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Perceived Transformational Teacher Leadership and Students' Motivation, Academic Performance, and Intent to Persist in STEM Education at a Community College

Stacy Lynn Waters-Bailey
Old Dominion University

PERCEIVED TRANSFORMATIONAL TEACHER LEADERSHIP AND STUDENTS' MOTIVATION, ACADEMIC PERFORMANCE, AND INTENT TO PERSIST IN STEM EDUCATION AT A COMMUNITY COLLEGE

by

Stacy Lynn Waters-Bailey
B.A. May 2001, University of North Carolina at Wilmington
M.P.A. May 2003, University of North Carolina at Wilmington
Post-Baccalaureate Certificate May 2003, University of North Carolina at Wilmington

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Approved by:

Mitchell Williams (Director)

Chris Glass (Member)

Tony Perez (Member)

ABSTRACT

PERCEIVED TRANSFORMATIONAL TEACHER LEADERSHIP AND STUDENTS' MOTIVATION, ACADEMIC PERFORMANCE, AND INTENT TO PERSIST IN STEM EDUCATION AT A COMMUNITY COLLEGE

Stacy Lynn Waters-Bailey
Old Dominion University, 2016
Director: Dr. Mitchell Williams

The transformational teacher leadership style has been identified as having a positive impact on student motivation, academic performance, and persistence. This study served to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions for students in transferable general education biological science courses offered at community colleges.

This quantitative research study was conducted in two phases at one campus of a large, multi-campus community college in a major urban area in a Mid-Atlantic state. In the initial phase, the researcher administered the survey to students who volunteered to participate in the study. The students who participated were enrolled in a transferable general education biological science course at the study location during the final four weeks of the semester. In the first phase, a survey containing 34 statements from the MLQ 5X-short, the MSLQ, and demographic information was administered to 178 students enrolled in transferable general education biological science courses. In the second phase, data on the student's final numerical course grade was collected from the instructor.

A regression analysis was conducted to determine if such a relationship exists. The study did not find a statistical relationship between perceived transformational teacher leadership and academic success or intent to persist in STEM coursework. The study, however, did find a

relationship between perceived transformational teacher leadership and student motivation. This study has provided additional insight as to what factors influence students in a biological community college classroom. While this study may not be generalizable to all academic subjects or student populations, it does serve to offer researchers additional knowledge in an effort to further support and retain students in higher education settings.

I dedicate this dissertation to my friend, my cheerleader, my rock, my husband, Johnny Bailey. You have stood by my side and supported me through all of my academic endeavors. You have laughed and celebrated with me in good times and wiped away my tears when I was ready to give up. I recognize all the things you have done to support me. The sacrifices you have made and the patience you have displayed have not gone unnoticed. Your love and compassion during this journey has only served to strengthen our bond.

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"Two roads diverged in a wood, and I- I took the one less traveled by,
And that has made all the difference." -Robert Frost

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CHAPTER 1

INTRODUCTION

There is a national concern over the low number of U.S. students working towards a degree in Science, Technology, Engineering, and Mathematics (STEM) (National Science Board [NSB], 2012). Only five percent of the U.S. workforce are employed in STEM fields; yet, STEM fields account for over half of economic growth in the United States (U.S. Department of Labor, Employment and Training, 2007). During 2011-2012 academic year, only 16% of the bachelor's degrees conferred by postsecondary education institutions in the U.S. were in a STEM field (National Center for Educational Statistics [NCES], 2013a). In 2012, the Programme for International Student Assessment (2012) ranked the U.S. 36th in Math and 28th in Science among 65 other nations. The lack of production of an educated STEM workforce is an urgent national priority (NSB, 2012).

The transformational teacher leadership style has been identified as having a positive impact on student motivation, academic performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey, Stout, & Royal, 2004; Pascarella, Seifert, & Whitt, 2008; Pounder, 2008). Researchers at the National Center for Education Statistics (2013b) stated that "69 percent of associate's degree students who entered STEM [programs] between 2003 and 2009 had left these [programs] by spring 2009" (p. iv). A better understanding of the influence of perceived transformational teacher leadership style on student motivation, student academic performance, and intent persistence in STEM classrooms is needed to prepare the future U.S. workforce for jobs in the growing STEM fields (Bolkan & Goodboy, 2009, 2011; Noland & Richards, 2014; Pounder, 2008).

Approximately half of students earning a bachelor's degree in a STEM field attended a community college at some point during their academic career (NSB, 2012). Students in allied heath fields such as nursing, radiography, or phlebotomy are more likely to begin their education at a community college than any other higher education institution (NSB, 2012). The top reason STEM students attended community college was to earn undergraduate credit; however, the second most listed reason for attending a community college was "to facilitate a change in fields or for financial reasons" (NSB, 2012, pp. 2-3).

Though many students, including STEM students, are enrolling in community college courses, less than 20% of those enrolled earn an Associate's degree in three years or less (NCES, 2014). Given that students entering community colleges cannot graduate if they are not retained, student motivation, student academic performance, and student persistence have become three of the most examined issues among community college educational researchers (Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Christophel, 1990; Frymier, 1993; Frymier & Shulman, 1995; Harvey et al., 2004; Pintrich, Smith, Garcia, & McKeachie's, 1991; Pounder, 2008; Richmond, 1990). Historically, research on community college student motivation, academic performance, and persistence has focused principally on student issues that contribute to failure such as full-time employment, financial issues, and lack of preparedness for the rigor of college (Dowd & Coury, 2006; Goldrick-Rab 2006; Mamiseishvili, 2010; Martinez, Bilges, Shabazz, Miller, & Morote, 2012; Porchea, Jeff, Robbins, & Phelps, 2010; Walpole, 2003). Many of the research solutions have involved an institutional response to create campus-wide interventions such as freshmen seminars, student activities and organizations, early alert systems, extended hours for services, and better access to academic advising (Chao, Stover DeRocco, & Flynn, 2007; Fincher, 2010; Rowlands, 2010;

Soares, 2013; Tinto, 1998). To date, no studies have analyzed influences on student motivation, academic performance, and student persistence focusing specifically on transferable general education biological science courses offered at a community college.

As early as the 1980s, researchers began studying the applicability of organizational leadership theories to postsecondary classrooms (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2010, 2011; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008; Yacapsin & Stick, 2007). Most of the studies evaluated student performance from two perspectives: the student's perspective and the instructor's perspective (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2010, 2011; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008; Yacapsin & Stick, 2007). Researchers who have examined the issue from the student's perspective have evaluated improving student performance through the incorporation of various student learning styles, class interaction, student behavior, teacher behavior, and techniques to motivate students through active learning. More recently, researchers have begun to analyze how a teacher's leadership style can directly influence academic learning, performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2010, 2011; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008). In previous studies researchers have correlated transformational teacher leadership as having a positive influence on subordinate effort and satisfaction, with marked relevance linking students as subordinates (Baba & Ace, 2003; Bolkan & Goodboy, 2010; Harvey et al., 2004; Pounder, 2008).

In the past thirty years, researchers have begun to use workforce leadership theories to examine teacher leadership styles in postsecondary education (Baba & Ace, 1989; Bess & Goldman, 2001; Bolkan & Goodboy, 2010; Harvey et al., 2004; Pounder, 2008; Yacapsin & Stick, 2007). Currently, the majority of teacher leadership literature is concentrated in the area of

primary and secondary institutions. Few studies have applied teacher leadership to analyze the teacher's leadership influence on motivation, academic performance, and persistence in postsecondary institutions (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008).

Bain (2004) asserted that the rocognition of teacher's transformational leadership skills could lead to positive institutional outcomes such as increased retention, lower attrition, fewer students on academic probation, and fewer student loan defaults. The recognition of teacher's leadership skills could also lead to other positive outcomes such as increased retention, lower attrition, fewer students on academic probation, and fewer student loan defaults (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008). Hiring teachers who display transformational leadership skills and engage students in communication, employ dynamic teaching methods, and create a learning environment for student academic performance, benefits not only students but the entire school (Bain, 2004).

Purpose Statement

A teacher's ability to motivate students is critical to student academic performance and persistence in a higher education setting (Bain, 2004; Bolkan, Goodboy, & Griffin, 2011). Thus, it is important to understand the relationship between a teacher's perceived leadership style and student motivation and academic performance and student's intent to persistence (Bolkan, Goodboy, & Griffin, 2011). Teacher leadership, as it relates to education, has been studied principally in primary and secondary schools; however, little research has been focused on postsecondary institutions, specifically community colleges (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008).

Community colleges serve a diverse demographic of students. As such, it is plausible to apply the same leadership theories to community colleges and study a more diverse student body. To date, no previous studies have been found which exam transformational teacher leadership and student motivation, academic performance, and STEM persistence, in transferable general education biological science courses offered at community colleges.

Students who seek to earn an associate's degree or wish to transfer to a four-year institution are commonly required to complete eight hours of general science education regardless of area of study. Not only is science a requirement, but introductory-level general science courses at community colleges are often gatekeeper courses for pursuing a degree in a STEM field. One study found most students "get their only exposure to science in an intro class—and most leave without understanding how science works or with any desire to take further courses" (Stokstad, 2011, p. 1608).

This quantitative study contributes to the body of knowledge needed to understand the extent to which perceived transformational teacher leadership is related to student motivation, student academic performance, and STEM persistence intentions in transferable general education biological science courses offered at community colleges. The study will control for covariates, student age, race, gender, expected course grade, and average overall course grade earned at the community college.

Research Questions

The following research questions have been examined:

1. Does perceived transformational teacher leadership have a statistically significant relationship with student motivation in a transferable general education biological science course?

2. Does perceived transformational teacher leadership style have a statistically significant relationship with students' academic performance in a transferable general education biological science course?
3. Does perceived transformational teacher leadership have a statistically significant relationship with students' intent to persist in STEM education?

Significance of Study

Student persistence in the community college system is lower than in any other type of higher education institution (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Dowd & Coury, 2006; Mamiseishvili, 2010; Martinez et al., 2012; Wassmer, Moore, & Shulock, 2004). The majority of research conducted on community college students has focused on the factors that contribute to the success or failure primarily on student issues that relate to persistence. Very little emphasis has been placed on the relationship between a teacher's transformational leadership style and student motivation, student academic performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harvey et al., 2004; Noland & Richards, 2014; Pounder, 2008). Although there are many strategies that contribute to student performance and persistence (e.g., mentoring programs, student activities, tutorial services, and community learning activities) these strategies are costly to operate and often may not reach at-risk students who are enrolled in community college courses (Campbell & Campbell, 1997; Dougherty & Kienzl, 2006; Dowd & Coury, 2006; Kuk & Banning, 2010; Martinez et al., 2012; Mamiseishvili, 2010; Tinto, 1998). One guaranteed interaction every student will encounter is interacting with an instructor, whether in a face-to-face or online class. Thus, the community college classroom is a vital location to focus on increasing student persistence in the STEM fields.

Research has shown that transformational teacher leadership affects academic performance and student motivation (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harvey et al., 2004; Noland & Richards, 2014; Pounder, 2008; Yacapsin & Stick, 2007). The studies were conducted by researchers in a variety of classroom environments. These studies examining transformational teacher leadership, student motivation, student performance and persistence has generated promising results but researchers cite a need for additional research in this field (Bain, 2004; Bolkan & Goodboy, 2010; Cheng, 1994; Harvey et al., 2004; Pounder, 2008; Yacapsin & Stick, 2007). Additional research is needed to determine the extent to which student motivation and student performance and persistence are affected by a teacher's transformational leadership.

Overview of Methodology

The purpose of this study was to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions, in transferable general education biological science courses offered at community colleges. A regression analysis was conducted to determine if such a relationship exists. According to Leedy and Ormrod (2013), a quantitative study using regression analysis and descriptive statistics research design is advantageous when trying to determine if relationships exist between two or more variables. In an attempt to find a relationship between perceived transformational teacher leadership, student motivation, academic performance, and STEM persistence intentions in a science classroom, gender, race, age, expected course grade, and average grade earned will be compared through the use of the following instruments: Bass and Avolio's (2004) Multifactor Leadership Questionnaire (MLQ) and Pintrich, Smith, Garcia, and McKeachie's (1991) Motivated Strategies for Learning Questionnaire (MSLQ).

The quantitative research study was conducted in two phases. In the initial phase, the researcher administered the survey to students who volunteered to participate in the study. The students who participated were enrolled in a transferable general education biological science course at the study location during the final four weeks of the semester. In the first phase, a survey was administered to collect data on student demographics, student motivation, perceived transformational teacher leadership dimensions, and intent to persist in STEM education. In the second phase, data on the student's final numerical course grade was collected from the instructor.

Delimitations

The study involved purposeful sampling due to an existing relationship between the researcher and faculty at the research location. The data collection procedure remained constant during the study, and the students were enrolled in the classes at the beginning of the semester.

The second issue in regards to conducting this study centers on the use of transferable biological science courses as a sample population. Although this limited the sample population to students enrolled in biological science classes at the time of the study, students were not aware of the study at the date of enrollment.

Limitations

The researcher opted to use a purposeful sampling method to select participants for this study. The students who participated were not randomly selected; therefore the results of this study may not reflect the entire population of students enrolled in transferable general education biological science courses. However, those students who were surveyed had no knowledge of the study before registering for class.

