement for girls than boys because the teachers were all female.

**Student motivation and engagement.** Saeed and Zyngier (2012) conducted a study that examined student motivation and engagement. The results of the study revealed most students indicate elements of both intrinsic and extrinsic motivation. The results indicate intrinsic motivation and engagement is linked to authentic student engagement. Saeed and Zyngier suggested the gender differences in teacher-student relationships should be analyzed to determine if these differences have an impact on student motivation and engagement.

**Student engagement.** Appleton et al. (2006) conducted a study on student engagement using the Student Engagement Instrument, a self-reporting instrument used to measure cognitive and psychological student engagement. The results of the study indicate engagement has social cognitive and psychological subtypes that are tightly intertwined with motivation. This is consistent with previous studies, which showed motivation and engagement is not correlated with popularity (Cole & Carpentieri, 1990; Harrist, Zaia, Bates, Dodge, & Pettit, 1997; Tesiny & Lefkowitz, 1982), but with rejection subtypes (Harrist et al., 1997; Kennedy, Spence, & Hensley,
1989). Often, these students who feel rejected have a poor self-image (Harrist et al., 1997; Kovacs & Beck, 1978). These students feel rejected because of a lack of Maslow’s Hierarchy of Needs: physiological, safety and security, belongingness, esteem and self-actualization (Lester, 2013) that is caused by absent fathers and lack of positive male role models (Huitt, 2007; Maslow, 1943).

**Student motivation.** Opdenakker, Maulana, and Den Brok (2012) studied academic motivation among first grade students. The data was collected several times throughout the school year from 566 students in 20 mathematics and English courses from three different schools. The results of the study revealed student motivation decreased as the quality of teacher-student relationships decreased. However, students in the control group demonstrated higher levels of motivation. Although the results of this study were extensive and intriguing, the researchers did not examine the impact of the teachers’ gender on student motivation. Opdenakker et al., (2012) claimed gender differences could explain the differences between the control group and the non-control group.

**Social context.** Critics contend the increased dropout rates have a strong impact on society at large (Kimmel & Mahler, 2003; Sum & Morial, 2009). They argue the dropout rates have resulted in an increase in crime, taxes, and poverty (Lynch, n.d.). According to Henrichson and Delaney (2012), the average annual costs to taxpayers per inmate is $31,286. The United States is spending approximately $80 billion a year to house 2,237,422 inmates (Henrichson & Delaney, 2012; NAACP, 2015). If teachers and educational leaders can increase graduation rates by introducing more positive male role models in academia, it could prevent over 3,000 murders and 175,000 aggravated assaults in America every year (School of Library Journal, 2008). The increase in graduation rates will save taxpayers approximately $6 billion a year (Bureau of
Justice Statistics, 2015; Hirschfield, 2009). Also, increasing student motivation and engagement will decrease disruptive student behavior and school violence (Van Brunt, 2012).

School counselors believe students’ motivation and engagement levels are rooted in the presence of positive male role models in academia. Lopez et al., (2001) believe male teachers have a strong influence on the students’ images of self-worth, lovability, and competence. The authors claimed those students who develop a secure attachment to positive male teachers who are loving and receptive to their emotional needs experience higher levels of motivation and engagement and academic achievement, thus drastically increasing the likelihood they will complete high school in pursuit of a postsecondary education.

**The Effect of Learning Environments on Student Motivation and Engagement**

According to Milner and Tenore (2010), analyzing and managing student motivation and engagement in the classroom climate is a serious concern for teachers. The level of student motivation and engagement in the teaching and learning process is one of the most important indicators of quality teaching (Saritepeci & Cakir, 2015). Milner and Tenore (2010) claimed that same gender teaching strategies will help teachers manage and facilitate the learning process. Tollefson (2000) claimed research indicates same gender teaching strategies have improved students’ grades. Conversely, Milner and Tenore conducted a study to examine the importance of same gender teaching and the effects of the classroom climate. Milner and Tenore observed during the data collection process that male teachers can motivate and engage students, whereas, the same students are disruptive and disengaged when taught by female teachers. The results support the importance of same gender teaching strategies in managing the classroom climate.

**The Role of Teaching Practices and Student Motivation and Engagement**

As students transition from elementary to middle school, their academic workload
becomes harder, they are subject to stricter grading guidelines, and the teaching strategies are less personalized. As a result, student motivation declines right after the transition (Jang, 2008). Kiefer et al. (2014) claimed evidence-based research shows teachers can prevent the decline in student motivation and engagement during the transition by implementing instructional strategies that are responsive to the students’ developmental needs. Morgan (2001) claimed research indicates that same-gender feedback increases the level of motivation and engagement for boys on future assignments, but it has no impact on girls.

**Multilevel perspective on gender and student motivation and engagement.** According to Dee (2006), research supports the theory boys learn more from men and girls learn more from women. Dee (2007) claimed research indicates the “role model effect implies that a student will have improved intellectual engagement, conduct, and academic performance when assigned to a same-gender teacher” (p. 532). This debate is not isolated to the United States. Latham (2004), stated, “now, more than ever, young boys need contact with men who can offer positive role models and mentor them in the right direction” (p. 78). According to Spilt et al. (2012), the multilevel perspective on same-gender teachers is developed in the climate of the classroom. Mitchell, Bradshaw, and Leaf (2010), argue poor classroom management and disruptive behaviors are significant factors contributing to the climate of the classroom, which suggests “teachers and students are sensitive to classroom-level factors” (p. 276). Spilt et al. (2012) claimed while addressing the effects of the classroom climate, they can assess the characteristics of student motivation and engagement.

**Characteristics of Online Student Motivation and Engagement**

In higher education, there is an increased focus on motivating and engaging online students through positive learning habits. This focus has led researchers to examine motivational
factors outside of academics (Edgar, 2015). There is a lot research on motivational characteristics, such as students’ perceptions of ability, intrinsic and extrinsic motivation, and perceptions of love and belonging, which proves there is a link between motivation and engagement and academic achievement (Murray & Zvoch, 2011; Walker, Greene, & Mansell, 2005). Gasiewski, Eagan, Garcia, Hurtado, and Chang (2011) examined student motivation and engagement in online science courses. The results illustrate that intrinsic and extrinsic rewards motivate experienced online students. Also, the results indicated that students exhibit a decrease in the need to earn a high grade and an increase in time management skills. The authors argued that the shift implies students are learning to accept responsibility for their own online learning.

**Summary of the Gender Gap**

The gender gap topic is complicated and deeply rooted. The gender gap in academics may be a combination of things: lack of male role models, feminized classrooms, primary and secondary learning environments that are geared toward the success of girls, psychological factors, economic factors, teacher-student interaction, and teacher-student gender. The gender gap is a controversial topic because there is limited research and the research that has been conducted indicates, by some, there is no gender gap (King, 2006; Mead, 2006), and others vehemently claimed boys are becoming discouraged at an early age (Sax, 2008; Sommers, 2013, Tyre, 2008), which is thus a reason to be concerned.

