IMPROVING FRESHMAN AFRICAN AMERICAN FEMALE STUDENTS

AWARENESS OF NON-TRADITIONAL CAREER OPPORTUNITIES:

AN APPLIED RESEARCH STUDY

by

Mary Jane Harris

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University, Lynchburg, VA

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APPROVED BY:

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ABSTRACT

The purpose of this applied study was to solve the problem of freshman African American female students being unaware of careers in science, technology, engineering, and mathematics, at universities located in the United States’ southern region and to formulate a solution for career advisors to implement. Historically, African American female students have identified with traditional female career fields in nursing, caretaking, and teaching and have infrequently pursued non-traditional careers. For African American female students, educational accomplishments yield access to professional advancement possibilities, higher wages, extensive job opportunities, and job satisfaction, especially when they are aware of underrepresented careers. Krumboltz (1976) and Pask’s (1975) career selection theories were explored to identify barriers that would interfere with career advisors exploring non-traditional careers with this student population. This study adopted a multimethod approach of gathering data that incorporated qualitative and quantitative methodologies by utilizing semistructured interviews, a review of university documents, and a survey that utilized a 5-point Likert scale. The overwhelming theme that resonated throughout the study was the importance of improving communication and trust between career advisors and freshman African American female students. As the enrollment of African American females continues to increase, cultural sensitivity and awareness training emerged as pivotal for universities to embrace. Students are also encouraged to meet with a career advisor their freshman year to explore career opportunities they may not have considered and to become familiar with other available services.

Keywords: non-traditional career, cultural identity, career advisors, career advising resources, race, gender, social learning theory of career selection, conversation theory
Dedication

In memory of my parents, Matthew and Margaret Harris, for supporting my
“independent spirit.”

Also, in memory of Michael D. Rind, Esq who was instrumental in me becoming
who I am, professionally. “Consider it Done”
Acknowledgments

To God be the Glory!

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I send peace, blessings, and much love to my cousin, Cheryl Kindred, and my Soul Sisters, Darmay Tolliver, Terie Shelton, Michelle Hudnall, Dr. Denise Graves, and Gloria Fogle for their prayers, words of encouragement, laughter, and support through a long journey that came to fruition.

Jeremiah 29:11 (NIV)
“For I know the plans I have for you, plans to prosper you . . . plans to give you hope and a future.”
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List of Abbreviations

Center for Disease Control (CDC)
Conversation Theory (CT)
Coronavirus-19 (COVID-19)
Institutional Review Board (IRB)
National Center for Educational Statistics (NCES)
National Science Foundation (NSF)
Science, Technology, Engineering, and Mathematics (STEM)
Social Learning Theory of Career Selection (SLTCS)
U. S. Department of Education (USDE)
CHAPTER ONE: INTRODUCTION

Overview

The purpose of this applied study was to solve the problem of freshman African American female students being unaware of science, technology, engineering, and mathematics (STEM) careers at several universities located in the United States’ southern region and to identify a resolution for career advisors to implement. The problem is that freshman African American female students are among a classification of students unaware of STEM careers (Schmid, Manturuk, Simpkins, Goldwasser, & Whitfield, 2015). Establishing a career trajectory can be one of the most critical and challenging decisions for a freshman African American female student. Determining a career trajectory can impact her self-efficacy and sense of belonging (Hodges & Isaac-Savage, 2016).

Chapter One discusses the study's objective by examining career advisors’ commitment to informing freshman African American female students of traditional and non-traditional STEM careers. Achieving this involves exploring the background, problem and purpose statements, the study’s significance, and developing research questions. Additionally, the terms pertinent to this study are defined. Chapter One will culminate with a summary that discusses why freshman African American female students are unaware of non-traditional STEM careers.

Background

A diverse educational environment was not prevalent 25 years ago (Childs, 2017), thus contributing to the limited research studies that examine why some African American female students are unaware of non-traditional STEM careers. Studies conducted frequently explored the challenges universities encounter with increased multicultural student enrollment (Hansen-Thomas & Chennapragada, 2018). These studies revealed the significance of conducting multicultural awareness training (Hall & Theriot, 2016) for faculty and staff. Other studies
explore reasons students do not utilize career advising services (Fadulu, 2018) or the importance of advisors' knowledge of barriers that impinge on their ability to explore non-traditional STEM careers with freshman African American female students (Lee, 2012).

Historically, the number of African American females employed in STEM careers has increased 28% over the past two decades, despite accounting for over half of the educated population (National Science Foundation [NSF], 2015). Career advisors that present the skills and aptitude to work with a diverse population of students have a unique opportunity to expand their awareness of STEM careers. As career advisors familiarize themselves with the African American female students’ cultural history and influences, they become prepared to explore non-traditional career opportunities.

**Historical Context – An Early Account of Educating the African American Female Student**

Addressing the increasingly diverse student population changes occurring at universities begins with reviewing the African American female student’s educational journey. In 1957 Jeanne Noble wrote in the Journal of Negro Education:

A backward look at the education of women and Negroes is like viewing two streams winding down a mountain path. At some points they seem to merge, and at other times they are miles apart. And yet, they are headed in the same direction-toward the great body of water. (p. 16)

African American females' passion for education is chronicled back to the 17th century when slavery was prevalent in the United States (History, 2009). Slave women would teach themselves how to read and write and then hold secret classes to teach other slaves (Thomas & Jackson, 2007). African American slaves were not permitted to pursue formal education for fear they would become discontent with their jobs working as field or household slave laborers (History, 2009). The obstacles these women encountered did not prevent their desire to obtain
an education; instead, it encouraged them to identify resources, such as the Bible, to serve as an educational instrument. Nearing the end of the Civil War, the opportunity to become educated came to fruition resulting in many African American females receiving a formal education. They encountered numerous challenges that involved hate crimes, segregated schools, a lack of funding, and numerous other hardships (Thomas & Jackson, 2007). These unfortunate interferences were addressed in the Brown v. Board of Education (U. S. Courts, 1954) case, which declared segregation unconstitutional. Additionally, this case proclaimed that depriving African American children of equal educational opportunities unlawful (U. S. Courts, 1954, 1955).

Two African American female trailblazers who contributed tremendously to the educational advancements of African American females are Mary Jane McLeod Bethune (1875-1955) and Nannie Helen Burroughs (1879-1961). They are two of several women who founded schools for African American females. Despite their being absent from many educational and historical literature, they acknowledged that a formal education was critical for the advancement of freed people and that women must take the initiative to become educated. They concluded that an education would enrich them with “the refinement and culture essential for entry into the highest stratum of African American society” (Perkins, 1997).

Mary Jane McLeod Bethune (1875-1955) was an educational pioneer, born free to former slaves. Ms. Bethune assisted her parents in managing the land they owned. She realized the significance of achieving a formal education (Michaels, 2015) and the opportunities she would be exposed to that; otherwise, she would not have experienced. Unaware of the impact she would have on other African American females' career advancement, Ms. Bethune dedicated her life to the educational enrichment for these women, whom she perceived had limited access to explore educational opportunities. In October 1904, Ms. Bethune opened the Daytona Beach
Literary and Industrial School for Training Negro Girls (Blattman, 2013). She was committed to providing African American females with knowledge and skills to prepare her for career opportunities in professions considered traditional female careers. These careers included domestic science, known as home economics, business, and liberal arts (Blattman, 2013). African American female students benefiting from this opportunity was apparent by their enrollment in higher education institutions (Storlie, Hilton, Duenyas, Archer, & Glavin, 2018).

In 1923, the Daytona Beach Literary and Industrial School for Training Negro Girls merged with the Cookman Institute of Jacksonville, Florida, an all-male school, to become Bethune-Cookman University. Bethune-Cookman was the first historically Black college founded by a Black woman (Blattman, 2013).

In 1909, Nannie Helen Burroughs (1879-1961), born of enslaved parents, received an endorsement from the National Baptist Convention and the Women's Convention to establish the National Training School for Women and Girls, located in Washington, DC. The school's mission was to train women and girls in a curriculum of academic and vocational studies. The name of the school was changed to the Nannie Hellen Burroughs School for elementary students. It operates in Washington, DC, as a private, coeducational institution (National Park Service, 2020).

**Historical Context – Educating the African American Female Student in the 21 Century**

The journey of educating the African American female student has been a tempestuous experience. It has involved navigating race and gender discrimination, exasperated by a lack of support to maneuver through these barriers (Fickling, 2016). The purpose of educating African American females in the late 1950s was to prepare her to be beneficial to society, marriage, and a family. Career advancement was not a priority (Noble, 1957).
At the turn of the 20th century, these women increasingly began focusing on pursuing professional careers. College enrollment for these women increased significantly; however, they continued to pursue traditional careers as social workers, teachers, nurses, and administrative support personnel (U. S. Department of Education [USDE], 2019). Careers in science, technology, engineering, and mathematics were pursued by African American female students two percent of the time (NSF, 2015). The necessity to address careers underrepresented by freshman African American female students was apparent, creating an opportunity for career advisors to collaborate with the university to identify programs to inform them of non-traditional STEM careers. Lee (2012) conceived that a culturally competent career advising process is predicated on the advisor’s commitment to communicating with a diverse student population. Communication competency constitutes acknowledging, accepting, and respecting the unique cultural contributions of these students.

**Social Context**

Social and cultural events can influence a student’s awareness of STEM careers. These influences also impact their worldview of career opportunities (Ozyasar, 2017). Schmid et al. (2015) presume that African American female students unaware of non-traditional careers can be attributed to them living in areas where obtaining knowledge of these careers was not always feasible. Their awareness of these careers is further complicated by their family’s social-economic status and stereotypes they encounter with individuals from different cultures, races, or genders (Cobham & Patton, 2015). Additionally, these students frequently rely on career advice from family and community members (Fadulu, 2018).

Simultaneously, as freshman African American female students become familiar with non-traditional STEM careers, they also become aware of careers they may not have considered. By implementing a career selection theory, career advisors can explore these career opportunities
with students. Utilizing these theories can inspire career advisors to take the initiative to become familiar with a culturally diverse student's educational aspirations and challenges.

**Theoretical Framework**

The theoretical framework of this study begins by examining the interconnectedness between two career selection theories; Krumboltz's (1976) social learning theory of career selection (SLTCS) and Pask's (1975) conversation theory (CT). Both theories substantiate why freshman African American female students are unaware of STEM careers. Each theory simultaneously emphasizes the significance of practical communication skills. Both theorists illustrate how integrating their philosophies will give insight into barriers that interfere with African American female students' awareness of STEM careers.

**Krumboltz’s (1976) Social Learning Theory of Career Selection**

Krumboltz's (1976) social learning theory of career selection assesses four fundamentals that, when combined, have the impetus to influence a student’s career decisions. These factors include: exploring environmental conditions, social learning experiences, cognitive and emotional responses, and genetic factors. Krumboltz's (1976) theory presumes that when people are passionate about their careers, they have achieved a professional accomplishment.

The National Center for Education Statistics (NCES, 2019) predicted that there would be an increase in the cultural demographics by the year 2040. This demographical change provides universities with an opportunity to evaluate their career advisors’ cultural competency, primarily where it impacts African American females' educational interest. Career advisors familiar with Krumboltz's (1976) SLTCS would examine these students' career interests to align them with non-traditional career opportunities. His theory establishes how each social learning factor influences a student’s career decisions.
Pask’s (1975) Conversation Theory

Integrating the information acquired from Krumboltz’s (1976) social learning theory of career selections with Pask’s (1975) conversation theory, career advisors obtain an awareness of why African American female students are unaware of STEM careers. Pask’s conversation theory acknowledges that environmental factors will influence a student’s career decision. When career advisors become intuitive to students’ cultural and family expectations and how social learning experiences impact their career perspectives, they have acquired skills to explore non-traditional careers (Mayes & Hines, 2014). Pask’s (1975) conversation theory introduces a design that encourages career advisors to discover and appreciate diverse heritages by engaging in a series of interactions with these students. By encouraging open discussion, career advisors construct a narrative of the student’s career interest, cultural expectations, family involvement, and other influences that impact her career objective. Additionally, it will motivate the students to embark on a self-discovery journey by identifying challenging and rewarding interests and will inspire them to pursue careers they had not previously considered (Krumboltz, 1976).

The conversation theory utilizes storytelling that is particularly beneficial for African American female students. The storytelling approach is presumed to be less intimidating. It creates an environment where students are more inclined to convey their career objectives with an advisor (Storlie et al., 2018). Storytelling implements a “teachback” method (Scott, 2001), where the career advisor is expected to “teachback” to the student what they perceive are their career aspirations. Storytelling requires astute listening skills that can be challenging for career advisors who are not accustomed to using this approach to establish a student’s career interest. Before exploring non-traditional careers with students from other cultures, races, and genders, career advisors must be aware of their cultural values and beliefs (Lee, 2012). Utilizing Pask’s conversation theory provides this opportunity for cultural awareness.
Problem Statement

The problem is that freshman African American female students are among a classification of students unaware of STEM careers (Schmid et al., 2015). The U. S. Department of Education (USDE, 2019) identified these students were awarded more bachelor's degrees than Black males (58% vs. 42%); however, they are still underrepresented in non-traditional career fields (36% vs. 64%). Twenty-five years ago, cultural diversity was not prominent among higher educational institutions (Childs, 2017). In 2019, Banks predicted that by the year 2020, these institutions would be confronted with identifying and addressing a diverse student’s populations educational needs. Numerous studies have explored the challenges universities encounter when multicultural student enrollment increases (Hansen-Thomas & Chennapragada, 2018). Other studies explored the significance of multicultural awareness training for university faculty and staff (Hall & Theriot, 2016) or why freshman African American female students do not utilize their university’s career resources (Fadulu, 2018). However, these studies neglect to address why these students are unaware of STEM careers. By applying a multimethod research design, this established an opportunity to amass data from several sources (Bickman & Rog, 2009) to propose why they are unaware of non-traditional STEM careers. This research design encourages participants to express their perceptions and lived experiences regarding their awareness of non-traditional STEM careers through interviews and survey participation.

Purpose Statement

The purpose of this applied study is to solve the problem of freshman African American female students being unaware of STEM careers at universities predominately located in the United States’ southern region and to identify a resolution for career advisors to consider. A multimethod research design consisting of both qualitative and quantitative methods was utilized. The qualitative method consisted of semistructured interviews with freshman African
American female students and career advisors and a review of the university career advising documents that define services available to become aware of non-traditional careers. The quantitative method consisted of a survey using a 5-point Likert scale to measure whether the participants agree or disagree with specific statements. The multimethod research design is optimal for this study because it mandates securing data from various methods, thereby increasing the validity of the information acquired (Bickman & Rog, 2009).

**Significance of the Study**

This applied research study yielded empirical, theoretical, and practical significance by revealing the influence career advisors have on a freshman African American female student’s career trajectory. The empirical significance contributed an additional layer of research that emphasizes the importance of career advisors assisting these students as they explore career opportunities that would include STEM careers. The theoretical distinction is that it presented lived experiences of these student’s awareness of STEM careers, whereas the practical contribution legitimized to educators, administrators, and career advisors the career opportunities students are exposed to when they are aware of non-traditional STEM careers.

A well-developed career advising process can be advantageous for African American female students interested in expanding their awareness of career opportunities. Minimal data has been explored to determine whether a career advisor's awareness of cultural differences and barriers would impact a student interested in exploring STEM careers. Perdrix, Stauffer, Masdonati, Massoudi, and Rossier (2012) maintained that career advisors could expose students to an array of career opportunities they may not have considered otherwise. Krumboltz's (1976) and Pask's (1975) career selection principles prepare career advisors to identify cultural influences and other barriers that interfere with their ability to explore STEM careers with African American female students.
Lee (2012) believes career advisors would also benefit from an awareness of their cultural heritage, attitudes, and beliefs and how they differ from other students. Exploring these attributes may elicit feelings of pride, embarrassment, or discomfort; however, career advisors must address personal biases or stereotypes before exploring career opportunities with African American female students. Additionally, Lee (2012) proposed three personal questions for career advisors to consider that could impact how they interact with these students when discussing non-traditional STEM careers:

1. “How do I experience myself as a member of the cultural group X?”
2. “How do I experience other members of cultural group X?”, and
3. “How do I experience people of other cultural backgrounds?” (p. 8).

A career advisor’s cultural self-awareness contributes to their cultural sensitivity to other cultures. Being cognizant of family and friends’ influence or the stereotypes that freshman African American female students encounter may enhance the career advisor’s propensity to explore career interests with these students (Fadulu, 2018). Becoming familiar with other cultures involves the career advisor taking the initiative to further educate themselves on their histories, experiences, values, and gender influences. Cultural proficiency involves career advisor’s repetitive exposure to other cultures to cultivate an awareness of relevant influencing career factors. Taking the initiative to become familiar with other cultures expands the career advisor’s knowledge of cultures beyond their culture.

**Research Questions**

**Central Question:** How can the problem of freshmen African American female students unaware of non-traditional career opportunities be solved at universities located in the United States’ southern region?
**Sub-question 1:** How would students and career advisors in an interview solve the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region?

**Sub-question 2:** How would reviewing career advising documents inform the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region?