The generalization of this study to other student populations is restricted by the sampling method used. The classrooms were selected through purposeful sampling, a nonprobability sampling method where participants are surveyed due to the proximity or ease of access to the researcher (Leedy & Ormrod, 2013). All students enrolled in a transferable general education biological course participating in the study had the opportunity to take part in the study. The selection method provided a representative sample of current students enrolled in transferable general education biological science courses at the selected research site.

Definitions

The following definitions serves as a reference of key terms used in this study:

General Education Transferable Biological Science Course: A biology course that satisfies a general education core requirement offered at a community college. The student may select from a list of pre-identified courses but may not use the same course to satisfy more than one curriculum requirement.

Leadership: Northouse (2013) defined leadership as "a process whereby an individual influences a group of individuals to achieve a common goal" (p. 5).

Motivated Strategies for Learning Questionnaire (MSLQ): An instrument designed to measure a college student's motivational strategies (Pintrich, Smith, Garcia, & McKeachie, 1991).

Multifactor leadership questionnaire (MLQ 5X-short): An instrument designed to measure a leader's range of leadership (Bass & Avolio, 2004).

Teacher leadership: Traditionally, teacher leadership has been defined as the process in which teachers exercise influence over colleagues in a school setting (York-Barr & Duke, 2004); however, for the purpose of this study, teacher leadership refers to a teacher as leader in

a classroom with students as followers (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harvey et al., 2004; Noland & Richards, 2014; Pounder, 2008).

Transformational leadership: Bass (1985) defined transformational leadership as a combination of three characteristics: charisma, individualized consideration, and intellectual stimulation.

Summary

Student academic performance in the community college system is lower than in any other type of higher education institution (Calcagno et al., 2008; Dowd & Coury, 2006; Mamiseishvili, 2010; Martinez et al., 2012; Wassmer et al., 2004). Several studies have been conducted to evaluate how the teacher's transformational leadership style contributes to student motivation, performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harvey et al., 2004; Noland & Richards, 2014; Pounder, 2008). To further the research surrounding transformational teacher leadership, a quantitative study was conducted to evaluate if there was a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions in transferable general education biological science courses offered at community colleges. The next chapter includes a review of relevant literature and discusses studies that analyzed teacher leadership styles, student persistence, and student motivation.

CHAPTER 2

LITERATURE REVIEW

The transformational teacher leadership style has been identified as having a positive impact on student motivation, academic performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey, Stout, & Royal, 2004; Pascarella, Seifert, & Whitt, 2008; Pounder, 2008). Though many of the studies surrounding leadership have focused on business settings, it is plausible to apply the same principles of leadership theory to the college classroom, substituting instructors as managers and students as subordinates (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2010; Cheng, 1994; Harvey, Stout, & Royal, 2004; Pascarella, Seifert, & Whitt, 2008; Pounder, 2008). To fully understand the relationship of transformational teacher leadership style, student motivation, and student academic performance and persistence, further research focusing on effective learning and teacher leadership styles should be considered.

Teachers Improving Student Academic Persistence

In 2012, 59% of first-time, full-time undergraduate students who enrolled at a United States public higher education institution earned a bachelor's degree in six years (National Center for Educational Statistics [NCES], 2013c). The retention rate at U.S. public two-year colleges was much worse with the average rate of students earning a degree at a two-year, public higher education institution in three years or less was 20% (NCES, 2014). Researchers have revealed approximately 45-50% of students dropping out of community college choose to do so during the first year of enrollment (Braxton, Hirschy, & McClendon, 2004; Cofer & Somers, 2001; Tinto, 1993).

Bailey, Leinbach, and Jenkins (2005) suggested the national community college dropout rate is deceiving due to the large mission of the community college. Community colleges serve students in ways other than earning an associate's degree. The retention rate is likely much higher when factoring the various goals of each student enrolling in a community college course. Students enter community colleges to learn skills to become employable or to take a class or two to transfer to another higher institution (Bailey et.al, 2005). Not earning an associate's degree may not necessarily be a shortfall or failure; in fact, the student may obtain their goal without earning a degree. According to Bailey, Leinbach, and Jenkins (2005),

> Graduation rates should be used cautiously as a measure of community college performance since there is no question that many factors beyond the control of the colleges hinder their ability to increase the rates at which students complete. Community colleges are expected to open their doors to all students, regardless of academic or socioeconomic challenges and, compared with public four-year institutions, they are given fewer financial resources per student to provide their services. (p. 20)

Being that community college students are often transient students with differing educational goals, tracking the student retention would require vast administrative resources (Bailey et al., 2005).

Previous research on community college student retention has focused on the unique challenges students' face which contribute to the success or failure of college completion and has not focused on classroom leadership (Braxton et al., 2004; Chao, Stover DeRocco, & Flynn, 2007; Cofer & Somers, 2001; Goldrick-Rab, 2010; Tinto, 1993). Multiple studies have found being employed full-time, attending school part-time, attending to family obligations, lack of family support, financial barriers, lack of academic preparation, and being a first generation

college student all can contribute to a student leaving a higher education institution before graduation (Braxton et al., 2004; Chao et al., 2007; Cofer & Somers, 2001; Goldrick-Rab, 2010; Tinto, 1993).

Roberts and Styron (2010) conducted a study to investigate "students' perceptions of services, interactions, and experiences" and found faculty approachability was the second best predictor of student retention (p. 8). To address the perceived unapproachability of faculty members, institutions need to create activities to help increase student-faculty interactions. The creation of an "effective faculty-student interaction will help establish an environment where students feel that faculty members truly care about them as individuals, which will facilitate the attainment of academic success" (Roberts & Styron, 2010, p. 10).

Numerous studies have shown student retention in Science, Technology, Engineering, and Math (STEM) majors positively correlate to faculty connections (Christe, 2013; Hong & Shull, 2010; Micari & Pazos, 2012; Suresh, 2007; Voght, 2008). Voght (2008) noted "faculty have the ability to affect student performance, and thus his or her persistence" (p. 34). Although, there are studies to suggest the reason for the high dropout rate among STEM majors is due to the lack of sensitivity "to their learning and personal needs" (Hong & Shull, 2012, p. 274); "the culture of STEM education diminishes the importance of the professor-student relationship" (Christe, 2013, p. 24). In an attempt to create a shift in STEM culture, faculty members need to acknowledge their role in retention goes beyond "the confines of lecture notes and exams" (Christe, 2013, p. 25).

Leadership Style

Northouse (2013) defined leadership as "a process whereby an individual influences a group of individuals to achieve a common goal" (p. 5). That definition identifies two major

areas of leadership, the leading of people and obtaining a common goal. A leader is someone who demonstrates extraordinary dedication to his or her team and will do what it takes to better the team as a whole. A leader infuses a sense of positivity and directs others to reach the specified goal. Leadership, therefore, is that process in which an individual influences a group of people to obtain a common goal (Northouse, 2013). The goal is attained by cooperation and cohesive behavior. In the end, leadership involves acquiring results through others and the ability to build a cohesive, goal-oriented team.

Leadership is often about "soft skills" rather than hard skills (Northouse, 2013). In most situations, knowledge is power and for those who believe power is the source of leadership, they will assume those who possess more knowledge and intelligence will make good leaders (Mumford, Zaccaro, Connelly, & Marks, 2000). This is not always the case; scientists and doctors may have very high cognitive ability but, their ability to lead may be very low, and are not necessarily the best leaders (Mumford et al., 2000). It is a leader who can motivate individuals or groups to perform at their best, which ultimately creates a cohesive and successful team.

Leadership style is composed of two types of behaviors: task-orientated behaviors and relationship-oriented behaviors (Northouse, 2013). A leader displaying relationship behaviors would be more inclined to help subordinates feel comfortable with themselves, with working in a team environment, and help build self-confidence (Northouse, 2013). A leader displaying a task-orientated behavior would be more focused on completing a mission or reaching a set goal.

In the late 1940s, The Ohio State University Bureau of Business Research conducted a leadership research study focused on leadership style (Stogdill, 1974). Stogdill (1974), discussed the Ohio State research findings as to have identified two types of leader behavior: *consideration*

(people-oriented) and *initiating structure* (task-oriented). Under this theory, the *consideration* behavior is identified as a relationship behavior, linked to respect and trust for others in the workplace (Stogdill, 1974). In contrast, the *initiating structure* behavior is identified as a task focused behavior. Those leaders who display initiating structure focus heavily on organization and schedules (Stogdill, 1974). A leader's style can be classified as having (a) high concern for people, low concern for task; (b) low concern for people, low concern for task; (c) high concern for people, high concern for task; or (d) low concern for people, high concern for task.

In the 1960s, Blake and Mouton began a continued examination of the relationship between a leader's concern for people and his or her concern for a task (Blake & Mouton, 1964, 1978, 1985). The research led to the development of the Managerial Grid, now called the Leadership Grid, which clearly displays how leaders reach organizational goals. The grid identifies five leadership styles: *authority-compliance*, *country-club management*, *impoverished management*, *middle-of-the-road management*, and *team management* (Blake & Mouton, 1985).

The grid was divided into five sections to establish five types of leadership identified. The *impoverished management* leadership, located in the lower left quadrant; represents low concern for results and low concern for people (Blake & Mouton, 1985). The leader goes through the motions; subordinates have little or no interaction with their manager. The *country club management* leadership style, located in the upper left quadrant, is a high concern for people and a low concern for results (Blake & Mouton, 1985). Leaders who embrace this leadership style are very social and concerned about their subordinates; however, tasks are often left unmet out of concern for subordinates. *Team management*, located in the upper right quadrant of the grid is a high concern for people and a high concern for results (Blake & Mouton, 1985). These leaders promote teamwork and enjoy working with others. Those leaders who subscribe to this

style can often be found working side-by-side with their subordinates to complete the task at hand. *Authority-compliance management* located in the lower right corner of the grid, is a high concern for results and a low concern for people focused (Blake & Mouton, 1985). Leaders view the subordinates as tools to get the job done. These leaders are result driven and demand results regardless of the circumstances. The final quadrant, *middle-of-the-road management*, located in the middle of the grid, is a moderate concern for people and a moderate concern for results (Blake & Mouton, 1985). Those leaders exhibiting middle-of-the-road management style emphasize a balance between subordinates' needs and results. Blake & Mouton (1985) recognized many leaders could operate using more than one of the leaderships styles found on the grid. They, however, suggested each leader also has a dominant style that they revert to in times of stress. Indicating each leader routinely falls under one leadership style.

Blanchard and fellow researchers (Blanchard, Zigarmi, & Zigarmi, 1985; Blanchard, Zigarmi, & Zigarmi, 1993) examined human leadership behavior based on leadership style and development level of the subordinates. The situational leadership theory stresses the need for leaders to adapt to the changing environment and subordinate needs to be an effective leader. From this theory, a four-quadrant model was designed to incorporate the directive behavior and supportive behavior of leaders (Blanchard, Zigarmi, & Zigarmi, 1985). The four quadrants were identified as *delegating*, *supporting*, *coaching*, and *directing*. The *delegating* leadership style, located in the lower left quadrant, represents low support and low directive focused (Blanchard et al., 1985). The leader defines the duties and tasks to be performed by the subordinates, who have the ability to execute their duties with little or no interaction with their manager. The *participatory* leadership style, located in the upper left quadrant, is high supportive, and low directive (Blanchard et al., 1985). Subordinates under this leadership style need little supervision

because of their high skill level, but support is needed to increase their confidence level. *Coaching*, located in the upper right quadrant of the grid, is high support and high directive focused (Blanchard et al., 1985). Leaders who operate under this style behave as coaches. The leader makes the decisions, but allows input from team members. The final quadrant is *directing* located in the lower right corner of the grid, is high directive focused and low supportive focused (Blanchard et al., 1985). Leaders make the decisions and inform the subordinates of the results. Blanchard and fellow researchers suggested that effective leaders are those who are adaptable and have the ability to navigate the work environment as situations change (Blanchard, 1985; Blanchard et al., 1985; Blanchard, Zigarmi, & Nelson, 1993).

Today, James Burns is considered the author of modern leadership theory (Northouse, 2013). Burns (1978) defined leadership as "the manner in which leaders see and act on their own and their followers' values and motivations" (p. 19). Burns differentiated between leadership and power, highlighting that leadership is based on the followers' goals while power does not focus on the followers' goals. Burns proposed that there are three different types of interaction between leaders and followers: transformational, transactional, and laissez-faire.

Transformational leadership. Transformational leadership ensues "when a person engages with others and creates a connection that raises the level of motivation and morality in both the leader and the follower" (Northouse, 2013, p. 186). James Downton coined the term *transforming leadership*, but Bass (1985) renamed the leadership style *transforming leadership* to *transformational leadership* and expanded the theory to include items such as idealized influence, charisma, inspirational motivation, intellectual stimulation, and individualized consideration as a means to influence followers (Northouse, 2013). Idealized influence and charisma are the emotional elements of leadership behavior. Leaders who demonstrate idealized

influence are considered role models with high ethical and moral standards. The inspirational motivation element describes a leader who can "communicate high expectations to followers, inspiring them through motivation to become committed to and part of the shared vision (Northouse, 2013, p.193). Intellectual stimulation is the ability of the leader "to stimulate followers to be creative and innovative and to challenge their beliefs and values as well as those of the leader" (Northouse, 2013, p. 193). Individualized consideration is the ability of a leader to "provide a supportive climate in which they listen carefully to the individual needs of followers" (Northouse, 2013, p. 193).