Transitioning into manhood is a multifaceted and sometimes challenging process for many young, male college students (Millenky, Schwarts, & Rhodes, 2013). Research stated this transition is difficult because young, male college students do not know what it means to be a man (Morris, 2012). The influence of positive male role models may be the link in preparing
young males for the transition into manhood. There is a need for valid and credible research to boost the future of educational programs for young, male college students.

The research on the relationship between teacher-student gender and student motivation and engagement is limited (Peter & Horn, 2006). Previous qualitative studies have sought to understand if intrinsic or extrinsic motivation is aligned with higher levels of student engagement. Saeed and Zyngier (2012) suggested that gender differences in teacher-student relationships should be quantitatively analyzed. Exploring this topic is important because it will help politicians and educators to identify strategies for quality teaching and learning (Fitzpatrick, 2014), increase graduation rates (Fall & Roberts, 2012), and decrease student delinquency (Hirschfield & Gasper, 2011).

Current research recognizes that a gender gap exists between boys and girls. The current literature acknowledges boys learn differently from girls (Greene & Dorankamp, 2008; Gurian, 2011; Gurian & Stevens, 2007; Rivers & Barnett, 2013; Sax, 2006). However, the literature has paid scant attention to the influence of teacher-student gender; and even less attention toward the influence of teacher-student gender on student motivation and engagement in online science courses. The current literature on student motivation and engagement does not quantitatively explain the differences between online courses taught by male and female teachers. Also, the literature does not examine the effect of Maslow’s Hierarchy of Needs, attachment theory, and social cognitive theory on adult teacher-student relationships on student motivation and engagement in an online environment. The findings of this study add to the existing body of knowledge by allowing colleges an opportunity to identify the cause of the academic gap between male and female students enrolled in online science courses. Finally, this study may
give college officials an opportunity to understand how the differences in students’ attachment styles impacts their levels of motivation and engagement.
CHAPTER THREE: METHODS

Overview

The purpose of this study was to examine the influence of male and female teachers on student motivation and engagement in online science courses. The literature reveals a need for the quantitative study of motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses (Saeed & Zyngier, 2012). Chapter Three discusses the study’s research design, research questions, hypotheses, participants and setting, instrumentation, and data analysis.

Design

The causal-comparative design is the most appropriate for this study because it determines the extent of the differences among the motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF). Also, the causal-comparative research design seeks to find the relationship between the independent variable (gender) and dependent variable (student motivation and engagement score) (Brewer & Kuhn, 2010; Gall et al., 2007; Green & Salkind, 2014; Wayne & Boissoneau, 1996). Furthermore, the causal comparative design allows the researcher to study educational phenomena that cannot be studied with experimental methods (Gay, Mills, & Airasian, 2011). The independent variable was teacher-student gender. The dependent variable was student motivation and engagement.
Research Question

RQ1: Is there a statistical difference among the motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses?

Null Hypotheses

H01: There is no statistically significant difference in Global Booster Thoughts scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

H02: There is no statistically significant difference in Global Booster Behaviors scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

H03: There is no statistically significant difference in Global Muffler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

H04: There is no statistically significant difference in Global Guzzler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.
Participants and Setting

The setting for this research was at a for-profit, online university. Students were enrolled in an online, mixed-gender, science course in the Fall 2016 semester. The university was diverse in race, ethnicity, age, gender, and student academic achievement. The school consisted of approximately 38,000 online students and 2,600 faculty members. The population of the online university consisted of approximately 28,000 females and 9,800 males. Approximately 344 of the students were African-American, 153 were Asian, 229 were American Indian, 651 were Hispanic/Latino, 76 were Native Hawaiian or other Pacific Islander, 36,726 were White, and 153 were unknown (National Center for Education Statistics, 2015). The college awards associate’s degrees, bachelor’s degrees, and master’s degrees. The target population for this study was drawn from a convenience sample of students during the fall semester of the 2016 academic year.

For this study, the number of participants was 629 which according to Gall et al. (2007) exceeds the required minimum number of participants for a medium effect size with the statistical power of .7 at the .05 alpha level. The participants were selected by the researcher for convenience because the students were volunteers and because of the appropriate representation of the generalized population (Gall et al., 2007). Eight hundred volunteers were solicited by the researcher from a pool of undergraduate male and female students. The study included a minimum of 80 male students and a minimum of 80 female students. The volunteers were enrolled in an online science course. The courses consisted of biology, physics, and anatomy & physiology.

The groups consisted of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers.
The males taught by male teachers (MM), group included 110 undergraduate male students. The males taught by female teachers (MF) included 197 undergraduate male students. Females taught by male teachers (FM) included 104 undergraduate female students. The females taught by female teachers (FF), group included 218 undergraduate female students.

**Instrumentation**

The Motivation and Engagement Wheel, designed by Dr. Andrew Martin, is the theoretical foundation of the Motivation and Engagement Scale (MES) (Lifelong Achievement Group, 2013). The instrument can be viewed in Appendix A. Permission to use the instrument was granted by the purchase of the instrument (see Appendix B). The MES has produced the highest Cronbach’s alpha with a mean reliability of .78 (Fredricks et al., 2011). Martin (2001, 2002, 2003) used the Linear Structural Relations (LISREL) procedures to prove the Student Motivation and Engagement Scale is a valid and reliable instrument of measurement. The MES has been determined a valid instrument for measuring the students' level of academic motivation and engagement in literacy, numeracy, mathematics, and English (Martin, 2005). Also, the instrument has shown to be a reliable measurement that is receptive to age and gender related variances in motivation (Martin, 2005). Instructions on how to use the instrument was provided by the author (see Appendix C).

The wheel consists of four primary subscales: positive thoughts, positive behaviors, negative thoughts, and negative behaviors. The primary subscales are broken down into secondary subscales: Global Booster Thoughts, Global Booster Behavior, Global Muffler, and Global Guzzler. The subscales measure the students’ level of “disengagement, disaffection, and alienation” (Christenson, Reschly, & Wylie, 2012, p. 769).
The MES “was developed to diagnose and identify students who are struggling or at risk for disengagement and academic failure” (Christenson et al., 2012, p. 773). The purpose of this instrument was to measure the students’ level of “motivation and engagement through three adaptive cognitive dimensions, three adaptive behavioral dimensions, three impeding/maladaptive cognitive dimensions, and two maladaptive behavioral dimensions of motivation and engagement” (Lifelong Achievement Group, 2012, para. 1). The MES was developed by producing individualized profiles for students based on their “responses to 11 different subscales reflecting a multidimensional model of motivation and engagement” (Christenson et al., 2012, p. 773). The MES instrument has been used in numerous studies (Bodkin-Andrews, Denson, & Bansel, 2013; Martin, Papworth, Ginns, & Liem, 2014; Martin, Way, Bobis, & Anderson, 2014; Plenty & Heubeck, 2013; Schwinger, Wirthwein, Lemmer, & Steinmayr, 2014).