**Sub-question 3:** How would quantitative survey data solve the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region?

**Definitions**


2. *Career Advisors* – “Is about listening to those counseled, deconstructing the story that he or she might tell, and later retelling the story through its association with other experiences – a linkage made possible by the similarities of perceived meanings and/or of the felt or induced effects that help the individual build new perspectives regarding the issues faced” (Duarte, 2017, p. 2).

3. *Career Selection Theories* – “Helps to understand a complex domain so that . . . more useful and intelligent actions [can be made] . . . A simplified representation of reality, identifying relationships among the most crucial characteristics” (Matthews, 2017, p. 322).

4. *Convenience sampling* – “Select cases based on their availability for the study and ease of data collection” (Bickman & Rog, 2009, p. 82).
5. **Credible** – “The validity of a study and whether the design is sufficiently rigorous to provide support for definitive conclusions and desired recommendations” (Bickman & Rog, 2009, p. 11).

6. **Cultural Identity** – “an individual’s sense of belonging to a cultural group and the part of one’s personality that is attributable to cultural group membership” (Lee, 2012, p. 10). It is also “closely connected to values, health beliefs and behaviors, and communication styles” (Hall & Theriot, 2016, p. 36).

7. **Cultural Proficiency** – “a way to understand, embrace, and talk about differences that recognize and respect individuals and their cultures” (Nuri-Robins, Lindsey, Terrell, & Lindsey, 2007, p. 16).

8. **Feasibility** – “Whether the research design can be executed, given the requisite time and other resource constraints” (Bickman & Rog, 2009, p. 12).

9. **Gender stereotypes** – are “shared knowledge structures about particular social groups that may or may not accurately reflect group characteristics” (Kurtz-Costes, Copping, Kinlaw, & Rowley, 2014, p. 603).

10. **Homogeneous Sampling** – “Select cases that are very similar to study the characteristics they have in common” (Patton, 2015, p. 268).

11. **Likert scale** – “asks individuals to rate their level of agreement with various statements” (Gall, Gall, & Borg, 2007, p. 220).

12. **Multimethod Design** – “The conduct of two or more research methods, each conducted rigorously and complete in itself, in one project. The results are then triangulated to form a comprehensive whole” (Tashakkori & Teddlie, 2003, p. 190).
13. **Non-Traditional Careers** – these careers “are defined as those for which females comprise less than 25% of those employed in the occupation” (Patterson, Poe-Yamagata, Nanda, & Corea, 2016, p. 1).

14. **Population** – “The set of persons or organizations to be studied, which may not be of finite size” (National Science Board, 2018, p. A7).

15. **Qualitative** – “A research paradigm designed to address questions of meaning, interpretation, and socially constructed realities” (Tashakkori & Teddlie, 2003, p. 170).

16. **Quantitative** – “A research paradigm designed to address questions that hypothesize relationships among variables that are measured frequently in numerical and objectives ways” (Tashakkori & Teddlie, 2003, p. 170).

17. **Self-Efficacy** – “The belief in one’s ability to successfully perform specific behaviors or navigate situations. Self-efficacy determines how people feel, think, and motivate themselves” (Cobham & Patton, 2015, p. 32).

18. **Semistructured Interviews** – “Provide practitioners with opportunities to develop rapport with members of the organization and learn about critical areas that are not readily accessed through standard questionnaires” (Bickman & Rog, 2009, p. 336).


20. **Triangulation** – “The combination of the results of two or more rigorous studies conducted to provide a more comprehensive picture of the results than either study could do alone” (Tashakkori & Teddlie, 2003, p. 190).

21. **Usefulness** – “Whether the design is appropriately targeted to answer the specific questions of interest” (Bickman & Rog, 2009, p. 12).

**Summary**
By employing a multimethod research approach, Chapter One aims to identify the process career advisors engage in to advise freshman African American female students of non-traditional STEM careers at universities located in the United States’ southern region. A multimethod approach is optimal for this study because it amasses data from three sources, interviews, review of university documents, and surveys, thereby increasing the validity of the findings. The study presumes that career advisors' advice can influence African American female students' career trajectories. The guidance from an advisor can also create a disadvantage for these students when the advisors are unaware of the barriers impacting a student’s career decisions. According to Fadulu (2018), the guidance freshman African American female students receive from career advisors can ultimately define their career trajectory.

Data will be accumulated using both qualitative and quantitative methods to validate the information collected. The central question of “How can the problem of freshmen African American female students unaware of non-traditional career opportunities be solved at universities located in the United States’ southern region?” will be examined. Additionally, data obtained will substantiate the empirical, theoretical, and practical relevancy. Career advisors will be challenged to establish communication barriers that interfere with their ability to inform African American female students of STEM careers.

The following chapter, Chapter Two, will introduce research studies relevant to career advisors informing these students of non-traditional careers. Chapter Two will contribute details of the career selection theories of Krumboltz’s (1976) and Pask’s (1975). These theories will present career advisors with an opportunity to utilize various approaches to identify and communicate non-traditional STEM careers to African American female students.
CHAPTER TWO: LITERATURE REVIEW

Overview

In 2019, the National Center for Educational Statistics (NCES) reported that African American females received more undergraduate degrees than Black males; however, they are underrepresented in non-traditional science, technology, engineering, and mathematics (STEM) careers. These careers are represented by less than 25% of women (Mayes & Hines, 2014). The purpose of Chapter Two is to present a comprehensive literature review of an applied study that focuses on solving the problem of freshman African American female students unfamiliar with non-traditional STEM career opportunities at universities located in the United States’ southern region. Equally important is to present career advisors with a process, thereby guiding them to formulate a solution that addresses this concern.

Chapter Two introduces the theoretical framework that will examine two career selection theories to propose a rationale for why these students are unaware of STEM careers. One of the more critical decisions an African American female student will establish is to align herself with a career trajectory that will be challenging and rewarding. Hodges and Isaac-Savage (2016) surmise that a student’s career identity can positively affect her self-efficacy while also giving her a connection to others. To prepare for this journey, she must be familiar with career opportunities that include careers she was unaware of or had not considered. Two career selection theories identified as germane to this research study were based on their complementing properties of identifying barriers that impinge on a career advisor’s capability to explore STEM careers with this diverse student population. The first career selection theory explored is John Krumboltz’s (1976) social learning theory of career selection. This theory explores external factors that can interfere with an African American female student becoming familiar with STEM careers. These factors are categorized based on similar characteristics. The
second career theory perceived as applicable to identifying why these students are unaware of non-traditional STEM careers is Gordon Pask’s (1975) conversation theory. His theory highlights the communication process that transpires between the career advisor and the student and recognizes how this experience can profoundly influence a students’ awareness of STEM careers. His theory emphasizes the significance of the career advisor being cognizant of the cultural heritage of students.

Essential to developing this literature review is to define the characteristics that each career selection theory proposes as interfering with a student’s awareness of non-traditional STEM careers. Previous studies explored why students restrict themselves from utilizing the university’s career advising resources (Fadulu, 2018) or the challenges universities encounter when minority student enrollment increases (Hansen-Thomas & Chennapragada, 2018). Other studies examined the increasing demand for multicultural awareness training for universities to address a culturally diverse student population (Hall & Theriot, 2016). Sufficient data has not been presented that examines career advisors' knowledge of barriers interfering with their ability to explore STEM careers with African American female students.

Freshman African American female students who are unaware of these career opportunities are at a disadvantage when identifying a career trajectory. This study's theoretical framework is supported by literature that analyzes why students are unaware of STEM careers and how barriers are perceived as hindering a career advisor's effectiveness from exploring these careers with African American female students. This chapter will culminate with a summary restating the problem, identifying the theoretical framework that establishes a foundation for the study, an overview of the literature reviewed, and the ethical considerations pertinent to identifying why they are unaware of STEM careers.

**Theoretical Framework**
The advice freshman African American female students receive from career advisors can profoundly transform their career trajectory. Career advisors have an advantage when they know how their career advice can influence a freshman student’s evaluation of career opportunities. Pertinent to this study were two career selection theories to help career advisors comprehend cultural influences interfering with their ability to explore STEM careers with these students. The career selection theories of Krumboltz (1976) and Pask (1975) identify cultural communication barriers that interfere with freshman African American female student's knowledge of these careers (Matthew, 2017). The advisor should not be so consumed with strictly following the format of a particular theory that they overlook their purpose. Theories are not intended to identify a career; they should be utilized as a resource to identify communication barriers (Krumboltz, 1976). Matthews (2017) supports utilizing several theories when identifying why some students are unaware of non-traditional careers.

The merging of John D. Krumboltz's (1976) social learning theory of career selection with Gordon Pask's (1975) conversation theory engages career advisors to identify communication barriers that would interfere with African American female students' awareness of STEM careers. Both theories consider the career interest and culture of the student when proposing communication barriers. These cultural barriers impinge on a career advisor’s effectiveness in exploring STEM careers with African American female students.

**Social Learning Theory of Career Selection**

The design of John Krumboltz's (1976) social learning theory of career selection (SLTCS) encourages an awareness of communication barriers hindering career advisor's ability to discuss STEM careers and other careers students may not have considered. Krumboltz (1976) perceives a “good theory is a simplified representation of reality, identifying relationships among the most crucial characteristics and ignoring the rest” (p.56). Career advisors that utilize
Krumboltz’s (1976) SLTCS must be cognizant of the student’s interests, abilities, and aptitude when exploring career opportunities with them (Matthews, 2017). Krumboltz’s (1976) career selection theory examines four conditions that may impact a career advisor’s ability to explore non-traditional careers with students. His theory generates awareness for the career advisor to acknowledge the challenges these students encounter when exploring career opportunities. These influencing factors include:

1. Environmental Conditions and Events – these are factors where the students have limited control of and involve social, cultural and economic influences (Ozyasar, 2017).

2. Social Learning Experiences – no two learning experiences will be the same; however, they will result in either instrumental or associative experiences (Krumboltz, 1976).
   a. Instrumental experiences are similar to cause and effect. If a student meets with a career advisor to discuss her career prospects, what are the consequences, or the effect, associated with that action?
   b. Associative experiences would involve the student observing a family member’s success and unknowingly become encouraged to follow that family member’s career trajectory.

3. Cognitive and Emotional Responses – Emotional responses strongly influence the perception of achievable career options for the African American female student (Inda, Rodriguez, & Peña, 2013, p. 346). Her career selection and success are established by her self-efficacy, outcome expectations, and commitment to pursue her career goal. These factors are further influenced by gender, race, and ethnicity (Inda et al., 2013).
4. Genetic Factors – are influences the student has no control over, aside from surgery, and includes race, gender, economic environment, and physical appearance (Krumboltz, 1976).

Krumboltz (1976) understood that if a female student were unable to commit to a career that evokes personal satisfaction, she would not be dedicated to that career. Although professional career skills can be taught, Plato presumes that success is predicated on her passion for that profession (Gutek, 2011). Career advisors can assist students in exploring exciting and challenging careers she had not previously considered. When career advisors utilize Krumboltz’s (1976) career selection theory, they can identify how career opportunities can be manipulated by family and community expectations (Fadulu, 2018). Career advisors can analyze or presume why freshman African American female students gravitate to some career opportunities and not to others. They can begin to formulate strategies that would encourage African American female students to explore non-traditional STEM careers and other careers they previously had not considered. Career advisors familiar with the student's career goals, what she excels in, and her interests are better prepared to explore career opportunities that she was unfamiliar with or had not previously considered. Beneficial to the advisors is the awareness of factors that have the propensity to influence a student’s career outlook. Career advisors who invest in becoming knowledgeable of these influencing cultural factors demonstrate an appreciation and respect for a culturally diverse student population (Cobham & Patton, 2015).

Over the past four decades, universities have experienced increased minority enrollment (Clauss-Ehlers & Parham, 2014). The National Center for Educational Statistics (2019) predicted that by the year 2040, more than half of all Americans would be comprised of minority groups. It is prudent for the university to reevaluate its cultural proficiency and diversity
initiatives to ensure all students experience a welcoming and accepting campus culture. Creating this environment would challenge the career advisor's approach to discussing STEM careers with African American female students and require faculty and staff to embrace the diverse student population's skills, interests, beliefs, values, and personal qualities (Krumboltz, 1976). With such a diverse student population, career advisors are encouraged to address barriers identified as impinging on their ability to explore STEM careers with African American female students.

**Cultural and Environmental Conditions.** Cultural and environmental conditions represent one of four settings that Krumboltz’s (1976) theory identifies as influencing how African American female students identify career opportunities. These conditions offer limited control over what students can alter or modify. From the earliest moments in life, the interaction between heredity and the environment has converged to shape who these students are and who they will become. An African American female's genetic makeup is inherited from her parents and provides a foundation for cultural norms; the environmental factors will impact how emotions to various circumstances are expressed (Cherry, 2020). As cultural and environmental factors evolve, her worldview of career opportunities will influence her self-efficacy and impact career opportunities she identifies as being conceivable (Ozyasar, 2017).

Krumboltz's (1976) SLTCS identified cultural and environmental conditions impacting her career trajectory, including her economic obligations, social, cultural, and political involvement, along with her cultural beliefs, values, goals, and family expectations (Ozyasar, 2017). Career advisors unfamiliar with how cultural and environmental factors influence a student's career trajectory can inadvertently misguide them from exploring non-traditional STEM careers (Fisher, 2016). Students unaware of these careers can unintentionally be encouraged to pursuing stereotypical careers as social workers, teachers, administrative support personnel, or careers they discover are unfulfilling.
Despite the increase in enrollment of African American female students, history has shown that women comprise less than 25% of non-traditional careers (Patterson et al., 2016). They continue to be underrepresented in STEM careers. Hrabowski and Henderson (2017) conclude that these are male-dominated careers, and careers in the social sciences are perceived as female-dominated careers (NCES, 2019). Lopez (2014) attributes females dominating social science careers to career advisors neglecting to expand their awareness of non-traditional STEM careers. Their reluctance to discuss career opportunities with career advisors is that they perceive advisors as culturally insensitive and do not want to appear uneducated (Reshwan, 2015).

The environment where these students reside will also impinge on her career outlook, especially when she has not been exposed to non-traditional career opportunities. Freshman African American female students will observe professions within their environment and community as their expected career trajectory (Hall & Theriot, 2016). From personal experience, in the mid-1900s, the African American community where I resided identified a letter carrier, police officer, or firefighter as male-dominated careers, and a secretary or schoolteacher as female-dominated careers. These were careers African Americans were commonly exposed to and professions they presumed were their career opportunities. African American female students unfamiliar with non-traditional career opportunities could be attributed to the unavailability of resources to explore and become aware of these career opportunities (Schmid et al., 2015). Additionally, in African American communities, these students often rely on career advice they receive from their family, friends, and the community.

The internet recently has become a source for students to acquire career advice (Elliot, Leck, Rockwell, & Luthy, 2013). Access to the internet provides a platform suggesting anonymity and provides students the capability of eliminating barriers of cultures, gender, and
race, and the stereotypes and biases associated with them. It also masks the feeling of being judged by others when they inquire about career opportunities and commitments related to these careers. The internet presents students with an opportunity to increase their awareness of career opportunities they have been unfamiliar with while providing the platform to network with other students and professionals (Elliot et al., 2013).

Social Learning Experiences. African American female students often presume they identify career opportunities strategically (Matthews, 2017) through their knowledge and exposure to careers, their perceptions of career satisfaction in others, or conforming to family influences and expectations. Other female students continue to experience social challenges that adversely impact their confidence to pursue STEM careers; and concede to pursue a stereotypical career as teachers and nurses (NCES, 2019). These are careers they often pursue when they are unaware of non-traditional STEM careers. Career advisors who take the initiative to become acquainted with African American female students' culture can consider the social challenges that interfere with these students becoming aware of STEM careers. Students who encounter career advisors unfamiliar with diversity concerns may interpret this lack of awareness of their cultural beliefs, values, goals, and family expectations as irrelevant and insignificant (Krumboltz, 1976). These cultural insensitivities interfere with students taking advantage of career resources (Krumboltz, 1976) to explore career opportunities, especially careers they had not considered.

Other social experiences these students confront involve assessing their family's social-economic status, self-efficacy, and encounters with individuals from different cultures, races, or genders (Cobham & Patton, 2015). Some freshman African American female students fear not being accepted by their White peers, which Guiffrida and Douthit (2010) present as an additional barrier for career advisors to consider. African American female students who find it necessary to escape hostile environments precipitated by racial discrimination increase their reluctance to
consider specific career opportunities (Storlie et al., 2018). Addressing these concerns is a fundamental need for career advisors to assess before encouraging students to consider a non-traditional career opportunity. Abraham Maslow’s (1943) classic hierarchy of needs identifies five levels of individual motivators. The pyramid levels are not sequential; however, each level is based on motivational properties adapted to any situation (Parkay, Anctil, & Hass, 2014). Figure 2.1 provides a visual image of Maslow’s hierarchy of needs pyramid. Career advisors interested in comprehending why freshman African American female students are unaware of non-traditional STEM careers would refer to Maslow's Basic Level to obtain insight into fulfilling this basic need of career affiliation, status, and purpose. As barriers are identified, and communication strategies are formulated, career advisors and students’ progress to different levels within the pyramid.