Teachers as Leaders

As early as the 1980s, researchers began studying the applicability of organizational leadership theories to secondary and postsecondary classrooms (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Cheng, 1994; Harvey et al., 2004; Pascarella et al., 2008; Pounder, 2008; Yacapsin & Stick, 2007). Baba and Ace (1989) collected data from 2,084 business students over a two-year period. The researchers used the Student Instructional Report Questionnaire (SIR) to gauge instructor performance as perceived by students (Baba & Ace, 1989). The goal of the study was to determine if a relationship existed between student perceptions of instruction and "traditional styles of leadership" (Baba & Ace, 1989, p. 511).

The four factors identified by Baba and Ace (1989) were *Structure, Consideration, Effort,* and *Evaluation,* and emerged using the "Kaiser-Meyer-Olkin measure of sampling adequacy" (p. 512). These four factors represented 74% of the variance found during the data set analysis (Baba & Ace, 1989). The results revealed that, regardless of course level or class size, student perception of the instructor remained the same.

The researchers found that the most effective instructor can maintain classroom structure and student consideration. It is feasible to suggest students prefer an instructor who can provide leadership through "clear definition of objectives and organized use of class time" (Baba & Ace, 1989, p. 523). These findings can clearly be linked to transformational leadership behaviors as they have been studied in industrial work environments and, therefore, offer evidence of the applicability of leadership theory in the classroom (Baba & Ace, 1989).

Harvey, Royal and Stout (2004) performed a similar study examining the "effect of an instructor's transformational leadership on university students" (p.395). In this study, 120 undergraduate students, ranging from 18-54 years of age, who were enrolled at a small liberal arts school and voluntarily completed a survey evaluating the instructor teaching their first class of the week (Harvey et al., 2004). The survey "included seventeen Charisma, seven Consideration, and three Intellectual Stimulation items" (Harvey et al., 2004, p. 397).

The study revealed a positive correlation between transformational classroom leadership, instructor performance, and student involvement. Researchers found charismatic leadership and intellectual stimulation "accounted for 66.3 percent of the variance in ratings of Instructor's Performance" (Harvey et al., 2004, p. 399). Conversely, the individualized considerations and intellectual stimulation "variables accounted for 51.5 percent of the variance in self-ratings on Student's Involvement" (Harvey et al., 2004, p. 399).

In another study relating leadership theories to instructors, Pascarella, Seifert, and Whitt (2008) sampled 1,353 first-year students at a large public university and found that a statistically significant relationship existed between instructor behavior and student persistence. The study used four web-based surveys spread over a twelve month period to collect information about student background, experiences, and educational satisfaction. The data analysis indicated the

most important factor determining student persistence was the "overall exposure to organized and clear instruction during the first-year of college" (Pascarella et al., 2008, 67). Though these findings are limited to one large public university, the "findings underscore the salience of faculty behaviors in student persistence decisions by suggesting that it is not just their non-classroom interactions with students that count, but also their actual classroom instructional behaviors" (Pascarella et al., 2008, 67).

Researchers have found that a classroom environment can be viewed as a small organization and can be managed by applying leadership theories. Fostering student academic performance can be equated to fostering organizational cohesiveness and productivity. Creating an environment that encourages learning and student satisfaction can lead to retention. Profiles of "leadership styles may provide a useful pattern for understanding the relationship of leadership" in an attempt to predict student performance (Cheng, 1994, p. 70).

Student Motivation

The need to promote student motivation at higher education institutions has led many researchers to apply organizational leadership theories to the classroom environment. Researchers have found student motivation goes beyond pedagogy methods and content knowledge; but can also be attributed to classroom leadership style (Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Harvey et al., 2004; Pounder, 2008). Research has found effective teachers are not only experts in their discipline, but are also experts in the social dynamics of classroom communication (Bolkan & Goodboy, 2009). To simply be a content expert imparting information is not enough to support student performance and promote motivation (Bolkan & Goodboy, 2009).

Expectancy-Value Theory. The expectancy-value theory has two distinct components, a student's expectancy for success and a student's value of education (Eccles & Wigfield, 2002). Student expectancy refers to how well a student perceives he or she will do when completing a task, while student value refers to the need or incentive for completing a task (Eccles & Wigfield, 2002). Expectancy and value components of this theory are often linked to much larger issues such as: gender, psychological, and cultural factors (Eccles & Wigfield, 2002; Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011). Though there are many external factors that interfere with a student's motivation, value and expectancy are positively correlated in that if a student perceives he/she will enjoy a task, then he/she will perform the task well (Eccles & Wigfield, 2002; Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011).

The value portion of the theory considers a student's perceived value of completing a task. The research conducted by Eccles and Wigfield (2002) listed four different task value themes: attainment value, intrinsic value, utility value, and cost. The attainment value theme refers to a students' perceived competency of completing a task, while the intrinsic value refers to a student's level of enjoyment while completing the task. The utility value and cost themes refer to perceived value in completing the task and the personal cost of denoting time to the completion of the task. Eccles and Wigfield (2002) found students who believe a task can be attained and hold value in the task being performed are more likely to accomplish the task. Conversely, when a student perceives that the cost of completing the task is high, the student is less likely to engage in the task. In short, students with more interest in a task are more likely to demonstrate higher levels of achievement (Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011; Spinath, Spinath, Harlaar, & Plomin, 2006).

Teacher Leadership Improving Motivation

Bolkan and Goodboy (2010) "examined learning outcomes including cognitive learning (i.e., learning loss, learning indicators), affective learning (i.e., instructor affect, course affect), student motivation, and student communication satisfaction" as it relates to transformational classroom leadership (p. 99). The results from the study concluded cognitive learning, affective learning, student motivation, and student communication satisfaction was in positive correlation to transformational classroom leadership. The study indicated transformational leaders as instructors lead to a higher satisfaction rate among students and persistence (Bolkan & Goodboy, 2010).

Two other similar studies were conducted by Harvey, Royal and Stout (2004) and Pounder (2008). These researchers discovered instructors who displayed a transformational leadership style had a positive effect on students. Harvey, Royal and Stout (2004) found Charismatic Leadership and Intellectual Stimulation "accounted for 66.3 percent of the variance in ratings of Instructor's Performance" (Harvey et al., 2004, p. 399). Pounder, in turn, concluded in his study "instructors displaying transformational leadership qualities in the classroom had a positive and significant influence on student perception of classroom dynamics" (Pounder, 2008, p. 4).

A qualitative study sampling 63 instructors at colleges and universities from around the country was conducted in an attempt to identify characteristics of an excellent educator (Bain, 2004). Bain (2004) sampled instructors of various disciplines but were identified as being an excellent instructor. The selected instructors "had achieved remarkable success in helping their students learn in ways that made a sustained, substantial, and positive influence on how those students think, act and feel" (Bain, 2004, p. 5). He identified "excellent" instructors as having

the ability to yield deeper learning, critical thinking skills, and student motivation in the enrolled class, as well subsequent courses (Bain, 2004).

The results of the study indicated instructor personality type was not related to successful teaching (Bain, 2004). In fact, the 63 instructors who participated in the study all had varied personalities, representing aggressive, passive, introverted, and extroverted. The one association among the instructors was their ability to build trust between themselves and the students (Bain, 2004). The instructor /student interactions forged a bond of respect for one another that translated into student motivation.

Bain (2004) even noted the instructors all had varied methods of instruction used to interact and foster learning. Though the instruction methods varied, each chosen method was able to motivate students to reach for a higher level of performance. Many of the instructors chose instructional methods that allowed the students to have a sense of control over their learning experiences. The other connection between the 63 instructors studied was their effort to assess their instructional techniques and flexibility to makes changes as needed (Bain, 2004).

Summary

Student persistence in the community college system is lower than in any other type of higher education institution. The majority of research studies conducted on community college students have focused on the nuisances that contribute to the success or failure primarily on student issues that relate to persistence, very little focus has been placed on a teacher's leadership style as being able to contribute to student motivation and student academic performance (Braxton et al., 2004; Chao et al., 2007; Cofer & Somers, 2001; Goldrick-Rab, 2010; Tinto, 1993).

Researchers have discovered teacher leadership has an effect on student motivation and student academic performance in education (Cheng, 1994; Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Harvey et al., 2004; Pounder, 2008; Yacapsin & Stick, 2007). The studies conducted by researchers in a variety of classroom environments examining teacher leadership and student performance has generated promising results but have called for additional research in this field (Cheng, 1994; Bain, 2004; Bolkan & Goodboy, 2010; Harvey et al., 2004; Pounder, 2008; Yacapsin & Stick, 2007). Additional research is needed to determine how student performance can be affected by a teacher's leadership style. Current research studies have yet to correlate a particular teacher leadership style with student motivation and student academic performance through the higher education system.

Although there are many strategies that have been proven to contribute successfully to student motivation-mentoring programs, student activities, tutorial services, and community learning activities these strategies sometimes prove difficult to reach students who are enrolled in community college courses and are costly to operate (Braxton et al., 2004; Chao et al., 2007; Cofer & Somers, 2001; Goldrick-Rab, 2010; Roberts and Styron, 2010; Tinto, 1993). The lone guaranteed interaction that every student will experience is with an instructor, either virtually or face-to-face.

If instructors approached the role of teaching as a two-part job, imparting knowledge and acting as a leader who can influence student academic performance and student motivation, the number of students who continue to matriculate through the higher education system could grow substantially (Bain, 2004). The recognition of a teacher's leadership skills could lead to other positive outcomes such as increased retention, lower attrition, fewer students on academic probation, and fewer student loan defaults. Understanding which teacher leadership style creates

the most favorable learning environment is vital and worth researching as student motivation and student academic performance affects all levels of higher education (Cheng, 1994; Bain, 2004; Bolkan & Goodboy, 2010; Harvey et al., 2004; Pounder, 2008; Yacapsin & Stick, 2007).

CHAPTER 3

METHODOLOGY

The purpose of this study was to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions, in transferable general education biological science courses offered at a large urban community college located in a Mid-Atlantic state. The study focused on student motivation, academic performance, and STEM persistence intentions as it correlates to the perceived transformational teacher leadership of their community college science instructor.

In this chapter, the following research items are outlined: (a) research design, (b) site and participants, (c) instrumentation, (d) data collection procedures, (e) data analysis, (f) treatment of missing data, and (g) protection of participants.

Research Design

The purpose of this study was to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions in transferable general education biological science courses offered at community colleges. A regression analysis was conducted to determine if such a relationship exists. According to Leedy and Ormrod (2013), a quantitative study using regression analysis and descriptive statistics research design is advantageous when trying to determine if relationships exist between two or more variables. The design further supported the researcher in determining how strong the relationship is between the research variables.

The quantitative research study was conducted in two phases. In the initial phase, the researcher administered the survey to students who volunteered to participate in the study. Qualifying students were currently enrolled in a transferable general education biological science

course at the study location during the final four weeks of the semester. In the first phase, a survey was administered to collect data on student demographics, student motivation, intent to persist in STEM, and perceived transformational teacher leadership dimensions. In the second phase, data on the student's final numerical course grade was collected from the instructor.

Research Questions

How does perceived transformational teacher leadership in a transferable general education biological science classroom relate to student motivation, student academic performance, and STEM persistence intentions? Specifically, the following research questions will be examined:

RQ1. Does perceived transformational teacher leadership have a statistically significant relationship with student motivation in a transferable general education biological science course?

$H1_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student motivation in a transferable general education biological science course.

RQ2. Does perceived transformational teacher leadership have a statistically significant relationship with students' academic performance in a transferable general education biological science course?

$H2_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student academic performance in a transferable general education biological science course.

RQ3. Does transformational perceived teacher leadership have a statistically significant relationship with students' intent to persist in STEM education?

$H3_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student's intent to persistence in STEM education.

Site and Participants

Description of the Population. The site for this study was a one-campus location that is part of a large multi-campus community college in a Mid-Atlantic state. The National Center for Educational Statistics (2014) lists the college population as 25,927 during Fall 2015, split between four main campuses. This study collected data from one of the four main campuses.

The selected campus population was 42% White, 49% African-American, and 9% other races. 66% of the students attending the community college were female, and the average student age was 29 years old. The campus enrolled 3,404 Full-time equivalent (FTEs) students in the 2015-2016 academic year, of which 165.75 FTEs were enrolled in a transferable general education biological science course during the Spring 2016 semester. The sample for this quantitative study was extracted from the current student population who volunteered and was currently enrolled in a transferable general education science course at the time of the study.

Selection of Sample. Purposeful sampling was used to ensure a large sample size. All full-time instructors teaching face-to-face transferable biological science courses at the study site were solicited to participate in the study. Those instructors who wished to participate in the study supplied the researcher with a roster of students enrolled in the classes, which was used in the study. All students enrolled in transferable biological science courses taught by instructors who volunteered to participate in the study were invited to participate in the study. Students under the age of 18, or students who did not wish to participate, were allowed to remain in the room or excuse themselves from the room.

Sample Size. The desired sample size for the quantitative study was approximately 116 students. The recommended sample size, based on the Spring 2016 semester FTEs in transferable general education biological science courses, should be at least 116 students, at a confidence level of 95% with a margin of error of 5% or less for a population size of 166 Full Time Equivalent students.

Setting. The campus offered a total of six face-to-face biological science courses, taught through the Science Department. During the Spring 2016 semester, the Science Department served 166 FTEs enrolling in one or more transferable biology courses. A total of eight full-time biological faculty members were actively teaching at the study site.

The researcher administered the survey in each participating classroom. The researcher was onsite for one week during the last four weeks of the course collecting data. More details about the procedures for survey administration are outlined in the Data Collection section.