The MES has produced a Cronbach’s alpha with a mean reliability of .78 (Fredricks et al., 2011). Martin (2001, 2002, 2003) used the Linear Structural Relations (LISREL) procedures to prove the Student Motivation and Engagement Scale is a valid and reliable instrument of measurement. The MES has been determined a valid instrument for measuring the students' level of academic motivation and engagement in literacy, numeracy, mathematics, and science (Martin, 2005). Also, the instrument has shown to be a reliable measurement that is receptive to age and gender related variances in motivation and engagement (Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Green, Martin, & Marsh, 2007; Liem & Martin, 2012; Martin, 2005).

The 44-item instrument asks students to rate themselves on a scale of 1 to 7. The instrument consists of 44 questions and uses a five-point Likert scale that ranges from Strongly Agree to Strongly Disagree. Responses are as follows: Strongly Agree = 7, Agree = 6, Agree
Somewhat = 5, Neither Agree nor Disagree = 4, Disagree Somewhat = 3, Disagree = 2, and Disagree Strongly = 1 (Christenson et al., 2012). The combined possible score on the MES ranges from 44 to 220 points. A score of 44 points is the lowest possible score, meaning that there is low motivation and engagement. A score of 220 points is the highest possible score, meaning that there is a high level of motivation and engagement. The MES takes approximately 10-15 minutes to administer (Lifelong Achievement Group, 2012) by teachers following MES guidelines. The MES was scored by Lifelong Achievement Group (the owner of the instrument) following MES scoring guidelines and templates (see Appendix D).

**Procedures**

The researcher obtained approval from the Institutional Review Board (IRB) at Liberty University (see Appendix E). Next, the researcher obtained approval from the Institutional Review Board at a “leading” online university (see Appendix F). After the university agreed to participate in the study, the researcher obtained a list of all teachers facilitating online science courses from the registrar. Two male teachers and two female teachers were selected based on gender from each of the four sections of the course being taught. The study was continued, ensuring that a minimum of 180 responses from male and female students taught by male and female teachers were collected. The consent form was built into the survey (see Appendix J). By clicking on the link at the bottom of the email, teachers consented to participate in the survey. To encourage students to take part in the voluntary study, the researcher asked each course instructor to post a brief introduction of the study in Blackboard, the learning management system, as an announcement. The IRB approved the announcement for the teachers’ introduction to the study (see Appendix I). The introduction to the study included the basic description of the research to be conducted and invited students to participate in the study by
completing the surveys. The students were notified they can withdraw from the study at any point during the research process. Survey Monkey, a computer software that protects the identity of the participants, was used to collect, and record the data. The survey was administered the third week of the fall semester and continued over a 4-week period. Instructions were given before completion of the survey (see Appendix C). The researcher emailed all participants and requested they complete the survey within 2 weeks (see Appendix G). After two weeks, the researcher emailed the participants to remind them to complete the survey within 5 days (see Appendix H). Lifelong Achievement Group scored each survey using the instrument’s scoring guidelines in the instrument section. The researcher entered the data from each survey into the Statistical Package for the Social Sciences (SPSS).

Data Analysis

The data obtained was entered into SPSS®. The researcher originally planned to use a one-way ANOVA to see if there was a statistical significance between the mean score of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF). An ANOVA was the most suitable for this study because it can determine if the independent variables have a statistically significant effect on the dependent variable (Gall et al., 2007; Vogt & Johnson, 2011; Warner, 2013). However, due to violations of numerous assumptions including normality using the Kolmogorov-Smirnov test and homogeneity of variance using the Levene’s test, a non-parametric Kruskal-Wallis test was used instead. Data screening included a Box and Whisker plot for each group and variable to look for extreme outliers. The statistical tests were run at the 95% confidence interval. Post-hoc analysis was used to confirm where the differences between individual groups using a Dunn-Bonferroni non-parametric tests.
CHAPTER FOUR: FINDINGS

Overview

The purpose of this causal-comparative quantitative study was to determine if teacher gender resulted in a significant influence on student motivation and engagement in online undergraduate science courses. This chapter presents the results of the statistical analysis of the influence of teacher gender on student motivation and engagement.

Research Question

RQ1: Is there a statistical difference among the motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses?

Null Hypotheses

H₀₁: There is no statistically significant difference in Global Booster Thoughts scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

H₀₂: There is no statistically significant difference in Global Booster Behaviors scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

H₀₃: There is no statistically significant difference in Global Muffler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.
**H04:** There is no statistically significant difference in Global Guzzler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

**Results for Null Hypothesis One**

Null Hypothesis One was as follows:

**H01:** There is no statistically significant difference in Global Booster Thoughts scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

**Descriptive Statistics for Null Hypothesis One**

The Global Booster Thoughts score was calculated by adding the answers to the questions included in the Self-Belief, Valuing, and Learning Focus subscales. A maximum score of 84 and a minimum score of 12 was possible. The means, standard deviation, minimum value, and maximum value were computed for each group of interest (MM, FM, MF, FF). The Global Booster Thoughts descriptive statistics for each of the groups are presented in Table 3. The lowest mean score of \((M = 58.59, SD = 4.60)\) was for the MF group, which means male students had lower levels of Self-Belief, Valuing, and Learning Focus when taught by female teachers, while the highest mean score of \((M = 80.88, SD = 3.60)\) was for the FM group, which means female students had higher levels of Self-Belief, Valuing, and Learning Focus when taught by male teachers.
Table 3

*Descriptive Statistics for the Four Groups (MM, FM, MF, FF) for the Global Booster Thoughts Score*

<table>
<thead>
<tr>
<th>Student Gender * Teacher Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM</td>
<td>110</td>
<td>79.05</td>
<td>7.07</td>
<td>54</td>
<td>84</td>
</tr>
<tr>
<td>MF</td>
<td>197</td>
<td>58.59</td>
<td>4.60</td>
<td>34</td>
<td>81</td>
</tr>
<tr>
<td>FM</td>
<td>104</td>
<td>80.88</td>
<td>3.60</td>
<td>69</td>
<td>84</td>
</tr>
<tr>
<td>FF</td>
<td>218</td>
<td>75.44</td>
<td>13.75</td>
<td>12</td>
<td>84</td>
</tr>
<tr>
<td>Total</td>
<td>629</td>
<td>71.69</td>
<td>12.84</td>
<td>12</td>
<td>84</td>
</tr>
</tbody>
</table>

Data Screening and Assumption Tests for Null Hypothesis One

The data was scanned for outliers using the Box and Whisker plot. An individual plot was created for each student and teacher gender combination (MM, MF, FM, FF). The male student and female teacher group consisted of outliers only. There was a total of 14 outliers in the male student and male teacher (MM) group, while the female student and male teacher (FM) group had 10 outliers, and in the female student and female teacher (FF) group there were 49 outliers identified. The Box and Whisker plot of the raw data is presented in Figure 8.
Figure 8. Box and Whisker plots for the Global Booster Thoughts scores before the removal of five outliers per student and teacher gender combinations (MM, MF, FM, FF). This figure illustrates the Global Booster Thoughts scores with outliers.