![Maslow's Hierarchy of Needs](image)

*Figure 2.1. Maslow’s Classic Hierarchy of Needs. “Removed to comply with copyright.”*
It is worth noting that numerous African American females have made groundbreaking contributions in STEM careers; however, their achievements have been passed over in the history books (Witter, 2019). Being familiar with other African American females' career contributions in STEM careers may facilitate a career advisor's potential to inspire other African American female students to consider non-traditional STEM careers. African American female pioneers who have made tremendous contributions to the United States include Dr. Marie M. Daly, the first African American woman to earn a Ph.D. in chemistry in 1947. She has devoted her life to research, education, teaching, and working as a biochemist. Mary Jackson was the National Aeronautics and Space Administration’s (NASA) first African American female engineer at NASA in 1958 (Witter, 2019). Lisette Titre, a video game artist and designer, has been instrumental in promoting diversity in video games and computer programming (Helton, 2018). Careers in video game design have been increasing in popularity. Due to the increased demand for animation and visual effects in video games, it has been projected there will be a four percent increase in multimedia artists and animators from 2018 to 2028 (Bureau of Labor Statistics, 2020). These are examples of prominent African American women that career advisors could discuss with other African American female students to encourage them to consider pursuing careers in science, technology, engineering, or mathematics.

**Cognitive and Emotional Responses.** Cognitive and emotional factors can also influence the “selection and pursuit of career-relevant choices” (Inda et al., 2013, p. 346). Lent, Brown, and Hackett (1994) maintain that career selection and success for African American female students is predicated on her self-efficacy, outcome expectations, and commitment to pursue her career goal. These factors are further influenced by gender, race, and ethnicity (Inda et al., 2013). The correlation between the two outcomes is displayed in Figure 2.2.
Self-efficacy expectation. Albert Bandura’s (1977) social cognitive theory defines self-efficacy as one’s perception of their ability to achieve the desired goal influenced by past experiences of success or failure and by observing other individuals' accomplishments (Schunk, 2016). Bandura (1977) concludes that a student’s career expectations, interests, and goals are predicated on her perception of achieving that goal. Applying the self-efficacy expectation theory to freshman African American female students' awareness of non-traditional STEM careers may not yield the anticipated results, primarily when they do not utilize career advising services at the university.

Outcome expectation. Bandura (1977) defines outcome expectation as “a person’s estimate that a given behavior will lead to a certain behavior” (p. 193). Outcome expectations occur when a career advisor initiates becoming familiar with cultural communication barriers that impinge on an African American female student’s awareness of STEM careers and apply it when exploring career opportunities. Bullock-Yowell, McConnell, and Schedin (2014) also maintain that increasing students' self-efficacy will positively impact her contemplating pursuing a career she had not previously considered.

Figure 2.2. The analysis of the difference between self-efficacy expectations and outcome expectations. “Removed to comply with copyright.”
**Outcome-Goals.** The outcome-goals integrate the self-efficacy and outcome expectations of African American female students. Goals for the students come to fruition when cultural communication barriers are acknowledged, and the career advisor formulates strategies addressing these barriers before exploring STEM careers with these students. Goals are accomplished once barriers are addressed.

African American female students may reflect on previous experiences when evaluating career opportunities. Some events will be encouraging, while other encounters may induce stress and avoidance (Mayes & Hines, 2014). Career advisors and students can explore how best to approach these emotional and stressful situations together while exploring career opportunities. When career advisors share other African American females’ professional accomplishments, these students can envision pursuing careers they had not previously considered. Cobham and Patton (2015) imagine that a student’s potential to identify fulfilling career opportunities is attributed to her ability to conceptualize opportunities that incorporate her culture, interests, and professional strengths.

**Genetics and Skills.** Genetics are those aspects of a female African American that are inherited or innate, such as physical attributes, disabilities, talents, aptitudes, birth family, and birth positions (Krumboltz, Foley, & Cotter, 2013). Additional genetic factors that influence these students’ career decisions include their race, gender, and cultural norms (Cobham & Patton, 2015). Ozyasar (2017) surmises that while genetic factors impact career choices, students and career advisors should focus on those environmental factors where they have some degree of control. When career advisors comprehend the impact that genetics contribute to students’ career trajectories, they can develop strategies to encourage them to consider exploring non-traditional STEM careers.
Career advisors familiar with Krumboltz’s (1976) SLTCS position themselves to identify cultural barriers that interfere with a student’s knowledge of STEM careers. The awareness of cultural communication barriers will engage an array of elements that embodies the student’s environment, social-economic status, family and cultural expectations, and cultural values (Cobham & Patton, 2015). Regardless of the student’s family environment and social-economic status, family values will continue to influence her career decisions (Guiffrida & Douthit, 2010).

For African American female students to continue pursuing traditional female careers when non-traditional STEM careers remain underrepresented, it can be attributed to insufficient knowledge of these career opportunities (Kurtz-Costes et al., 2014). Career advisors familiar with Krumboltz’s (1976) career selection theory can utilize his theory to identify cultural communication barriers and determine the appropriate approach to encourage students to consider pursuing a career they had not previously considered. The ability to inspire African American female students to explore STEM careers transpires when career advisors embrace cultures that do not resemble their culture.

**Conversation Theory**

When Gordon Pask's (1975) conversation theory (CT) integrates the communication barriers identified by utilizing Krumboltz's (1976) social learning theory of career selection, career advisors can begin to interpret how these barriers will impinge on students’ awareness of non-traditional STEM careers. Recapping the influencing factor identified with Krumboltz’s (1976) career selection theory involves embodying environmental experiences, social interactions, emotional reactions to events, and genetic factors (Krumboltz, 1976). Pask's (1975) CT is a resource for career advisors to simultaneously merge with Krumboltz's (1976) theory to encourage advisors to reflect on cultural barriers that impinge on their interest in informing these students of non-traditional career opportunities. The CT focuses on communication strategies...
that support the career advisor’s involvement in informing students of careers they were either unaware of or had not considered. Pask’s (1975) conversation theory is a complete “learning conversation” composed of three elements: Why, How, and Why and How. A diagram of this concept is depicted in Figure 2.3 and elaborated on below.

1. Why of learning – Involves the “conceptual structure of definitions and justifications that relate topics one to another” (Scott, 2001, p. 355). The “why” relevance to this research study addresses: Why freshman African American female students are unaware of non-traditional STEM careers.

![Figure 2.3. Learning conversation consists of three main components: the why of learning, the how of learning, and the how and why of a topic. “Removed to comply with copyright.”](image-url)
2. How of learning – This considers the “procedural knowledge” that reflects on one’s experiences (Scott, 2001). The “How” relevancy for this research study addresses the procedure of how students obtaining knowledge of non-traditional STEM careers. “How” involves understanding how one’s culture, family expectations, cultural stereotypes, and self-efficacy may generate barriers that impinge on freshman African American female student’s knowledge of non-traditional STEM careers.

3. Why and How of learning – The Why and How of learning places emphasis on personal autonomy and accepting responsibility for one’s learning (Scott, 2001). Pask (1975) believes that career advisors have a responsibility to take the initiative to educate themselves on the African American female student’s culture and to consider whether cultural communication barriers will impact how they explore STEM careers for these students.

“Pask refers to learning about ‘why’ as comprehension learning and learning about ‘how’ as operation learning. He conceives that both forms of learning are complementary features of active learning” (Scott, 2001, p. 353). Pask’s (1975) conversation theory emphasizes establishing communication methods that acknowledge cultural barriers that interfere with students’ awareness of STEM careers. Career advisors will amass critical information from these students to ensure that career opportunities reflect her interests, strengths, and career objectives.

Pask’s (1975) CT encourages career advisors and African American female students to invest in one-on-one discussions to establish their career objectives, personal strengths, and interests. Initiating one-on-one interactions between the career advisor and the students demonstrates a learning technique that embraces a "teachback" method where one person learns from the other. While the student narrates her career ambitions, the career advisor processes this
information to identify non-traditional careers for the student to consider. When a career advisor unable to use the "teachback" method to communicate back to the student what they identified as her career interests, then using this method of communication has not been effective.

The CT is particularly advantageous among African American female students because it enables her voice to be heard through storytelling (Storlie et al., 2018). This approach presents her with an opportunity to share her experiences, influences, and career interests with her career advisor. Storytelling narratives are efficient when career advisors integrate cultural communication barriers with the student’s career objective before presenting culturally sensitive career advice. Additionally, for career advisors to initiate career guidance to freshman African American female students, they must be capable of separating their values, biases, and personal interests (Krumboltz, 1976) from the students to effectively focus on the career goals of the student.

Storytelling is not a common practice that career advisors regularly engage in; thus, it can be a challenging skill for advisors to accomplish (Storlie et al., 2018). The past 25 years have yielded an increased culturally diverse student population (Childs, 2017). The increase has precipitated a demand for storytelling. Engaging in storytelling necessitates strong listening skills and the aptitude to decipher career interests, strengths, and activities that a student will convey through her narratives. As career advisors become familiar with the student’s strengths and interests acquired through storytelling, they can inspire her to explore career opportunities she had not previously considered. Storytelling can also deter career advisors from encouraging students to pursue gender stereotype careers in teaching and support services (Kurtz-Costes et al., 2014) as they become familiar with the student’s career ambitions.

Pask’s (1975) CT also recognizes that social, cultural, and political events will impinge on a students’ awareness of non-traditional STEM careers. These influences are instrumental in
developing an African American female student’s worldview of career opportunities that she perceives as achievable (Ozyasar, 2017). Career advisors familiar with these students' cultural values and beliefs have the advantage of encouraging them to consider STEM careers. Advisors can identify how their perceptions and cultural views can impinge on their effectiveness in providing career guidance to a culturally diverse student population (Lee, 2012).

**Code of Ethics**

“A code of ethics helps to define professional behavior and serves to protect the public, the profession, and those who practice within the profession” (National Career Development Association [NCDA], 2015, p. 3). In 2015 the NCDA updated its code of ethics, which addresses career advisors’ expected behavior while protecting participants and organizations involved in research studies. These studies are expected to be transparent and not contain any hidden agenda. The code has established values and principles to ensure the researcher engages in ethical behavior. It expresses the importance of understanding cultural diversity and the contributions a diverse culture will make to the university and society. The core values of the code are:

- Enhancing human development, embracing multiculturalism and diversity, promoting social justice, safeguarding the integrity of the counselor–client relationship, and practicing in a competent and ethical manner. (NCDA, 2015, p. 3)

The significance of addressing the code in this research study is that it precipitates an awareness of the influence career advisors can impose on freshman African American female students as they consider career opportunities. The code outlines the expectations for career advisors to adhere to when the study utilizes career selection theories to identify communication barriers that interfere with a career advisor’s commitment to exploring non-traditional STEM careers with African American female students. It encourages career advisors to take the
initiative to explore the diverse cultural backgrounds of these students. Career advisors must be familiar with their cultural identity to ensure their values and beliefs do not become barriers when exploring career opportunities with a diverse student population (Kaplan et al., 2017).

The code addresses the significance of ongoing career development for career advisors and maintains the participants’ trust and confidentiality. With the reluctance of African American female students to utilize the career resources, career advisors must be sensitive to these concerns. The student’s apprehension to utilize career resources is often for fear of being judged, appearing uneducated (Reshwan, 2015), or exposing their limited access to explore career opportunities. Additionally, students may perceive the cultural and family expectations shared with the advisor as personal and sensitive information. These constitute personal concerns that the code considers relevant.

The code also requires that all live human participates in a study sign a consent form (NCDA, 2015). The consent form outlines the research and its purpose. It explains why their participation is critical to the study and how the information will be handled. The consent form will also inform participants that they may terminate their participation at any time without reprisal. Participants will be allowed to ask the researcher questions about the research study. Addressing these code expectations is essential to any research study that involves human participants.

**Related Literature**

Before exploring literature relevant to this study, it is essential to acknowledge the educational challenges that freshman African American female students encounter while considering their career opportunities trajectory. Cultural diversity on college campuses has been increasing for more than two decades (Childs, 2017). Career advisors are encountering students from various cultures and social-economic backgrounds interested in aligning with a
career trajectory. Advisors also encountered students whose family influences weigh heavily on their career decision and often with limited access to explore career opportunities (Schmid, 2015).

Career identification begins in early childhood for an African American female when family and friends repeatedly inquire about their career goals when they grow up. A simple statement of "What do you want to be when you grow up" can impose many reactions and emotions for a young female. These inquiries address an enthusiastic desire to please or impress their parents, teachers, peers, or community members. When a youth expresses her presumed career ambitions, she will often receive positive accolades and encouraging advice from others for having the foresight to anticipate her career ambitions at a young age. Internally she questions the likelihood of fulfilling these expectations (Krumboltz, 1992). However, suppose she is undecided about her future career ambitions. In that case, she experiences embarrassment for not having defined her career trajectory, despite this being the more appropriate response (Krumboltz, 1992). Given her maturity level and insufficient knowledge of future career opportunities and the qualifications and obligations required, she is unprepared and inexperienced in predicting her future career goals with certainty.

Both events will impact her self-efficacy (Krumboltz, 1976). Albert Bandura’s (1977) social cognitive theory identifies self-efficacy as what a person perceives their likelihood of succeeding in a career that has been influenced by past experiences (Schunk, 2016). He presumes that a student’s perception of her skills and abilities will impact her self-efficacy and career ambitions (Fenning & May, 2013). With limited knowledge of non-traditional STEM careers, freshman African American female students may presume that they have not acquired the competency to succeed in these careers (Reshwan, 2015). Reluctantly, she may concede to her family's advice or other community members and pursue a less appealing or inspiring career.
Bruk (2018) predicts that when a student’s career goals do not come to fruition, they may experience anxiety and regrets.

An African American female student’s interest in identifying challenging careers can be complicated by her inability to access resources to explore non-traditional career opportunities. Career trajectories can also be impacted by cultural or family expectations; or biases based on their gender or race. Students unaware of non-traditional careers will possibly pursue stereotypical careers as nurses, teachers, or administrative support personnel, while STEM careers remain underrepresented by African American females (Patterson et al., 2016). Her family’s social-economic status and where she grew up, whether urban or rural, the schools she attended, and her ability to research career opportunities that she was unfamiliar with all represent factors that can interfere with her career prospects. Cultures vary as to which occupations are glamorized or valued, and life events significantly impact the career opportunities these students may pursue.

University career advisors have an optimal opportunity to prepare these students to make prudent career decisions by enlightening them to non-traditional STEM career opportunities. These are marginally represented careers by African American female students (Patterson et al., 2016). However, before career advisors can explore careers with students, they must be familiar with communication barriers that can impinge on their confidence to engage in these discussions. West Haven University has experienced an increase in freshman African American female student enrollment over the past four decades (Clauss-Ehlers & Parham, 2014). It has challenged career advisors to identify opportunities to encourage them to consider non-traditional STEM careers. Schmid et al. (2015) recognized that these students are among a larger population of students unaware of these non-traditional career opportunities. Childs (2017) realized that student diversity was not as prevalent as it has become in the past 25 years. The reason varies as
to why students are unaware of these career opportunities. Students also speculate whether pursuing a career as a social worker, teacher, or administrative support personnel (USDE, 2019) is their expected career trajectory. Despite the increase of African American female students graduating from college over the past three decades (NCES, 2019), this population continues to be underrepresented in STEM careers (Patterson et al., 2016).

Career advisors are presumed to be knowledgeable of career trends and opportunities especially careers perpetually underrepresented by freshman African American female students. The advisors have an opportunity to influence the career trajectory of these students by inspiring them to consider pursuing a career they were unaware of or had not previously considered. Bimrose, McMahon, and Watson (2013) acknowledge that students would benefit from utilizing career advising services to acquire knowledge and educational commitments associated with non-traditional career opportunities.

Reshwan (2015) discovered that African American female students who do not utilize career services are attributed to career advisors ineffectively discussing with them STEM careers. The author further explains that the students perceive career advisors as culturally insensitive, contributing to their reluctance to embrace their career advice (Hall & Theriot, 2016). Additionally, African American female students fear being characterized as uneducated (Reshwan, 2015). The insensitivities these students reported experiencing include biased career advice that concentrates on a particular race or gender and neglects to consider cultural influences, genetics, or career interests (Guiffrida & Douthit, 2010). The discrimination further exacerbates these cultural influences they encounter based on their race, gender, or disability (Cobham & Patton, 2015). When students experience limited exposure to non-traditional STEM careers, they often are encouraged to explore gender stereotype careers (Kurtz-Costes et al., 2014).
Lopez (2014) discovered that less than 10% of students utilize career services on university campuses because of cultural insensitivity. Students perceive their campus career services as archaic and not keeping abreast of ethnomological changes. They also perceive a deficiency in resources available to educate them on diverse career opportunities. Career advisors who present limited culturally sensitive communication skills are perceived as inept at exploring these career opportunities with African American female students (Storlie et al., 2018).