Instrumentation

Two instruments were used to gather data during the research study. The Bass and Avolio's (2000) Multi-factor Leadership Questionnaire (MLQ) 5X-short and Pintrich, Smith, Garcia and McKeachie's (1991) Motivated Strategies for Learning Questionnaire (MSLQ). Transformational teacher leadership dimensions were measured using an adapted version of MLQ 5X-short. Student motivation was measured using an adapted version of the MSLQ. The MLQ 5X-short, the MSLQ, and demographic questions were combined into one survey instrument totaling 34 statements.

Independent Variable

Multi-factor Leadership Questionnaire 5x-Short (MLQ). The Multi-factor Leadership Questionnaire was created in 1985, but the most recent version, which was used in

this study, was updated in 2002 (Bass & Avolio, 2000). The newest MLQ version, MLQ 5X-short has been used in over 300 research studies, doctoral dissertations, and other academic research across the world (Bass & Avolio, 2004). The MLQ 5X-short survey has two different forms of evaluation. One form allows the leader, or instructor in this study, to evaluate his/her leadership style. The alternative form allows the follower, or student in this study, to evaluate his/her leader.

The MLQ 5X-short is a 45-item instrument with four statements for each of the nine leadership dimensions: transformational (idealized attributes, idealized behaviors, inspirational motivation, intellectual stimulation, individualized consideration), transactional (contingent reward, management-by-exception), or laissez-faire (management-by-exception, laissez-faire) (Bass, Avolio, 2004). The instrument uses a Likert-style scale ranging in values from zero to four. The zero equals "not at all;" one equals "once in a while;" two equals "sometimes;" three equals "fairly often;" and four equals "frequently, if not always" (Bass & Avolio, 2004).

The researcher adapted the survey to focus exclusively on the transformational leadership style. The adapted 20 item survey included only the transformational scales including, four-items measuring *Idealized Influence* (attributes), four-items measuring *Idealized Influence* (behavior), four-items measuring *Inspirational Motivation*, four-items measuring *Intellectual Stimulation*, and four-items measuring *Individual Consideration*.

Idealized influence. The teacher is able to provide a course vision and a sense of course expectations, with the ability to instill pride, respect, and trust to increase confidence. The teacher will be able to excite and inspire the students to learn. Idealized influence is separated into two categories, attribute and behavior, due to that influence can both be demonstrated by behavior and a quality attributed by subordinates (Bass & Avolio, 2004).

Inspirational motivation. The teacher is able to serve as a model for students. The teacher is able to promote high-expectations and build confidence through frequent and positive communication.

Individualized consideration. The teacher is able to coach and mentor students through feedback. Students who lack confidence may receive additional attention from the teacher in order to promote their confidence and foster their needs.

Intellectual stimulation. The teacher stimulates the students to think critically and examine their values and beliefs. The teacher will challenge the students with tasks, but will encourage them to solve difficult problems.

The instrument was purchased from Mind Garden, a research corporation specializing in research instrumentation and data analysis. Mind Garden does not allow the instrument to be reproduced and published in its entirety. However, a sample of the questionnaire can be found in Appendix A.

Each student was asked to complete the transformational scale from the Bass and Avolio's (2004) Multi-factor Leadership Questionnaire (MLQ 5x-Short) Rater Form. The MLQ served to measure transformational leadership dimensions in the classroom. The students responded to 20 items on the Rater MLQ 5X-short form listing specific transformational dimensions that have been linked to interactions between leaders and followers. The MLQ was constructed using a Likert-style scale, with the rater indicating how frequently the leader demonstrates a stated behavior.

The MLQ 5X-short is a reliable and valid instrument (Bass & Avolio, 2004; Bass & Riggio, 2006; Pounder, 2008). The MLQ Manual, produced as a support guide for the questionnaire, includes descriptive statistics and reliability for the MLQ 5X-short. The findings

were based on ratings from other studies. Therefore, no self-ratings were included in the evaluation. Bass and Avolio (2004) reported the MLQ 5X-short alpha reliability as .77 for Idealized Influence (attributes), .70 for Idealized Influence (behavior), .85 for Inspirational Motivation, .75 for Intellectual Stimulation, and .80 for Individual. These findings have been supported in other studies and have exceeded the recommended level for internal consistency (Bass & Riggio, 2006; Pounder, 2008).

Scoring. The MLQ 5X-short was scored by calculating an average for each sub-scale. The score was found by adding the responses for each item in each sub-scale and dividing by the total number. Final scores dictated if the teacher is more transformational than average or less transformational than average when compared to the U.S. data set found in the *Multi-factor leadership questionnaire: Technical report, leader form, rater and scoring key for MLQ (Form 5x-Short).*

Dependent Variable

Motivated Strategies for Learning Questionnaire (MSLQ). The MSLQ is an 81-item questionnaire designed to measure college students' motivation and their use of different learning strategies. The Motivated Strategies for Learning Questionnaire (MSLQ) was created by Pintrich, Smith, Garcia and McKeachie (1991). The questionnaire is broken into two sections: motivation and learning strategies. The first section consists of 31 items assessing the students' motivation, goals, and value beliefs, including their capacity to succeed and their test anxiety in a specific course. The second section consists of 50 items focus on student learning, specifically with 31 items focusing on the use of cognitive and metacognitive strategies and 19 questions addressing the use of educational resources (Pintrich, Smith, Garcia, & McKeachie, 1991).

All items are scored by participants on a 7-point Likert scale, where 1 means "not at all true of me" and 7 means "very true of me" (Pintrich, et al., 1991). There are 15 different sub-scales on the MSLQ that focus on student motivation and cognitive strategy within a course. These scales can be used together or separately depending on the researcher needs. For the purpose of this study, only one of the sub-scales focusing on motivation was utilized, totaling eight questions (Appendix A).

The Task Value sub-scale was used to assess student motivation in a transferable general education biological science classroom. The scale includes six-items assessing Task Value. Task Value measures the student's perception of how interesting or valuable the course is to them (Pintrich, et al., 1991). A student who has a high task value should be more motivated to be involved in the course material and learning. A student who has a low task value should be less involved in the course material and learning.

Each student was asked to complete the Task Value portion of the MSLQ. The MSLQ will serve to determine how motivated each student is to learn the material presented in a transferable general education biological science course in which they are enrolled. Previous research has established good instrument reliability .90 for the Task Value sub-scale (Pintrich, Smith, Garcia, & McKeachie, 1993).

Scoring. The MSLQ responses were summed for one score to measure Task Value sub-scale. The score was computed by adding the responses and determining the mean value. For example, the Task Value scale has six-items. The student's response to the six items was computed by adding the responses and dividing the total by six to calculate the mean total. Higher scores are indicative of greater task value which is indicative of higher motivation,

whereas lower scores are indicative of less motivation to actively participate and learn the course material.

Student Demographics. Participants were also asked to report their gender, race, age, expected course grade, and average overall course grade earned at the community college when completing the survey. Gender, race, expected course grade and average overall course grade earned was used to evaluate if there is a relationship between student motivation and/or final course grade and transformational teacher leadership. A student's age was collected to evaluate if variables being studied, specifically student motivation, as well as transformational teacher leadership, are correlated. Students were asked to self-disclose their age, race, gender, expected course grade and average overall course grade earned at the community college by filling the appropriate information or by identifying the correct label. A sample of the student demographic questions can be found in Appendix A.

Student Academic Performance. At the conclusion of the semester, participating teachers were asked to submit the final numerical grade for all students enrolled in the participating classroom. The final grade was used to establish student academic performance. The grade was matched with the student's survey results to evaluate if there is any relationship between the research variables. The grades of students who did not participate in the survey were immediately deleted from the data by the researcher.

Student Intent to Persist in STEM. Students were asked to report whether or not they intend to continue to enroll in science courses after the currently enrolled class is concluded. The information gathered helped to establish students' intent to persist in STEM. The response was evaluated if see if there is any relationship between the research variables.

Data Collection

The data collection strategy chosen for this quantitative study was the administration of a survey. The survey was administered to students who were currently enrolled in a transferable general education biological science course at the selected study site location. The rationale behind choosing this population is based on approximately 49% of students earning a bachelor's degree in a STEM field attended a community college at some point during their academic career (National Science Board, 2012). However, only 16% of the bachelor's degrees conferred by postsecondary education institutions in the U.S. were in a STEM field (National Center for Educational Statistics, 2013a). While it has been determined that a teacher's ability to motivate students is critical to the performance and persistence in a higher education setting, there is limited data on the relationship between perceived transformational teacher leadership, student motivation, student academic performance, and STEM persistence intentions (Bain, 2004; Bolkan, Goodboy, & Griffin, 2011).

An email was sent to the division dean outlining the proposed research, including instructions for how the research would be administered. A sample email can be found in Appendix C. Upon approval from the division dean, the researcher contacted the department chair to request an updated list of faculty currently teaching transferable general education biological science courses. The researcher then emailed each faculty member outlining the proposed research, including instructions for how the research would be administered and request permission to use their classroom(s) in the study. Faculty members who were willing to participate in the study were then notified as to what week when the researcher would be on site collecting data. The faculty members were asked to select a date and time while the researcher

was on site. The researcher entered the classroom(s) to conduct the student survey on the mutually agreed upon dates.

The MLQ 5X-short, the MSLQ, and the demographic survey were given at the same time in a combined paper survey format. At the time of survey administration, the faculty member was not in the classroom. The researcher carefully explained the purpose of the study. It was also explained that the student could choose not to participate, the process was entirely voluntary, and would have no impact on their course grade. Once the survey was completed, each student deposited their form into a large envelope with only the course section number displayed on the outside. Once all the surveys had been submitted the researcher thanked the students for their time and left the room to notify the teacher that he/she could return to the room. This procedure was followed in each of the 17 classrooms participating in the study.

Data Analysis

The data were entered by the researcher and analyzed utilizing the Statistical Package for the Social Sciences (SPSS). The data collected from the paper survey were entered into SPSS. Data were analyzed to determine if there is a relationship between perceived transformational teacher leadership, student motivation, student academic performance, and STEM persistence intentions in a transferable general education biological science course taught at a community college using an alpha of 0.05.

To examine RQ1, a multiple linear regression analysis was conducted to compare the relationship of perceived transformational teacher leadership on student motivation. A multiple linear regression analysis was conducted to determine if a statistically significant difference between perceived transformational teacher leadership style on student motivation, controlling

for covariates, student age, race, gender, expected course grade, and average overall course grade earned at the community college.

To examine RQ2, a multiple liner regression analysis was conducted to compare the relationship of perceived transformational teacher leadership on student academic performance. A multiple linear regression analysis was conducted to determine if a statistically significant difference between perceived transformational teacher leadership on student academic performance, controlling for covariates, student age, race, gender, expected course grade, and average overall course grade earned at the community college.

To examine RQ3, an ordinal logistic regression analysis was conducted to compare the relationship of perceived transformational teacher leadership on students' intent to persist in STEM education. An ordinal logistic regression analysis was conducted to determine if a statistically significant difference between perceived transformational teacher leadership on students' intent to persist in STEM education, controlling for covariates, student age, race, gender, expected course grade, and average overall course grade earned at the community college.

Treatment of Missing Data

Data collected from participants who failed to respond to 3 or more questions on the entire survey was excluded from the analysis. Any missing demographic variables, such as gender, race or age, were analyzed using pairwise exclusions. Any missing items from the MLQ 5X-short or the MSLQ portion of the survey were assigned the average score for the missed question based on all participants in the same classroom. Pairwise exclusions and mean substitution, assigning the average score for missing data, is a conservative statistical approach,

thus allowing the researcher to minimize data loss without changing the statistical mean (Gamst, Meyers, & Guarino, 2008).

Protection of Participants

Every effort to protect the rights and privacy of participants during the study were taken. All materials associated with the study and the research design to be used in this study was reviewed by the Institutional Review Board (IRB) of the researcher's academic affiliation and the academic institution being studied. Leedy and Ormond (2013) state that it is important to inform each participant of their rights and that their participation is completely voluntarily. During each stage of the research process, all attempts were made to protect each student's privacy and limit any potential risk.

In an attempt to protect students participating in the study, the researcher requested the final numerical grades for all students enrolled in a participating course. This helped to ensure that the instructor would have no knowledge of which students completed the survey and which students did not. Grades of non-participating students were immediately deleted by the researcher upon receipt. The researcher did not release any identifying student information collected during the study. All data collected was kept in a locked file cabinet or on a flash drive stored in a secure location.

To limit the amount of disruption to instructional time, the researcher selected one week during the last four weeks of the semester to be on site at the study location. Each teacher was allowed to select a class period or periods during the week in which the researcher could enter the classroom.

Summary

This quantitative research study examined the relationship between perceived transformational teacher leadership, student motivation, student academic performance, and STEM persistence intentions in a transferable general education biological science courses. This section of the paper has addressed the methods and procedures to be used in the study. The next chapter will outline the study results.

CHAPTER 4

RESULTS

The purpose of this study was to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions in transferable general education biology courses offered at community colleges. A regression analysis was conducted to determine if such a relationship exists. Research questions one and two were analyzed using multiple regression procedures, while research question three was analyzed using ordinal regression procedures. This chapter presents descriptive statistics and the results of each analysis.