After numerous iterations of the data and removal of outliers (see figure 9), the researcher ran Kolmogorov-Smirnov tests to check for normality and Levene’s tests to check for equal variance. The researcher was originally planning to run an ANOVA; however, assumptions of normality and equal variance were severely violated. The violations of the assumptions required the researcher to use a Kruskal-Wallis test, which is the non-parametric equivalent to one-way ANOVA. A Dunn-Bonferroni test was used for the post-hoc tests. The resulting sample size was (N = 629).
Figure 9. Box and Whisker plots for the Global Booster Thoughts scores after the removal of outliers per student and teacher gender combinations (MM, MF, FM, FF). This figure illustrates the Global Booster Thoughts scores without outliers.

Statistical Results for Null Hypothesis One

The Kruskal-Wallis test was statistically significant, indicating that there were differences in the mean rank Global Booster Thoughts scores between MM, MF, FM, and FF groups, $\chi^2(3) = 342.73, p < .001$. Thus, the null hypothesis was rejected and there was statistically significant difference in Global Booster Thoughts score of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

As the Kruskal-Wallis test is an omnibus test, post-hoc pair wise comparisons were conducted using the Dunn-Bonferroni non-parametric test. There were statistically significant differences between mean rank Global Booster Thoughts score for MF and MM groups, where MF group had a higher mean rank score than the MM group ($p < .001$). Similarly, there were
statistically significant differences between FF and FM, where FF group had a higher mean rank score than the FM group \((p < .001)\). There were statistically significant differences between MF and FF, where MF group mean rank score was lower than the FF group \((p < .001)\). Lastly, there were statistically significant differences between MF and FM, where MF group had a lower mean rank score than FM group \((p < .001)\). There were no statistically significant differences between FF and MM and MM and FM.

**Results for Null Hypothesis Two**

Null Hypothesis Two was as follows:

\textbf{H}_{02}: \text{There is no statistically significant difference in Global Booster Behaviors score of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.}

**Descriptive Statistics for Null Hypothesis Two**

The Global Booster Behaviors score was calculated by adding the answers to the questions included in the Planning, Task Management, and Persistence subscales. A maximum score of 84 and a minimum score of 12 was possible. The means, standard deviation, minimum value, and maximum value were computed for each group of interest (MM, FM, MF, FF). The Global Booster Behaviors descriptive statistics for each of the groups are presented in Table 4. The lowest mean score of \((M = 63.25, SD = 3.59)\) was for the MF group, which means male students had lower levels of Planning, Task Management, and Persistence when taught by female teachers, while the highest mean score of \((M = 77.24, SD = 9.33)\) was for the MM group, which means male students had higher levels of Planning, Task Management, and Persistence when taught by male teachers.
Table 4

*Descriptive Statistics for the Four Groups (MM, MF, FM, FF) for the Global Booster Behaviors Score*

<table>
<thead>
<tr>
<th>Student Gender * Teacher Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM</td>
<td>110</td>
<td>77.24</td>
<td>9.33</td>
<td>49</td>
<td>84</td>
</tr>
<tr>
<td>MF</td>
<td>197</td>
<td>63.25</td>
<td>3.59</td>
<td>42</td>
<td>66</td>
</tr>
<tr>
<td>FM</td>
<td>104</td>
<td>75.86</td>
<td>9.22</td>
<td>50</td>
<td>84</td>
</tr>
<tr>
<td>FF</td>
<td>218</td>
<td>73.15</td>
<td>15.18</td>
<td>12</td>
<td>84</td>
</tr>
<tr>
<td>Total</td>
<td>629</td>
<td>71.21</td>
<td>11.99</td>
<td>12</td>
<td>84</td>
</tr>
</tbody>
</table>

**Data Screening and Assumption Tests for Null Hypothesis Two**

The data was scanned for outliers using the Box and Whisker plot. An individual plot was created for each student and teacher gender combination (MM, MF, FM, FF). The male student and female teacher group consisted of outliers only. To remove all the outliers, a total of seven additional Box and Whisker graphs were plotted. After the seven iterations, there were a total of 41 outliers in the male student and male teacher (MM) group, while the female student and male teacher (FM) group had six outliers. In the female student and female teacher (FF) group there were 100 outliers identified. The Box and Whisker plot of the raw data is presented in Figure 10.
After numerous iterations of the data and removal of outliers (see Figure 11), the researcher ran Kolmogorov-Smirnov tests to check for normality and Levene’s tests to check for equal variance. The researcher was originally planning to run an ANOVA; however, assumptions of normality and equal variance were severely violated. The violations of the assumptions required the researcher to use a Kruskal-Wallis test, which is the non-parametric equivalent to one-way ANOVA. A Dunn-Bonferroni test was used for the post-hoc tests. The resulting sample size was (N = 629).
Figure 11. Box and Whisker plots for the Global Booster Behavior scores after the removal of outliers per student and teacher gender combinations (MM, MF, FM, FF) This figure illustrates the Global Booster Behavior scores without outliers.

Statistical Results for Null Hypothesis Two

The Kruskal-Wallis test was statistically significant, indicating that there were differences in the mean rank Global Booster Behaviors scores between MM, MF, FM, and FF groups, $\chi^2(3) = 208.29, p < .001$. Thus, the null hypothesis was rejected and there was statistically significant difference in Global Booster Behaviors score of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

As the Kruskal-Wallis test is an omnibus test, post-hoc pair wise comparisons were conducted using the Dunn-Bonferroni non-parametric test. There were statistically significant differences between mean rank Global Booster Behaviors score for MF and MM groups, where MF group had a higher mean rank score than the MM group ($p < .001$). There were statistically
significant differences between MF and FF, where the MF group mean rank score was lower than the FF group ($p < .001$). Lastly, there were statistically significant differences between MF and FM, where MF group had a lower mean rank score than FM group ($p < .001$). There were no statistically significant differences between FF and FM, FF and MM and MM and FM.