The author further explains that the students perceive career advisors as culturally insensitive, contributing to their reluctance to accept career advice (Hall & Theriot, 2016). Proficient career advisors take the initiative to educate themselves on the histories, experiences, values, and gender influences that impact these students’ career trajectories (Lee, 2012). Knowledgeable and experienced career advisors can assist students in navigating these circumstances. The foundational relationship between students and their career advisor is strengthened when advisors are culturally knowledgeable and sensitive to career influencing factors (Hall & Theriot, 2016).

As multicultural awareness increases, career advisors acknowledging cultural communication barriers are encouraged to explore non-traditional STEM careers with students. For an African American female student, establishing a career objective when enrolling at a university promotes personal growth, increases self-efficacy, and contributes to career success. Encouraging family, supportive teachers, persuasive friends, and involved communities are influential to these students as she embarks on her career exploration (Krumboltz et al., 2013). Knowledge of these influences is critical for career advisors to consider when identifying freshman students’ career opportunities.

Clauss-Ehlers and Parham (2014) emphasize the importance of academic institutions addressing the cultural changes that have occurred over the past three decades. These cultural
changes include acknowledging African American female students' cultural norms and encouraging them to explore non-traditional STEM careers. The demographic challenges that career advisors and students regularly encounter involve the student’s race, ethnicity, religious beliefs, family, community involvement, cultural expectations, and societal influences. An analogy was made by Clauss-Ehlers and Parham (2014) relating the cultural diversity changes at a university to the changing age of technology, proposing that universities have successfully adapted to these technology changes, and adjusting to diversity changes is equally feasible. This approach reverted to an educational environment 25 years ago. The demand to address the cultures, genders, ethnicities, socioeconomic status, religious beliefs, and family influences of a diverse student population were not as critical to consider. Although technology and the increase in cultural diversity enrollment have significantly changed the university's landscape over the past several decades, career advisors must exercise confidence in their competency to address campus cultural changes and consider why freshman African American female students are unaware of non-traditional STEM careers. Career advisors are among the leaders that remain abreast of changes occurring with the university. Career advisors utilizing the career selection theories of Krumboltz (1976) and Pask (1975) acquire skills to identify cultural communication barriers that impinge on their ability to explore STEM careers with African American female students.

Career advisors focused on exploring culturally diverse students' career interests are not confined to enrolling in a diversity course and subsequently be identified as the subject matter expert in cultural diversity. It requires time and commitment from both the university and the career advisors while adapting to a diverse student population. Career advisors who invest the time to comprehend how their cultural values may differ from African American female students can determine if these value differences will interfere with them exploring STEM careers with
these students. As a primary resource for students to discuss career interests, career advisors must recognize the significance of acknowledging cultural differences.

When career advisors are familiar with a diverse student population's cultures, freshman African American female students perceive career advisors as capable of identifying career opportunities that would be fulfilling and challenging (Duarte, 2017). Each student’s career journey is personal and will not be synonymous with other students. Over the past three decades, cultural diversity has increased; yet, African American female students perceive their career interests are not being assessed. These students presume that when their cultural norms are ignored, the university is not acclimating to the cultural changes occurring on their campus (Clauss-Ehlers & Parham, 2014).

Viewing how the future success and accomplishments of African American female students often rely on the advice they receive from the career advisors, it is unfortunate that over 85% of students do not pursue career advisors’ guidance (Lopez, 2014). Students that do not engage in the career services at their university are at a disadvantage of being unfamiliar with non-traditional STEM careers and careers they had not considered pursuing. Having insufficient knowledge of career opportunities renders these students unprepared to make informed career decisions. Cultural barriers often interfere with the relationship between the career advisor and the student. Addressing these cultural barriers relies on the advisor’s knowledge of the student’s career aspiration that might be culturally influenced. Banks (2019) maintains that a mission for career advisors is to ensure that these students are encouraged to explore non-traditional STEM careers and other opportunities they had not previously considered.

Career advisors that utilize the career selection theories of Krumboltz (1976) and Pask (1975) have acquired an awareness of cultural barriers. Knowledge of these barriers prepares career advisors to address the students' career interests and encourage them to consider exploring
STEM careers. Trust is another barrier that can interfere with a career advisors' success in exploring specific careers with African American female students. These students must maintain confidence and trust in the career advisor’s competency to identify career opportunities that incorporate an awareness of existing communication barriers. Barriers identified all focus on the evolving interest for cultural diversity training that extends beyond enrolling in a diversity course.

**Barriers to Overcome**

Numerous sources projected universities would experience an increased enrollment of a culturally diverse student population over the next two generations. Hall and Theriot (2016) observe cultural diversity as the experiences and communication styles relevant to a diverse student population that compels career advisors to acquaint themselves with their student population's cultural traditions. The approach career advisors engage in to inform freshman African American female students of STEM careers are enriched when they implement the principles acquired through Krumboltz’s (1976) and Pask’s (1975) career selection theories synchronously to cultivate an awareness and sensitivity of cultural differences.

African American female students may not be inspired to explore careers they were not familiar with when they perceive career advisors are not receptive to their culture (Patterson et al., 2016). Lee (2012) suspects that career advisors often neglect to present a rudimentary awareness of the student’s culture. However, Guiffrida and Douthit (2010) surmise that African American female students perceive African American career advisors exhibit a genuine interest in advocating for other African American female students' success by conveying career advice respectful of cultural influences.

**Cultural differences.** According to Fickling (2016), university career advisors who graduated in the 1990s or earlier most likely had limited exposure to a culturally diverse student
population. The limited knowledge and sensitivity to cultural and racial differences exhibited by career advisors have contributed to the barriers that African American female students encounter while assessing career opportunities. These students’ cultural traditions are cultivated from family values and beliefs, behaviors, cultural customs, and how they communicate with others who share similar values. Although it is not feasible for career advisors to have extensive knowledge of every culture represented on the campus, they are expected to initiate an awareness of cultural values (Hall & Theriot, 2016). Cultural proficiency for career advisors increases with repetitive exposure. Career advisors unfamiliar with a diverse student population’s cultural and social challenges are presumed to be inept at exploring career opportunities that include STEM careers with these students (Patterson et al., 2016). Advisors may encounter apprehension from students when exploring career opportunities that only involve stereotype careers.

Cultural proficiency involves career advisors being cognizant of their cultural differences and how their views may obstruct their commitment to providing career guidance to students of different backgrounds and ethnicities. Freshman African American female student’s confidence and trust are enriched when career advisors exemplify cultural sensitivity while discussing non-traditional STEM careers with these students. Consequently, career advisors can alienate students from utilizing the career services when students perceive the advisor has not taken the initiative to familiarize themselves with the university’s diverse culture.

**Trust.** The foundation between the career advisor and the student relationship must be entrenched in trust. Career advisors will benefit from being aware of what an African American female student identifies as a significant factor when considering their career opportunities. Advisors must be cognizant of their cultural identity and establish whether their cultural values might eclipse culturally diverse students’ values and beliefs when reviewing career opportunities (Kaplan et al., 2017). The student's interests should take precedence over the career advisor's
personal views. To accomplish this would require the advisor to implement a bracketing technique. Bracketing is where the career advisor would set aside their values and beliefs to ensure they focus their attention on the student's career interest (Kaplan et al., 2017). Career advisors are not expected to be knowledgeable in all aspects of an African American female’s culture; however, they should pursue becoming familiar with their culture (Kaplan et al., 2017).

When African American female students are reluctant to explore career opportunities with a career advisor, it frequently originates from the student's fear of being judged or identified as uneducated by others (Reshwan, 2015). These fears may influence the trust between the student and the career advisor. However, when career advisors are astute to a student’s apprehension to discuss their career ambitions, they are better prepared to address these concerns with the student when they are familiar with their culture. If trust has not been established, students may be hesitant to discuss personal circumstances that involve their culture, family expectations, discriminations they have encountered, or that they may not have the resources to explore career opportunities with the advisor. When an African American female student perceives the career advisor is providing incomplete information regarding career opportunities (Patterson et al., 2016), trust and respect for the career advisor are compromised. She may be reluctant to pursue further advice from the advisor.

Trust between the student and the career advisor is also predicated on the university promoting career services available campus-wide to students interested in exploring career opportunities. Henry (2015) suggested that African American female students are perceptive to other African American females' enrollment and employment at the university. When students perceive their university seldom hires and enrolls African American females, they may presume cultural diversity is neither valued nor significant (Henry, 2015) at that university, and invitations to utilize the career services available are not pursued. They identify career advisors
as not committed to conveying unbiased career guidance, especially when cultural diversity is not prevalent throughout the university. The lack of diversity represented on campus factors into the trust freshman African American female students experience when exploring career opportunities with a career advisor. Guiffrida and Douthit (2010) recognized that cultural proficiency is scarce on many university campuses. Awareness and consideration of students’ cultural values and beliefs are critical if advisors anticipate establishing their trust.

Training deficiencies. As the diverse student population continues to increase (NCES, 2019), cultural sensitivity and awareness training will remain an evolving concern. Career advisors have an unparalleled opportunity to enlighten students to non-traditional STEM careers; however, accomplishing this would require career advisors familiar with the cultural challenges students encounter when exploring career opportunities. Cultural diversity training that incorporates the ideology of the career selection theories of Krumboltz (1976) and Pask (1975) will generate insight into why freshman African American female students are unaware of these careers (Martinez, 2014).

Freshman African American female students have expressed concerns with career advisors who neglect to advise them of career opportunities they were unfamiliar with or careers they had not considered (Fadulu, 2018). Storlie et al. (2018) believe that the disregard of career advisors inspiring African American female students to explore STEM careers strengthens the demand for cultural diversity training that contributes to improving the advisor’s communication skills, sensitivity, and confidence to explore non-traditional careers with these students. Training strategies would involve career advisors acknowledging their cultural beliefs and values and identifying how they communicate with students of different races, cultures, and genders. Utilizing the career selection theories of Krumboltz and Pask, career advisors become familiar with cultural career expectations that interfere with African American female students’
awareness of these careers. Equally important is addressing stereotypes and biases, such as those associated with students from low-income families (Fadulu, 2018). Recognizing these stereotypes confirms the necessity to propose training opportunities that acknowledge barriers and prejudices that impinge on these students’ awareness of STEM careers.

The importance of cultural awareness and acceptance commences with the university’s leadership, where the values of a diverse student population should be entrenched into its culture. Universities are expected to be cognizant of cultural-educational needs for their career advisors that extend beyond attending a course or conference on diversity awareness. Training involves career advisors taking the initiative to comprehend African American female students' cultural values and eliminate bias perceptions that society often imposes on them. The advisors are to ensure students are provided with the opportunity to become knowledgeable of STEM careers.

**Summary**

African American females were awarded more bachelor’s degrees than Black males, according to the National Center for Educational Statistics (2019). However, only two percent pursued STEM careers (NSF, 2015). Being unaware of these careers was a leading factor attributing to these students not pursuing these careers; however, the limited research conducted addressing why African American female students were unaware of STEM careers presented an opportunity to address this problem. Previous research studies explored why these students do not utilize the available career resources, while other studies addressed cultural diversity training among career advisors. Colby and Ortman (2015) predicted a demographic change in student enrollment. More than half of all Americans would belong to a minority group and require universities to be proactive in addressing these changes. Freshman African American female students have recognized that pursuing a higher education degree presents opportunities they would not experience without a degree.
Cultural diversity is not discussed at the level it should be, mainly because with a monoculture student population that existed 25 years ago (Childs, 2017), cultural diversity was not a notable concern. Diversity awareness and education were not as prominent then as it has become. The demand for diversity training reflects career advisors being unprepared to address the cultural barriers that impinge on their ability to discuss STEM careers with freshman African American female students. To assist career advisors in becoming familiar with these barriers; and supporting their interest in discussing non-traditional STEM careers with freshman African American female students, two career selection theories were presented illustrating the significance of being familiar with the cultures of a diverse student population. These theories established a foundation for this study. The first theory recognized was Krumboltz’s (1976) social learning theory of career selection. His theory initiates an awareness of barriers that impinge on a career advisor’s potential to educate African American female students of STEM careers. His career selection theory encompasses being familiar with the cultural and environmental conditions, social learning experiences, cognitive and emotional responses, and students’ genetics. The second career selection theory, Gordon Pask’s (1975) conversation theory, adopts a storytelling or narratives approach to confirm the career aspirations of the students. Both theories complement one another by integrating African American female students’ educational and cultural interests while recognizing cultural barriers that impinge on their awareness of non-traditional STEM careers.

Reshwan (2015) discussed the reluctance some students experience to utilize the career services involves a fear of being judged by others or seen as less educated. Barriers identified are derived from cultural differences, trust, society stereotypes, and the lack of cultural diversity training for career advisors. Cultural difference awareness and training were not customary two decades ago (Childs, 2017). As the cultural diversity population continues to increase,
universities are confronted with addressing African American female students' cultural and racial concerns. Additional concerns addressing cultural diversity education for career advisors was the importance of trust between students and career advisors when identifying career opportunities that include STEM careers. Students are observant of diversity deficiencies among the students and staff on campus and will speculate the career advisor’s dedication (Henry, 2015) to explore STEM careers with them. The value and trust of career advisors are strengthened with students when they take the initiative to familiarize themselves with the African American female student's cultural dynamics. When career advisors explore cultural diversity norms reflective of these students, they must explore their values and beliefs to identify if their interests distract from their commitment to exploring career opportunities (Kaplan et al., 2017) with students.

The final barrier explored reflected on the insufficient training career advisors receive addressing cultural diversity concerns. Implementing a one-time, single course in cultural diversity training is insufficient for preparing career advisors to explore career opportunities for freshman African American female students that include STEM careers. It is beneficial if career advisors consistently meet with these students to understand and appreciate their culture.

The following chapter, Chapter Three, will commence by restating the purpose of this applied study, which is to identify why freshman African American female students are unaware of non-traditional career opportunities at their university. Chapter Three will introduce the research design that aligns with this research study’s purpose and create a foundation that establishes research questions suitable to this study. This chapter will provide readers with the minutiae associated with executing this study and allows for its replication under different environmental conditions. The information provided introduces the region where the study will occur and the gender and racial characteristics. The procedures taken to amass the data will be
outlined and how each form of data will be analyzed. The data will be acquired through interviews, a review of university documentation, and a student survey. Chapter Three will culminate with an ethical review pertinent to gathering data and reporting the results, how data will be stored, and participants’ rights.
CHAPTER THREE: PROPOSED METHODS

Overview

The purpose of this applied study was to solve the problem of freshman African American female students being unaware of science, technology, engineering, and mathematics (STEM) careers at universities located in the United States’ southern region and to identify a resolution for career advisors to consider. The problem is that freshman African American female students are among a classification of students unaware of STEM careers (Schmid et al., 2015). Chapter Three will chronicle the design, site setting, and the participants connected to this study. This chapter will define the researcher’s role, identify the methods utilized to amass and analyze the data, explore ethical considerations to determine why freshmen African American female students are unaware of STEM careers, and culminate with a synopsis of Chapter Three. The information presented will acquaint the reader with details of how each section will be executed and provide sufficient information to inspire other researchers to replicate some or all of the findings in modified settings.

This research study was conducted during the COVID-19 pandemic. Due to in-person meeting restrictions related to the virus, interviews were conducted utilizing Zoom Rooms to capture the participant’s expressions. If additional modifications to the interview process are identified, this chapter will reflect those adjustments. This research study is presented as if a pandemic were not present.

Design

A multimethod design was utilized, integrating three strategies to amass data and capture analogous views regarding freshmen African American female students being unaware of STEM careers. According to Tashakkori and Teddlie (2003), using a multimethod design employs several approaches to obtain data that integrates qualitative and quantitative methodologies.
Securing data from a variety of sources increases the validity of the information obtained. It also decreases biases and stereotypes that could be introduced if only one method of gathering data was utilized (Bickman & Rog, 2009). Additionally, a multimethod research design for this study provides participants with an opportunity to respond to questions representing their perceptions and lived experiences regarding the student's awareness of STEM careers.

The first qualitative source of data collection utilized semistructured interviews with open-ended questions. Semistructured interviews accommodate an environment that allows the researcher to develop a rapport with the interviewee. Open-ended interview questions can capture open and honest responses. When limited research has been conducted on a topic, open-ended interview questions are ideal for capturing the participants’ lived experiences. Additionally, this question format has a high probability of producing valid and reliable participant responses, making the study replicable for other researchers (Bickman & Rog, 2009). When electing to utilize semistructured interview questions, it is essential to communicate to the participants the purpose of each question and the significance of providing accurate responses based on their knowledge and lived experiences.

The second qualitative method of amassing data involved reviewing existing university career advising documents that promote career advising services throughout the university, encouraging students to consider exploring STEM careers. When reviewing this data, the presumption was that the documents’ information was current and relevant. The third source of acquiring research data integrated a quantitative method that utilized an online 5-point Likert scale to accumulate survey data. The survey was accessible from several Facebook groups. Utilizing online surveys is frequently employed to expedite responses from a large population of participants. The online 5-point Likert scale survey was an optimal opportunity to measure
participants’ attitudes and opinions. It required participants to rate their agreement level to various questions (Gall et al., 2007).