Descriptive Statistics

All full-time instructors teaching face-to-face biology science courses at the study site were solicited to participate in the study. Of the eight full-time biology faculty members teaching face-to-face courses during the Spring 2016 academic semester, seven faculty members agreed to participate in the study. A total of 274 students were enrolled in face-to-face biology classes at the close of the semester. Of those 212, or 77%, were enrolled in the courses taught by the seven full-time faculty members who volunteered to participate in the study. Adapted versions of the MLQ 5X-short, the MSLQ, and demographic questions were combined into one survey instrument totaling 34 statements. The survey was administered to 178 students, or 83%, of the students who were enrolled in a participating instructor.

Among the 178 participating students, 40% were White, 37% African-American/Black, 8% listed multiple ethnicities, and 7% were Hispanic. A large percentage of the population surveyed, 75%, were women. The ages of the participants ranged from 18 to 59, and well over

half of the participants were under the age of 24. A detailed description of survey student demographic information is presented in Table 1.

Table 1

Demographic Characteristics of Student Participants

		Frequency	Percent
Gender	Female	134	75.3%
	Male	44	24.7%
Race	Black	66	37.1%
	Asian	6	3.4%
	White	71	39.9%
	Hispanic	12	6.7%
	Native American	0	0.0%
	Two or More Ethnicities	14	7.9%
	Prefer Not to Respond	9	5.1%
Reported Age	18-24	99	55.6%
	25-29	33	18.5%
	30-39	25	14.0%
	40-49	9	5.1%
	50-59	5	2.8%
	60-69	0	0.0%
	Prefer Not to Respond	7	3.9%

N = 178

Additional data obtained from the sample included average grade earned at the community college, final expected course grade, if the expected course grade was higher or lower than their average community college grade, and the reason for enrolling in the course. As indicated in Table 2, the majority of the participants (51%) listed an alpha grade of "B" as their average grade earned at the community college. Also, 37% of the respondents listed an alpha grade of "A" as the average grade. A total of 88% of the students stated the average community college grade earned was an "A" or "B." A large plurality of the students, 47%, expected to earn approximately the same grade in the biology course when compared to their typical course grades. Further, 65% of the students listed their reason for enrollment as being required for their degree. A detailed description of survey educational characteristics is presented in Table 2.

Table 2

Educational Characteristics of Student Participants

		Frequency	Percentage
Average Grade Earned at the Community College	F	0	0.0%
	D	6	3.4%
	C	14	7.9%
	B	91	51.1%
	A	67	37.6%
Expected Grade Earned in Transferable Biology Course	Much lower	25	14.0%
	Somewhat Lower	37	20.8%
	About Average	84	47.2%
	Somewhat Higher	23	12.9%
	Much Higher	9	5.1%
Reason For Enrolling in Transferable Biology Course	Required for Degree	116	65.2%
	Core Requirement	41	23.0%
	Elective	4	2.2%
	Interested in Subject	17	9.6%

N = 178

The student survey included the Task Value motivation subscale from the MSLQ. Task Value measures the student's perception of how interesting or valuable the course is to them

(Pintrich, Smith, Garcia, & McKeachie, 1991). A student who has a high task value should be more motivated to be involved in the course material and learning. A student who has a low task value should be less involved in the course material and learning.

The MSLQ, Task Value motivation subscale showed a mean score of 5.92, with a minimum and maximum range of 1 and 7. The standard deviation of the Task Value scale was 1.26. The summary of the descriptive statistics for the Task Value motivation subscale can be found in Table 3.

Table 3

MSLQ Task Value Subscale Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
MSLQ Task Value Score	178	1	7	5.92	1.255	1.576

The student survey included the Transformational subscales from the MLQ 5X-short. The selected transformational dimensions have been linked to positive interactions between leaders and followers (Bass & Avolio, 2004; Bass & Riggio, 2006; Pounder, 2008). A student who is enrolled in a course with a high scoring perceived transformational teacher should be more positively influenced, thus motivated to achieve a higher academic standing and persist in their education.

The MLQ, transformational subscale, portion of the survey showed a mean score of 2.96, which is less than the national average of 3.51, with a minimum and maximum range of 0-4.

The standard deviation of the Transformational subscale was 0.81. Seventy-five percent of the students perceived their instructor's leadership style as less transformation, with a score of less than the national average of 3.51. The summary of descriptive statistics for the Transformational subscale can be found in Table 4.

Table 4

MLQ Transformational Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
MLQ-Level	178	0.00	4.00	2.9562	.80963	.655

Analysis of Research Question 1

RQ1. Does perceived transformational teacher leadership have a statistically significant relationship with student motivation in a transferable general education biological course?

$H1_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student motivation in a transferable general education biological science course.

A multiple regression analysis was conducted to determine if a teacher's perceived transformational leadership (MLQ score) predicts student motivation (MSLQ Task Value score), using age, gender, race, average grade earned at the community college, expected course grade, and the reason for enrollment as control variables. The combination of variables significantly predicts student motivation in a transferable biology classroom, F (7,170) = 4.23, $p < .001$, with MLQ score, age, and expected course grade having the largest statistical contribution. The adjusted R squared value was .11, indicating a low correlation among the variables. This score

indicates that 11% of the variance in student motivation (MSLQ Task Value score) could be explained using this model. The beta weights for this model can be found in Table 5.

Table 5

Coefficients for Variables Predicting Student Motivation

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	5.364	.751		7.138	.000
MLQ Transformational	.698	.210	.242	3.325	.001
Gender	.329	.216	.113	1.524	.129
Race	.016	.053	.022	.306	.760
Average Grade Earned	.119	.126	.070	.942	.347
Expected Grade	.202	.091	.164	2.222	.028
Reason For Enrollment	.116	.097	.086	1.188	.236
Age	.126	.063	.147	2.010	.046

N = 178

In summary, Research Question 1, the multiple regression analysis, verified there was a significant relationship between perceived transformational teacher leadership and student motivation in a transferable general education biological course. Accordingly, the null hypothesis is rejected.

Analysis of Research Question 2

RQ2. Does perceived transformational teacher leadership have a statistically significant relationship with students' academic performance in a transferable general education biological science course?

$H2_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student academic performance in a transferable general education biological science course.

A multiple regression analysis was conducted to determine if a teacher's perceived transformational leadership (MLQ score) predicts student academic performance (final course grade), using age, gender, race, average grade earned at the community college, the expected course grade, and reason for enrollment as control variables. The combination of variables significantly predicts student academic performance in a transferable biology classroom, $F(7,170) = 14.98$, $p < .001$, with average community college grade earned and expected course grade having the largest statistical contribution on final course grade. The adjusted *R* squared value was .36, indicating a moderate correlation among the variables. This score indicates that 36% of the variance in academic performance (final course grade) was explained using this model. The beta weights in Table 6 suggest that students enrolled in a general education transferable biology class with a highly transformational instructor and who expect to earn a higher course grade and have on average earned higher grades at the community college will have a higher academic performance.

Table 6

Coefficients for Variables Predicting Final Course Grade

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	30.480	8.090		3.768	.000
MLQ Transformational	-3.281	2.260	-.090	-1.452	.148
Age	.040	.676	.004	.059	.953
Gender	.997	2.324	.027	.429	.669
Race	.080	.569	.009	.141	.888
Average Grade Earned	7.901	1.359	.366	5.815	.000
Expected Grade	6.361	.978	.409	6.503	.000
Reason For Enrollment	1.093	1.047	.064	1.044	.298

N = 178

In summary, Research Question 2, the multiple regression analysis verified there was a significant relationship between perceived transformational teacher leadership and student academic performance in a transferable general education biological course when using age, gender, race, average grade earned at the community college, expected course grade, and reason for enrollment as control variables. However, the model was only significant due to average grade earned at the community college and expected course grade, but not perceived transformational teacher leadership. Accordingly, the null hypothesis is accepted.

Analysis of Research Questions 3

RQ3. Does perceived transformational teacher leadership have a statistically significant relationship with students' intent to persist in STEM education?

$H3_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student's intent to persist in STEM education.

Cumulative odds ordinal logistic regression was run to determine the effect of perceived transformational leadership on a student's intent to persist in STEM education, using age, gender, race, average grade earned at the community college, the expected course grade, and the reason for enrollment as control variables. The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $x^2(314) = 220.791$, $p = 1.00$, but most cells were sparse with zero frequencies in 65% of cells. However, the final model statistically significantly predicted the dependent variable over and above the intercept-only model, $x^2(18) = 40.745$, $p < 0.002$. The parameter estimates, however, (Table 7) indicated that perceived transformational teacher leadership was not a statistically significant predictor of STEM persistence intentions. Therefore, perceived transformational teacher leadership in a general education transferable biological science classroom at a community college was not associated with STEM persistence intentions.

Table 7

Parameter Estimates for STEM Persistence

			Hypothesis Test			95% Wald Confidence Interval for Exp(B)	
Parameter	B	Std. Error	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
Threshold No Future Enrollment	-5.908	1.6747	12.447	1	.000	.003	.000	.072
Maybe Future Enrollment	-3.882	1.6342	5.643	1	.018	.021	.001	.507
Less Transformational	.861	.4587	3.521	1	.061	2.365	.962	5.811
More Transformational	0	.	.	.	.	1	.	.
Male	.424	.4526	.878	1	.349	1.528	.629	3.711
Female	0	.	.	.	.	1	.	.
African American/Black	-.245	.4161	.346	1	.556	.783	.346	1.769
Asian	-.466	.9535	.239	1	.625	.628	.097	4.067
White	.987	1.0103	.954	1	.329	2.683	.370	19.437
Hispanic	.154	.7736	.040	1	.842	1.167	.256	5.316
Multiple Ethnicities	2.064	1.1840	3.040	1	.081	7.879	.774	80.226
Prefer Not to Respond	0	.	.	.	.	1	.	.
Average Grade of D	1.121	1.2336	.825	1	.364	3.067	.273	34.421
Average Grade of C	-1.469	.6934	4.489	1	.054	.230	.059	.896
Average Grade of B	-.476	.4212	1.279	1	.258	.621	.272	1.418
Average Grade of A	0	.	.	.	.	1	.	.
Expected Grade Much Lower	-1.604	1.3344	1.445	1	.229	.201	.015	2.750
Expected Grade Somewhat Lower	-2.776	1.3017	4.548	1	.053	.062	.005	.799
Expected Grade About Avg.	-2.200	1.2732	2.985	1	.084	.111	.009	1.344
Expected Grade Somewhat Higher	-1.804	1.4034	1.652	1	.199	.165	.011	2.578
Expected Grade Much Higher	0	.	.	.	.	1	.	.
Required for Degree	-1.324	.8632	2.353	1	.125	.266	.049	1.444
Core Requirement	-2.473	.9163	7.281	1	.057	.084	.014	.508
Elective	19.151	21184.2	.000	1	.999	207630291	.000	.
Interested in Subject	0	.	.	.	.	1	.	.
Age	.024	.0204	1.334	1	.248	1.024	.984	1.066

N = 178

In summary, Research Question 3, the ordinal regression analysis, verified there was no significant relationship between perceived transformational teacher leadership and student STEM persistence intentions in a transferable general education biological course when using age, gender, race, average grade earned at the community college, expected course grade, and reason for enrollment as control variables. Accordingly, the null hypothesis is accepted.

Summary

This chapter presented the results of the quantitative study methods used to examine the relationship between perceived transformational teacher leadership, student motivation, student academic performance, and STEM persistence intentions in a transferable general education biological science courses. This section of the paper included the demographic analysis of the survey participants, the multiple regression analysis for both Research Question 1 and 2, as well as the ordinal logistic regression analysis of Research Question3. The next chapter will focus on the implications and recommendations based on these findings.

CHAPTER 5

DISCUSSION

The purpose of this study was to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions, in transferable general education science courses offered at a large urban community college located in a Mid-Atlantic state. The study focused on student motivation, academic performance, and STEM persistence intentions as it correlates to the transformational teacher leadership of their community college science instructor. This chapter will include a summary of the study, conclusions based on the findings, and recommendations for further research.

Summary of Study

A teacher's ability to motivate students is critical to student academic performance and persistence in a higher education setting (Bain, 2004; Bolkan, Goodboy, & Griffin, 2011). Thus, it is important to understand the relationship between a teacher's leadership style and student motivation and academic performance and student persistence (Bolkan, Goodboy, & Griffin, 2011). Teacher leadership, as it relates to education, has been studied principally in primary and secondary schools; however, little research has been focused on postsecondary institutions, specifically community colleges (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey, Stout, & Royal, 2004; Pascarella, Seifert, & Whitt, 2008; Pounder, 2008). Community colleges serve a diverse student population. As such, it is plausible to apply the same leadership theories to community colleges and study a more diverse student body.

Students who seek to earn an associate's degree or wish to transfer to a four-year institution are commonly required to complete eight hours of general science education

regardless of area of study. Not only is science a requirement, but introductory-level general science courses at community colleges are often gatekeeper courses for pursuing a degree in a STEM field. One study found most students "get their only exposure to science in an intro class—and most leave without understanding how science works or with any desire to take further courses" (Stokstad, 2011, p. 1608).