**Results for Null Hypothesis Three**

Null Hypothesis Three was as follows:

**H$_{03}$:** There is no statistically significant difference in Global Muffler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

**Descriptive Statistics for Null Hypothesis Three**

The Global Muffler Behaviors score was calculated by adding the answers to the questions included in the Anxiety, Failure Avoidance, and Uncertainty Control subscales. A maximum score of 84 and a minimum score of 12 was possible. The means, standard deviation, minimum value, and maximum value were computed for each group of interest (MM, FM, MF, FF). The Global Muffler Behaviors descriptive statistics for each of the groups are presented in Table 5. The lowest mean score of ($M = 40.55$, $SD = 13.15$) was for the FM group, which means female students had lower levels of Anxiety, Failure Avoidance, and Uncertainty Control when taught by male teachers, while the highest mean score of ($M = 82.34$, $SD = 6.49$) was for the MF group, which means male students had higher levels of Anxiety, Failure Avoidance, and Uncertainty Control when taught by female teachers.
Table 5

*Descriptive Statistics for the Four Groups (MM, MF, FM, FF) for the Global Muffler Score*

<table>
<thead>
<tr>
<th>Student Gender * Teacher Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM</td>
<td>110</td>
<td>48.73</td>
<td>10.24</td>
<td>22</td>
<td>69</td>
</tr>
<tr>
<td>MF</td>
<td>197</td>
<td>82.34</td>
<td>6.49</td>
<td>35</td>
<td>84</td>
</tr>
<tr>
<td>FM</td>
<td>104</td>
<td>40.55</td>
<td>13.15</td>
<td>19</td>
<td>84</td>
</tr>
<tr>
<td>FF</td>
<td>218</td>
<td>43.24</td>
<td>10.80</td>
<td>12</td>
<td>83</td>
</tr>
<tr>
<td>Total</td>
<td>629</td>
<td>56.00</td>
<td>20.57</td>
<td>12</td>
<td>84</td>
</tr>
</tbody>
</table>

**Data Screening and Assumption Tests for Null Hypothesis Three**

The data was scanned for outliers using the Box and Whisker plot. An individual plot was created for each student and teacher gender combination (MM, MF, FM, FF). The male student and female teacher group consisted of outliers only. There was a total of 2 outliers in the male student and male teacher (MM) group, while the female student and male teacher (FM) group had six outliers. In the female student and female teacher (FF) group there were 24 outliers identified. The Box and Whisker plot of the raw data is presented in Figure 13.
Figure 12. Box and Whisker plots for the Global Muffler scores before the removal of outliers per student and teacher gender combinations (MM, MF, FM, FF). This figure illustrates the Global Booster Muffler scores with outliers.

After numerous iterations of the data and removal of outliers (see figure 14), the researcher ran Kolmogorov-Smirnov tests to check for normality and Levene’s tests to check for equal variance. The researcher was originally planning to run an ANOVA; however, assumptions of normality and equal variance were severely violated. The violations of the assumptions required the researcher to use a Kruskal-Wallis test, which is the non-parametric equivalent to one-way ANOVA. A Dunn-Bonferroni test was used for the post-hoc tests. The resulting sample size was (N = 629).
Figure 13. Box and Whisker plots for the Global Booster Muffler scores after the removal of outliers per student and teacher gender combinations (MM, MF, FM, FF). This figure illustrates the Global Booster Muffler scores without outliers.

Statistical Results for Null Hypothesis Three

The Kruskal-Wallis test was statistically significant, indicating that there were differences in the mean rank Global Booster Muffler scores between MM, MF, FM, and FF groups, $\chi^2(3) = 406.91, p < .001$. Thus, the null hypothesis was rejected and there was statistically significant difference in the Global Muffler score of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

As the Kruskal-Wallis test is an omnibus test, post-hoc pair wise comparisons were conducted using the Dunn-Bonferroni non-parametric test. There were statistically significant differences between mean rank Global Muffler score for FM and MM groups, where FM group
had a higher mean rank score than the MM group \((p < .001)\). There were statistically significant differences between FM and MF, where FM group mean rank score was higher than the MF group \((p < .001)\). Further, there were statistically significant differences between FF and MF, where FF group mean rank score was higher than the MF group \((p < .001)\), where MM group had a lower mean rank score than MF group \((p < .001)\). There were no statistically significant differences between FF and FM, and FF and MM.

**Results for Null Hypothesis Four**

Null Hypothesis Four was as follows:

**H4**: There is no statistically significant difference in Global Guzzler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

**Descriptive Statistics for Null Hypothesis Four**

The Global Guzzler score was calculated by adding the answers to the questions included in the Self-Sabotage and Disengagement subscales. A maximum score of 56 and a minimum score of 8 was possible. The means, standard deviation, minimum value, and maximum value were computed for each group of interest (MM, FM, MF, FF). The Global Guzzler descriptive statistics for each of the groups are presented in Table 6. The lowest mean score of \((M = 11.45, SD = 6.15)\) was for the FM group, which means female students had lower levels of Self-Sabotage and Disengagement when taught by male teachers, while the highest mean score of \((M = 27.83, SD = 4.55)\) was for the MF group, which means male students had higher levels of Self-Sabotage and Disengagement when taught by female teachers.
Table 6

*Descriptive Statistics for the Four Groups (MM, MF, FM, FF) for the Global Guzzler Score*

<table>
<thead>
<tr>
<th>Student Gender * Teacher Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM</td>
<td>110</td>
<td>13.92</td>
<td>6.97</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>MF</td>
<td>197</td>
<td>27.83</td>
<td>4.55</td>
<td>10</td>
<td>52</td>
</tr>
<tr>
<td>FM</td>
<td>104</td>
<td>11.45</td>
<td>6.15</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td>FF</td>
<td>218</td>
<td>13.95</td>
<td>8.02</td>
<td>8</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>629</td>
<td>17.88</td>
<td>9.45</td>
<td>8</td>
<td>52</td>
</tr>
</tbody>
</table>

Data Screening and Assumption Tests for Null Hypothesis Four

The data was scanned for outliers using the Box and Whisker plot. An individual plot was created for each student and teacher gender combination (MM, MF, FM, FF). The male student and female teacher group consisted of outliers only. To remove all the outliers there were four iterations of Box and Whisker plots, which are included in Appendix A. After all the outliers were removed there were a total of 20 outliers in the MM group and 22 outliers in the FM group. The Box and Whisker plot of the raw data is presented in Figure 14.
Figure 14. Box and Whisker plots for the Global Guzzler scores before the removal of outliers per student and teacher gender combinations (MM, MF, FM, FF). This figure illustrates the Global Guzzler scores with outliers.

After numerous iterations of the data and removal of outliers (see figure 15), the researcher ran Kolmogorov-Smirnov tests to check for normality and Levene’s tests to check for equal variance. The researcher was originally planning to run an ANOVA; however, assumptions of normality and equal variance were severely violated. The violations of the assumptions required the researcher to use a Kruskal-Wallis test, which is the non-parametric equivalent to one-way ANOVA. A Dunn-Bonferroni test was used for the post-hoc tests. The resulting sample size was (N = 629).
**Figure 15.** Box and Whisker plots for the Global Guzzler scores after the removal of outliers per student and teacher gender combinations (MM, MF, FM, FF). This figure illustrates the Global Guzzler scores without outliers.