**Research Questions**

**Central Question:** How can the problem of freshmen African American female students unaware of non-traditional career opportunities be solved at universities located in the United States’ southern region?

**Sub-question 1:** How would students and career advisors in an interview solve the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region?

**Sub-question 2:** How would reviewing career advising documents inform the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region?

**Sub-question 3:** How would quantitative survey data solve the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region?

**Setting**

This research study was conducted during a viral pandemic, making it necessary to modify how data were acquired. The original approach was to amass data at West Haven University (pseudonym), located in Georgia; however, in February 2020, the World Health Organization identified coronavirus-19 (COVID-19) as a pandemic. West Haven University subsequently adopted an online learning environment to provide a safe learning environment for its students. Therefore, utilizing one university to amass research data was not feasible, and alternative data collection methods were identified. Utilizing social media became a practical resource to amass data for the interviews and surveys. The researcher confessed to not being
social media savvy, so the idea of being immersed in the social media biosphere was intimidating. The researcher was encouraged to research groups on Facebook that engaged freshman African American female students. This search led the researcher to join Black Americans – Understanding the Real Cost of College, Empowering First Generation College Students, College Freshman Focus, College Bound, College and Career Convos, Common Black College – Application, and College Advisors.

**Participants**

A convenient sample of four African American females who will be freshman students in the fall of 2021 were invited to participate in a pilot test. The pilot test participants were students of either family members or friends. They were asked to provide feedback to the clarity of each question. The pilot test was executed to ensure the responses would represent data relevant to execute this study.

Participants for this study were career advisors and freshman African American female students. A convenient homogeneous sampling was utilized to identify career advisors and freshmen African American female students to provide relevant answers to each research question. Utilizing this sampling provided an opportunity to narrow the participants into two influential groups, career advisors and freshman African American female students, who reflected on their perceptions and lived experiences (Patton, 2015) regarding the student’s awareness of non-traditional STEM careers. Interviewed participants consisted of three freshmen African American female students and two career advisors who were invited to participate through several Facebook groups.

A convenient homogeneous sampling was also utilized to identify 15 freshmen African American female student participants to complete a 5-point Likert survey. Utilizing this sampling procedure made it possible to identify participants who met the criteria of freshman
African American students. This population was identified as capable of recalling their lived experiences (Patton, 2015) regarding their exposure to non-traditional STEM careers. The participants were identified utilizing several social media networks identified as germane to this study.

The Researcher’s Role

Despite the increase in enrollment of African American female students, history has shown that women comprise less than 25% of non-traditional STEM careers (Patterson et al., 2016). An applied research study’s purpose is to identify a problem and propose a solution. As the sole researcher for this study, my role was as a non-participant observer responsible for amassing data where direct quotations will be utilized to capture the perceptions and experiences (Patton, 2015) of the students becoming aware of STEM careers. Data were collected through interviews, a review of university documents, and an online survey.

Building trust with the participants was essential. It involved communicating the study’s purpose, avoiding leading questions, avoid disclosing my personal opinions or biases, and minimizing disruptions while collecting the data. Participants were informed that the interviews would be audio-recorded. The data were coded to protect their identity and their university, then categorized into similar experiences. The participants were informed that collecting the data will generate a report identifying similar experiences and presenting suggestions to improve the existing process addressing why freshman African American female students were unaware of STEM careers. They were also informed that the data would be stored on an external drive secured in a safe for five years and destroyed afterward. As the researcher, I was responsible for informing participants that they would not sustain any harm and that deceptive techniques would not be used to obtain information. If they decide to terminate their involvement in the study before it is completed, they were informed they could do so at any time and not incur any
adverse consequences. The participants were also provided with an opportunity to ask questions related to the research study.

My inspiration associated with identifying why freshmen African American female students are unaware of non-traditional STEM careers originated from my personal experience of not being exposed to STEM careers while contemplating my career trajectory. As a former adjunct instructor, I discovered several African American female students were also unaware of STEM careers. These are careers that historically have been underrepresented by African American females National Center for Educational Statistics (NCES, 2019). The experiences I encountered being an African American female, who was unaware of STEM careers upon graduating from high school, required that I implement a bracketing technique. This process necessitates that I make a concerted effort to avoid interjecting my experiences and biases to ensure the participants’ data reflect their opinions and experiences (Creswell & Poth, 2018). Additionally, I composed a research journal to capture my thoughts and observations during the interview process to ensure that my biases are not reflected in the participants' transcribed data. I currently work with a local church. I do not have any commitments to any of the participants that propose creating a conflict of interest. Former students that I taught would not be eligible to be participants in this research study; thus, I would not influence participants' responses.

**Procedures**

As the researcher, I submitted a request to Liberty University’s Institutional Review Board (IRB) for approval to conduct my research. I received notification from the IRB indicating that following the Office for Human Research Protections and Food and Drug Administration regulations, my study did not classify as human subject research. The IRB letter indicated that I had their approval to begin my research (see Appendix A for IRB Approval Letter).
Due to the COVID pandemic and my inability to amass data at one university, several social media resources were utilized to identify career advisors and student volunteers to be interviewed (see Appendix E for Participant Interview Questions). Career advisors were identified by utilizing social media networks for career advisors. I sent a message to 10 career advisors through Facebook, petitioning for volunteers to participate in an interview related to how freshman African American female students at their university are informed of STEM careers (see Appendix B for Career Advisor Request to Participate). I received three replies, and I was able to schedule two interviews using a Zoom Room within one week. Information about the study and the request for each participant's consent was obtained verbally and recorded prior to the interview. The informed consent form was reviewed with each participant (see Appendix D for Interview Informed Consent Form). I confirmed each meeting by sending a Zoom link to each interview participant. The third career advisor was not available to participate in the interview for another two weeks.

Student interview participants were identified by utilizing social Facebook groups, Black Americans – Understanding the Real Cost of College, Empowering First Generation College Students, College Freshman Focus, College Bound, College and Career Convos, Common Black College – Application. The participants were established by sending a message to each qualified student requesting volunteers to participate in a short interview (see Appendix C for Student Request to Participate in Interview). Qualification was determined using the survey that requested participants identify if they were freshman African American female students. Of the 15 messages sent to survey participants, two students replied with an interest to participate in the interview. I resent the message to the remaining 13 students again requesting for volunteers to participate in a short interview and I was able to secure a third participant (see Appendix C for Student Request to Participate in Interview). Information pertaining to the study and the request
for participant's consent was obtained verbally prior to the interview and was recorded. The informed consent form was reviewed with each participant (see Appendix D for Interview Informed Consent Form). I confirmed each meeting by sending a Zoom link to each interview participant.

The university document assessment was accomplished by visiting three local universities in southern Georgia. The visits occurred over three weeks and included assessing information from the administrative office, student union, and career advising departments. Student information boards, a student newspaper, and university brochures for students were also examined. The information was reviewed to identify how the universities encouraged freshman African American female students to meet with a career advisor to explore career opportunities that would include information about STEM careers.

Student survey participants were identified by their responses to the first three survey questions, which asked them to identify if they were a freshman student, African American, and a female. The survey informed participants that by completing the survey, they were providing their voluntary consent to participate. Of the 20 students who completed the survey, 15 were identified as meeting the prerequisites. Three students who completed the survey were males, and two students were not freshman students and thus were eliminated from the final results. Google Forms were utilized to amass the responses to 10 survey questions where the responses were measured using a 5-point Likert scale. According to Warner (2013), the responses are weighted and correspond to degrees of agreement utilizing a scale to which one is the lowest level of agreement, and five is the highest level of agreement.

Data Collection and Analysis

Data collection for this study engaged a triangulation of three sources, presenting the researcher with an opportunity to see, hear, and comprehend the problem being studied (Patton,
Triangulation involves using multiple sources to obtain information that can reduce researcher biases and prejudices (Bickman & Rog, 2009). Data were acquired using semistructured interviews with two career advisors and three freshman African American female students. The interview structure created an opportunity for the researcher to compare the participants’ thoughts and perceptions about freshmen African American female students being unaware of non-traditional STEM careers (Bickman & Rog, 2009). Research data were also secured by reviewing university documents to identify methods students were encouraged to discuss their career ambitions with a career advisor. The third source of data collection engaged an online 5-point Likert survey for students to complete. Each method of collecting data had the purpose of amassing data that addressed each research question.

Data analysis for this research study applied open coding, where data were separated into major categories (Creswell & Poth, 2018). As similarities began to emerge, a constant comparative method was applied that incorporated “two general processes:

1. Unitizing – identified patterns allowing the researcher to organize the information into similar categories, and

2. Categorization – presented an opportunity to identify similarities within each category” (Bickman & Rog, 2009, p. 302).

**Interviews**

The first sub-question for this study explored how students and career advisors in an interview would address the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region. Before initiating interviews, I selected a convenient sample of four African American females who will be freshman students in the fall of 2021 to participate in a pilot test. The pilot test participants were students of either family members or friends. The students were asked to
answer the research interview and survey questions and provided feedback to the clarity of each question. The pilot test was executed to ensure the responses would represent data relevant to execute this study. The results of the pilot test required minimal semantic changes to the research questions. Pilot testing can serve the same function as data obtained from prior research; however, when limited studies have been conducted, data collected from pilot testing can identify areas of the study that need to be clarified or strengthened (Bickman & Rog, 2009).

Interviewed participants were informed that their name and the name of their university would not be identified in the report; instead, participants would be identified as career advisor one or two, and students as student one, two, or three to maintain anonymity. At the beginning of each Zoom interview, the researcher shared a short biography that included the researcher’s name, the university they are attending to obtain their Doctor of Education. The researcher informed the participants the purpose of this study was to identify why freshmen African American female students are unaware of non-traditional STEM careers. Participants made aware that the interview should last between 30 to 45 minutes, and would be recorded using Voice Notebook (see Appendix D for Interview Informed Consent Form). They were also notified of their option not to complete the interview without reprisal.

Participants were informed that the questions are not intended to portray the school or the participants in any particular manner. According to the State of Georgia, data obtained for research studies will be secured on an external drive, locked in a safe, and maintained for five years. The information would be destroyed afterward (University of Georgia [UGA], 2019). The information stored included an application to conduct the research, a description of the protocol, signed consent forms, interview transcriptions, review summaries, statement of findings, researcher’s journal notes, and working papers. I asked each participant for their permission to record the interview, which was captured on Voice Notebook. I also asked if they
had any questions before beginning the interview (see Appendix E for Participant Interview Questions).

The interviews consisted of the following 10 questions that focus on career advising resources at their university. Each open-ended interview question “probed for in-depth responses about experiences, perceptions, opinions, feelings, and knowledge of [each participant] relevant to this study” (Patton, 2015, p. 36). The questions below are accompanied by their objective and relevancy to the study.

**Interview questions.**

1. How does your university inform freshman African American female students of available career advising resources? This question seeks to identify how career advisors perceive students as informed of their university's career advising resources. It also recognizes the reality of participating students in how they become aware of career advising resources (Creswell & Poth, 2018).

2. How can the awareness of career advising resources at your university influence a freshman African American female student's career trajectory? This question’s purpose is to comprehend the impact cultural and environmental conditions have on a student’s career trajectory (Krumboltz, 1976).

3. How might a career advisor inspire freshman African American female students to research non-traditional career opportunities they had not previously considered, such as careers in science, technology, engineering, or mathematics? With the wealth of knowledge career advisors have access to regarding market career trends, underrepresented careers, and the potential to match student interest to careers, this question will amass data to assess how career advisors inspire students to discuss with them STEM careers (Hall & Theriot, 2016).
4. What cultural factors could interfere with a freshman African American female student exploring a non-traditional STEM career (science, technology, engineering, or mathematics) with a career advisor? Answering any question that entertains cultural perceptions may generate nonspecific responses so as not to offend any particular culture, race, or gender. The responses to this question will identify the university's awareness of the cultural changes occurring on their campus by assessing how familiar career advisors are with cultural influences that can persuade a student's career trajectory (Saladaña, 2016).

5. How does your university inform freshman African American female students of non-traditional STEM careers? (science, technology, engineering, and mathematic). This question can offer insight into the perception of a student’s awareness of STEM careers (Creswell & Poth, 2018).

6. How does your university encourage freshman African American female students to consider non-traditional STEM careers? Responses to this question will provide both a perception, how career advisors perceive their university encourages students to consider STEM careers, and the lived experiences of students and how they obtain information regarding STEM careers (Creswell & Poth, 2018).

7. Besides the career center, how else can freshman African American female students become aware of non-traditional STEM careers? The career advisors’ replies will identify where students can obtain information regarding STEM careers, other than the career services department. The students' replies will offer their lived experience of obtaining information regarding STEM careers or knowing where to acquire knowledge of STEM careers (Henry, 2015).
8. How could your university improve its process of informing freshman African American female students of career advising resources that will identify non-traditional career opportunities to consider? Data obtained from this question will suggest opportunities to enhance the existing process of informing students of STEM careers (Saladaña, 2016).

9. What are the benefits of encouraging freshman African American female students to schedule an appointment with a career advisor during their freshman year? The career advisor and the students can identify what they perceive as the benefits of discussing career objectives with a career advisor (Bimrose, McMahon, & Watson, 2013).

10. What factors could enhance or hinder a freshman African American female student discussing career opportunities with a career advisor? Replies to this question indicate career advisors' presumption as to why students do not pursue their advice. Replies will also identify why students do not consult with a career advisor to discuss career opportunities (Fadulu, 2018).

Data analysis for this study was conducted simultaneously as the data was collected. Each data collection method employed slightly different strategies to analyze. Interviews and student surveys employed an open coding system, where data was separated into major categories (Creswell & Poth, 2018). Interviews were recorded using Voice Notebook, a software which transcribed the exchange between the interviewer and the student during the interviews. Each transcription received a code to represent each interview participant to maintain anonymity. Participants were identified as either career advisor one or two, or student one, two, or three. Once interviews were transcribed and similarities emerge, a constant comparative method was utilized where according to Bickman and Rog (2009), this method incorporated “two general
processes: (1) Unitizing [patterns] . . . and (2) Categorization” (p. 302). Utilizing this method helped the researcher identify patterns from the data amassed to categorize similar responses (Gall et al., 2007). Once the information was categorized and analyzed, the results were displayed using a table identifying commonly expressed codes.

**University Document Review**

The second sub-question for this study explored how reviewing career advising documents could address the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region? The document assessment included visiting the administrative office, the student union, and the career advising departments at the three universities in southern Georgia. The researcher observed posters, announcement boards, brochure displays, and the college website to identify how students were encouraged to discuss career goals with a career advisor. Four students also made available copies of their acceptance letters from four different universities, two in Mississippi and two in Alabama. The letters were also assessed as to whether students were encouraged to discuss career opportunities.

The data obtained was compiled and arranged into categories to facilitate comparison between categories and within each category. The researcher identified organizational categories that identified common categories and categories identified as insignificant, then transitioned into theoretical categories that provided insight into how the university communicates career services available for students to discuss STEM careers (Bickman & Rog, 2009). The implementation of categories established an opportunity to formulate a general understanding of why students are unaware of non-traditional STEM careers. Analysis of the documents obtained from the universities visited allowed the researcher to engage a parallel mixed analysis method where the university documents were analyzed parallel to the data accumulated from the
interviews and the surveys (Bickman & Rog, 2009). The objective was to allow the data gathered to illustrate a story of why freshmen African American female students are unaware of non-traditional STEM careers.

**Survey**

The third sub-question for this study explored how quantitative survey data can solve the problem of freshmen African American female students unaware of non-traditional career opportunities at universities located in the United States’ southern region. Utilizing social media, I posted a Google Form survey to several Facebook groups inviting freshman African American female students to complete the survey (see Appendix F for Participant Survey Questions). The participant responses were downloaded from the Google Forms into bar charts that displayed responses to each question. The survey questions below are accompanied by their objective and relevancy to the study.

**Survey questions.**

1. It is expected that freshman African American female students discuss their career goals with a career advisor?

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

   To establish the significance of students discussing their career goals with a career advisor during their freshman year (Bimrose, McMahon, & Watson, 2013).

2. It is essential for freshman African American female students to identify a major when they begin college?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

   Yes, it is essential for students to identify a major early to guide their academic and career paths. (Bimrose, McMahon, & Watson, 2013).
To assess whether students encounter pressure to declare a major during their freshman year of college (Matthew, 2017).

3. It is critical to require freshman African American female students to discuss career goals with a career advisor?

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

To determine if the students consider meeting with a career advisor during their freshman semester to discuss career opportunities as necessary (Bimrose, McMahon, & Watson, 2013).

4. Career advisors are experienced in discussing non-traditional STEM careers with freshman African American female students who are undecided about their career trajectory? (STEM careers include science, technology, engineering, and mathematics).

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
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</table>

To assess the student’s perception of whether career advisors are perceptive to a culturally diverse student population’s cultural influences and are capable of encouraging them to pursue STEM careers (Fisher, 2016).

5. Career advisors regularly discuss non-traditional career opportunities with freshman African American female students?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
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</tbody>
</table>
To assess the student’s perception of whether career advisors are cognizant of cultural communication barriers that would interfere with their ability to discussing STEM careers with freshman African American female students (Fisher, 2016).