Student persistence in the community college system is lower than in any other type of higher education institution (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Dowd & Coury, 2006; Mamiseishvili, 2010; Martinez, Bilges, Shabazz, Miller, & Morote, 2012; Wassmer, Moore, & Shulock, 2004). The majority of research conducted on community college students has focused on the factors that contribute to the success or failure primarily on student issues that relate to persistence. Very little emphasis has been placed on the relationship between a teacher's transformational leadership style and student motivation, student academic performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harvey et al., 2004; Noland & Richards, 2014; Pounder, 2008). Although there are many strategies that contribute to student performance and persistence (e.g., mentoring programs, student activities, tutorial services, and community learning activities) these strategies are costly to operate and often may not reach at-risk students who are enrolled in community college courses (Campbell & Campbell, 1997; Dougherty & Kienzl, 2006; Dowd & Coury, 2006; Kuk & Banning, 2010; Martinez et al., 2012; Mamiseishvili, 2010; Tinto, 1998). One guaranteed interaction every student will encounter is interacting with an instructor, whether in a face-to-face or online class. Thus, the community college classroom is a vital location to focus on increasing student persistence in the STEM fields.

Research has shown that transformational teacher leadership affects academic performance and student motivation (Baba & Ace, 1989; Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harvey et al., 2004; Noland & Richards, 2014; Pounder, 2008; Yacapsin & Stick, 2007). The studies were conducted by researchers in a variety of classroom environments. These studies examining transformational teacher leadership, student motivation, student performance and persistence has generated promising results but researchers cite a need for additional research in this field (Bain, 2004; Bolkan & Goodboy, 2010; Cheng, 1994; Harvey et al., 2004; Pounder, 2008; Yacapsin & Stick, 2007).

The purpose of this study was to determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions, in transferable general education biological science courses offered at community colleges. A regression analysis was conducted to determine if such a relationship exists. According to Leedy and Ormrod (2013), a quantitative study using regression analysis and descriptive statistics research design is advantageous when trying to determine if relationships exist between two or more variables. In an attempt to find a relationship between perceived transformational teacher leadership, student motivation, academic performance, and STEM persistence intentions in a science classroom, gender, race, age, expected course grade, and average grade earned will be compared through the use of the following instruments: Bass and Avolio's (2004) Multifactor Leadership Questionnaire (MLQ) and Pintrich, Smith, Garcia, and McKeachie's (1991) Motivated Strategies for Learning Questionnaire (MSLQ).

To determine if there is a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions, in

transferable general education biological science courses offered at community colleges, the following research questions have been examined:

1. Does perceived transformational teacher leadership have a statistically significant relationship with student motivation in a transferable general education biological science course?
2. Does perceived transformational teacher leadership style have a statistically significant relationship with students' academic performance in a transferable general education biological science course?
3. Does perceived transformational teacher leadership have a statistically significant relationship with students' intent to persist in STEM education?

The quantitative research study was conducted in two phases. In the initial phase, the researcher administered the survey to students who volunteered to participate in the study. The students who participated were enrolled in a transferable general education biological science course at the study location during the final four weeks of the semester. In the first phase, a survey was administered to collect data on student demographics, student motivation, transformational teacher leadership dimensions, and intent to persist in STEM education. In the second phase, data on the student's final numerical course grade was collected from the instructor.

The site for this study was one campus of a large, multi-campus community college in a major urban area in a Mid-Atlantic state. The National Center for Educational Statistics (2014) lists the college population as 25,927 during Fall 2015, split between four main campuses. The study location offered a total of six face-to-face biological science courses, taught through the Science Department. During the Spring 2016 semester, the Science Department served 166

FTEs enrolling in one or more transferable biology courses. A total of eight full-time biological faculty members were employed and actively teaching at the study site.

The researcher administered the survey in the classrooms of seven participating full-time biological science instructors. The researcher was onsite for one week collecting data during the last four weeks of the course collecting data. Two instruments were used to gather data during the research study. The Bass and Avolio's (2000) Multi-factor Leadership Questionnaire (MLQ) 5X-short and Pintrich, Smith, Garcia and McKeachie's (1991) Motivated Strategies for Learning Questionnaire (MSLQ). Transformational teacher leadership dimensions were measured using an adapted version of MLQ 5X-short. Student motivation was measured using an adapted version of the MSLQ. The MLQ 5X-short, the MSLQ, and demographic questions were combined into one survey instrument totaling 34 statements.

All full-time instructors teaching face-to-face biology science courses at the study site were solicited to participate in the study. Of the eight full-time biology faculty members teaching face-to-face courses during the Spring 2016 academic semester, seven faculty members agreed to participate in the study. A total of 274 students were enrolled in face-to-face biology classes at the close of the semester. Of those 212, or 77%, were enrolled in the courses taught by the seven full-time faculty members who volunteered to participate in the study. The survey was administered to 178 students, or 83%, of the students who were enrolled in a participating instructor.

The study did not find a statistical relationship between perceived transformational teacher leadership and academic success or STEM persistence intentions. The study, however, did find a relationship between perceived transformational teacher leadership and student motivation. This study has provided additional insight as to what factors influence students in a

biological community college classroom. While this study may not be generalizable to all academic subjects or student populations, it does serve to offer researchers additional knowledge in an effort to further support and retain students in higher education settings.

Discussion

Research Question 1. Does perceived transformational teacher leadership have a statistically significant relationship with student motivation in a transferable general education biological course?

$H1_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student motivation in a transferable general education biological science course.

As outlined in Chapter 4, an analysis of the data using multiple regression verified there was a significant relationship between perceived transformational teacher leadership and student motivation in a transferable general education biological course. Accordingly, the null hypothesis was rejected.

The overall model accounted for 11% of the variance in student motivation (MSLQ Task Value score). However, gender, race, and average grade earned at a community college all had a *p* value of greater than .05 and therefore, did not significantly contribute to the model. A student's expected grade earned, age, and a teacher's perceived transformational leadership style was more important to a student's motivation in a transferable general education biological classroom, all earning a *p* value of less than .05.

The findings of this study support previous research that has linked student motivation in higher education institutions to transformational teacher leadership (Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Eccles & Wigfield, 2002; Fryer & Elliot, 2007; Harvey et al., 2004; Pintrich & DeGroot, 1990; Pounder, 2008; Singh, 2011).

Researchers have found student motivation goes beyond pedagogy methods and content knowledge; but can also be attributed to classroom leadership style (Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Harvey et al., 2004; Pounder, 2008). Research has found effective teachers are not only experts in their discipline, but are also experts in the social dynamics of classroom communication (Bolkan & Goodboy, 2009). To simply be a content expert imparting information is not enough to support student performance and promote motivation (Bolkan & Goodboy, 2009).

The findings from the present study further supports the results of other researchers linking teacher's perceived transformational leadership style to greatly influencing a student's motivation in an academic course. Student motivation in a transferable general education biological science course can be enhanced through the classroom leadership of a transformational teacher.

Research Question 2. Does perceived transformational teacher leadership have a statistically significant relationship with students' academic performance in a transferable general education biological science course?

$H2_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student academic performance in a transferable general education biological science course.

An analysis of data using multiple regression was conducted to determine if there was a significant relationship between transformational teacher leadership and student academic success in a transferable general education biological science course when using age, gender, race, average grade earned at the community college, expected course grade, and reason for enrollment as control variables. The combination of variables significantly predicted student

academic performance in a transferable biology classroom, with average community college grade earned and expected course grade having the largest statistical contribution on academic success. However, since the model was only significant due to average grade earned at the community college and expected course grade, but not transformational teacher leadership, the null hypothesis was accepted.

The model accounted for 36% of the variance in academic performance (final course grade). Age, gender, race, reason for enrollment, and a teacher's perceived transformational leadership style (MLQ) all had a *p* value greater than .05 and therefore did not significantly contribute to the model. A student's expected course grade and the average grade earned at the community college were significantly important to the model, both resulting in a *p* score of .000. The student's expected course grade and average grade earned at the community college were the strongest factors influencing student academic performance in a transferable general education biological science course and were the only factors that were significant in the model.

The significance of the two factors, student course grade and the average grade earned at the community college, could logically be linked to the student's motivation which can be supported by the Expectancy-Value Theory. If a student enters the biological science course prepared and expecting to succeed, as well as placing a value on the course, he or she will likely do well (Eccles & Wigfield, 2002; Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011). A student that has previously earned high grades at the community college and believe he or she will do well in the biological science course will be much more likely to place a high value on academic success and therefore be internally motivated (Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011; Spinath, Spinath, Harlaar, & Plomin, 2006). The student's perceived value of doing well in a biological science course likely accounts for the findings.

The expectancy-value theory has two distinct components, a student's expectancy for success and a student's value of education (Eccles & Wigfield, 2002). Student expectancy refers to how well a student perceives he or she will do when completing a task, while student value refers to the need or incentive for completing a task (Eccles & Wigfield, 2002). Expectancy and value components of this theory are often linked to much larger issues such as: gender, psychological, and cultural factors (Eccles & Wigfield, 2002; Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011). Though there are many external factors that interfere with a student's motivation, value and expectancy are positively correlated in that if a student perceives he/she will enjoy a task, then he/she will perform the task well (Eccles & Wigfield, 2002; Fryer & Elliot, 2007; Pintrich & DeGroot, 1990; Singh, 2011).

While the data analysis of Research Question 1 did find there was a relationship between perceived transformational teacher leadership and student motivation, it does not appear to be related to student academic performance. Instead, it appears as though there are external factors affecting student academic performance. This study did not include survey questions investigating external factors which could potentially explain these findings, it is plausible to apply Eccles and Wigfield's (2002) expectancy-value theory to explain the study results.

Though the data for Research Question 2 did not support previous studies in finding that a teacher's perceived transformational leadership style in the classroom as having a significant influence on student academic success (Baba & Ace, 1989; Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Cheng, 1994; Harvey et al., 2004; Pascarella, Seifert, & Whitt, 2008; Pounder, 2008; Roberts & Styron, 2010; Yacapsin & Stick, 2007). Instead, the findings support studies which use the Expectancy-Value Theory to understand a student's academic success (Eccles & Wigfield, 2002; Fryer & Elliot, 2007;

Pintrich & DeGroot, 1990; Singh, 2011; Spinath, Spinath, Harlaar, & Plomin, 2006). Though the null hypothesis was accepted for this question, the results offer additional insight to what factors can directly influence student academic performance.

Research Question 3. Does perceived transformational teacher leadership have a statistically significant relationship with students' intent to persist in STEM education?

$H3_o$. There is no statistically significant relationship between perceived transformational teacher leadership and student persistence in STEM education.

Research Question 3 was analyzed using cumulative odds ordinal logistic regression to determine the effect of perceived transformational leadership on a student's intent to persist in STEM education, using age, gender, race, the average grade earned at the community college, expected course grade, and the reason for enrollment as control variables. The data analysis determined that perceived transformational teacher leadership was not a statistically significant predictor of intent to persist in STEM courses. Therefore, perceived transformational teacher leadership in a general education transferable biological science classroom at a community college was not associated with STEM persistence. Accordingly, the null hypothesis was accepted.

Numerous studies have shown student retention in Science, Technology, Engineering, and Math (STEM) majors positively correlate to faculty connections (Christe, 2013; Hong & Shull, 2010; Micari & Pazos, 2012; Suresh, 2007; Voght, 2008). One study conducted by Voght (2008) noted "faculty have the ability to affect student performance, and thus his or her persistence" (p. 34). There are other studies which suggest the reason for the high dropout rate among STEM majors is due to the lack of sensitivity to students and the diminished value of teacher-student relationship (Christe, 2013; Hong & Shull, 2012). A study conducted by Roberts

and Styron (2010) found faculty approachability as one of the best predictors of student retention.

The survey administered for this study used the transformational teacher leadership dimensions of the MLQ 5X-short. The transformational dimension questions did not specifically include probing questions about teacher approachability or the teacher-student relationship. Based on previous studies conducted on STEM persistence, inclusion of these questions may have added additional insight to understanding STEM retention.

The data for Research Question 3 did not support previous studies which found that a teacher's perceived transformational leadership style in the classroom as having a significant influence on the student's intent to persist in STEM courses (Christe, 2013; Hong & Shull, 2010; Micari & Pazos, 2012; Stokstad, 2011; Suresh, 2007; Voght, 2008). Though the null hypothesis was accepted for this question, the results offer additional insight into the role that teacher leadership has on student persistence in STEM fields.

Limitations

There were several limitations of this study which would limit the generalizability of the findings. The sample size was small and limited to transferable general education biological science courses taught at one community college location in a mid-Atlantic state. The method of purposeful sampling to select participants for this study was not random. The students were nested in classrooms and therefore unable to do a hierarchal analysis. Students who participated in this study may not speak for the entire population of students enrolled in transferable general education biological science courses. However, those students who were surveyed had no knowledge of the study prior to registering for class. The students who completed a survey were self-selected and would have been present in class on the day that the survey was administered.

It is plausible to infer that students who were not in attendance or did not complete a survey fall within a group of students who are less motivated, less academically successful, and less likely to persist in STEM courses. Therefore, students who either opted out of completing the survey or were not present in class on the day that the survey was administered may have had the ability to impact the outcome of this study.

The data collection process for this study took place during the final weeks of the semester. Students who withdrew or were no longer attending class before the administration of the survey were not included in the study. These students would likely offer a different perspective of their teachers' transformational leadership and thus would affect the study results.

Implications for Practice

The purpose of this study was to determine if there is a relationship between perceived teacher transformational leadership and student motivation, academic performance, and STEM persistence intentions for students in transferable general education biological science courses offered at a large urban community college. While there was not a direct relationship between perceived teacher transformational leadership and student success or STEM persistence, there was a clear relationship with student motivation. This relationship could be used to foster student motivation in science classrooms.