**Statistical Results for Null Hypothesis Four**

The Kruskal-Wallis test was statistically significant, indicating that there were differences in the mean rank Global Booster Guzzler scores between MM, MF, FM, and FF groups, $\chi^2(3) = 293.35, p = < .001$. Thus, the null hypothesis was rejected and there was statistically significant difference in Global Guzzler score of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

As the Kruskal-Wallis test is an omnibus test, post-hoc pair wise comparisons were conducted using the Dunn-Bonferroni non-parametric test. There were statistically significant differences between mean rank Global Guzzler score for FM and FF groups, where FM group
had a higher mean rank score than the FF group ($p = 0.043$). There were statistically significant differences between FM and MF, where FM group mean rank score was higher than the MF group ($p < .001$). Further, there were statistically significant differences between MM and MF, where MM group mean rank score was lower than the MF group ($p < .001$). Lastly, there were statistically significant differences between FF and MF, where FF group had a higher mean rank score than MF group ($p < .001$). There were no statistically significant differences between MM and FM, and FF and MM.
CHAPTER FIVE: CONCLUSIONS

Overview

In the last 10 years, the idea of a gender gap has sparked a controversial discussion about the influence of teacher gender on student motivation and engagement. The aim of the study was to examine the influence of teacher-student gender on student motivation and engagement. Chapter Five discusses conclusions, implications, limitations, and recommendations for future research.

Discussion

The purpose of this causal-comparative study was to determine if there is a statistical difference among the motivation and engagement scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses. To determine the statistical difference, students were administered a 44-item survey derived from the Motivation and Engagement Wheel. The wheel consists of four primary subscales: positive thoughts, positive behaviors, negative thoughts, and negative behaviors. The primary subscales are broken down into secondary subscales: Global Booster Thoughts, Global Booster Behavior, Global Muffler, and Global Guzzler (Christenson et al., 2012). The subscales measure the students’ level of “disengagement, disaffection, and alienation” (Christenson et al., 2012, p. 769).

This quantitative study evaluated the possible influence of teacher gender on student motivation and engagement in undergraduate online science courses. A Kruskal-Wallis test, was used to determine if there was a statistical difference among the motivation and engagement score of males taught by male teachers (MM), males taught by female teachers (MF), females
taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses.

**Discussion of Null Hypothesis One**

Null hypothesis one examined if there was a statistically significant difference in Global Booster Thoughts scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses. The Global Booster Thoughts score is defined as the “average of self-belief, learning focus, and valuing” (Lifelong Achievement Group, 2012, p. 7).

The results of null hypothesis one show male students have lower levels of Self-Belief, Valuing, and Learning Focus when taught by female teachers, while female students have higher levels of Self-Belief, Valuing, and Learning Focus when taught by male teachers. The results of null hypothesis one supports a previous study that shows male students prefer same gender teachers (Burusic et al., 2012; Martino et al., 2005), but rejects the claim that female students prefer same gender teachers.

Burusic et al. (2012) examined the influence of teacher-student gender on student academic achievement. Burusic et al. (2012) found that female teachers favor female students because they are perceived as the “ideal student” because they are “more organized, better self-learners, more confident and articulate” (p. 530), as a result female students are viewed by female teachers as agreeable and likeable, which gives female students an academic grading advantage. Therefore, Burusic et al. concluded teacher-student gender influences student academic achievement. Burusic et al.’s conclusion was similar to the results of this study in that students form an emotional attachment to teachers who satisfy their need of belongingness.
Discussion of Null Hypothesis Two

Null hypothesis two examined if there was a statistically significant difference in Global Booster Behaviors scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses. Global Booster Behavior score is defined as the “average of persistence, planning, and task management” (Lifelong Achievement Group, 2012, p. 7).

The results of null hypothesis two show male students have lower levels of Planning, Task Management, and Persistence resulting in decreased student engagement and increased delinquency when taught by female teachers, but have higher levels of Planning, Task Management, and Persistence when taught by male teachers. The results of null hypothesis two supports a previous study that shows students exhibit behaviors conducive to learning when taught by male teachers.

Martino et al. (2005) examined the influence of single sex classrooms on student behaviors and academic achievement. The results of the study show male students from single-sex classrooms “spoke positively about their experience” (p. 245) and female students “were a bit more prepared to speak their mind and want to be involved equally” (p. 243). Martino et al. claimed the results of the study were influenced by the structural change that allowed students, who lacked the influence of a positive male role model, to develop and embrace the missing emotional literacy that is needed for academic achievement. Martino et al. concluded students who do not have a significant male role model in their family could benefit from being taught by male teachers. The authors’ conclusion was similar to the results of this study in that students form an emotional attachment to the missing link, a positive male role model.
Discussion of Null Hypothesis Three

Null hypothesis three examined if there was a statistically significant difference in Global Muffler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses. Global Muffler score is defined as the “average of anxiety, failure avoidance and uncertain control” (Lifelong Achievement Group, 2012, p. 7).

The results of null hypothesis three show female students have lower levels of Anxiety, Failure Avoidance, and Uncertainty Control when taught by male teachers, while male students have higher levels of Anxiety, Failure Avoidance, and Uncertainty Control when taught by female teachers. The results of null hypothesis three support a previous study that shows male teachers decrease students’ level of anxiety (Ahert et al., 2012).

Ahert et al. (2012) examined the relationship between teachers and students’ stress levels. The authors concluded that students taught by male teachers have higher levels of engagement and lower levels of anxiety and delinquency. The authors suggest this phenomenon occurs because male students feel more secure in a male dominated classroom. The conclusion of Ahert et al. was similar to the results of this study in that students form an emotional attachment to teachers who satisfy their feelings of safety and security.

Discussion of Null Hypothesis Four

Null hypothesis four examined if there was a statistically significant difference in Global Guzzler scores of males taught by male teachers (MM), males taught by female teachers (MF), females taught by male teachers (FM), and females taught by female teachers (FF) enrolled in online science courses. Global Guzzler score is defined as the “average of self-sabotage and disengagement” (Lifelong Achievement Group, 2012, p. 7).
The results of null hypothesis four show female students have lower levels of Self-Sabotage and Disengagement when taught by male teachers, while male students have higher levels of Self-Sabotage and Disengagement when taught by female teachers. The results of null hypothesis four support a previous study that shows male teachers have a positive influence on student motivation and engagement (Lee & Wolinsky, 1973).

Lee and Wolinsky (1973) examined the relationship between teacher-student gender and students’ attitude toward their teachers. The authors suggest the results show teachers favor students of the same sex, and students perceived female teachers favored female students and male teachers had no preference. As a result, Lee and Wolinksy concluded teacher-student gender influences the students’ attitude toward their teachers. Lee and Wolinksy’s conclusion was similar to the results of this study in that students form an emotional attachment to teachers who satisfy their physiological, safety and security, belongingness, esteem, and self-actualization needs.