6. Freshman African American female students are aware of available career advising resources at your university?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
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</table>

To determine whether students are aware of career advising resources at the student’s university that would advise them of career opportunities they had not previously considered (Lopez, 2014).

7. Being aware of career advising resources will encourage an African American female student to explore career opportunities they had not previously considered with a career advisor?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
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</table>

This question assesses the value placed on a student's advice from a career advisor, inspiring them to explore careers they had not previously considered (Duarte, 2017).

8. The university you attend employs several approaches to inform freshman African American female students of the available career advising resources?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
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<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
To identify how the university informs these students of available career resources (Creswell & Poth, 2018).

9. Career advising resources are both valuable and beneficial for freshman African American female students?

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

To evaluate the value and benefit of career advising resources available to freshman African American female students (Hall & Theriot, 2016).

10. How likely are you to utilize or refer another freshman African American female student to utilize the career advising resources at your university to discuss career goals?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
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</table>

To determine if the students identify the career advising resources their university as beneficial and refer other students to discuss their career goals with an advisor (Kaplan et al., 2017).

The online survey utilized a 5-point Likert scale comprised of closed-ended questions. The closed-ended responses were weighted and categorized based on the participant’s corresponding degree of agreement. This study used a cross-sectional survey design which measures the current beliefs, practices, and attitudes (Creswell & Poth, 2018) of participants that belong to the same cultural, gender, and student classification. The survey results were used to evaluate how freshman African American female students become aware of non-traditional STEM careers at various universities and identify opportunities to improve current practices.
The survey results are displayed utilizing a bar chart representing the distribution of student responses (Warner, 2013).

**Ethical Considerations**

The researcher considered several ethical concerns when gathering data and reporting the results. These included being honest and transparent with the participants, not making promises or causing harm to them, informing them of the purpose of the study and how the data will be utilized. Once participants were identified, pseudonyms and codes were employed to maintain the participant’s and the university’s anonymity. It was made known to all participants that, according to the State of Georgia, all data collected for this study would be secured on an external drive, locked in a safe, and maintained for five years, after which the information will be destroyed (UGA, 2019). Information that would be stored included the application and description of the research study, the IRB approval letter, and survey forms indicating informed consent was received. Also included is a sample questionnaire and survey, statement and review of findings, progress reports, working papers, and journals. Any issue that arises during the study was handled appropriately according to the level of severity.

**Summary**

Chapter Three commenced by identifying the purpose of this applied research study of why freshmen African American female students are unaware of non-traditional STEM careers at their university. A multimethod design was introduced which integrated three methods of collecting data. Two qualitative methods were incorporated into this study: interviews with career advisors and students and a review of three universities in southern Georgia documents, and student acceptance letters from four universities. The quantitative method employed an online 5-point Likert scale with closed-ended questions to accumulate survey data. The setting for this study involved the use of several social media resources to amass data relevant to the
study. The participants consisted of two career advisors and 18 freshmen African American female students. Defined was the motivation that inspired conducting this multimethod research study along with the role of the researcher. The procedures followed included obtaining IRB approval. Specifics regarding each data collection method were identified, along with how the data was analyzed. Chapter Three concludes by addressing ethical considerations and how the State of Georgia expects data will be maintained.

The following chapter, Chapter Four, introduces the results of the data collected and analyzed for this research study. This chapter defines the categories and themes that emerged by engaging in a constant comparative method. Relevant charts accompany these themes that define the students' lived experiences relating to their knowledge of non-traditional STEM careers at their university. The summary of the findings will succinctly align with each answered research question before the conclusion of the chapter.
CHAPTER FOUR: FINDINGS

Overview

The purpose of this applied study was to solve the problem of freshman African American female students being unaware of science, technology, engineering, and mathematics (STEM) careers at universities and to identify a resolution for career advisors to consider. The problem is that freshman African American female students are among a classification of students unaware of non-traditional STEM careers (Schmid et al., 2015). Chapter Four outlines the participants involved in this study and the sequence of data obtained to address each sub-question. Tables and figures are presented to support the reader in visualizing the data collected and where common themes become evident. Chapter Four addresses the theoretical literature presented in Chapter Two while contributing to the limited research that has been conducted addressing why freshmen African American female students are unaware of STEM careers. This research will culminate with a summary of the information presented in Chapter Four.

Participants

This research study was conducted during a viral pandemic, making it necessary to modify how data would be acquired. Utilizing one university to amass research data was not feasible, and alternative data collection methods were identified. Engaging social media became a practical resource to identify interview and survey participants.

Interview Participants

Participants for the qualitative interviews consisted of two career advisors and three freshman African American female students. The interviews were conducted utilizing Zoom Rooms, a software-based conference room that allowed the interviews to be conducted over the internet. With the consent of the participants, interviews were recorded and transcribed using Voice Notebook, a voice recognition application for converting speech to text. Student
participants for the survey were freshman African American females who have graduated from high school within the past three years.

While conducting the interviews, the researcher implemented a bracketing technique. Bracketing involves making a conscious effort to avoid interjecting the researcher’s opinions and biases during the interviews to ensure the responses represented their perceptions and experiences. During the interviews, the researcher also kept a journal that captured the researcher’s observations and recorded any follow-up or clarifying questions to ask the participants. The journal allowed the researcher to reflect on student responses.

**Career advisor one.** Career advisor one was a Career Development Advisor employed at a university in Massachusetts. She was a White female that has been employed with the university for five years. She received her Business Administration degree eight years ago. Career advisor one’s opinion was that the university could improve how they communicate STEM careers to freshman African American female students. She indicated that discussing non-traditional careers with these students could be enhanced by identifying professionals with similar appearances and similar career trajectories.

**Career advisor two.** Career advisor two was a White female Career and Academic Advisor employed at a university in Pennsylvania. She has been employed there for two years. Career advisor two graduated college three years ago with an Education degree. She is currently enrolled part-time in the Master of Science in Education program at the university where she is employed. Career advisor two stated that first-year students are anxious to receive career guidance. She believed communication could be improved at the university.

Career advisor two expressed a cultural concern where race and socioeconomic status often impact freshman African American female's exposure to non-traditional career opportunities. In her opinion, she presumed that building a trusting relationship with students
would be beneficial when exploring career opportunities the students had not previously considered. Career advisor two believed that many students identify the career advising department as assisting with writing cover letters and resumes and assisting with job searches, not as a department to assist students in identifying non-traditional career opportunities to pursue.

**Student one.** Student one is a second-semester freshman. While she was a senior in high school, student one also attended the local community college in Mississippi, where she received college credits. She is currently attending a university located in Mississippi. She is an only child who is on a basketball scholarship at her university. Student one is interested in becoming a social worker and has expressed a desire to work with disadvantaged youth when she graduates. She mentioned that during her first semester, she had not discussed her career goals with an advisor. She also considers this a university weakness, especially for an 18-year-old who is undecided about their career trajectory. Her perception was that family members are persuasive in informing students of their career expectations. Student one identified that she was unaware of how the university informed freshman African American female students of STEM careers. She believes that to address cultural factors, an experienced career advisor should become familiar with the cultural influences and the strengths and interests of students.

**Student two.** Student two is a second-semester freshman attending a university located in Alabama. Student two is the oldest and only female of her four siblings. She is a first-generation college student. During the interview, student two indicated that she was pursuing a degree in English but expressed an interest in healthcare administration. She had not considered other career opportunities. She indicated that she had not met with an advisor at the university who encouraged her to explore career opportunities she had not considered. Student two shared she was not familiar with how the university encourages freshman African American female
students to consider non-traditional careers. She did suggest that involving alumni could be an option. She also suggested that freshmen students could benefit from attending the university job fairs to become familiar with educational obligations.

**Student three.** Student three is a second-semester freshman student who attends a university located in Oklahoma. She has a sister who is younger than she, and she is a first-generation college student. She is a history major and would like to teach junior high school when she graduates. During the interview, student three informed the researcher that her career advisor assisted with her course selections and discussed careers with her. The career advisor encouraged her to research careers that complimented her interest in working with high school students. Student three indicated that her family encouraged her to concentrate on a traditional career that would provide a consistent income. Student three expressed the external pressures and expectations she received from her family, but she was grateful for their advice. She mentioned that she was not aware of how or if her university encourages freshman African American female students to consider STEM careers.

**Survey Participants**

Data for the quantitative surveys were achieved utilizing several social media platforms. The survey was uploaded to several social media resources and invited freshman African American female students to complete a 5-point Likert survey. The survey requested participants to identify if they were freshman African American female students and informed them that completing the survey represented their voluntary consent to participate (see Appendix F for Participant Survey Questions).

**Results**

A multimethod research design consisting of both qualitative and quantitative methods was utilized to amass the data. The qualitative method consisted of semistructured interviews
with two career advisors and three freshman African American female students. The responses provided an opportunity to compare the thoughts and perceptions of the participants. The second qualitative method of accumulating data involved reviewing documents from several universities. The review of documents was to identify how career advising resources were communicated to freshman African American female students. Finally, the quantitative method of amassing data involved a 5-point Likert scale survey that measured whether the participants agreed or disagreed with specific statements relating to the career advisor’s involvement in informing students of non-traditional STEM careers.

**Sub-question One**

The first sub-question for this study explored how would students and career advisors in an interview solve the problem of freshmen African American female students unaware of non-traditional career opportunities at their university. Interviews were conducted with two career advisors and three freshman African American female students, each representing a different university. The interviews were accomplished using Zoom Rooms and were recorded and transcribed using Voice Notebook due to COVID-19 restrictions. The interviews consisted of 10 open-ended questions, and each interview lasted approximately 30-40 minutes. Several similar concerns became apparent during the interviews and are revealed in Table 4.1.

**Theme #1.** The significance of improving communication. There was a consensus between the career advisors and students that communication between the two needed improvement. The students perceived their career advisors were not concerned with their interests. Student three asserted that when advisors are unaware of their interests, they might influence students to consider traditional careers that do not include STEM careers. Lee (2012) perceives that a culturally competent career advising process is predicated on the advisor's commitment to communicating with a diverse student population.
Table 4.1. Interview Codes and Frequency. Codes related to common themes expressed between career advisors and freshman African American female students.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>Improve communication of STEM careers to African American students</td>
<td>12</td>
</tr>
<tr>
<td>Freshman unsure of career goals</td>
<td>11</td>
</tr>
<tr>
<td>Establish trust between student and career advisor</td>
<td>10</td>
</tr>
<tr>
<td>Family expectations for career goals</td>
<td>6</td>
</tr>
<tr>
<td>Identify professionals that students can associate with, &quot;who look like me&quot;</td>
<td>6</td>
</tr>
<tr>
<td>Involve alumni to speak with freshman about career goals and opportunities</td>
<td>4</td>
</tr>
<tr>
<td>Career fairs - to become familiar with career expectations</td>
<td>3</td>
</tr>
<tr>
<td>Students learn about STEM careers from professors, mentors, and classmates</td>
<td>3</td>
</tr>
<tr>
<td>Cultural factors interference includes race and socioeconomic status</td>
<td>3</td>
</tr>
<tr>
<td>Become aware of STEM careers from a career advisor and career center</td>
<td>2</td>
</tr>
<tr>
<td>Provide aptitude test to align with strengths and career interests</td>
<td>2</td>
</tr>
<tr>
<td>Career services review cover letters, resumes, and help find a job</td>
<td>2</td>
</tr>
<tr>
<td>Awareness of STEM careers at Freshman Student Orientation</td>
<td>1</td>
</tr>
<tr>
<td>Students are not encouraged to consider non-traditional STEM careers</td>
<td>1</td>
</tr>
</tbody>
</table>

Theme #2. Establish trust between the career advisor and the freshman African American female student. Career advisor two stated that it is essential to build a connection with the student to benefit from the advising experience. Trust and respect for career advisors are often jeopardized when African American female students are not encouraged to explore non-traditional career opportunities.

Theme #3. The advantages of implementing cultural sensitivity and awareness training. The interest in training became prevalent as the diverse student population continues to increase. There is a focus for career advisors to become culturally familiar with a diverse student population. Student one believes that students may avoid inquiring about STEM careers because they do not want to appear uneducated. Student one believes that family pressures contribute to students not asking an advisor about non-traditional careers. Students one and three agreed that receiving pressure from their family to pursue specific careers were common in their community. Advisor two believes that race and socioeconomic status also influence exposure to career
opportunities. The university could improve researching STEM career opportunities with a culturally diverse student population.

**Sub-question Two**

The second sub-question for this study explored how reviewing career advising documents would solve the problem of freshmen African American female students unaware of non-traditional career opportunities at their university. Although classes were not being held on the campuses, the document assessment consisted of visiting the administrative office, the student union, and the career advising departments of three local universities in southern Georgia. The researcher observed posters, announcement boards, and brochure displays. Four students also made available copies of their acceptance letters from four different universities, two in Mississippi and two in Alabama.

**University one.** During the researcher’s visit to university one, the researcher noticed posters and notices on each building entrance and throughout each building's hallways defining the university's COVID-19 restrictions and requirements. In the administrative building, several announcement boards provided career opportunities at the university and the equal employment opportunity law posters. Other posters displayed throughout the hallways were recognition news articles about the university. There was also a display of majors offered at the university. During the researcher’s visit to the career services office, the researcher was informed that students' services were listed on their website.

**University two.** The researcher’s visit to university two resulted in similar information being displayed regarding COVID-19 restrictions and requirements. These posters were located on the doors and throughout the hallways of the university. Posters were displayed in the administrative office that defined services available to students in need of special accommodations. They were able to provide the researcher with a pamphlet titled Career
Services that discussed Handshake. Handshake is an online career management system where students can schedule appointments with a career advisor. Handshake also allows students to become involved in virtual skills development workshops. The goals presented on the brochure encouraged personal career exploration and provided access to career services through their technological resources. There were also brochures discussing financial aid and military recruiting information.

University three. University three resulted in similar posters defining the campus restrictions and requirements regarding COVID-19. The notices were displayed on the entrance doors and in the hallways. There were several posters displayed on student information boards announcing virtual events being held that included guest speakers and job fairs. Also on display was information promoting the military. The researcher had an opportunity to peruse the university student newspaper. The information the researcher was able to examine did not provide information promoting career advising resources available to students.

Acceptance letters. Students from four universities made available their acceptance letters. The letters were congratulatory and provided information regarding opportunities students will be exposed to while attending their university. The first letter from Russell University (pseudonym) acquainted the student with their cultural, moral, and spiritual values. The letter also provided information outlining the requirements for freshman students interested in applying for an honors scholarship. The acceptance letter from Green University (pseudonym) mentioned the opportunities for students to study abroad and participate in their internship program. The third acceptance letter from James University (pseudonym) provided a checklist of items to submit to the university to begin the enrollment process. The fourth acceptance letter from Grace University (pseudonym) was short, acknowledging acceptance to the university. A review of the four acceptance letters did not encourage students to meet with a
career advisor to discuss career goals and career opportunities.

**Theme #1.** Universities are ineffective at communicating and encouraging students to meet with a career advisor. The COVID-19 pandemic may have hindered information being displayed for students informing or encouraging them to meet with a career advisor to discuss career opportunities. The information that was prominent through the university defined the university requirements and restrictions related to COVID-19.

**Theme #2.** The college acceptance letter did not communicate available career advising resources. The college acceptance letter offers universities a platform to introduce freshman African American female students to various career advising resources. This form of communication allows the university to encourage students to meet with a career advisor during their freshman year. When students are aware of career advising resources, they have an opportunity to explore careers they had not previously considered.

**Theme #3.** University websites promoted career advising resources. The website for university one revealed an opportunity to meet with an admissions advisor who reviews available majors with students. However, the university did not promote career advisors to help students explore career opportunities that include non-traditional STEM careers. The student services section provided information valuable to graduating students to develop their cover letter, resume, and job search assistance. Information appropriate for a freshman African American female student unsure of her career trajectory was not apparent.

One college website revealed a student advising category that listed services available to the students. Their website informed students of services to assist them in managing stress or navigate technological challenges. The information regarding services to assist students in exploring career opportunities was limited. Another website presented a Student Services Division promoting dissecting a major. By completing a 30-minute exercise, this program is
designed to provide an overview of available majors. Upon completing the exercise, the student can meet with a career advisor to discuss the majors. The information presented on the university website vaguely mentioned cultural diversity. It was not apparent where the school encouraged students to explore non-traditional STEM career opportunities.

**Sub-question Three**

The third sub-question for this study explored how quantitative survey data could solve the problem of freshmen African American female students unaware of non-traditional career opportunities at their university. Google Forms was utilized to create the survey, which also produced bar charts documenting similar responses. Of the 20 surveys received, 15 surveys were accepted as meeting the criteria of freshman African American female students. The surveys not meeting the criteria and thus eliminated from the results included three male students and two participants who were not freshman students. The participating student's perceptions and experiences for each survey question are reflected in Figures 4.1 – 4.10.

![Bar Chart](image)

**Figure 4.1. The expectation that freshman African American female students should discuss their career goals with a career advisor.**

Although 20% of the participants strongly agreed that students should discuss their career aspirations with a career advisor, the majority of the participants agreed that students would benefit by discussing their career trajectory with a career advisor at 40%. Seven percent of the
participants did not have an opinion either way. Of those surveyed, 33% disagreed with it being necessary to discuss career opportunities with an advisor.