Transformational teacher leadership has been found to have a positive correlation with student motivation (Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Harvey et al., 2004; Pounder, 2008). Since the current study corroborated the findings of earlier studies, it would be advantageous for community colleges to offer teachers professional development seminars on how to incorporate transformational behaviors into their classroom. Instructing teachers on how to display enthusiasm for the course material, how to

encourage students to speak up and express their ideas in a safe classroom environment, offer sample ideas on creative projects to help boost students' confidence and skills, and how to communicate with students creating an atmosphere of respect and individuality. Many community colleges offer and require teachers to attend professional development seminars to strengthen their skills and understanding of academic topics. Offering teachers educational opportunities to impart ideas on how to incorporate transformational leadership best practices into their classroom could produce increased student motivation.

Transformational behaviors and curriculum ideas on how to display transformational leadership should be taught to teachers as part of the institution's professional development plan. To be effective, professional development sessions addressing transformational leadership should be carefully planned and implemented with feedback opportunities to ensure the learning needs are being met. Teachers who participate in transformational leadership development opportunities should be asked to apply the newly gained knowledge and skills in their classrooms. Additionally, to track the adoption and implementation of transformational leadership behaviors in the classroom, questions measuring perceived transformational leadership could be added to the end of the semester course survey. The student feedback gained about perceived transformational teacher leadership would serve to help direct additional professional development opportunities.

There are numerous studies which have shown student retention in Science, Technology, Engineering, and Math (STEM) majors positively correlate to faculty relationship (Christe, 2013; Hong & Shull, 2010; Micari & Pazos, 2012; Suresh, 2007; Voght, 2008). Students need to feel their teachers are approachable in order to feel connected (Roberts & Styron, 2010). This sense

of connection and methods to increase student-faculty connections should be explored as part professional development transformational teacher leadership opportunities.

To increase student-teacher interactions institutions should examine methods to foster relationships between students and teachers. Institutions should evaluate the availability of teachers on campus, scheduling practices, number of students in a classroom, and policies addressing teacher involvement at the institution. Particular attention should be given to teacher involvement on campus. The responsibility of institutional committees such as college governance, judicial review boards, and hiring committees should be spread equally among all teachers and staff. A few institutional members should not be caring the load for the entire campus.

Another opportunity to increase student-teacher interaction would be to analyze scheduling practices. Administrators should look at allowing teachers to teach set courses each semester. Allowing teachers the opportunity to teach the same courses each semester would allow teachers to feel more comfortable with the content and less focused on creating new content. The time saved from constantly developing new content could instead be spent focusing on creating student relationships and incorporating transformational leadership behaviors.

The goal for every higher education institution should be to increase student motivation and academic success. Transformational leadership traits displayed by teachers have been proven to increase student motivation (Bain, 2004; Bolkan & Goodboy, 2009, 2010, 2011; Bolkan, Goodboy, & Griffin, 2011; Harvey et al., 2004; Pounder, 2008). Providing professional development opportunities to educate teachers about transformational leadership and how to incorporate transformational behaviors in the classroom would serve to promote student motivation. Increased student motivation will increase student retention, lower attrition, fewer

students on academic probation, and fewer student loan defaults. These outcomes would be beneficial to not only a single institution or community but would serve to retain and produce students to fill the growing need for STEM professionals across the country (U.S. Department of Labor, Employment and Training, 2007)

Recommendations for Future Research

The perceived transformational teacher leadership style has been identified as having a positive impact on student motivation, academic performance, and persistence (Baba & Ace, 1989; Bolkan & Goodboy, 2009; Cheng, 1994; Harvey et al., 2004; Pascarella, Seifert, & Whitt, 2008; Pounder, 2008). The data collected for this study offered additional insight to the influence of transformational teacher leadership on community college students. The results highlight the need for more extensive research.

Recommendation 1. A significant relationship between perceived transformational teacher leadership and student motivation in a transferable general education biological course was found during this study. However, the overall model only accounted for 11% of the variance in student motivation (MSLQ Task Value score). There are clearly other unknown factors that are significantly contributing to student motivation. These unknown factors could be external factors that were not analyzed in this study. External factors such as the number of hours worked each week, the number of young children the student is the primary caregiver for, the support network that is available for the student, and financial stresses. These are just a few unknown factors that could contribute to a student's motivation in a transferable general education biological science classroom and should be further studied.

Recommendation 2. A significant relationship between perceived transformational teacher leadership and student academic success in a transferable general education biological

science course was not found. The model accounted for 36% of the variance in academic performance (final course grade), but perceived transformational leadership was not significant. The study results did indicate that a student's expected course grade and average grade earned at the community college were significant. These two factors could be affected by internal or external factors that were not measured in this study. In order to gain a better understanding of these two factors and what factors influence student academic success, further explanation of Expectancy-Value Theory as a framework for examination of academic performance issues.

Recommendation 3. No relationship was found between perceived transformational leadership on a student's intent to persist in STEM education. None of the factors analyzed were significant in predicting STEM persistence intentions. More research needs to be done to better understand what makes a student continue to enroll in STEM courses. Additional factors need to be analyzed to further understand why a student does or does not enroll in additional STEM courses.

Conclusion

The purpose of this study was to determine if there was a relationship between perceived transformational teacher leadership and student motivation, academic performance, and STEM persistence intentions for students in transferable general education biological science courses offered at community colleges. The study focused on student motivation, academic performance, and STEM persistence intentions as it correlates to the perceived transformational teacher leadership of their community college science instructor. The study did not find a statistical relationship between perceived transformational teacher leadership and academic success or STEM persistence intentions. The study, however, did find a relationship between perceived transformational teacher leadership and student motivation. This study has provided

additional insight as to what factors influence students in a biological community college classroom. While this study may not be generalizable to all academic subjects or student populations, it does serve to offer researchers additional knowledge in an effort to further support and retain students in higher education settings.

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Appendix A

Student Survey

This survey includes questions about your experiences, perceptions, and feelings about this science instructor. Your responses, along with those of your fellow classmates, will provide extremely valuable information for the completion of my dissertation. I hope you will provide an open and honest assessment of your time in this course.

Please be assured that your responses will be treated in a strictly confidential manner. Any findings based on this survey will be reported in a manner that does not identify individuals.

Survey Part 1:

Multifactor Leadership Questionnaire
Rater Form

Directions: The next 20 questions are concerned with how you view your instructor's classroom leadership in this course. Please select the number which best describes your view and experiences in this classroom. Use the following rating scale:

Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
0	1	2	3	4

The Person I Am Rating. . .

1. *Re-examines critical assumptions to question whether they are appropriate..... 1 2 3 4
2. *Talks about his/her most important values and beliefs 1 2 3 4
3. *Seeks differing perspectives when solving problems..... 1 2 3 4
4. *Talks optimistically about the future..... 1 2 3 4
5. *Instills pride in me for being associated with him/her..... 1 2 3 4

Survey Part 2:

Motivated Strategies for Learning Questionnaire

Directions: The next 6 questions are concerned with how ***you feel*** about this course. Please select the number toward either word which best describes your feelings.

1. I think I will be able to use what I learn in this course in other courses.

1 2 3 4 5 6 7

Not True *Very True*

2. It is important for me to learn the course material in this class.

1 2 3 4 5 6 7

Not True *Very True*

3. I am very interested in the content area of this course.

1 2 3 4 5 6 7

Not True *Very True*

4. I think the course material in this class is useful for me to learn.

1 2 3 4 5 6 7

Not True *Very True*

5. I like the subject matter of this course.

1 2 3 4 5 6 7

Not True *Very True*

6. Understanding the subject matter of this course is very important to me.

1 2 3 4 5 6 7

Not True *Very True*

Survey Part 3:

Directions: Please fill out this entire questionnaire for this specific course and instructor. Please mark your responses by selecting the corresponding answer.

---

1. Student Name: _____

2. What gender do you identify with?

□ Female □ Male □ Other

3. Your age: _____

4. What race do you identify with?

□ African/ African American/ Black □ Asian/ Pacific Islander
□ European/ White □ Hispanic/ Latino □ Native American
□ Multiple Ethnicities
□ I prefer not to respond

5. What is the average grade you earn in most of your classes?

□ A □ B □ C □ D □ F

6. The grade I expect to earn in this course is lower, higher, or about the same as the grades I typically earn in my other community college classes? (Only select ONE answer)

1	2	3	4	5
Much Lower		*About the Same*		*Much Higher*

7. Why did you enroll in this course? (Only select ONE answer)

□ It was required for my degree □ It fulfills one of my required lab sciences □ I needed another elective course □ I was interested in the subject

8. If taking a science course were not required: (Only select ONE answer)

□ I would take science courses in the future.
□ It is unlikely that I will take more science courses in the future.
□ I do not intend to take more science courses in the future.

Appendix B

www.mindgarden.com

To whom it may concern,

This letter is to grant permission for the above named person to use the following copyright material for his/her research:

Instrument: ***Multifactor Leadership Questionnaire***

Authors: ***Bruce Avolio and Bernard Bass***

Copyright: ***1995 by Bruce Avolio and Bernard Bass***

Five sample items from this instrument may be reproduced for inclusion in a proposal, thesis, or dissertation.

The entire instrument may not be included or reproduced at any time in any published material.

Sincerely,

Robert Most
Mind Garden, Inc.
www.mindgarden.com

Appendix C

Request for Permission to Conduct Study

Date January 11, 2016

Dr. XXXX
Dean of Languages, Mathematics, and Sciences
Address

RE: Permission to Conduct Research Study

Dear Dr. X:

I am writing to request permission to conduct a research study at your institution. I am currently enrolled in the Community College Leadership Program at Old Dominion University in Norfolk, Virginia and am in the process of writing my dissertation. The study is entitled The Relationship of Perceived Transformational Teacher Leadership and Student Motivation, Academic Performance, and STEM Persistence Intentions for Students at a Community College.

I hope that the school administration will allow me to recruit transfer science instructors to participate in the study. All students currently enrolled in science courses taught by instructors who have volunteered to partake in the study, will be invited to participate. Due to the nature of the study, I hope to recruit a minimum of five instructors and 116 of their current students. The students will complete a four-page questionnaire (attached). Also, at the conclusion of the semester, in order to protect the privacy of those who completed a survey, instructors will be asked to submit the final numerical grade for all students enrolled in a participating course. Grades of those who did not complete a survey will be deleted immediately. Students enrolled in a participating instructor's course, who volunteer to participate, will be given a consent form to be signed (attached) and returned to the primary researcher at the beginning of the survey process. Instructors who volunteer to participate will also be given consent forms to be signed and returned to the primary researcher (attached).

If approval is granted, student participants will complete the survey in the transfer science classroom. The survey process should take no longer than 15 minutes. The survey results will be pooled for the study and individual results of this study will remain absolutely confidential. Should this study be published, only pooled results will be documented. No costs will be incurred by either your school or the individual participants.

Your approval to conduct this study will be greatly appreciated. If you would like, I would be happy to schedule a telephone call to answer any questions or concerns that you may have about the study. You may contact me at my email address:swate008@odu.edu.

If you agree, kindly submit a signed letter of permission on your institution's letterhead acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,

Stacy L. Waters-Bailey
Doctoral Candidate-Old Dominion University

Attachments

Appendix D

INSTRUCTOR INFORMED CONSENT DOCUMENT
OLD DOMINION UNIVERSITY

PROJECT TITLE: THE RELATIONSHIP OF PERCEIVED TRANSFORMATIONAL TEACHER LEADERSHIP AND STUDENT MOTIVATION, ACADEMIC PERFORMANCE, AND STEM PERSISTENCE INTENTIONS FOR STUDENTS AT A COMMUNITY COLLEGE

INTRODUCTION

The purposes of this form is to give you information that may affect your decision whether to say YES or NO to participating in this research, and to record the consent of those who say YES. This project will be conducted via classroom survey.

RESEARCHER

Stacy Waters-Bailey, Doctoral Candidate in the Community College Leadership Program at Old Dominion University.

DESCRIPTION OF RESEARCH STUDY

The purpose of this quantitative study will be to determine if there is a relationship between transformational teacher leadership and student motivation, student academic performance, and STEM persistence in a transferable general education science courses offered at community colleges.

You understand that Stacy Waters-Bailey will retain the data collected. You agree that the survey responses and course final grade may be used in Stacy Waters-Bailey's written report for her dissertation and may be used in future papers that she might submit for publication. You will not be personally identified in any publication, presentation, or report.

If you decide to participate, you will agree to allow Stacy Waters-Bailey into your classroom to administer a survey to your students and submit the final numerical course grade for all students enrolled in a participating course. The survey will take not more than 20 minutes. The final numerical grade will be submitted directly to Stacy Waters-Bailey within six weeks of the last day of the semester. Participation in this study will be at no cost to you and you will not be compensated.

RISKS AND BENEFITS

While participating in this study, you will encounter minimal risks. The questionnaire poses minimal risk, as questions refer only to your experiences, motivation, and demographic information. Your final course grade will be released to the researcher. All data collected will be kept in a locked file cabinet or on a flash drive that will be kept in a secure location.

BENEFITS

The potential benefits to you for taking part in this study include reflecting on your experiences in the science course. More generally, your participation will also contribute to the world's understanding of these processes.

COSTS AND PAYMENTS

The researcher wants your decision about participating in this study to be absolutely voluntary. The researcher is unable to give you any payment for participating in this study.

CONFIDENTIALITY

The researcher will take reasonable measures to keep your information private. The researcher will remove identifiers from the information. The results of this study may be used in reports, presentations, and publications; but the researcher will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

WITHDRAWAL PRIVILEGE

It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study -- at any time.