**Implications**

This study is important because it helps fill the gap in the literature on the influence of teacher gender on student motivation and engagement. The existing literature focuses on the role of teaching practices on student motivation and engagement (Jang, 2008; Kiefer, Ellerbrock, & Alley, 2014); the effect of the learning environment on student motivation and engagement (Milner & Tenore, 2010; Saritepeci & Cakir, 2015; Tollefson, 2000); psychological factors on student motivation and engagement (King, 2006; Mead, 2006; Ross et al., 2012); teacher-student interactions on student motivation and engagement (Rimm-Kaufman et al., 2015); or how motivation encourages engagement (Saeed & Zyngier, 2012).
The existing literature on the influence of teacher gender on student motivation and engagement is scant. However, the literature does indicate male teachers can motivate and engage students that are disruptive and disengaged when taught by female teachers (Milner & Tenore, 2010). Monteiro (2013) suggested male students have an inherent nature to draw close to male role models. As a result, Saeed and Zyngier (2012) suggested a quantitative examination of the influence of teacher gender on student motivation and engagement.

Though controversial, this study implies that students may prefer male teachers. Male students may prefer male teachers because of shared interests and experiences (Martino et al., 2005; Punyanunt-Carter & Carter, 2015). Male students may feel male teachers can relate to them better (McGrath & Sinclair, 2013). For the females, male teachers may serve as an opportunity to interact and build healthy relationships with men outside of the family dynamics (McGrath & Sinclair, 2013). This is an important task for female students as they transition into adulthood (Collins & Feeney, 2000). For these reasons, students exhibit higher levels of motivation and engagement when taught by male teachers. As a result, these students are motivated to engage in learning (Frydenbeg, Ainley & Russell, 2005; Green et al., 2012; Irvin et al., 2007; Ryan & Deci, 2009; Van Ryzin, 2011) and master the learning objectives (Schlechty, 2001; Woolfolk & Margetts, 2007).

The results of this study may add to the existing body of knowledge by providing insight into the existence of a gender gap in academics and by examining the influence of teacher gender on student motivation and engagement. The results will allow school districts, teachers, and politicians opportunities to identify and implement teaching strategies that are a better fit for female and male students. Also, the results of the study emphasize the importance of recruiting and retaining positive male teachers to improve the condition of the economy (Mortenson, 2006;
Whitmire & Bailey, 2010), reduce poverty (Lynch, n.d), decrease crime (Henrichson & Delaney, 2012; NAACP, 2015; School of Library Journal, 2008; Van Brunt, 2012), and provide for a gender balanced work environment (DiPrete & Buchmann, 2013; Sum et al., 2003; Whitmire & Bailey, 2010).

**Limitations**

The present study provides information on the influence of teacher gender on student motivation and engagement in online undergraduate science courses. The results of this study may shed light on the influence of teacher gender on student motivation and engagement. However, there are several limitations that are important to consider when interpreting the results. The limitations of this study are areas for future research.

This study has limitations regarding the chosen population. The study only focused on undergraduate students enrolled in an online science course at one four-year university, therefore the results are not applicable to students enrolled at a two-year college or technical institution. Also, this study did not include many classes taught by the same teacher. For this reason, it could be assumed that motivation and engagement is more a function of the student, rather than the gender of the teacher and should be interpreted with caution. In addition, this study only focused on the influence of teacher gender on student motivation and engagement. This study does not take into consideration other variables such as teaching methods, course requirements or the personality of the teachers. The instrument used for this study is a self-reported Likert scale, which can lead to the halo effect, where students can overstate variables such as grades and effort. Finally, because of extreme outliers, the statistical test used to analyze the data was changed to a non-parametric test. The violations of normality and equal variance may have had an adverse effect on the results, thus the results of this study should be interpreted with caution.
**Recommendations for Future Research**

Because the focus of this study was to examine the influence of teacher gender on student motivation and engagement in online undergraduate science, future research should explore factors that go beyond the demographics and self-selecting factors examined in this study and examine additional factors such as:

1. Future research needs to be conducted that includes a different population from colleges and universities of different academic levels in the United States and Europe.

2. It would be useful in future research to collect data from different classes taught by the same teacher for a qualitative study to get a better understanding through first-hand experience and quotations of actual conversations with teachers and students.

3. Future studies could go beyond this demographic and examine additional factors that teachers can influence student motivation and engagement, such as learning designs and scaffolding schemes.

4. Future studies could focus on factors related to the teacher, teaching strategies, and the online learning environment.

5. It is important to conduct research that examines the same constructs using data from additional resources from teachers and parents, and using different methodologies, such as interviews and observations.
REFERENCES


The impact of teaching strategies on intrinsic motivation. Retrieved from ERIC.


Fitzpatrick, C. (2014, October 27). Scrutinizing the ways to keep boys engaged: A foundation says Pinellas County schools are losing male students, who are falling behind females in academics and graduation rates. Tampa Bay Times [St. Petersburg], p. 1A.


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race/ethnicity, time to completion, sex, control of institution, and acceptance rate:

Selected cohort entry years, 1996 through 2007. *Institute of Education Sciences.*


Appendix A: Instrument

Due to copyright permissions, the instrument has been removed.
Appendix B: Permission to Use Instrument

December 2015

To Whom It May Concern

We approve the use of the Motivation and engagement Scale by Zacharia Varughese for research purposes.

Please do not hesitate to contact us if you have any questions or require any further information.

Sincerely

M’lane Field
Director

Lifelong Achievement Group Pty Ltd (ABN 58 088 991 146)
Ph: 0423 147 806 • Fax: (02) 9554 7445 • PO Box 380 Summer Hill NSW 2130
Appendix C: Instrument Instructions

Dear Student,

Welcome to the Motivation and Engagement Scale – University/College.

This survey has been given to you to examine your motivation and engagement, how you study, and what you think of yourself as a student.

There are no right or wrong answers. Just make sure that your answers show what you think about yourself. When answering the questions, if you want to change an answer, just cross it out and circle the answer that you prefer. If you are not sure which answer to circle, just circle the one that is the closest to what you think. You should have only one answer for each question. For the purposes of the survey, it is best that you do not leave out any questions.

If before, during, or after the survey you have any concerns, please talk to your lecturer, tutor, counselor, psychologist, or the person who administered this survey.

There are some questions that are very similar to each other. This is not a trick. It is just that this type of survey needs to ask some similar questions in slightly different ways. Just answer them in a way that shows what you really think about yourself.

Thanks for your participation.

Before you start, here is an example:

<table>
<thead>
<tr>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Disagree Somewhat</th>
<th>Neither Agree nor Disagree</th>
<th>Agree Somewhat</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

I work hard at university/college

<table>
<thead>
<tr>
<th>Disagree Strongly</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

This student circled Number 6 ('Agree') because he does work quite hard at university. He didn't circle Number 7 ('Agree Strongly') because he doesn't work hard all of the time. He didn't circle Number 5 ('Agree Somewhat') because he works hard most of the time.

Ask the lecturer, tutor, psychologist, counselor, or researcher if you have any questions. You can now begin.