![Figure 4.2. Identifying whether it is necessary for freshman African American female students to confirm a major when they begin college.](image)

Seven percent of the participants strongly agree that it is essential for students to identify a major before they begin their freshman year of college; however, 47% of the students agreed it was essential to confirm a major when they begin college. Twelve percent of those surveyed did not have an opinion either way. The participants who disagreed with it being essential to confirm a major when they begin college was 27%. Seven percent of the participants strongly disagree that freshman African American female students should identify a major when they begin college.

![Figure 4.3. Reveals whether freshman African American female students should be required to meet with a career advisor to discuss their career goals during their freshman year.](image)
It was prevalent at 53% that most participants strongly agreed that freshman African American female students should be required to meet with a career advisor to discuss their career goals. Although 27% of participants agree with this proposed requirement, 13% did not have an opinion either way. Seven percent of participants disagreed with requiring freshman African American female students to meet with a career advisor to discuss career goals.

![Figure 4.4. Student’s perception of career advisors being experienced to discuss STEM careers with freshman African American female students.](image)

Twenty percent of the participants strongly agreed that career advisors were prepared to discuss STEM careers with freshman African American female students. The majority of participants, 33%, agree that career advisors were experienced in discussing non-traditional careers with freshman African American female students. Twenty percent did not have an opinion either way. Those that disagreed with advisors being experienced in discussing non-traditional careers with these students were 27%.
Twenty percent of the participants agreed that career advisors discuss non-traditional careers with freshman African American female students. Twenty percent also did not have an opinion either way. Of those surveyed, 53% of the participants disagree that career advisors discuss non-traditional careers with freshman African American female students. The survey reported that 7% strongly disagree with this statement.

The perception was that 20% of the participants strongly agree that students are aware of available resources. Those surveyed that agreed with students being aware of resources was 33%. The participants that did not have an opinion, either way, was 7%, and 40% of the
participants believe that the students were unaware of available career resources at their university.

Figure 4.7. If being aware of career advising resources would encourage freshman African American female students to explore careers they had not previously considered with a career advisor.

Seventy-three percent of the participants strongly agreed that being aware of career advising resources would encourage them to discuss careers not previously explored. In contrast, 27% of the participants agreed with the prospect of exploring career opportunities with a career advisor. There were no participants who disagreed with being aware of career resources would provide freshman African American female students with the opportunity to identify careers they had not previously considered.

Figure 4.8. Identifies how familiar freshman African American female students are with how their university communicates available career advising resources.
Thirteen percent of participants strongly agreed that their institution employed several approaches to inform students of available career advising resources. Participants that agreed their college or university utilizes several approaches to inform students of career advising services was 47%. The participants who did not express an opinion either way or disagreed with their institution exploring different approaches to inform students of career advising services were both at 20%.

Figure 4.9. Determining the value and benefit career advising services are for freshman African American female students.

The participants expressed their perception regarding the information career advisors provide to freshman African American female students. All of the students participating in the survey agreed at some level that career advising resources are both valuable and beneficial for freshman African American female students to gain knowledge of non-traditional careers. Sixty-seven percent of the student surveyed strongly agree with the value of these resources. Thirty-three percent of the students agree with this statement.
Students who find value in university career resources are likely to utilize the services and refer other students to the services. Forty-seven percent of the participants strongly agreed and agreed to either utilize the career advising resources at their university or refer another freshman African American female student to inquire about the available resources. Six percent of the students did not express an opinion either way.

**Theme #1.** Freshmen African American female students would benefit from being required to meet with a career advisor during their freshman year. Answers to survey question six, which determines how familiar the students were of the career advising resources at their university, show that 40% of students were unaware of career advising resources. However, 53% of the students agreed that students should be required to meet with a career advisor their freshman year. They agreed that being aware of their university's career advising resources would allow them to explore careers they had previously not considered. For African American female students, educational accomplishments present access to professional advancements and job satisfaction opportunities (Storlie et al., 2018); however, this is only feasible when they have knowledge of non-traditional STEM careers.

**Theme #2.** The perception is that career advisors do not discuss non-traditional STEM
careers with freshman African American female students. Twenty-seven percent of the students surveyed believe career advisors are not culturally experienced in discussing non-traditional careers with freshman African American female students. This perception supports why 53% of students surveyed believe career advisors are not discussing STEM careers with African American students. When career advisors are unfamiliar with cultural factors that can interfere with African American awareness of non-traditional careers, they can unintentionally deter them from exploring STEM careers (Fisher, 2016).

**Theme #3.** Freshman African American female students utilizing career advising resources are likely to become aware of non-traditional STEM careers. The participants surveyed all agree that having knowledge of the career advising resources at their university would encourage them to explore careers they had not previously considered. According to Lopez (2014), 10% of students do not utilize their university career resources. Those surveyed agreed that they would meet with a career advisor to explore non-traditional careers if they were aware of these services.

**Discussion**

Cultural diversity on college campuses has been increasing for more than two decades (Childs, 2017). Career advisors are encountering students from various cultures and social-economic backgrounds searching to establish a career trajectory. African American females receive more undergraduate degrees than Black males (NCES, 2019). However, non-traditional careers in science, technology, engineering, and mathematics continue to be represented by less than 25% of African American females (Mayes & Hines, 2014).

**Empirical Significance**

The empirical significance of the study presented an additional layer of research that emphasizes the importance of career advisors assisting freshman African American female
students in exploring career opportunities that would include STEM careers. Study results were based on the participants' knowledge and lived experiences of students' awareness of non-traditional STEM careers. Student one commented that she was not familiar with whether her university engaged freshman African American female students in discussions about their career interests. Student two indicated she was not encouraged to explore non-traditional STEM careers at her university. She was also not aware of career advisors encouraging other African American female students to consider a non-traditional career. The data obtained through student interviews and surveys support Schmid’s et al. (2015) statement that freshman African American female students were among a classification of students unaware of STEM careers. Advisor one suggested that African American female students unaware of non-traditional careers are directly related to communication deficiencies that need to be addressed. Advisor one agrees this is an area that warranted attention. Kurtz-Costes et al. (2014) believe that when freshman African American female students are not exposed to non-traditional STEM careers, they often resort to exploring gender stereotype careers.

**Theoretical Framework**

The theoretical framework for this study examined the connection between two career selection theories that explore why students are unaware of STEM careers. By implementing the social learning theory of career selection simultaneously with the conversation theory, many of these factors that interfere with an awareness of STEM careers would be identified and addressed. Krumboltz (1976) presumes that African American students unaware of non-traditional careers are associated with their cultural and environmental conditions, social learning experiences, cognitive and emotional responses, and genetics. The conversation theory focuses on establishing communication strategies for career advisors to encourage students to explore careers they were either unaware of or had not considered.
Several students feared they would not be seen favorably by their White peers (Guiffrida & Douthit, 2010) if they discuss their career interests with an advisor. Student one believes that some students are told that they were not smart enough to pursue specific careers and avoided discussing career opportunities with a career advisor. Patton (2015) concluded that a career interest is manifested when the student can perceive herself as achieving that goal. When students are unaware of career advising resources, student three said this contributes to their hesitation of defining a career trajectory.

Family influences also impinge on the African American female career decision, limiting their access to becoming familiar with non-traditional STEM career opportunities. During the interview with student one, she indicated that there are students who were informed of their expected career trajectory and are not encouraged to explore non-traditional careers. Being a first-generation college student, student three informed the researcher that her family encouraged her to pursue a traditional teaching career to have a stable income. They did not encourage her to explore non-traditional careers. The participants' responses support Fadulu's (2018) perception that family and community members can influence career opportunities. Being unfamiliar with non-traditional career opportunities positions freshman African American female students at a disadvantage that can profoundly transform their career opportunities.

**Code of Ethics**

African American female students have expressed a concern that when career advisors are unfamiliar with how cultural and environmental factors influence their career trajectory, they believe career advisors can unintentionally deter them from exploring STEM careers (Fisher, 2016). Implementing training strategies would require career advisors to eliminate bias perceptions and become cognizant of their cultural values and expectations. Training would
involve career advisors acknowledging personal cultural beliefs and values and identifying how they communicate with students of different races, cultures, and genders.

The code addresses the significance of ongoing career development for career advisors. It also establishes values and principles to ensure the career advisor engages in ethical and unbiased behavior when meeting with freshman African American female students. Career development training contributes to an awareness of how their guidance can influence the career trajectory for these students. Career advisors who routinely meet with African American students cultivate an appreciation and understanding of their cultural and family expectations.

**Barriers to Overcome**

Lopez (2014) identified that less than 10% of students utilize university campuses’ career resources. Some African American female students identify career advisors perceiving their cultural beliefs and family expectations as insignificant and irrelevant (Krumboltz, 1976). However, when career advisors commit to becoming familiar with cultural influences, they recognize and respect cultural diversity (Cobham & Patton, 2015) among the students at their university. Career advisors, however, must be capable of separating their biases and personal interests (Krumboltz, 1976) from the students they are advising to focus on the career objectives. Student one believed that an influential career advisor would become familiar with the cultural interests of the students they encourage to explore non-traditional careers.

As career advisors take the initiative to educate themselves on cultural factors that influence a career trajectory (Hall & Theriot, 2016), a trusting relationship begins to evolve with students. Trust progresses when universities promote career services that inspire African American female students to explore careers they had not considered. Advisor one agreed that building a trusting relationship with students would enhance their ability to exploring non-traditional STEM careers with African American female students. Career advisor two
acknowledged that cultivating a connection and trust with the student encourages them to benefit from their career advising experience.

Career advisors neglecting to inspire freshman African American female students from exploring non-traditional STEM careers promotes the significance of requiring cultural proficiency training. The students interviewed advocated that training should integrate career advisors identifying other successful African American females. According to student three, identifying other women from her culture who are successful in STEM careers would encourage her to explore non-traditional career opportunities. Student two also believes that meeting other professional African American females, who have successfully pursued non-traditional careers, might encourage her to explore non-traditional STEM careers.

**Summary**

Chapter Four commenced with an overview of the problem and purpose of this research study. A detailed description of each participant in the study was provided. The results of the study were narrated, addressing each sub-question and identifying themes associated with each sub-question. The narration began with interviews followed by documents reviewed from three area universities and culminating with an overview of the survey results. Chapter Four concluded with discussing the primary concerns presented in Chapter Two with research data to support each concern.

The final chapter, Chapter Five, will present the conclusion of this study by providing solutions to the central question; how can the problem of freshmen African American female students unaware of non-traditional career opportunities be solved? Resources and funds will be presented to address the problem and the roles and responsibilities of essential personnel to implement the proposed solutions. Chapter Five will propose a timeline to resolve the problem
and identify the benefits and constraints related to the recommendations. An evaluation plan to assess the effectiveness of the solutions will be presented.
CHAPTER FIVE: CONCLUSION

Overview

The purpose of this applied study was to solve the problem of freshman African American female students being unaware of science, technology, engineering, and mathematics (STEM) careers at several universities and to identify a resolution for career advisors to implement. The problem was that freshman African American female students were among a classification of students unaware of non-traditional STEM careers (Schmid et al., 2015). Establishing a career trajectory can be one of the more challenging decisions of a freshman African American female student.

Chapter Five presents the conclusion of this study by answering the central question: How can the problem of freshmen African American female students unaware of non-traditional career opportunities be solved? Resources and funds needed to address and solve the problem are projected. The roles and responsibilities of personnel involved with implementing the solutions will be defined. A timeline to resolve the problem will be proposed. Chapter Five will culminate with an evaluation plan designed to assess the effectiveness of the proposals and a summary of the information presented in this research study.

Restatement of the Problem

Cultural diversity among higher educational institutions was not a familiar climate 25 years ago (Childs, 2017). Banks (2019) predicted that by the year 2020, institutions would be challenged with addressing the educational needs of an increasingly diverse student population. Numerous studies explored the challenges universities encounter when multicultural student enrollment increases (Hansen-Thomas & Chennapragada, 2018). However, these studies neglected to address why freshman African American female students were unaware of non-traditional STEM careers.
Proposed Solutions to the Central Question

The results of this study supported the significance of career advisors being cognizant of cultural influences that can impede a freshman African American female student’s awareness of non-traditional career opportunities. Convincing university administrators of the significance of incorporating cultural proficiency training into the annual training would require acquainting them with cultural diversity challenges identified while assessing the data obtained from participants and from a review of university documents. The solution that resonated throughout the study focused on improving communication between career advisors and African American female students. The results of the study identified that students are unaware of career advisors discussing non-traditional STEM careers with these female students. Further solutions discovered include the need to inform freshman students of the career advising resources available to them. All universities have university or student newsletters that present an optimal opportunity to encourage students to meet with an advisor to discuss career opportunities and become familiar with the career advising resources available to them. Informing students of these resources would encourage them to explore career opportunities with a career advisor that would include becoming aware of non-traditional STEM careers.

As the diverse student population continues to increase on college campuses, cultural proficiency training emerged as a fundamental solution to address the widespread communication challenges. It is essential that cultural proficiency training incorporate the philosophies of the career selection theories of Krumboltz (1976) and Pask (1975). These theories encourage career advisors to comprehend cultural views that influence students' awareness of non-traditional careers. Cultural proficiency training also involves career advisors being cognizant of their beliefs and how they may influence their ability to provide unbiased career guidance to students from different cultures.
Visiting several area universities and examining their websites revealed a deficiency in communicating career advising resources available to students. A review of the student’s acceptance letters was also ineffective at encouraging students to explore careers they had not considered with a career advisor. There are multiple opportunities for universities to promote career advising resources available to students and encourage freshman students to assess the career outlook for various careers that include brochures, correspondence sent to freshman students, the university website and newspaper. Student’s awareness of non-traditional STEM careers is enhanced when they are familiar with career advising resources.

**Resources Needed**

The resources needed to implement the solutions for this research study begin with the university adopting the theoretical career selection theories of Krumboltz (1976) and Pask (1975). The principles of these theories become the foundation for training development. Both theories will assist the training developers identify why freshman African American females are unaware of non-traditional STEM careers.

Having been the Vice President of Human Resources for numerous companies and the principal of a human resources consulting company, the researcher has extensive knowledge in developing and implementing training initiatives, where an existing training budget absorbs the cost. Developing cultural proficiency training requires the university’s support and approval to be incorporated into existing required diversity training. Protocol required to secure the university approval will be executed.

The resources needed would commence with identifying a training development team from existing trainers employed by the university. The staff responsible for training and development would be familiar with developing training and creating train-the-trainer courses. The trainers will familiarize themselves with the principles of Krumboltz (1976) and Pask’s
(1975) career selection theories. Knowledge of the theories will provide an infrastructure for developing cultural proficiency training. The trainers will rely on the information technology department to provide technical support for training material, remote access to training, and troubleshooting technical issues. Information technology specialists will be instrumental in ensuring the evaluations are forwarded to freshman African American female students, and the responses are reported to the appropriate trainers. Additional resources would require students to complete the evaluations at the conclusion of the fall and winter semesters.

**Funds Needed**

The educational environment three decades ago has evolved to include students, faculty, and staff from diverse cultures and socioeconomic backgrounds. The overarching responsibility to embrace and commit to creating an inclusive education environment for students resides with those employed by the university. The training responsibilities for career advisors would be absorbed into existing university training, thus reducing university expenses. Expenses incurred would involve unforeseen expenses that would be identified, for financial reporting purposes, as miscellaneous expenses. These expenses would be identified as they occur and would be factored into future funding needs.

**Roles and Responsibilities**

The goal is to solve the problem of freshman African American female students being unaware of non-traditional STEM careers and to present a resolution for universities to adopt. The responsibility to address African American female educational interests does not reside in one department or one person. When university supports cultural proficiency training, they promote a respectful, inclusive environment. The responsibility to provide training to the career advisor resides with the training department. After speaking with several career advisors and a university career advising department director, the researcher was informed that career advisors
must attend cultural diversity training annually. Career advisors are also provided with an annual education stipend for training opportunities not offered at their university. The stipend could involve attending additional cultural diversity training. The education stipends are factored into the department’s annual training budget and would not incur additional expenses.

The information technology (IT) department’s webmaster supports the university by maintaining a well-organized website for individuals to become acquainted with the university. The webmaster would update the website with information provided by the career advising department related to services available and advocate for freshman students to meet with an advisor to discuss career ambitions. The training material would also be made available through an online staff portal accessible by career advisors and supported by the IT department.

The admissions office would encourage accepted students to schedule an appointment with a career advisor to discuss career objectives through various forms of communication. Students that have identified their career interests would be encouraged to review their career goals with an advisor. Students would also be encouraged to visit the career advising department during their freshman year to become familiar with the services and accommodations available to them. The career advising department would provide the admissions office with information for the acceptance letter and other written correspondence that freshman students receive.