COMPENSATION FOR ILLNESS AND INJURY

If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm, arising from this study, neither Old Dominion University nor the researcher is able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Dr. Mitchell Williams at mrwillia@odu.edu or phone 757-683-4344 or Petros Katsioloudis, the current IRB chair at (757) 683-5323 or pkatsiol@odu.edu at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

VOLUNTARY CONSENT

By signing this form, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them:

Stacy Waters-Bailey, Doctoral Candidate in the Community College Leadership Program at Old Dominion University, contact (757) 513-0741

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Petros Katsioloudis, the current IRB chair at (757) 683-5323 or pkatsiol@odu.edu, or the Old Dominion University Office of Research, at 757-683-3460.

And importantly, by signing below, you are telling the researcher YES, that you agree to participate in this study. The researcher should give you a copy of this form for your records.

Subject's Printed Name & Signature	**Date**

INVESTIGATOR'S STATEMENT

I certify that I have explained to this subject the nature and purpose of this research, including benefits, risks, costs, and any experimental procedures. I have described the rights and protections afforded to human subjects and have done nothing to pressure, coerce, or falsely entice this subject into participating. I am aware of my obligations under state and federal laws, and promise compliance. I have answered the subject's questions and have encouraged him/her to ask additional questions at any time during the course of this study. I have witnessed the above signature(s) on this consent form.

Investigator's Printed Name & Signature	**Date**

Appendix E

STUDENT INFORMED CONSENT DOCUMENT
OLD DOMINION UNIVERSITY

PROJECT TITLE: THE RELATIONSHIP OF PERCEIVED TRANSFORMATIONAL TEACHER LEADERSHIP AND STUDENT MOTIVATION, ACADEMIC PERFORMANCE, AND STEM PERSISTENCE INTENTIONS FOR STUDENTS AT A COMMUNITY COLLEGE

INTRODUCTION

The purposes of this form is to give you information that may affect your decision whether to say YES or NO to participating in this research, and to record the consent of those who say YES. This project will be conducted via classroom survey.

RESEARCHER

Stacy Waters-Bailey, Doctoral Candidate in the Community College Leadership Program at Old Dominion University.

DESCRIPTION OF RESEARCH STUDY

The purpose of this quantitative study will be to determine if there is a relationship between transformational teacher leadership and student motivation, student academic performance, and STEM persistence in a transferable general education science courses offered at community colleges.

RISKS AND BENEFITS

While participating in this study, you will encounter minimal risks. The questionnaire poses minimal risk, as questions refer only to your experiences, motivation, and demographic information. Your final course grade will be released to the researcher. All data collected will be kept in a locked file cabinet or on a flash drive that will be kept in a secure location.

BENEFITS

The potential benefits to you for taking part in this study include reflecting on your experiences in the science course. More generally, your participation will also contribute to the world's understanding of these processes.

COSTS AND PAYMENTS

The researcher wants your decision about participating in this study to be absolutely voluntary. The researcher is unable to give you any payment for participating in this study.

CONFIDENTIALITY

The researcher will take reasonable measures to keep your information private. The researcher will remove identifiers from the information. The results of this study may be used in reports, presentations, and publications; but the researcher will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

WITHDRAWAL PRIVILEGE

It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study -- at any time.

COMPENSATION FOR ILLNESS AND INJURY

If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm, arising from this study, neither Old Dominion University nor the researcher is able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Dr. Mitchell Williams at mrwillia@odu.edu or phone 757-683-4344 or Petros Katsioloudis, the current IRB

chair at (757) 683-5323 or pkatsiol@odu.edu at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

VOLUNTARY CONSENT

By signing this form, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them:

Stacy Waters-Bailey, Doctoral Candidate in the Community College Leadership Program at Old Dominion University, contact (757) 513-0741

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Petros Katsioloudis, the current IRB chair at (757) 683-5323 or pkatsiol@odu.edu, or the Old Dominion University Office of Research, at 757-683-3460.

And importantly, by signing below, you are telling the researcher YES, that you agree to participate in this study. The researcher should give you a copy of this form for your records.

Subject's Printed Name & Signature	**Date**

INVESTIGATOR'S STATEMENT

I certify that I have explained to this subject the nature and purpose of this research, including benefits, risks, costs, and any experimental procedures. I have described the rights and protections afforded to human subjects and have done nothing to pressure, coerce, or falsely entice this subject into participating. I am aware of my obligations under state and federal laws, and promise compliance. I have answered the subject's questions and have encouraged him/her to ask additional questions at any time during the course of this study. I have witnessed the above signature(s) on this consent form.

Investigator's Printed Name & Signature	**Date**

Appendix F

Classroom Script

Hello, my name is Stacy Waters-Bailey. I am a doctoral student in the Community College Leadership Program at ODU and I am currently writing my dissertation. I am conducting a research study to better understand how a teacher's leadership style can effect student motivation and academic performance in a transfer science classroom.

In order to collect data to use in my research study, your instructor has agreed to allow me to administer a survey your classroom. The survey has questions concerning how you feel about your instructor's classroom leadership and how you feel about the course. I am asking you to complete a brief survey that will take no more than 20 minutes of your time. Your participation is entirely voluntary; you may skip any questions that you don't want to answer. If you agree to participate in this study and complete the survey you are also authorizing your instructor to provide me with your final course grade at the end of the semester.

Any personally identifiable information collected during the survey will be kept strictly confidential and in locked files in my office. I will only use data in my research, individual results will never be shared. Your instructor will never see any individual responses and will never see the completed surveys. Your participation in this study will not have any effect on your final grade.

Do you have any questions about the research study?

I will be passing out two items. One item is the Student Consent Form and the second item is the survey. Please complete both items to participate in the study. Once you have completed the survey and signed the consent form please place the items in the envelope at the front of the room. I will then provide you with a copy of the consent form which has my contact information should you have questions later.

Are you ready to begin?

Appendix G

OLD DOMINION UNIVERSITY

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

aadlac INTERNATIONAL
PROUDLY, AN AAALAC ACCREDITED PROGRAM

Physical Address
4111 Monarch Way, Suite 203
Norfolk, Virginia 23508
Mailing Address
Office of Research
1 Old Dominion University
Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE:	November 13, 2015
TO:	Mitchell Williams, PhD
FROM:	Old Dominion University Education Human Subjects Review Committee
PROJECT TITLE:	[815599-1] The Relationship of Transformational Teacher Leadership and Student Motivation, Academic Performance, and STEM Persistence in a General Education Transfer Science Classroom
REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	November 13, 2015
REVIEW CATEGORY:	Exemption category # *[6.1]*

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Petros Katsioloudis at (757) 683-5323 or pkatsiol@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

VITA

Stacy Waters-Bailey
1942 Harrison Drive, Tuscaloosa, Alabama 35405
slw2808@gmail.com
(757) 513-0741

Education

- **Ph.D. Community College Leadership,** Old Dominion University, Norfolk, VA; 2016
- **Master of Public Administration**, The University of North Carolina at Wilmington, Wilmington, NC; 2003
- **Graduate Certificate in Environmental Studies**, The University of North Carolina at Wilmington, Wilmington, NC; 2003
- **B.A., Environmental Studies**, The University of North Carolina at Wilmington, Wilmington, NC; 2001
- **Minor, Geology**, The University of North Carolina at Wilmington, Wilmington, NC; 2001

Academic Experience

- 2014- Present, Technology Coordinator/ Academic Advisor II/ Instructor, The University of Alabama- Tuscaloosa, Alabama
- 2009-2014, Instructor, Tidewater Community College- Norfolk, Virginia
- 2003, Adjunct Instructor, University of North Carolina Wilmington- Wilmington, North Carolina

Teaching Experience

- Climate Change (EXD 355-112) 2016-Present
- Water Quality (EXD 355-109, UA) 2014-Present
- Soil Quality (EXD 355-110, UA) 2014-Present
- Aliens In Your Backyard (EXD 355-111, UA) 2014-Present
- Foundations of Adult Learning (EXD 101, UA) 2014-Present
- General Environmental Science (ENV 122, TCC) 2011-Present
- General Environmental Science (ENV 121, TCC) 2011-Present
- General Environmental Science Lab (ENV 121, TCC) 2011-2014
- Earth Science (GOL 110, TCC) 2009-Present

- Earth Science Lab (GOL 110, TCC) 2009-2014
- Senior Seminar in Environmental Science (EVS 495, UNCW) 2003

Courses Developed

- Climate Change (EXD 355-112, UA) 2016
- Water Quality (EXD 355-109, UA) 2014
- Soil Quality (EXD 355-110, UA) 2014
- Aliens In Your Backyard (Invasive Species) (EXD 355-111, UA) 2014
- General Environmental Sciences I (ENV 121, TCC) 2012
- General Environmental Sciences I Lab (ENV 121, TCC) 2012
- General Environmental Sciences II (ENV 122, TCC)
- General Environmental Sciences II Lab (ENV 122, TCC)
- Environmental Law (ENV 227, TCC)

Efforts to Improve Teaching

- Completion of The University of Alabama online teaching certification (2015)
- Faculty Advisor Training- Tidewater Community College (2013)
- Development of course content materials (lecture and laboratory) for General Environmental Science (ENV 121)
- Development of hypermedia presentations for Earth Science (GOL 110) and General Environmental Science (ENV 121)
- Coordinate development and implementation of field trips for Earth Science (GOL 110) and General Environmental Science (ENV 121) to Nauticus Museum, Norfolk, Virginia
- Completion of Quality Matters- Peer Reviewer Course for online classes (2012)
- Completion of Quality Matters- Applying the QM Rubric (APPQMR) (2012)
- Completion of the Teaching Online Program (TOP) at Tidewater Community College (2011)

Service to the College and Community

- Member, Community College Relations Coordinator Search Committee, 2016
- Committee member on The University of Alabama System Board for the Student Resiliency Initiative, 2015-2016
- Committee member on The University of Alabama System Board for the Student Resiliency Initiative Planning sub-committee, 2015

- Faculty Advisor for Student Organization- S.A.G.E (Students Advocating for a Greener Environment) (2013-2014)
- Norfolk Campus Judicial Committee Board Member, 2013
- Open Door Project Mentor, 2013
- Member, Annual Faculty Awards Committee, 2013
- Participant, College-wide Planning Session- Norfolk, 2013
- Member, Biology Search Committee, 2013
- Member, History Search Committee, 2012-2013
- Member, First Year Success Coordinator Search Committee, 2012-2013
- Member, The Western Tidewater Community Services Board, 2007-2008
- Coordinator, Western Tidewater HOME Consortium, 2007-2008
- Member, Habitat for Humanity Huntersville Project, Suffolk, VA, 2007-2008

Technical Reports

- U.S. Army Corps of Engineers- Wilmington District Emergency Operations Handbook. Report prepared for the U.S.A.C.E Wilmington District Field Office. Authors: Waters-Bailey, S., Adopted August 2002.
- National Pollution Discharge Elimination System Phase II Comprehensive Stormwater Management Program. Report prepared for the Town of Wrightsville Beach, North Carolina. Authors: Davis, T., Bungaard, J., Kellon, E., Vallery, L., Swartz, N., Isom, C., Waters-Bailey, S., Adopted May 1, 2007.
- Airlie Gardens Wetlands Cost Benefit Analysis. Report Prepared for Airlie Gardens Board Members. Authors: Waters-Bailey, S.
- Barr,J., Bullard-Clark, C., Emge, W., Evans, R., Howard, R., Hughes, T., Knight, C., Malogianni, C., McCauley, D., McGraw, M., Piazza, C., Preble, B., Rabel, K., Ross, M., Tucker, A., Waters-Bailey, S., & Pribesh, S. (February 2015). A Qualitative Examination of CACREP Program Mission Statements. Norfolk, VA. Old Dominion University.

Honors

- Old Dominion Darden College of Education Community College Leadership Fellowship, 2014
- Curricular Development Award- Tidewater Community College, 2013
- Army Corps of Engineers- Wilmington District, Coin of Excellence, 2003
- Graduate Student Award for Leadership Lecture Series, Robert F. Kennedy, Jr., 2003

- Chancellor's Achievement Award, UNCW, 2000

Certification(s)

- Prior Learning Assessment Certificate, Council for Adult and Experiential Learning (CAEL), 2016
- Certified to teach online classes at The University of Alabama, 2015
- Certified to teach online classes in the Virginia Community College System, 2011
- Certified Floodplain Manager (CFM), Association of State Floodplain Managers, 2007-2009 (Expired)

Grants Obtained

- $552,390 (2008). Waters-Bailey, S., City of Suffolk, Virginia. U.S. Department of Housing and Urban Development, Community Development Block Grant (CDBG). The CDBG funds were used to develop sustainable communities by providing housing, a suitable living environment, and opportunities to expand economic opportunities, principally for low- and moderate-income citizens. U.S. Department of Housing and Urban Development (HUD).

- $491,583 (2008). Waters-Bailey, S., City of Suffolk, Virginia. U.S. Department of Housing and Urban Development, Home Investment Partnerships Program (HOME). The HOME funds were used as grants, direct loans, loan guarantees, rental assistance or security deposits for low- and moderate-income citizens. U.S. Department of Housing and Urban Development (HUD).

- $1,230,587 (2007). Waters-Bailey, S., and Walker, H., City of Chesapeake, Virginia. The Repetitive Flood Claims grant program (RFC). The RFC grant funds were used to purchase three repetitive flood loss properties, demolish the structures and return the land to open space. Federal Emergency Management Agency.