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Appendix D: Scoring Guidelines

Due to copyright permissions, the scoring guidelines have been removed.
Appendix E: IRB Approval – Liberty University

September 30, 2016

Zacharia Varughese

IRB Exemption 2460.093016: The Influence of Teacher Gender on College Student Motivation and Engagement in an Online Environment

Dear Zacharia Varughese,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(2), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:

(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects’ responses outside...
the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

The Liberty University Institutional Review Board has approved this document for use from 9/30/2016 to -- Protocol # 2460.093016
Expedited Review – Final Approval - Updated

September 29, 2016

Mr. Zacharia Varughese
A Leading University

Re: Protocol #16-01 – “THE INFLUENCE OF TEACHER GENDER ON COLLEGE STUDENT MOTIVATION AND ENGAGEMENT IN AN ONLINE ENVIRONMENT.”

Dear Mr. Varughese:

Based on your updated research proposal submission, breaking your one hypothesis out into 4 separate ones, your proposed research was administratively reviewed by the A Leading University Institutional Review Board (IRB) for the protection of human subjects under an Expedited Category (Category 7). It was determined that your research activity meets the expedited criteria as defined by the DHHS Regulations for the Protection of Human Subjects (45 CFR 46), and is in compliance with this institution’s Federal Wide Assurance 00010056.

As a reminder, the next step for you in this process, per the Student Survey Policy is as follows:

**Step 3:** Submit the final survey draft after making revisions (if applicable) to David Starnes, Vice Provost at dstarnes@kaplan.edu. Include (step 1) and (step 2) approval dates in your message.

You may then proceed with your research project.

**IMPORTANT NOTE:** Per President Vandenbosch’s direction, all researchers who will recruit from the Kaplan student population must work through Student Operations to disseminate their recruitment material. This ensures that a neutral third-party is initiating this contact. This is a requirement.

Please be sure to work through the Student Operations folks for your subject School for this.

Additionally, please be sure to follow up with item #4 from the Student Survey Policy which states:

**Step 4:** Send an invitation to @ augment.kampflassin@kaplan.edu to participate in the survey.

Please notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to human subjects or others to the IRB.

If you have any questions or need additional information, please contact feel free to contact me at spettine@kaplan.edu.

I wish you well with your research!

Sincerely,

Susan B. Pettine, Ph.D., CBM
Appendix G: Student Email Solicitation

Dear Students,

My name is Zacharia Varughese, and I am a doctoral candidate at Liberty University in Lynchburg, VA. I would like to invite you to be a participant in a A Leading University and Liberty University approved research study examining the influence of male teachers in the online environment.

The purpose of this study is to examine the influence of teacher gender on student motivation and engagement. You are being contacted because you are a student enrolled in an online science course. Your participation in this research is voluntary and will not affect your current or future relationship with the university. None of your personal information (e.g., name, e-mail address, or internet protocol address) will be gathered or reported in the final results. All participants will use the same Survey Monkey link, therefore further assuring anonymity. All data will be reported in aggregate form. The survey is anonymous and therefore no data is linked back to any one individual.

The survey should take approximately 15 minutes to complete. I would appreciate you completing the survey no later than October 21, 2016.

If you agree to participate, please click on the following link to access the Survey Monkey questionnaire: https://www.surveymonkey.com/r/8P232SR. The password to access the survey is: zava

For help logging into the survey or to find answers to a variety of other questions, please send an email to: lifelong@lifelongachievement.com. More information about Lifelong Learning Achievement is at: http://www.lifelongachievement.com/the-motivation-and-engagement-scale-mes-i8/.com.

Should you have any further questions about this study, feel free to contact me or Dr. Susan Pettine, IRB Chair, A Leading University, spettine@kaplan.edu. Again, thank you for considering participating in this important research. An executive summary of results from this research will be available, upon request.

If you wish to be removed from the participant pool please email the researcher, Zacharia Varughese, at zvarughese@liberty.edu.

Sincerely,

Zacharia Varughese, MBA, Ed.S. 
Principal Investigator
(601) 667-8414
zvarughese@liberty.edu
Appendix H: Student Follow-Up Email Solicitation

Dear Student,

You were recently sent an email inviting you to respond to a questionnaire examining the influence of male teacher role models in an online environment. The information you and other faculty members provide will help identify areas of strength and improvement that I hope will lead to constructive discussions related to teaching, learning, and the quality of your students’ educational experience.

The survey is available at: https://www.surveymonkey.com/r/8P232SR

The password to access the survey is: zava

For help logging into the survey or to find answers to a variety of other questions, please send an email to: lifelong@lifelongachievement.com. More information about Lifelong Learning Achievement is at: http://www.lifelongachievement.com/the-motivation-and-engagement-scale-mes-i8/.com.

Your participation is voluntary. Please be assured that your responses will be anonymous. All student responses will be scored by the Lifelong Learning Achievement Group and summarized by the principal investigator.

Should you have any questions about this project and your interest in using the results, I encourage you to contact me at zvarughese@liberty.edu or (601) 667-8414.

Thanks again for considering this request! Best wishes.

Sincerely,

Zacharia Varughese, MBA, Ed.S.
Principal Investigator
Liberty University
Appendix I: Faculty Announcement

**What:** You have been selected to participate in an anonymous online 15-minute survey that will help us learn how to provide better instructional services.

**When:** On October 10th, 2016, you will receive an email invitation from Zacharia Varughese. If you are enrolled in multiple science courses, you will get a separate email for each course/teacher.

**How long:** The survey will be available from October 10th, 2016 to November 10th, 2016, during which time you will receive an email solicitation to complete the survey and a follow-up email remainder five days before the close of the survey.

**Why:** The survey is very important. Your participation will be helpful in examining the influence of teachers on student motivation and engagement.
Appendix J: Consent Forms

A LEADING UNIVERSITY

CONSENT FOR PARTICIPATION IN RESEARCH

The Influence of Teacher Gender on College Student Motivation and Engagement in an Online Environment

You have been invited to be in a research study of the impact of male teacher role models. You have been selected as a possible participant because of your enrollment in an online science course. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

I, Zacharia Varughese, a doctoral candidate in the School of Education at Liberty University, am conducting this study.

Background Information:

The purpose of this study is to examine the impact of male teacher role models on the development of student motivation and engagement.

Procedures:

If you agree to be in this study, I will ask you to do the following things:

1.) You will be asked to fill out a questionnaire during the third week of school. The questionnaire will allow the researcher to gain an understanding of how you feel about school, your teachers, subjects, grades, and motivation or engagement. The questionnaire should take about 15 minutes and will be administered by SurveyMonkey.

Risks and Benefits of being in the Study:

There are no reasonable foreseeable or expected risks for participating in the study.

The benefits to participation include the opportunity for teachers to identify teaching strategies that will best meet your unique learning needs. There are no direct benefits to the participant.


Compensation:

Participation in this study is voluntary. No compensation will be awarded for participation.

Confidentiality:

The records of this study will be kept private. In any sort of report, I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records.