**Timeline**

The timeline to address freshman African American female students being unaware of non-traditional STEM careers is continuous. A multicultural student population is constantly evolving, and training should also continue to evolve. The timeline associated with implementing a training initiative begins when the university endorses focusing on freshman African American female educational interests. The training plan begins with identifying trainers, that would include African American females, to become proficient in the career
selection principles of Krumboltz’s (1976) social learning theory of career selection and Pask’s (1975) conversation theory. Career advisors working remotely will participate in the training through an online portal. The timeline to develop and implement cultural proficiency training to address why freshman African American female students are unaware of non-traditional STEM careers is outlined below.

- Identify trainers who are familiar with designing training programs. These designers will include African American females familiar with the cultural barriers that freshman African American female students may encounter when exploring career opportunities. Training will necessitate being proficient with the principles of Krumboltz (1976) and Pask (1975) career selection theories.
- Training development will initially occur over four weeks and will be modified as needed.
- Pilot training will be conducted commencing with the fall semester and will involve selected freshman African American female students. The students will be aware of their involvement in the pilot program.
- Students will complete an evaluation at the end of the fall and winter semesters. The evaluation will replicate the survey used for this study.
- The responses received from the students will be reviewed by the training department.
- Based on the responses of the evaluation, revisions may be made to the training.
- Cultural proficiency training will be required annually.

Solution Implications
Storlie et al. (2018) believe that as career advisors overlook inspiring African American female students to explore STEM careers, this strengthens the demand for cultural diversity training. It is training that contributes to improving the advisor’s communication skills, sensitivity, and confidence in exploring non-traditional careers with students. However, information becomes repetitive during annual in-services, participants become restless and lose interest in attending another training on race relations, overcoming unconscious biases, improving communication with a diverse workforce, or building a diverse working environment. The titles are endless; however, the goals are similar, to accept that your workplace and classrooms will not culturally appear the same as they did 30 years ago. This cultural proficiency training cannot be another training that sits on a shelf. Other professions strengthen their “product” by remaining cognizant of evolving changes for their market. Universities can replicate this behavior by frequently pursuing an understanding of students' cultural challenges when identifying a career trajectory.

The data analysis illustrated barriers that interfere with African American students being aware of non-traditional STEM careers. Fadulu (2018) believes that students will frequently rely on career advice they receive from family and community members. His understanding of cultural barriers that involve the family was supported throughout the interviews and, more specifically, with student three. She revealed her family was instrumental in encouraging her to pursue a traditional career to ensure a stable income. Career advisors unfamiliar with how cultural and environmental factors influence a student's career trajectory can inadvertently misguide them from exploring non-traditional STEM careers (Fisher, 2016). As career advisors become perceptive to students' cultural and family expectations and how social learning experiences impact their career perspectives, they begin to acquire an awareness and aptitude to explore non-traditional careers with these students.
Not all universities will be motivated to address these concerns annually. The disadvantage of implementing cultural proficiency training is when African American females are not involved in the development and execution of the training. Their exclusion alienates their cultural perspectives. Participants may initially view this training as insignificant; however, the contributions of African American females will validate the advantages and significance of the training.

Although the university’s training department would be responsible for providing cultural proficiency training to career advisors, there are also non-university-supported training opportunities. There are community resources available to universities, at no additional expense, to discuss cultural diversity concerns in the African American community. Currently, there is an initiative to educate individuals relating to COVID health concerns in the African American community. Numerous healthcare organizations have made available to businesses individuals who will discuss healthcare concerns affecting this community. According to the Center for Disease Control (2021), ethnic minority groups with limited job options are at a higher risk of being exposed to the COVID virus. The “inequities in access to high-quality education for some racial and ethnic minority groups can lead to barriers” (CDC, 2021, para. 9). Besides cultural beliefs and traditions, health concerns are barriers that also affect African American females’ awareness of non-traditional career opportunities.

**Evaluation Plan**

A goal-based evaluation process will be utilized to measure the effectiveness of the training course. Goal-based evaluations determine “the extent to which a program has achieved its goals . . . [and] relies heavily on program goals and objectives” (APA, 2020). The cultural proficiency training goal is to generate awareness of cultural factors that can interfere with freshman African American female students' awareness of non-traditional STEM careers.
Evaluation of the offer letters and the website will be accomplished by ensuring the information provided to the admissions department, and the webmaster remains visible and current.

At the conclusion of the fall and winter semesters, students will complete a goal-based evaluation to identify the effectiveness of cultural proficiency training among career advisors (see Appendix G for Student Evaluation). The evaluations will accompany the end-of-semester faculty evaluations, and the responses will be forwarded to the training department for review. Based on the responses, the cultural proficiency training will be revised to reflect the students’ comments. The effectiveness of the training will be measured by how familiar freshman African American female students are with career advising resources and whether they have explored non-traditional careers with a career advisor.

**Delimitations**

The study’s objective is to determine why freshman African American female students were unaware of non-traditional STEM careers. An awareness of cultural barriers that interfered with students’ awareness of non-traditional careers was presented. Identifying why freshman African American female students are unaware of non-traditional STEM careers is limited to participants who are freshmen students, African American, and female and career advisors. Students who are not a freshman, African American, and female have been excluded from this study. Employees of the university who are not career advisors do not meet the participant selection criteria and have been excluded from the study.

**Limitations**

The evaluation limitations rely on the commitment to providing reliable feedback from students when completing the evaluation survey. From experience, students are often more dedicated to complete the semester than complete a survey. Training effectiveness is predicated on several factors that include the support of the university identifying cultural proficiency
training as benefiting the university and creating an inclusive educational environment. The involvement of career advisors in becoming familiar with cultural barriers that interfere with freshman African American female students' awareness of non-traditional STEM careers is essential. Students experiencing benefits of career advising resources are limited when a trusting and respecting relationship has not been established between the student and the career advisor. Additional limitations include the information technology department not providing technical support for training material, remote access to training, and troubleshooting technical issues. Limitations become a concern when unforeseen events occur, such as COVID, requiring the need to identify alternative ways to amass research data.

**Future Research Opportunities**

Additional research to address why freshman African American female students are unaware of non-traditional STEM careers could include surveying sophomores and seniors. Feedback received from sophomore students would provide the perspectives of students who have recently completed their freshman year. Interviewed participants indicated that freshman students often are not confident in their career selection. Surveying seniors would provide a perspective from students measuring how prepared they were their freshman year to begin their educational journey. Their input could prove to be valuable given their experiences.

There also exists the opportunity to survey female students from different cultures or male students, alternative career opportunities, and students from different age groups. To accomplish this would require being familiar with other races and cultures, and barriers when exploring career opportunities. The survey results would reinforce the significance of annual culture proficiency training. It would also encourage career advisors to be proactive in meeting with freshman students to explore career opportunities they may not have considered.

**Summary**
Chapter Five commenced with identifying the central question: How can the problem of freshman African American female students unaware of non-traditional career opportunities be solved? The outcome of this study supported the significance of career advisors being familiar with cultural influences that freshman African American female students encounter when identifying a career trajectory. The overwhelming theme that resonated throughout the study was the commitment to improve communication and trust between career advisors and freshman African American female students.

Cultural sensitivity and awareness training emerged as a fundamental necessity for universities to support as their freshman African American female enrollment increases. Incorporating the philosophy of the career selection theories of Krumboltz (1976) and Pask (1975) would provide a method for career advisors to become familiar with cultural values that interfere with African American female awareness of non-traditional STEM careers. The significance of employing a pilot test was discussed. To determine the relevancy of the training, freshman African American female students would complete an evaluation following the fall and winter semesters, with training revisions occurring when necessary.

Chapter Five closed by presenting cultural proficiency training delimitations and limitations. The opportunity to replicate this study under alternative circumstances was also presented. This research study revealed the relevance of communication, trust, and cultural proficiency training in promoting freshman African American female students becoming aware of non-traditional STEM careers.
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January 11, 2021


The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research for the following reason:

(2) Your project will consist of quality improvement activities, which are not "designed to develop or contribute to generalizable knowledge" according to 45 CFR 46. 102(1).

Please note that this decision only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

Also, although you are welcome to use our recruitment and consent templates, you are not required to do so. If you choose to use our documents, please replace the word research with the word project throughout both documents.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email.
APPENDIX B – CAREER ADVISOR REQUEST TO PARTICIPATE

Improving Freshman African American Female Students Awareness of Non-Traditional Career Opportunities

Mary Jane Harris
Liberty University
School of Education

Greetings,

My name is Mary Jane Harris, and I am a doctoral candidate at Liberty University. I am looking to interview career advisors to identify how freshman African American female students at your university are informed of non-traditional career opportunities in science, technology, engineering, and mathematics. These are careers typically underrepresented by these students. The interviews will be conducted using Zoom and will involve 10 questions and should last between 30-45 minutes.

If you would be willing to participate, please message me to set up a time convenient to conduct the interview. If you have any questions, please do not hesitate to contact me with your questions. I look forward to hearing from you.
APPENDIX C – STUDENT REQUEST TO PARTICIPATE IN INTERVIEW

Improving Freshman African American Female Students Awareness of Non-Traditional Career Opportunities

Mary Jane Harris
Liberty University
School of Education

Greetings,

My name is Mary Jane Harris, and I am a doctoral candidate at Liberty University. I am looking to interview freshman African American female students to determine if your university informed you of careers in science, technology, engineering, and mathematics. The interviews will be conducted using Zoom and will involve 10 questions and should last between 30-45 minutes.

If you would be willing to participate, please email me or message me to set up a time convenient to conduct the interview. If you have any questions, please do not hesitate to email me or contact me with your questions. Thank you in advance and I look forward to hearing from you.

Mary Jane Harris
APPENDIX D - INTERVIEW INFORMED CONSENT FORM

Improving Freshman African American Female Students Awareness of Non-Traditional Career Opportunities

Mary Jane Harris
Liberty University
School of Education

The following information was read to each interview participant.

My name is Mary Jane Harris, and I am a doctoral candidate in the School of Education at Liberty University.

You are invited to participate in a research study to identify how career advisors inform freshmen African American female students of non-traditional career opportunities that include careers in science, technology, engineering, and mathematics. These are careers that are underrepresented by African American females.

Background Information

The purpose of this research study is to identify why freshmen African American female students are not aware of non-traditional career opportunities in science, technology, engineering, and mathematics, and identify ways to increase their awareness of these careers.

Procedures

If you agree to be in this study, your participation will involve the following:

Interviews

1. Interviews will be conducted utilizing Zoom Rooms and will recorded and transcribed using Voice Notebook due to COVID-19 restrictions.

2. Interviews will consist of 10 questions and are anticipated to take between 30-45 minutes to complete the interview.
3. At the conclusion of the interview, answers will be reviewed to ensure the accuracy of information was captured. Follow-up questions may be asked if clarification is needed.

4. As a participant you will be asked if you have any questions before concluding the interview.

5. Participants will be thanked for their participation.

**Risks**

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

**Benefits**

To support the researcher to identify how freshman African American female students obtain knowledge of non-traditional careers in science, technology, engineering, and mathematics.

**Confidentiality**

The documents associated with this study will be kept private. If any report related to this study is published, it will not include any information that will make it possible to identify a participant or the university; pseudonyms will be used.

- Research records will be stored securely on a password locked computer, and only the researcher will have access to the records. According to federal and Georgia regulations, data must be retained for five years upon completing the study. After five years, all data will be deleted.

- Interviews will be recorded and transcribed. Interviewed recordings and survey responses will be stored on a password locked computer for five years and then erased. Only the researcher will have access to these recordings.

**Voluntary Nature of the Study**
Participation in this study is voluntary. Your decision to participate will not affect your current or future relations with Liberty University or the university you attend. If you decide to participate, you are free not to answer any question or withdraw at any time prior to completing the interview and not incur any adverse consequences.

**How to Withdraw from the Study**

If you choose to withdraw from the study, please inform the researcher at any time during the study. Incomplete interviews will not be recorded or included in the study.

**Contacts and Questions**

I am the researcher conducting this study. You may ask any questions you have pertaining to this research study. If you have questions later, **you are encouraged** to contact me. You may also contact the researcher’s faculty chairperson.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board.

**Please notify the researcher if you would like a copy of this consent form for your records.**

**Statement of Consent**

- □ Verbal consent to participate in the study was received.
- □ Permission to audio-record the interview was received by the participant.

_________________________________________  __________________________
Name of Participant                                      Date

☐ Career Advisor

☐ Student
APPENDIX E - PARTICIPANT INTERVIEW QUESTIONS

Improving Freshman African American Female Students Awareness of Non-Traditional Career Opportunities

Mary Jane Harris
Liberty University
School of Education

Interview questions.

1. How does your university inform freshman African American female students of available career advising resources?
2. How can the awareness of career advising resources at your university influence a freshman African American female student's career trajectory?
3. How might a career advisor inspire freshman African American female students to research non-traditional career opportunities they had not previously considered, such as careers in science, technology, engineering, or mathematics?
4. What cultural factors could interfere with a freshman African American female student exploring a non-traditional STEM career (science, technology, engineering, or mathematics) with a career advisor?
5. How does your university inform freshman African American female students of non-traditional STEM careers? (science, technology, engineering, and mathematic).
6. How does your university encourage freshman African American female students to consider non-traditional STEM careers?
7. Besides the career center, how else can freshman African American female students become aware of non-traditional STEM careers?
8. How could your university improve their process of informing freshman African American female students of career advising resources that will identify non-traditional career opportunities to consider?

9. What are the benefits of encouraging freshman African American female students to schedule an appointment with a career advisor during their freshman year at your university?

10. What factors could enhance or hinder a freshman African American female student in discussing career opportunities with a career advisor?
APPENDIX F - PARTICIPANT SURVEY QUESTIONS

Improving Freshman African American Female Students' Awareness of Non-Traditional Career Opportunities

Mary Jane Harris
Liberty University
School of Education

African American Female Student Survey

You are invited to participate in a research study to identify how career advisors inform freshmen African American female students of non-traditional career opportunities, including careers in science, technology, engineering, and mathematics. These are careers that are underrepresented by African American females.

Participation in this study is voluntary. If you decide to participate, you are free not to answer any question or withdraw at any time before completing the survey and not incur any adverse consequences.

By completing this survey, you are providing your informed consent to participate.

Note: Research records will be stored securely on a password-locked computer, and only the researcher will have access to the records. According to federal and Georgia regulations, data must be retained for five years upon completing the study. After five years, all data will be deleted.

Email address *

Valid email address

Are you a freshman student? *

- Yes
- No

Gender? *

- Male
- Female
- Other
- Prefer not to answer

Are you a Black/African American student? *

- Yes
- No
1. It is expected that freshman African American female students discuss their career goals with a career advisor?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree or Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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Row 1

2. It is essential for freshman African American female students to confirm a major when they begin college?

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<th>Strongly Agree</th>
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<th>Neither Agree or Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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Row 1

3. Should freshman African American female students be required to meet with a career advisor to discuss their career goals?

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<th>Strongly Agree</th>
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<th>Neither Agree or Disagree</th>
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<th>Strongly Disagree</th>
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Row 1

4. Career advisors are experienced to discuss non-traditional STEM careers with freshman African American female students, who are undecided about their career trajectory? (STEM careers include science, technology, engineering, and mathematics).

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<th>Strongly Agree</th>
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<th>Neither Agree or Disagree</th>
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Row 1

5. Career advisors regularly discuss non-traditional career opportunities with freshman African American female students?

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<th>Strongly Agree</th>
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<th>Neither Agree or Disagree</th>
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Row 1
6. Freshman African American female students are aware of available career advising resources at their college/university?

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<th>Strongly Agree</th>
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<th>Disagree</th>
<th>Strongly Disagree</th>
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7. Being aware of career advising resources will encourage an African American female student to explore career opportunities they had not previously considered with a career advisor?

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<th>Disagree</th>
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<td>O</td>
</tr>
</tbody>
</table>

8. Your college/university employs several approaches to inform freshman African American female students of the available career advising resources?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree o...</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
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<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

9. Career advising resources are both valuable and beneficial for freshman African American female students?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree o...</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>O</td>
<td>O</td>
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</tbody>
</table>

10. How likely are you to utilize or refer another freshman African American female student to utilize the career advising resources at your college/university to discuss career goals?

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree o...</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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</table>
APPENDIX G – STUDENT EVALUATION

Improving Freshman African American Female Students Awareness of Non-Traditional Career Opportunities

Mary Jane Harris
Liberty University
School of Education

1. Freshman African American female students are encouraged to discuss career goals with a career advisor.

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

2. Career advisors regularly discuss STEM careers with freshman African American female students.

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

3. Career advisors are experienced in discussing non-traditional STEM careers with freshman African American female students who are undecided about their career trajectory.

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
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<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

4. Freshman African American female students are aware of available career advising resources at your university.

<table>
<thead>
<tr>
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<th>Disagree</th>
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</table>
5. Being aware of career advising resources will encourage an African American female student to explore career opportunities they had not previously considered with a career advisor.

<table>
<thead>
<tr>
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</table>

6. Career advising resources are both valuable and beneficial for freshman African American female students.

<table>
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<td>1</td>
</tr>
</tbody>
</table>

7. How likely are you to utilize or refer another freshman African American female student to utilize the career advising resources at your university to discuss career goals.

<table>
<thead>
<tr>
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Comments: