

THE RECOUNT: BLACK MEN'S EXPERIENCES OF PREDOMINANTLY WHITE
INSTITUTION UNDERGRADUATE STEM PROGRAMS IN THE UNITED STATES

by

James Justin Hairston

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University

2021

THE RECOUNT: BLACK MEN'S EXPERIENCES OF PREDOMINANTLY WHITE
INSTITUTION UNDERGRADUATE STEM PROGRAMS IN THE UNITED STATES

by James Justin Hairston

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University, Lynchburg, VA

2021

APPROVED BY:

David Vacchi, Ph.D., Committee Chair

Alexandra Barnett, Ed.D., Committee Member

ABSTRACT

The purpose of this transcendental phenomenological study was to understand the undergraduate experiences of Black men who completed bachelor's degrees in science, technology, engineering, and mathematics (STEM) at small and large predominantly White institutions (PWIs) of higher learning in the United States. This study focused on student engagement, mentorship, and experiences of racism and discrimination as three factors that might influence Black men's completion of STEM bachelor's degrees at PWIs in the United States. The central research question for this study was, "What contributes to the success of Black STEM undergraduate men at predominantly White institutions of higher learning?" The self-efficacy theory guided this study. Shaun Harper's (2010) anti-deficit achievement framework provided a conceptual framework for the study. The study setting was nonspecific small and large PWI campuses, as this study was not an assessment of specific campuses and explored the experiences of 17 Black alumni. Data sources included one-on-one interviews, focus groups, and journal prompts to develop detailed, thick descriptions of the participants' experiences. The data were analyzed using a combination of phenomenological reduction methods described by Moustakas and Creswell. Findings suggest that engagement and fictive kin are two main contributors to Black men completing their STEM degrees at PWIs.

Keywords: self-efficacy, underrepresented, retention, mentorship, completion, STEM

Copyright Page

Copyright 2021, James Hairston

Dedication

This dissertation is dedicated to the Black men who paved the way in higher education by completing their degrees and their support system. This dissertation is dedicated to the magnificent Black men of this study. This dissertation is dedicated to the young Black boys who will tread a pathway through higher education. Finally, to the legacy of George McLaurin, who the university president embarrassingly isolated, who had to fight to be admitted into the University of Oklahoma because he was Black: I honor you. Finally, this dissertation is for Harvey Beech, the first Black man to graduate from The University of North Carolina at Chapel Hill.

Acknowledgments

I would like to thank God for everything that He has done and for being with me every step of the way. To my parents James and Alice Hairston, words could never express how appreciative I am of you all for always grounding me in a foundation that would be possible with God. What better combination than knowing that God has placed my parents in my life to guide me towards the calling of research to help other men who look like me graduate from college. Thanks for all the cooked meals, too, more importantly, uplifting me in prayer. To my siblings and cousins, I hope that I have made you incredibly proud. To my nieces and nephews, thank you for bringing so much joy into my life. Finally, to my mentors and friends, please know that I value and treasure each of you.

Thank you to my dissertation chair, Dr. David Vacchi, for first encouraging me through this entire process and providing your expertise and time. Thank you for breaking down barriers that I had put up, seeing beyond my limitations, and embracing me wholeheartedly. Thank you for not giving up on me nor allowing me to do the same on myself. Thank you for having high standards for research and making me work to meet them as a research-based scholar. Dr. Alexandra Barnett, thank you for providing feedback and support throughout my academic journey. Dr. Vacchi and Dr. Barnett, thank you for sharpening my critical thinking skills as a researcher.

Thank you to my former high school teacher and current mentor, Dr. Bolds, for always providing me guidance—even though it was tough to accept at times. Thank you to my village for always encouraging me to do my best. Finally, to my participants, thank you for being highly courageous Black men and giving up your time to strengthen the voice and presence of Black men in higher education at PWIs.

Table of Contents

ABSTRACT.....	3
Copyright Page.....	4
Dedication	5
Acknowledgments.....	6
List of Tables	11
List of Abbreviations	12
CHAPTER ONE: INTRODUCTION.....	13
Overview.....	13
Background.....	14
Historical Context	15
Social Context.....	16
Theoretical Context.....	17
Situation to Self.....	18
Problem Statement	20
Purpose Statement.....	21
Significance of the Study	21
Research Questions	22
Central Research Question.....	22
Sub-Question One	23
Sub-Question Two	23
Sub-Question Three	24
Definitions.....	24

Summary	25
CHAPTER TWO: LITERATURE REVIEW	27
Overview	27
Theoretical Framework	28
Related Literature.....	31
Understanding Attrition and Retention	32
Racial Discrimination	34
Mentoring.....	41
Engagement.....	55
Multicultural Education	61
Summary	62
CHAPTER THREE: METHODS	64
Overview	64
Design	64
Qualitative Methodology	64
Phenomenological Research Design	65
Transcendental Design Type.....	65
Research Questions	66
Central Research Question.....	66
Sub-Question One	66
Sub-Question Two	67
Sub-Question Three	67
Setting	67

Outlier #2 – We Need More Black Mentors	107
Research Question Responses.....	107
Central Research Question.....	107
Sub-Question 1.....	108
Sub-Question 2.....	108
Sub-Question 3.....	109
Summary	109
CHAPTER FIVE: CONCLUSION.....	111
Overview.....	111
Discussion.....	111
Interpretation of Findings	112
Implications for Policy and Practice	115
Theoretical and Empirical Implications.....	118
Limitations and Delimitations.....	120
Recommendations for Future Research	121
Conclusion	121
REFERENCES	123
APPENDIX A: IRB APPROVAL LETTER	150
APPENDIX B: CONSENT FORM	152
APPENDIX C: RECRUITMENT LETTER.....	155
APPENDIX D: INTERVIEW QUESTIONS/GUIDE.....	156
APPENDIX E: LETTER TO FUTURE BLACK MEN IN STEM AT PWIs.....	158
APPENDIX F: FOCUS GROUP QUESTIONS.....	159

List of Tables

Table 1 Portrait of Participants	85
--	----

List of Abbreviations

Association of Christian Schools International (ACSI)

Historically Black College or University (HBCU)

National Academy of Sciences and National Academy of Engineering, Institute of Medicine
(NASNAE)

National Association for the Advancement of Colored People (NAACP)

National Center for Education Statistics (NCES)

Predominantly White Institution (PWI)

Science, Technology, Engineering, and Mathematics (STEM)

CHAPTER ONE: INTRODUCTION

Overview

A gap in degree completion of Black students is a national problem that must resolve through research (Ashburn, 2007; Estrada et al., 2016; Harper, 2015; National Student Clearinghouse Resource Center, 2017). The purpose of this transcendental phenomenological study is to describe the undergraduate experiences of Black men in STEM who persisted and completed bachelor's degrees at a small and a large PWI located in a Mid-Atlantic state. Chapter one presents the framework for this transcendental phenomenological study. Estrada et al. (2016) offer that Black students leave STEM majors by dropping out of college at a rate of 29% or switching to a non-STEM degree at a rate of 36%. Simon et al. (2015) explained that higher education institutions should focus on retention efforts, and research to decrease Black student attrition rates in higher education programs such as science, technology, engineering, and mathematics (STEM) is needed. Research must continue to expand in higher education regarding Black men and complete undergraduate STEM programs (Harper, 2010, 2015). As higher education implements more programs, institutions of higher learning must support Black men in STEM undergraduate programs to decrease their attrition rate within undergraduate studies. For decades, higher education researchers have examined and theorized student success; however, limited research suggests mentorship is an essential part of the support system for Black men's persistence in STEM programs (Burt et al., 2019).

A bachelor's degree is hailed as one of the highest forms of success by Black students and graduates due to upward mobility and decreased inequality (Eller et al., 2018; Harper, 2010). Degree completion is vital for people of color because of the need to conquer barriers with social mobility (Dache-Gerbino, 2017). Student engagement has been one of the top strategies used in

higher education to increase academic success (Comeaux & Harrison, 2011). Mentoring is a component of student affairs that promotes success for Black men within higher education (Heaven, 2015). However, there is a disconnection regarding Black men in undergraduate STEM programs at PWIs who may not receive the same support as majority populations (Eller et al., 2018; Gusa, 2010). Chapter One provides the background of the problem, situation to self, problem statement, purpose statement, the significance of the study, research questions, definitions to understand the study, and a summary.

Background

Higher education lays a foundation for all students to build their knowledge, skills, and abilities regarding specific subjects. In addition, completing higher education is an avenue for upward mobility for Black families because it increases income, leading to an upward shift in social class (Harper, 2015). Boykin and Palmer (2016) explained that for the past 75 years, racial diversity had been at the forefront of legality in America's higher education system. *Brown v. Board of Education* (1954) not only affected the K-12 sector ruling that all schools must allow for students of color to enroll but also had a trickle-up effect into higher education, requiring all institutions to desegregate. Therefore, affirmative action should address the disparities in higher education that result in Black men's declining enrollment and declining even more in degree completion (Allen, 2005; Berrett, 2020; Heaven, 2015). Though society has not provided a guarantee for academic achievement of underrepresented students, equal opportunity and affirmative action programs have given underrepresented groups a chance to compete and succeed in areas such as higher education (Allen, 1988, 2001; Boykin & Palmer, 2016; Harper et al., 2009).

Though many students enroll in STEM programs, there is a decrease among Black men in STEM undergraduate programs dating back to the 1950s (Allen, 1988). As of 2010, the engagement and mentoring of Black men in undergraduate STEM programs at PWIs are not well-informed by scholarship, given that less than 1% of higher education research focuses on supporting minorities (Bonner, 2010). Therefore, higher education must continue to promote diversity and equity in excellence (Allen, 2005). The total percentage of Black men's completion rates of STEM degrees and certificates awarded between 2008 and 2018 has decreased from 9.3% to 8.4% (NCES, 2020), demonstrating a need to research Black student persistence and completion rates (Harper, 2010). A high percentage of Black graduates who earn terminal degrees, the highest degree in their field of study, gain their bachelor's degrees from a Historically Black College and University (Louis, 2015); therefore, much research is needed to increase PWI graduate rates among Black men, particularly in STEM degrees. The more diverse institutions are, the greater the chance Black students have at finding their place, making a connection, and succeeding at PWIs (Harper, 2015). This study focused on student life experiences of Black men in STEM who graduated from small and large PWIs.

Historical Context

Science and mathematics have always had a place in higher education; however, technology and engineering programs have increased within institutions of higher learning since the 1950s (Thelin, 2011). Moreover, higher education should strengthen students to become graduates who will contribute to STEM fields and meet the demands for STEM jobs (Okahana et al., 2018). It is a top priority to develop, recruit, and retain STEM talent to maintain U.S. competitiveness with globalization (Hurtado et al., 2011). The increase in STEM jobs in America necessitates professionals with postsecondary education to fill those (Herrmann et al., 2016).

Providing resources for underrepresented student success has been a challenge since the desegregation of schools in 1954; yet, it is necessary for enhancing the knowledge, skills, and abilities of future STEM professionals (Coates & Matthews, 2018; Harper, 2010). Higher education should celebrate differences; however, complex histories of oppression, exclusion, and discrimination have plagued higher education (Harris & Lee, 2019). Though STEM programs are challenging, many underrepresented students still do not persist in degree completion. STEM programs are typically undergraduate programs with the least number of minority students dropping out or transferring to another academic program within their first year (Herrmann et al., 2016). Often, STEM students evolve into professionals within STEM fields, which is inclusive of faculty roles.

Social Context

The social implications of the Black man's plight are that minor college education completion begets fewer career opportunities, perpetuating poverty and lack of opportunity to survive and thrive (Cati et al., 2015). There is a continued need for research to understand the causes of increasing attrition rates and decreasing completion rates for Blacks, as evidenced by the paucity of current research on the Black population overall (Stipanovic & Woo, 2017). Further, little research has been done in the STEM field to address Black men's lack of persistence in undergraduate STEM programs (Herrmann et al., 2016). Despite some programs supported by federal initiatives for increasing Black student representation in STEM undergraduate and graduate programs (Okahana et al., 2018), there is a need for institutional research to understand Black men's experiences in STEM undergraduate programs at PWIs. Higher education has acknowledged a relationship between increased student persistence and student engagement, enhancing institutional success and equity (Groccia, 2018). Haeger and

Fresquez (2016) explained that due to an increase in students with diverse backgrounds enrolling in academic programs, mentoring could be essential for successfully preparing first-generational students to succeed in STEM programs. Mentoring contributes to hearing and accepting perspectives and enriched conversations that add personal growth and heightened awareness of social inequity, microaggression, campus-wide racial discrimination, being overlooked, devalued, and cultural significance for Black men in STEM undergraduate programs at PWIs (Louis, 2015; Waldeck, 2019). Continued research around mentorship in academic affairs is necessary to “understand what is and what is not happening as higher education strives to create diverse learning environments” (Perry et al., 2019, p. 65).

Theoretical Context

This study situates within the broader critical race theory (Bell, 1995) literature by resisting the deficit modeling extant in the literature, which predominantly explains the failure of Black men and exploring exemplars of success from which to model recommendations to the field to help improve the success of Black men in STEM. Bandura’s (1997) self-efficacy theory guided this study. Self-efficacy enables individuals to do extraordinary things, such as being resilient through adversity, shaping an individual’s perspective, growth, and development (Bandura, 1997). The knowledge gained from this study will increase the small body of literature regarding Black men in STEM undergraduate programs at PWIs overcoming challenges and completing their degrees.

This study offers an opportunity to explore the experiences of Black men in STEM programs at PWIs through the conceptual lens of Shaun Harper’s (2010) anti-deficit achievement framework. As research in this area increases, scholars should use a panoply of conceptual frameworks to contribute to a composite understanding of the Black man’s experience in STEM

programs at PWIs. Harper's contributions in the conceptual and theoretical framing of Black men's experiences in higher education have been among essential foundational scholarly work over the last 15 years. With the broad applicability and acceptance of Harper's work, this study will be a meaningful contribution to the field from a conceptual perspective.

Harper's (2010) anti-deficit achievement framework focuses on factors that lead to completing undergraduate degrees rather than concentrating on inhibitors that perpetuate attrition amongst Black men in undergraduate studies. Harper (2013) developed the anti-deficit framework based on sociological, psychological, and educational theories coupled with gender studies inverting questions on educational disadvantage, underperformance, and disengagement. Harper's (2010) anti-deficit achievement framework would seek to understand through the exploration of how Black men successfully navigate college. Harper (2013) explained that the anti-deficit achievement framework establishes three pipeline points of pre-college socialization and readiness, college achievement, and post-college success. Familial factors, K-12 forces, out-of-school college prep resources, classroom experiences, out-of-class engagement, enriching educational experiences, graduate school enrollment, and career readiness are eight researchable dimensions of the anti-deficit achievement framework (Harper, 2013).

Situation to Self

I am pursuing a Doctor of Philosophy in higher education administration and have earned an Educational Specialist degree in educational leadership from Liberty University. There were many motives for this study. As a higher education professional, I mentored underrepresented STEM students dealing with the feeling of disconnection. I am passionate about helping underrepresented groups be persistent and excel toward academic achievement. As a scholar, it was my goal to conduct research that promotes a need to recruit and hire Black faculty, staff, and

administrators at PWIs (Dancy & Jean-Marie, 2014; Irby, 2014). I explored Black persistence towards the completion of STEM undergraduate degrees at small and large PWIs. I wanted to provide information on how Black men graduates navigated the STEM pipeline of success.

My best friend moved from being a student with good grades to allowing the imposter syndrome to set in, and she ended up withdrawing from college. The imposter syndrome is gaining access to academic accomplishments and does not feel entitled to it (Edwards, 2019). Thinking of that experience and the countless students I interacted with daily; I wanted to contribute research to increase retention, progression, and completion among STEM students. Professionally, I feel that I must help increase the percentage of Black graduates across the board of academia, but for this study, in STEM fields exclusively. Personal and professional experiences have led me to research the positive and negative undergraduate experiences regarding Black men in STEM undergraduate programs at PWIs.

For this study, I utilized axiology as a philosophical assumption. My experiences of being a Black man who completed a bachelor's degree at a predominantly White institution and working as a Black man at PWIs led me to select degree completion among STEM Black men undergraduates. Harper's (2010) anti-deficit achievement framework identified with the goal of this study to change society better to encompass deeper relationships between PWIs and Black STEM men. I presented values of engagement for Black men in STEM at PWIs and biases upfront, so the audience will understand what I valued and considered the study's inclinations. Ontological assumptions allowed me to understand the nature of reality as accept the participants' reality as truths. From a positivist's point of view, epistemology understands the nature of knowledge, and those replicable findings are valid through obtaining data with various research methods.

My research paradigm was to use transformative frameworks, essentially nesting this study within the broader critical race theory literature. My study strengthened the critical race theory as applied to higher education as I presented the stories of discrimination from Black men in STEM at PWIs, decreased the perpetuation of racial control in higher education, and addressed the identity of the Black man in STEM at PWIs (Creswell & Poth, 2018). This study yielded data and may encourage PWIs to embrace Black men in STEM and empower Black men in STEM at PWIs to make their voices known. My research advocated for the needs of Black men in STEM at PWIs to complete bachelor-level degrees. I realized that the participants told me their stories, and it was my goal to collaborate to tell their stories accurately.

Problem Statement

The more significant problem is that for at least 20 years, Black men have low completion rates in STEM undergraduate programs at PWIs (NCES, 2020). There is a vast difference between the minority and majority graduation rates in higher education (Carter, 2006). Completion rates of Black men in STEM undergraduate programs at PWIs appear to be decreasing over the last 20 years and are among the lowest in higher education (NCES, 2020). Black undergraduates drop out of STEM programs more than any other program (Kezar & Holcombe, 2018). Despite the data, much STEM research has focused on White upper- and middle-class men leaving scant research on underrepresented students (Lykkegaard & Ulriksen, 2019). The current studies primarily identify failure rates and causes for Black men and appear not to address success strategies (Harper, 2010; NCES, 2020). To address this gap in knowledge, I proposed a transcendental phenomenology to elicit Black men's perspectives who have completed STEM degrees at predominantly White institutions.

Purpose Statement

This transcendental phenomenological study aimed to understand how Black men in STEM undergraduate programs succeed at PWIs. At this stage of the research, success is graduating within six years from the initial start of a STEM degree program. The anti-deficit achievement framework by Shaun Harper (2010) as the conceptual framework allowed me to ascertain the participants' belief in their knowledge, skills, and abilities to inform higher education professionals about the highest quality of support services for Black men.

Significance of the Study

This study demonstrates empirical, theoretical, and practical significance towards understanding Black men's experiences in STEM undergraduate programs at small and large PWIs. This phenomenology is essential because it will add value through scholarly research to address low completion rates of Black men in STEM undergraduate programs at PWIs. Empirical significance demonstrated adding research to close the gap of Black men STEM undergraduate success, inclusive of the student life experiences of Black men undergraduates of STEM programs at small and large PWIs. This study provides knowledge by observing collected data such as letters written by Black men with bachelor's degrees awarded from PWIs addressed to Black men undergraduate students and conducting interviews regarding student perceptions of this phenomenon.

This research brought a new insight and application through Harper's (2010) anti-deficit achievement framework by listening to the perceptions of those who persisted and completed a STEM undergraduate degree at a PWI as a Black man. Additionally, Lane (2016) explained that research continues to grow in enrichment programs such as mentoring as a form of academic support; however, few studies theorize strategies that increase retention, and even fewer look at

Black undergraduate students. Therefore, this study incorporates theoretical significance by broadening the body of research for Black men in STEM and their perception of self-efficacy, contributing to persistence and graduation from PWIs.

Practically, this study will influence policy, procedures, practice, and decision-making at PWIs by presenting a collective voice for Black men in STEM undergraduate programs at PWIs through in-depth descriptions of the phenomenon. Practically, this study helps close the gap in research regarding Black men undergraduate student success at PWIs. Furthermore, it honors and enhances the commitment to nurturing and empowering all students to persist and graduate due to the study's phenomenon. Finally, this study strengthens the need for engagement and mentoring relationships as tools to build Black men's inclusion in undergraduate STEM programs at PWIs.

Research Questions

This transcendental phenomenological study consists of one central research question and three sub-questions.

Central Research Question

What contributes to the success of Black STEM undergraduate men at predominantly White institutions of higher learning?

This central research question allowed Black STEM undergraduate men who are graduates of PWIs to describe their undergraduate experiences. Success is defined as starting and completing a degree from higher learning institutions within 6 or fewer years (NCES, 2020). Being a Black man in a STEM undergraduate program at a PWI, detailed descriptions of the phenomenon were provided from sub-questions to examine engagement and mentorship, self-perceived challenges of racial discrimination, and connection to the institution. The goal of the

central research question was to depict the descriptions of engagement and mentorship in relationship with the self-efficacy of graduates (Bandura, 1997).

Sub-Question One

What role did engagement such as mentorship at a PWI play in handling challenges as a Black man who completed an undergraduate STEM program?

This sub-question contributes to the central research question by gaining insight into overcoming underrepresented STEM graduates' challenges and what experiences shaped self-efficacy (Bandura, 1997). Mentors are a premier example of helping women enrolled in STEM overcome challenges they face in higher education; the mentor should communicate their challenges and steps in overcoming them (Herrmann et al., 2016). There are challenges in STEM practices that must reform for vulnerable students to learn, persist, and complete their degrees (Bernstein-Sierra & Kezar, 2017). Mentoring shapes the attitudes and self-concepts of STEM students (Herrmann et al., 2016). Mentoring is a part of proactive care that (a) advises strategies to students to understand potential academic, social, and personal pitfalls; (b) plans solutions for overcoming challenges; and (c) avoids mentors being reactive with providing support to students once they experience challenges (Lane, 2016).

Sub-Question Two

How did Black men who completed undergraduate STEM programs connect to a PWI campus?

Sub-question two examines if Black men in undergraduate STEM programs connected with the PWI through building relationships. Black undergraduate students at PWIs may struggle with completion because of no connection to the institution (Guess, 2006; Gusa, 2010; Harper, 2010, 2015; Kezar & Holcombe, 2018; NCES, 2020). Therefore, student engagement allows

students to feel connected to the institution and attributes to sociocultural, aspirational, and navigational academic and personal gains (Brooms et al., 2018). Zhoc et al. (2019) explained that student engagement affects improved learning outcomes such as academic performance, self-esteem, and satisfaction.

Sub-Question Three

How do Black men, who are STEM graduates of PWIs, describe their undergraduate experiences with racial discrimination?

Sub-question 3 provides details of firsthand experiences of racial discrimination at PWIs against Black STEM graduates. As noted, while attempting to adapt to a new environment and change, Black students face racism and discrimination at the intersection of gender and race (Bernstein-Sierra & Kezar, 2017; Litzler et al., 2014). From past to present, institutional racism is an institutional norm, intentionally or unconsciously, that withstands White privilege and allows discrimination against minorities (Harper, 2012b). Furthermore, Black students still experience racial discrimination, as evidenced by hate-based crimes on higher education campuses (Criminal Justice Information Service Division [CJISD], 2018). Hate-based discrimination was prevalent in the 1960s, demonstrated by White supremacists who knowingly discriminated against and caused harm to minorities (Harper, 2012a).

Definitions

Terms pertinent to the study are listed and defined as the final section of Chapter One. The literature supports all definitions in this section. Included are words that use abbreviations.

1. *Efficacy*—the ability to overcome challenges and achieve goals (Bandura, 1997).
2. *Engagement*—involvement, interest, and connection to the institution (Axelson & Flick, 2011).

3. *Mentor*—a vested interest in developing a professional to be successful (NASNAE, 1997).
4. *Mentoring*—personal and professional relationships between students and faculty developed over a period (National Academy of Sciences, Engineering, and Institute of Medicine, 1997).
5. *Persistence*—a student’s desire to complete a degree (Berger et al., 2012).
6. *Racism*—a form of discrimination based on race (Stovall, 2005).
7. *Retention*—the timespan from admissions to graduation that the institution retains a student (Berger et al., 2012).
8. *Success*—graduating within 6 years from the start of a STEM degree program (NCES, 2020).
9. *STEM Pipeline*—a successful flow from middle grades and high school through college to STEM careers (Holmegaard, 2015; Lykkegaard & Ulriksen, 2019).
10. *Underrepresented*—the minority of a group, including gender, ethnicity, religion, first-generation, and low income (Kezar & Holcombe, 2018).
11. *Family*—a group of individuals that serve as a part of the support system for individuals (Sussman, 1976).

Summary

This study provides a greater understanding of the experiences of Black men in STEM undergraduate programs at PWIs. STEM programs are rapidly being developed and implemented on college campuses; however, Black men have low completion rates in STEM undergraduate programs at PWIs (NCES, 2020). Therefore, institutions must work intentionally to implement practices like fostering engagement, mentorship, and multicultural education to address racial

discrimination that will improve success in STEM programs for underrepresented students (Harper, 2015; Harper et al., 2009; Holmegaard, 2015; Lane, 2016; Litzler et al., 2014; Simon et al., 2015). Therefore, this study purposefully explores the experiences of Black men who completed their undergraduate STEM programs at PWIs.

CHAPTER TWO: LITERATURE REVIEW

Overview

This transcendental phenomenological study aims to understand how Black men in STEM undergraduate programs succeed to graduation at PWIs. Shaun Harper's (2010) anti-deficit achievement framework provides the theoretical and conceptual framework foundation for this study. The literature review proceeds with research regarding engagement, mentorship, and challenges in higher education.

Higher education is expanding daily with a diverse range of students and interests in educational programs. Hermann et al. (2016) stated dropout rates are significantly higher in STEM fields during the first two years of college due to poor performance and lost interest. This transcendental phenomenological study aims to understand how Black men in STEM undergraduate programs succeed in graduation at PWIs. Higher education has a duty of equipping students with the knowledge, skills, and abilities to enter their career field, known as the STEM pipeline of success (Lykkegaard & Ulriksen, 2019). One of the main concerns for higher education is lowering the attrition rate among science, technology, engineering, and mathematics (STEM) students (Liu, 2018). This study uses the lens of Shaun Harper's (2010) anti-deficit achievement framework, which focuses on Black men who have persisted and completed academic achievement through engagement that builds self-efficacy.

Both small and large PWI programs must explore the success of Black men graduates (Lane, 2016; Lykkegaard & Ulriksen, 2019), and it is essential to stabilize the upward mobility of Black students in the United States. Unfortunately, there is a paucity of research in higher education regarding challenges to efficacy and persistence of Black undergraduate men, especially at small and large PWIs (Carter, 2006; Harper, 2012b; Harper et al., 2009). A search

of the Education Resources Information Center (ERIC) database returned less than 1% of journal articles focused on Black STEM men's completion at PWIs; the overwhelming majority of those are quantitative reports explaining the rates at which Black men struggle to succeed. Stipanovic and Woo (2017) detailed a shortage of research on underrepresented students pursuing STEM careers, and future research should focus on relationships between student identity and professions. Carter (2006), Harper (2015), and McGowan (2017) suggested that higher learning institutions would have a steady retention rate amongst minorities such as Black men with the implementation of engagement, mentorship, and interpersonal relationships.

Chapter two provides an overview of the existing literature on theories, conceptual framework, mentoring, engagement, challenges of Black men, and racial discrimination. The first and second sections discuss the theoretical and conceptual framework and relate to the central phenomenon. The third section synthesizes the literature about attrition and retention in higher education, followed by studies regarding challenges such as racial discrimination, engagement, and mentoring of underrepresented students since there is limited research on Black men in STEM at PWIs. Finally, the chapter concludes with a summary of the related literature and guiding frameworks.

Theoretical Framework

In searching for a theoretical framework for this study, Critical Race Theory and Tinto may appear to the higher education audience to be a good fit; however, for this study, it was not. The field has moved away from Tinto because the theory is outdated and not inclusive of marginalized populations. Tinto's (1993) interactionalist theory stated that students must adapt to their college to avoid withdrawing instead of institutions accommodating students as they are and supporting student success (Vacchi et al., 2017). Critical Race Theory was not explored in

this study because the researcher was not seeking to understand the racism of higher education institutions. The field is ever-changing, and as college campuses become more diversified, it causes us to have to revisit outdated theories and intentionally developing new high-impact practices. Harper's (2010) anti-deficit achievement framework was the conceptual foundation for this study. Harper's (2010) anti-deficit achievement framework leads researchers to explore experiences of Black men's abilities and beliefs in one's ability to attain different levels of growth and matriculation. Little research encompasses the anti-deficit achievement framework from the perspective of looking at the persistence and completion of Black men in undergraduate STEM programs at PWIs. The anti-deficit achievement framework is essential because it questions how Black graduates persisted and completed their undergraduate studies at a PWI instead of looking at Black students who did not graduate and why (Harper, 2010). It is imperative to view those who were successful and hear their voices. Harper's (2012b) anti-deficit achievement framework will look at how Black men in STEM at PWIs succeeded in completing the STEM pipeline.

I aimed to collect a meaningful and comprehensive understanding of this phenomenon to give voice to Black men who have graduated from STEM undergraduate programs at PWIs. In conjunction with the theoretical framework, Harper's (2010) anti-deficit achievement framework guided this study. This framework, adapted from the National Black Male College Achievement Study, explores enablers of STEM student achievement (Harper, 2012a). The framework took on a new perspective for "those who subscribe to The Deficit Achievement Theory appearing less interested in exploring explanatory insights into STEM success among students who perform well at institutions where they were perceivably overmatched" (Harper, 2012a, p. 63). This transcendental phenomenological study utilized Harper's (2010) anti-deficit achievement

framework and focus on Black men in STEM who have achieved STEM completion at a PWI. These are STEM students who have made it, and this study gives a voice to what helped them persist towards academic achievement. The anti-deficit achievement framework focuses solely on minority student achievement in STEM. The anti-deficit achievement framework provided that to understand STEM success, one must give attention to “research on students of color at various junctures of the STEM pipeline, from K-12 schools through doctoral degree attainment and transitions into science research and long-term industry careers” (Harper, 2010, p. 67).

Every framework has the primary intent of discovery for new information to close a gap in research. For example, a study Harper conducted to validate the anti-deficit achievement framework, with 219 Black male undergraduate students from forty-two universities; 23% of the students in the study were STEM students. Harper’s (2010) anti-deficit achievement framework emphasized exploring factors that led to minority student engagement instead of disengagement. This study focuses on the undergraduate experiences of Black men in STEM who graduated from PWIs, which is in alignment with the framework. Harper (2010) used this same framework to provide an example of utilizing theories to advance studies on underrepresented student STEM success. Harper’s (2010) purpose for developing the framework was to “deliberate and attempt to discover how some students of color have managed to succeed in STEM” (p. 68). Specifically, this framework will add valuable information as the researcher is looking at Black men STEM graduates of PWIs instead of those who started in a STEM program and did not complete it.

Theoretically, Harper’s (2010) anti-deficit achievement framework was shaped by the following theories: (a) Bourdieu’s (1986, 1987) cultural capital and social capital theories which focus on understanding how achievers from low-resource backgrounds manage to overcome

such disadvantage and cultivate meaningful and value-added relationships with STEM faculty and being professionally well-connected in fields; (b) Steele (1997) and Steele and Aronson's (1995) stereotype threat theory which focuses on strategies minority students employ to resist the internalization of discouraging misconceptions about members of their racial groups and how they manage to respond productively to stereotypes they encounter on campus; (c) Weiner's (1985) attribution theory invites minority STEM achievers to name the persons, resources, experiences, and opportunities to which they attribute their achievement; (d) Moos (1986) and Strange and Banning's (2001) campus ecology theories explain how a student of color who is one of few non-White persons in her or his major manages to thrive and negotiate environments that are culturally foreign, unresponsive, politically complex, and overwhelmingly White; (e) Harper's (2009), Solórzano and Yosso's (2002), and Yosso's (2005) critical race theory recognizes students of color as experts on their experiential realities and empowers them to offer counternarratives concerning their success in STEM fields; (f) Swail et al.'s (2003) and Tinto's (1993) theories on college student retention explores the undercurrents of retention in STEM and factors that keep students of color enrolled through degree attainment; and (g) Markus and Nurius (1986) and Oyserman et al.'s (1995) possible selves theory takes accounts of which experiences afford STEM persisters opportunities to envision themselves in future long-term careers as chemists, mechanical engineers, and math professors; and (h) Bandura's (1997) self-efficacy theory which focuses on confidence, competence, and identity as a scientist.

Related Literature

The following section provides information from existing studies regarding retention, persistence, completion, and mentoring. This section will strengthen the foundation of significance for this transcendental phenomenological study. The researcher examined sources

regarding mentoring in education in general, but little research presented mentoring in STEM fields or STEM fields for underrepresented students. For example, Lane (2016) studied underrepresented STEM students generate understanding of enrichment programs that supports and influences retention, and degree attainment at large, public, PWIs through (a) holistic support based on academic, transitional, psychological services; (b) community building with familial atmosphere and mentoring relationships with staff and peers; (c) catalysts for STEM identity development through building confidence and competence, undergraduate research, and praise and celebration. Russell and Russell (2015) conducted a qualitative study on four Black women in STEM at PWIs, and presented three challenges that negatively impacted Black people:

1. Lack of early success in science at the predominantly White institution
2. Lack of adequate career counseling and advisement
3. Feelings that they lacked proper science preparation in the college classroom based on their pre-college science and mathematics course experiences.

Understanding Attrition and Retention

This section will provide a brief understanding of attrition and retention rates in higher education. Attrition is a global problem in higher education (Beer & Lawson, 2017). Attrition rates of higher learners mean that students are not persisting from one year to the next. Mainly in higher education, despite efforts to support all students, underrepresented students leave STEM programs at higher rates (Liu, 2018). Thus, attrition rates lead to the non-completion of underrepresented STEM students (Harper, 2012a; Liu, 2018).

There is a rise in attrition rates of Black men in undergraduate STEM programs for postsecondary STEM degree programs, causing a leak in the STEM pipeline (Lykkegaard & Ulriksen, 2019; Simon et al., 2015). STEM programs are the most frequent programs that

students drop out of in higher education (Kezar & Holcombe, 2018). There is an urgent need for higher education to examine Black men STEM graduates (Lane, 2016). Progression, retention, and completion are all critical characteristics of student success; however, retention is a significant focus of higher education. For this study, it is imperative to identify that persistence and retention are not the same. Burke (2019) and Belch et al. (2001) agree with Berger et al. (2012) that persistence is a students' continuation to completion of their degree regardless of institution. Borgen and Borgen (2016) explained that research demonstrates apparent educational goals influence retention through engagement, such as mentoring.

Facing Challenges

This section will provide a glimpse into Black men's challenges in STEM undergraduate programs at PWIs. Harris and Lee (2019) stated that a perfect learning environment would celebrate racial, ethnic, gender, class, and sexual orientation differences; however, histories of oppression, White supremacy, cis/heterosexism, and patriarchy have filtered into our institutions of higher learning. There is a need to address the negative perception of differences causing challenges for undergraduate Black men in STEM to graduate successfully. Lane (2016) stated that while higher education attempts to recognize underrepresented STEM students' pressing and the complex issue being consistently lower than majority graduates, mentoring can be a strategic way of increasing STEM identity amongst underrepresented STEM students. Underrepresented students have different collegiate experiences than most of the student population (Harris & Lee, 2019), and PWIs must become knowledgeable about embracing and addressing negative experiences such as racial discrimination.

Racial Discrimination

Historically, racial discrimination resulted in worrying, anger, anxiety, lower life satisfaction, decreased self-esteem, and depression of Black men undergraduate students (Braveman et al., 2017; Harper, 2015; Seaton et al., 2014). Through the lens of diversity and inclusion, the focus must confront the unrecognized and unacknowledged cultural knowledge, skills, and abilities of marginalized groups (Yosso, 2005); however, higher education should understand the racial discrimination facing Black men within their institutions. Racial discrimination is a global problem that has filtered into our most diverse places in America: institutions of higher learning (Criminal Justice Information Service Division [CJISD], 2018). However, higher education does not discuss racial discrimination and its effects on Black students (Harper, 2012b). Racial discrimination is when minority racial groups/ethnicities are treated unfavorably by majority racial groups/ethnicities due to limited access to political power, economic resources, and social capital (Hope et al., 2015; Seaton et al., 2014). Experiences of racism are not one direct action but various forms of incidents and race-based unfair treatment (Braveman et al., 2017). Black undergraduate men who attend PWIs are the most stereotyped in higher education, resulting in adverse effects on their psychological states, coupled with low academic performance and persistence (Harper, 2015). Higher education partially established racial inequities in K-12 schooling by tiptoeing and avoiding research and discussion on racism and White supremacy instead of addressing it (Patton, 2016). Therefore, it is imperative to address racial discrimination by including underrepresented cultures intertwined with curriculum materials, professional development, and the representation of diverse faculty (Childs, 2017).

Historical Review

K. Alexander and Alexander (2017) described that in December 1952, five cases argued by the Supreme Court took over a year to collect oral and written arguments and documenting the future position. In a racially segregated era, substandard and under-resourced schools were a decisive factor in disproportioned outcomes such as low completion percentages for minorities (Gaxiola-Serrano, 2017). Racial discrimination historically dates back over 65 years. The *Brown v. Board of Education of Topeka* 347 U.S. 483 (1954) focused on public school discrimination based on race. *Brown v. Board of Education of Topeka* 347 U.S. 483 (1954) established laws to end racial segregation in public schools, allowing Black children equal protection and access to good safe learning facilities under the fourteenth amendment (NOLO, n.d.). The National Association for the Advancement of Colored People (NAACP) was adamant in making a change with the expertise of Thurgood Marshall (K. Alexander & Alexander, 2017). This case was critical to Black boys in K-12 who dreamed of entering postsecondary education. The Supreme Court notated the Fourteenth Amendment was not purposed to exclude or include the integration of schools, yet it was prohibited (K. Alexander & Alexander, 2017). Historically, Black men endured the lawfully unfair treatment of segregation within education. Over time, Black students struggled with completion due to limited resources, quantity, and quality, compared with White students. K. Alexander and Alexander (2017) highlight that the doctrine of separate but equal” did not appear in court until 1896 in *Plessy v. Ferguson*. American courts have since labored with the doctrine for over half a century. The U.S. Supreme Court ruled that it is unconstitutional to discriminate within public schools. Racial discrimination has trickled up into higher education with White favoritism, evidenced in college access, curriculum, and policy (Patton, 2016). It was not until the 1990s that the National Association of Multicultural Education (NAME) had a

conference that focused on defining multicultural education, sensitivity, equity, and inclusion within the K-12 classroom (Childs, 2017).

Historically, Black students struggle with degree completion through systemic and institutional racism (Brook et al., 2015; Harper, 2012a). Over an extended time, Black students interpret their experience more negatively than White students due to the inability to learn, develop, and identify with the campus climate, yet there is still no solution to this problem (Gaither, 2005; Harper & Hurtado, 2007; Hurtado et al., 2015). Karkouti (2016) noted that higher education's commitment to students of color has gradually eroded because of several problems, including the country's changing climate regarding the racial issue. Therefore, the enrollment of Black students PWIs continues to fall short of anticipated goals due in part to the fact that Black students at PWIs view the campus racial climate as hostile, alienating, and culturally insensitive. Brook et al. (2015) explained that social experiences, stigmas, and stereotypes, coupled with experiences of racism, occur in various ways and depth to Black students. Higher education institutions insist upon minimum to low discrimination on campuses; however, institutional racism within public services of the academy, physical spaces of service delivery, staff, and weighing values upon decision-making processes (Brook et al., 2015). By denying racism, racial hostility, and discrimination as norm behavior (Gusa, 2010), the cultural significance of Black students will strengthen within higher education.

Black students are burdened with competing academically, with finances, family commitment, and self-identity; some drop out of school due to a lack of support and feeling connected and valued within PWIs of higher learning (Harper, 2012b). Therefore, it is imperative to understand the racial formation of subgroups on factors such as culture, history, geography, and economy (Omi & Winant, 1994). Racism by consequences from the 15th century until now

has taken on different formations from slavery, Jim Crow laws, colorblindness, to current day Anti-Black as the New Jim Crow has and will alter the experience of Black students at predominantly White institutions as an example of evolution and current operations (M. Alexander, 2010; Darder & Torres, 2004; Fredrickson, 2002; Guess, 2006). Research on racism and discrimination in campus climates as ethnicity is a salient issue among Black men in undergraduate STEM programs (Barker, 2007; Johnson et al., 2014). Racial discrimination may stem from lack of support for diversity, unfair treatment, and the bare minimums of professionals of various ethnicities that lead to intimidating and unfriendly learning and living environment (Hope et al., 2015). There are many studies completed on the college preparedness of underrepresented students; however, significant research must center attention on persistence and completion in college (Knaggs et al., 2015). Racial climates on PWI campuses require immediate help; however, administrators disregard these signals intentionally or inadvertently (Harper & Hurtado, 2007).

Current State

Jones and Reddick (2017) explained that student activism had rekindled in the mid-2010s due to incidents in higher education nationwide explicitly focused on racism and police violence. The researcher selected predominantly White institutions for this study because they have the financial means and historical syntax of having a distinct difference between the Black and White experiences. PWIs provides a strong example of privileges afforded to students due to being White; therefore, it conjunctively demonstrates the rights denied to Black students (Brook et al., 2015). Higher education must recognize “racism is central, permanent and endemic to explaining individual experiences in higher education” (Brook et al., 2015, p. 251).

Stereotyping Can Also Be Racism. Racism does not have to be blatantly obvious, but it is prevalent in practices and perceptions found within institutions (Guess, 2006). Black students at PWI dismissed stereotypes of the Black culture, such as being asked by White people if all Blacks liked fried chicken (Harper, 2015). At a fraternity at Arizona State University, White students hosted a Martin Luther King “Black Party” where White students dressed in baggy clothes, displayed gang signs and drank from watermelon cups (Argos, 2014; Cole & Harper, 2017). Stovall (2005) declared that racism in the form of discrimination had been a leading factor in the attrition rate among Black students at predominantly White institutions of higher learning; however, Black students who encounter racial discrimination at a PWI expend most of their energy contesting stereotypes rather than investing in studies (Harper, 2015).

McGee’s (2016) research found that higher education devalued Blacks. They explained that Black students must manage stereotypes. McGee (2016) determined that high-achieving Black students must rearticulate the stereotypes, a learned competency, and drive them to minimize social and psychological threats as an impact on their identity, called stereotype management. Ireland et al. (2018) noted that identity development is related to students’ interest, intrinsic motivation, competence beliefs, and expectancy for STEM academic success.

Hate Crimes. Higher education researches and analyzes racism and discrimination; discussions must address physical and mental abuse that some Black students have experienced. The NCES (2020) reported that in 2016, there were 1,070 criminal incidents classified as hate crimes on the campuses of post-secondary institutions reported to police and security agencies. The most common type of hate crime reported by institutions was destruction, damage, and vandalism (464 incidents), followed by intimidation (421 incidents), simple assault (99

incidents), larceny and aggravated assault (34 incidents each), forcible sex offenses (eight incidents), burglary (six incidents), and robbery and arson (two incidents each).

According to the Criminal Justice Information Service Division (2018), 9.2% of hate crimes took place at one of the 5,300 institutions of higher learning. Out of 4,047 hate crimes reported, 8.5% of the crimes were motivated by biases of race, ethnicity, and ancestry (CJISD, 2018). Racialized experiences were reported on the campus of large PWIs by Black students, including racist confrontations with insulting remarks from White students, instructors, and staff members (Harper, 2015). Twenty-three of these 84 multiple biased hate crimes occurred on college campuses (CJISD, 2018). The perpetuation of hostile racial climates on campuses of higher education, coupled with administration refusing to address the issue of racial discrimination at Northeastern University, had made headlines. A campus police officer at Northeastern University made racist remarks to three Black female students. At the same time, a philosophy professor at the same institution sued the university for demoting him from the department chair because he had reported to the dean of his college that students had been racially harassed and discriminated against by faculty colleagues (Harper & Hurtado, 2007). The University of Massachusetts-Amherst found hate messages in residence halls that called for the killing of “Niggas” and “Mexicans” (Cole & Harper, 2017; Everett, 2014). According to Gusa (2010) and Mitchell (2008):

Black students were harassed on campus at Appalachian State University after the 2008 election with Barack Obama as the 44th President of the United States of America. A few counties over in North Carolina at North Carolina State University had “Kill that n-word expletive” and “Shoot Obama” spray-painted on the campus.

There were also racial responses at the University of North Alabama and Hampden-Sydney College that made national news regarding the election of President Barack Obama (Cole & Harper, 2017; Heim, 2012; Howard, 2012). Furthermore, at the University of Oklahoma, White students of a fraternity were singing, “There will never be a Nigger in [SAE], you can hang him from a tree, but he can never sign with me, there will never be a nigger in SAE” (Cole & Harper, 2017; Oklahoma Daily, 2015).

The low enrollment rates, retention, and completion for underrepresented students have caused concern in higher education (Allen, 2005). Higher education research identified racial inequality as a top contributor to low completion rates of underrepresented students (Harris & Lee, 2019). One example of racial inequality in higher education would be the small number of underrepresented STEM faculty members. Okahana et al. (2018) explained that the more an underrepresented STEM student could identify with the characteristics through a significant connection of an institution such as a high research-driven school, the more chance an underrepresented STEM student will succeed. However, underrepresented students must be equipped and provided the opportunity to partake in those high research-driven activities.

Future Change. Racial discrimination is still an everyday occurrence on PWI campuses in America. The college administration must take appropriate measures to address racism on campus effectively. Data displays campuses are becoming more diverse, and entering first-year students believe that racial discrimination is no longer a big issue in America; however, racism still exists with nooses hanging from trees on campuses in the south to verbal harassment of minorities (CJISD, 2018; Hurtado et al., 2015). Harper and Hurtado (2007) described the immediate actions of a northwestern PWI after receiving a bad rating for racial equity and insensitivity on campus from a Black man in undergraduate studies. Measures included hiring a

chief diversity officer and collaborating with the NAACP to (a) improve the racial climate for Black men; (b) raise the consciousness of race; (c) hire more diverse faculty; and (d) address long-lasting toxicity on campus (Harper & Hurtado, 2007).

Research must continuously increase understanding of the power of identity-based practices, validation, processes, and preparation for achievement (Harper, 2015; Harper & Hurtado, 2007; Hurtado et al., 2015). In academic affairs, faculty must be deeply challenged and allowed to reflect and examine biases and assumptions about Black students (Harper, 2015). Meaningful interactions must empower Black students to address stereotypes by building a sense of belonging and identity development through engagement (Harper & Hurtado, 2007; Hurtado et al., 2015).

Mentoring

The problem of Black undergraduate students not completing programs is on the rise in higher education (Harper, 2010; Harris & Lee, 2019; Holmegaard, 2015). Herrmann et al. (2016) declared that attrition rates are significantly higher among STEM majors than among others. Studies must continue to research the effects of mentoring on student performance through academic and social efficacy (Herrmann et al., 2016). Mentoring is an effective strategy to improve persistence and academic achievement from the student affairs perspective in higher education (Harris & Lee, 2019). Mentoring is a form of integration based on intentionally shared experiences that affect self-efficacy (Bandura, 1997; Kezar & Holcombe, 2018). A foundational aspect of mentorship programs is to ensure some level of formal training to prepare mentors to serve students best (Harper, 2015; Kezar & Holcombe, 2018).

For higher education to understand the need for resources to increase retention and completion of Black undergraduate students, this study provides evidence of firsthand

experiences with the phenomenon of being a Black man in an undergraduate STEM program at a PWI. The shared undergraduate experiences of Black men who are graduates of STEM programs at PWIs allow the research to account for self-perceived challenges faced and how they overcame challenges. Current research provides limited research on mentoring and engaging Black men of STEM at PWIs in America. There are slim to no studies that have included varied approaches to closing the gap of undergraduate success for genders, first-generation, low-income, and underrepresented minority students (Harper, 2010; Herrmann et al., 2016; Kezar & Holcombe, 2018). Research shows that interventions take place to attempt to decrease attrition rates in higher education. Mentoring has been one of the intervention strategies that has been implemented but not utilized over a long period (Herrmann et al., 2016). Mentoring has been used to intervene within students who have not been performing academically but has not been researched and utilized as a long-term initiative to reduce attrition and increase completion (Herrmann et al., 2016).

A Collaborative Effort for Mentoring Black Men

Underrepresented students enter college clinging to a dream of getting a college degree but not understanding how to advocate for themselves and gather resources to point them toward success. Black men feel pressure to obtain employment by their family; however, Black men who attend college prove themselves academically to overcome the social perception of being “criminals, irresponsible fathers, descendants of dysfunctional families, self-destructive drug addicts, materialistic lovers of flashy possessions, and violent rapists of non-colored women” (Harper, 2009, p. 697).

Faculty, staff, and administrators vigorously promote a sense of diversity, inclusion, growth, and development in higher education (Daniels et al., 2015; Linder et al., 2019).

Academic, alumni, student and business affairs, human resources, and enterprise are just a couple of units on campus that must decrease STEM attrition by addressing extenuating educational burdens of Black men in undergraduate STEM programs (Emekalam, 2019).

Mentorship occurs in various forms, such as student-faculty, student-staff, and peer mentoring, which increases interconnectivity on campus (Graham & McClain, 2019). Mentoring allows for students to become equipped to handle all issues from racism to sexism. Hurtado et al. (2011) concluded mentoring is a strong strategy for preparing students to excel in performance and preparation for career goals academically. Mentoring is beneficial for Black students facing racism and discrimination resulting in difficulty adjusting to PWIs (Graham & McClain, 2019). Mentorship has affected the academic outcomes of minority students with the focus of aspirations, expectations, motivation, the economic value of education, and high performance for urban, low-income students (Liao & Sánchez, 2019). Experts stated a need for more research to investigate the impact of mentorships on identity, cultural beings, self-esteem, and academic performance (Peifer et al., 2016).

Mentoring is a form of engagement that allows persistence towards goals of academic achievement and career advancement. Higher education needs role models in mentors for underrepresented students that reflect their diverse backgrounds (Harris & Lee, 2019). Mentoring equips participants to adequately address career advancement needs (Chadiha et al., 2014). Mentoring enriches the learning environment in various ways: (a) methods of instruction; (b) increasing active learning; and (c) presenting students with role models who mirror themselves (Outten & Hilton, 2013; Smith, 2000; Umbach, 2006; Zirkel, 2002). Therefore, needed details for retention methods for underrepresented faculty members may serve as mentors to underrepresented students (Haley & Jaeger, 2012; Perry et al., 2019). Higher education needs

research completion on how mentoring should be effectively implemented on campuses to overcome programmatic underrepresented STEM student challenges such as first-generation, low-income, and diverse backgrounds (Herrmann et al., 2016).

Mentoring in STEM

Mentoring should facilitate students completing the STEM pipeline. STEM pipeline is a triumphant journey from education to career placement (Liu, 2018). A recognized outflow in the STEM pipeline for underrepresented STEM students in higher education has many factors (Stronger Together, 2017). Mentoring helps underrepresented STEM students succeed (Harris & Lee, 2019). Mentorship can play a significant role in ensuring that underrepresented students persist and complete STEM programs through their collegiate experiences and beyond. Some underrepresented STEM graduates go on to pursue STEM careers in the role of a faculty member. Hott and Tietjen-Smith (2018) and Dancy and Jean-Marie (2014) explained that faculty must share successes and challenges for mentoring to be effective.

Mentors must receive proper training and maybe have experienced mentoring themselves for mentoring to be effective (Urban et al., 2017). Mentoring allows individuals to persist towards their goals. Mentoring as a form of developmental activity will help train proteges to make decisions effectively as students and future professionals. Luna (2018) provided thorough communications, effective professional development, and specialized pieces of training are an integral basis of mentorship. Formal mentoring is when meaningful conversations with internal and external perspectives incorporate new ideas (Bernstein-Sierra & Kezar, 2017; Morrison et al., 2014), guiding proteges towards making decisions that are worthwhile for achievement. Kezar and Holcombe (2018) stated that mentoring was implemented in higher education to help

students navigate college. For mentoring to be effective, there must be substantial interest from both the mentor and protégé.

Higher education institutions must look at current practices and explore if the institution needs new approaches to enrich the lives of underserved Black students based on empirical evidence (Aldana & Byrd, 2015). Black students should successfully engage in activities to decrease inequalities within the learning environment and build their identity through engagement (Anyiwo et al., 2018). Though abundant evidence for engagement and mentorship exists, there is still limited information narrowing research to focus on Black men in STEM undergraduate programs at PWIs. This study focuses on the SLE of Black men graduates of undergraduate STEM programs from small and large PWIs in a Mid-Atlantic state.

Mentoring and Self-Efficacy

Mentoring should allow the recipient to enhance their knowledge, skills, and abilities in an area through meaningful conversations and observations. The most influential source of efficacy information is personal mastery experiences because they provide the most authentic evidence of whether one can master whatever it takes to succeed in an endeavor (Bandura, 1997; Tschannen-Moran & McMaster, 2009). Bandura's (1997) self-efficacy theory allows the researcher to build a firm foundation with completed research to provide a solid theoretical approach to support mentoring experiences.

Bandura's (1997) self-efficacy theory applies to all involved in mentoring. This portion of the study will focus on faculty as mentors because not only are they guiding and exemplifying self-controlled positive behaviors within the field, but they are instilling those characteristics early on in students' careers. Mentors should have strong verbal communication skills, competence, maturity, emotional stability, and excellent listening skills (Williams et al., 2019).

Wren (1982) explained that mentors should express self-control due to being held to a higher regard and demonstrate understanding of how to handle different events based on behaviors and the motivational role of rewards. Gratification, bonuses, and incentives are important, but the mentor must be disciplined enough to self-perceived outcomes to actions to avoid negative perceptions and unhealthy relationships (Małota, 2019). Mentors should consistently demonstrate self-control, which prompts special recognition and rewards within mentor relationships (Hott & Tietjen-Smith, 2018).

Mentoring builds upon self-efficacy; however, mentors must create strategies to increase self-efficacy among proteges. Tschannen-Moran and McMaster (2009) voiced that verbal persuasion has limited power for increasing self-efficacy and promotes self-change, increased skill sets, and a firmer belief in oneself. Mentoring allows students to hear their importance in selected fields and find their voice as underrepresented students and professionals. Wren (1982) rendered the self-regulation construct focusing on empowerment by following examples: expectancy construct, which is the input behavior leading to greater expectation in faculty mentoring, and motivational construct that places tendencies and desires as strength of the good cause.

Mentoring Motives

A lack of motivation to mentor can lead to mentorship being ineffective. Higher education views mentoring as a tool to prepare future professionals for greatness adequately and to carry out the STEM mission. Morales et al. (2017) questioned what motivated mentoring to successfully occur and at what cost from the mentor and the protégé. Higher education institutions should look at current mentoring on campus to compare benefits to costs of a formal

mentoring program. In addition, institutions should research best practices for mentors to keep the protégé and mentors actively involved.

Kezar and Holcombe (2018) named the Meyerhoff Scholars Program, a summer bridge program, as the best program to positively affect students and faculty. This STEM enrichment program allows the protégé and mentor to complete research along with active mentoring (Maton et al., 2009). Additionally, students enrolled in the program impacted grade point averages to increased completion rates on campus (Maton et al., 2000). The program currently identifiable to this program is the Ronald E. McNair Scholars Program, where underrepresented STEM students work with a faculty mentor during the summers on research and presentations with the end goal of promoting doctoral completion for underrepresented students (McNair Scholars, 2019).

Faculty Mentorship

Santos and Reigadas (2002) provided three points regarding faculty-student mentoring programs: (a) self-efficacy and identification of academic goals increased; (b) underrepresented proteges believed their underrepresented mentors supported them personally and career-wise; and (c) the more mentorship occurred, the more satisfied they were with the mentor relationship, and the better the students adjusted to college. Students must strive hard towards the completion of undergraduate degrees. Sometimes, that requires guidance and engagement in the form of mentoring as a critical ingredient to self-efficacy. Through mentoring, faculty members fulfill the four sources of mastery for students' self-efficacy (Bandura, 1997). In higher education, the individual provides guidance or advice to students known as mentors or advisors (National Academy of Sciences and National Academy of Engineering, Institute of Medicine, 1997). Turner and Gonzalez (2015) described faculty to student mentoring as “a process by which persons of superior rank, special achievements, and prestige instruct, counsel, guide, and

facilitate the intellectual and career development of persons known as protégé” (Turner & Gonzalez, 2015, p. 2). Faculty members who take on mentoring responsibilities must feel confident and equipped to offer to mentor (Miorelli et al., 2015).

Some institutions have a well-developed plan for mentoring, and other higher learning institutions allow mentoring to occur freely, without boundaries or commitment. The National Academy of Sciences and National Academy of Engineering, Institute of Medicine (1997) recognized an emerging need for faculty mentors. They described them as having a professional relationship lasting over an extended period providing guidance and encouragement to degree completion. The mentorship will not be meaningful or yield effective results if the motivation is lacking (Miorelli et al., 2015). Mayer et al. (2014) declared that mentors must find an effective strategy for mentoring that works within the mentorship. Faculty of color are often disproportionately called to advise, counsel, mentor, and otherwise work with students of color (Dancy & Jean-Marie, 2014, p. 355). Higher education must research effective ways to offer cross-race mentoring. Faculty mentors must multitask with teaching and handling professionalism, which means dealing with race, classism, and other trends in higher education. Higher education must ensure that all students have someone with whom they feel comfortable communicating, such as mentorship, built on trust and communication. Faculty mentoring should cultivate, prepare, and socialize individuals to complete degree requirements and enter the professoriate (Perry et al., 2019).

As this study focuses on Black men who completed undergraduate STEM studies at PWIs, it does not “discount the severity of the problems that confront underrepresented students in the K-12 sector or undergraduate and graduate programs, as these issues at these fundamental levels of education have a direct impact on the supply of faculty of color” (Myers & Turner,

2004, p. 2). Engagement and mentoring allow students to understand how to navigate school with financing, course sequence, academic support, and professional development (Okahana et al., 2018).

Benefits of Faculty Mentoring

Benefits inclusive of mentoring are the ability to understand and increase the power of influence, self-efficacy, and learning-efficacy as mentoring students in higher education (Kezar & Holcombe, 2018). Mentors serve as advisors, career coaches, guides, leaders, and role models to students (Herrmann et al., 2016). Dancy and Jean-Marie (2014) stated that what motivates mentoring is supporting an increasingly diverse student body. The NASNAE (1997) said that a mentor focuses on helping another person develop into a success story. The overarching benefit of mentorship is that knowledgeable people play a significant role in improving education, leading to better performance, persistence, and achievement by guiding students through identifying and overcoming challenges (Bernstein-Sierra & Kezar, 2017). Cullen et al. (2017) made it clear that various programs, disciplines, and schools, such as nursing, do not formally implement mentoring programs; however, more faculty members are interested in the programs. Due to faculty mentoring, faculty members are experiencing retention and improved morale within academics, which leads to retention amongst students (Cullen et al., 2017). Students will succeed if they engage with professionals whom they deem successful.

The advancement of careers is essential because everyone wants to succeed and grow in a challenging yet rewarding way. Students are looking for the opportunity to make the most of their college experience, advance in their studies, and prepare for their potential careers through exposure (Groccia, 2018; Harris & Lee, 2019; Lane, 2016). Engagement allows students to excel towards academic achievement and beyond in the STEM pipeline to academic success. In

addition, the higher education pipeline should produce more faculty due to persistence and achieving completion of degrees (Lane, 2016; Okahana et al., 2018).

Students benefit from faculty mentoring with research, presentations, and their publications (McRae & Zimmerman, 2019; Okahana et al., 2018). Faculty members who serve as mentors can benefit through tenure and promotion (Miorelli et al., 2015). Mentoring allows for faculty to serve as a demonstrated example to students of being successful in academia. It also will enable mentors to have a hands-on approach to advocating the needs of underrepresented STEM students to stakeholders (Harris & Lee, 2019). Faculty mentoring allows students to overcome STEM challenges (Miorelli et al., 2015; Bernstein-Sierra & Kezar, 2017). Miorelli et al. (2015) concluded in a study on STEM faculty morale and mentorship conducted at Texas Tech University that universities should consider adding mentoring to improve STEM engagement and outreach as criteria for tenure and promotion. Tschannen-Moran and McMaster (2009) explained that professionals do not put forth great effort in their endeavors if they believe that their actions are not worthy of producing meaningful results. Faculty members who received mentorship need to mentor STEM students to keep the cycle of STEM success moving forward and close gaps within the STEM pipeline (Liu, 2018; Lykkegaard & Uriksen, 2019).

The ultimate example of faculty-student mentorship success for the STEM pipeline is completing degree requirements and entering the workforce. The U.S. is facing a shortage of domestic STEM workers (Litzler et al., 2014). The smallest percentage of current STEM professionals are Blacks, Hispanics, and women in the workforce (Lane, 2016). Underrepresented STEM students completing the STEM pipeline is imperative because it increases underrepresented role models' visibility (Herrmann et al., 2016). For example, in

higher education, there are two trends: higher education continues to be dominated by the White society, and there are not enough underrepresented graduates serving as faculty members who mentor, role model, advocate, and understand underrepresented students and how they can reach success (Harris & Lee, 2019). Johnson et al. (2014) explained that benefits reported by undergraduate research proteges include increased retention, a greater probability of degree completion, increased confidence, identity development, and increased student commitment and engagement.

Costs of Faculty Mentoring

Bernstein-Sierra and Kezar (2017) identified funding, leadership, staleness, perceived threats to legitimacy, and maintaining integrity as five challenges that higher education institutions face with implementing formal mentoring. Besides those challenges, mentors must understand how to integrate underrepresented students into social and learning environments and combat a lack of motivation. Faculty mentoring can be overly taxing based on primary commitments to their own assigned students and research (Miorelli et al., 2005). Mentors will face challenges, but they must remain highly motivated and interested in serving and improving undergraduate experiences (Morales et al., 2017).

Mentoring must appeal to participants as being an investment worth the time and extra responsibilities. Cullen et al. (2017) presented two themes that faculty members face: mentoring, meaningful mentoring, and lack of time for mentoring. Mentorship is time-consuming when done well. Traditionally, it has been considered a faculty requirement; however, mentorship has not been reported and acknowledged in the same way as an education scholarship or research productivity (Morrison et al., 2014). These positive attributes of mentoring will demonstrate evidence of being a scholar and teacher as their self-perceived identity.

Leaders, educators, managers, and professionals, in general, want to serve as mentors in a formalized setting but are many costs associated, and they are all swamped with tasks (Linnenbrink-Garcia et al., 2018). The highest price that all participants should consider is time. Nevertheless, “the forces working against such one-on-one student-faculty interaction are intensifying” (McKinsey, 2016, p. 2). Faculty, staff, and students are busy with their respective responsibilities. For example, staff members have practitioner events, conferences, and daily operations of their department; faculty have research and instruction. Though schedules fill up quickly, mentoring is worth the cost of time for student gains (Lopatto, 2010). Though sacrifices would occur on both sides of mentorship, it is imperative to understand that mentoring can lead to persistence and achievement. Often, some mentorships provide investments of time and personal energy at a total cost (Linnenbrink-Garcia et al., 2018; Małota, 2019).

Mentorship is a worthy time investment. Once there is a mutual understanding of goals and support, then progress is made. Mentorship may be costly, but students hold their mentors in high value because they invest in relationships to advance their degrees (Lopatto, 2010). Evidence of self-efficacy and mentoring displays retention and persistence for completing the STEM pipeline (Liu, 2018). Bandura (2012) stated that performance is not an isomorphic reflection of ability, yet it fuses with many motivational and self-regulatory determinants. Thus, past performance is a mixed conglomerate index in which perceived self-efficacy is part of its constellation of determinants (Bandura, 2012, p. 24). Performance is critical when deciding to mentor. One of the estimated costs of mentoring is performance equaling reputation, and if mentoring is not adequate, then mentors are putting their name and professional reputation at stake (Linnenbrink-Garcia et al., 2018; Małota, 2019). In all, cost-effectiveness is the best term to describe what mentors and proteges sacrificed to see the successful completion of the STEM

pipeline. A medical study was completed regarding cost-effectiveness, mentoring as an intervention, and underrepresented patients with a medical condition. The investigation resulted in cost-effectiveness because the interventions improved patients' well-being because they learned how to care for themselves (Williams et al., 2019). Applying this scenario to higher education is just as relevant and would be considered cost-effective because of the sacrifices made to see students complete the STEM pipeline.

As current faculty members mentor students, they face various challenges in higher education. Some of these challenges are defined as budget cutbacks, halted raises, yet placing the expectation to produce more high-quality with lesser resources (Hott & Tietjen-Smith, 2018). As candid conversations occur within mentorship, proteges build self-efficacy through visualizing how the mentor handles professional challenges. Faculty feel the daily pressure of research, proving their worth due to increasing tuition, integrating technology, and devoting themselves to their responsibilities (McKinsey, 2016).

Effective Mentoring

While mentors may have difficulty finding a balance between all their assigned duties, mentoring proved to be a good resource for student efficacy (Groccia, 2018). The National Academy of Sciences and National Academy of Engineering, Institute of Medicine (1997) stated an excellent mentor guides a student in advancing educational experiences, assisting the student's socialization into a disciplinary culture, and helping the student find suitable employment. A quality faculty-student mentoring relationship is likely to engender positive self-perceptions in at-risk students and feelings of self-efficacy, personal control, respect for oneself, and a sense of being valued and respected by significant others (Santos & Reigadas, 2002). An effective faculty mentor understands the need to challenge students to become critical thinkers,

retention, persistence towards degree completion, preparedness for employment, and the importance of graduate school preparations (Morales et al., 2017). Effective mentoring will temper the imposter syndrome and feelings of doubt and incompetence (Hutchins, 2015). Relationships with mentors should serve as a source that makes students aware of additional resources to build personal competence and self-efficacy (Santos & Reigadas, 2002).

Mentoring and Ethnicity

To fight systematic racial inequality in higher education, one must employ faculty of color (Harris & Lee, 2019). Faculty of color will increase the likelihood of mentoring amongst Black men students in undergraduate STEM programs at PWIs (Myers & Turner, 2004). Black undergraduates benefit from mentoring by performing well academically (Apprey et al., 2014; Santos & Reigadas, 2002). Kezar and Holcombe (2018) expressed that scholars and policymakers will need to align support structures for students who have traditionally not been successful such as first-generation, low-income, and underrepresented minority students. Apprey et al. (2014) stated that mentoring has helped underrepresented students develop social belonging, understanding, and connection of engagement, persistence, completion, and building knowledge and behaviors that support and sustain underrepresented students to completion.

Mentoring is vital because it gives underrepresented groups a place of belonging, which will increase academic performance (Apprey et al., 2014). Mentorship between underrepresented mentors and proteges will freely engage in mentoring because they mirror self-efficacy by seeing evidence of overcoming challenges (Bandura, 1997). Students can trust the vicarious experience of the mentor and listen to their experiences through verbal persuasion and emotional arousal (Bandura, 1997). Students of color whom the Whites or males have mentored have stated that friction always occurred because the underrepresented students felt they had to prove themselves

continually, defend their intellectual interests, and fight for assistantships, publishing, and research opportunities (Harris & Lee, 2019). Lancaster and Xu (2017) stated that Black STEM students face persistence and graduating on time. Mainly, barriers of ambivalence toward the teaching and learning environment, weak, formal relationships with faculty, inadequate preparation for challenging classes, large classes, infrequent class offerings, and frustration with academic advising will decrease due to faculty mentorship (Lancaster & Xu, 2017). Students can experience intellectual stimulation, receive academic support, and gain career guidance through the connection of students and mentors (Apprey et al., 2014).

One federal program nationally known for preparing underrepresented undergraduate STEM students for doctoral studies through research and other scholarly activities through STEM faculty mentoring is the McNair Scholars Program (McNair Scholars, 2019). During the summertime, STEM students are matched with STEM faculty members to mentor them through research. Welch et al. (2017) explained the importance of faculty mentors and underrepresented students and stated that faculty in academic medicine associated inclusion in a formal mentoring program with higher research productivity; therefore, traditional mentoring programs increase educational productivity. In addition, an informal program increases career satisfaction.

Engagement

A standard method to support the success of underrepresented students is to increase or add engagement, mentorship, and support programming on the college campus (Crisp et al., 2017; Harper, 2012b, 2015). Engagement and support build connections that Black men need at PWIs to be successful. Holmegaard (2015) noted that STEM programs must attract and retain students by actively engaging and supporting them throughout their educational journey. Winkle-Wagner and McCoy (2018) completed a qualitative exploration of diverse experiences among

undergraduate and graduate students and faculty in STEM disciplines at a predominantly White institution (PWI) and a historically Black college or university (HBCU) in a Mid-Atlantic state. Winkle-Wagner and McCoy (2018) found that PWI participants felt excluded, voicing concerns about institutional struggles with creating an inclusive campus climate; whereas, HBCU participants perceived STEM disciplines as diverse and viewed their programs and institutions as supportive of their needs. Black men achievers tend to be academically high-performing and engaged in student leadership at HBCUs (Harper, 2015). Axelson and Flick (2011) define student engagement as the perception of how students appear to be involved and interested in learning and how they connect to the institution, coursework, and peers. Engagement and mentoring are essential to academic success for Black undergraduate students, but they trust the institution enough to partake in these activities (Welch et al., 2017). Engaged Black undergraduate students: (a) decrease the risk of academic failure; (b) increase persistence; and (c) receive guidance and ownership towards completion of a college degree (Herrmann et al., 2016; Kezar & Holcombe, 2018; Simon et al., 2015). Higher education professionals must understand the lived experiences of Black undergraduate students and successfully develop and implement meaningful engagement within the college community. The more students engage within the campus community with peer connections, community opportunities, and available resources on campus, the more opportunity to complete degrees (Du, 2016; Kuh, 2003).

National Survey of Student Engagement

The National Survey of Student Engagement, hereafter referred to as NSSE, was an assessment tool developed to understand student engagement in higher learning (Axelson & Flick, 2011). The NSSE collected data from participation institutions of higher education in 2011 and 2013 on the evidence of convergence that student engagement measures were significantly

and positively related to perceived goals in learning (Zilvinskis et al., 2017). The National Center for Higher Education Management Systems fulfilled a request to develop an assessment instrument that measured the extent to which students participated in acceptable educational practices and what they gained from the experiences (Axelson & Flick, 2011). The most recent NSSE model displayed strong evidence of discrimination, such as differential relationships between engagement measures and self-reported learning outcomes (Zilvinskis et al., 2017). NSSE shows that the connection between engagement and retention is a high-quality success (Zilvinskis et al., 2017). The NSSE is needed to understand students' current culture on campus, particularly Black men, and utilize those data to implement engagement for the current and future students effectively. Carini et al. (2006) stated that students live a productive and satisfying life after college due to attention, adding to skills and dispositions. Students partly control their educational outcomes by participating in programs of interest. Participation in programs of interest is an example of meaningful engagement because students get to develop connections to help them overcome daily challenges (Nash & Jang, 2013; Nash & Murray, 2010).

The New Five-Factor Model for Engagement

Engagement must be intentional and well developed to affect students' persistence and completion. Effective engagement is paying attention to students' backgrounds because it provides insight and types of support that the institution can offer effectively (Brooms et al., 2018). The New Five-Factor Model for Engagement developed by Zhoc et al. (2019) provides five main facets of student engagement: academic, cognitive, social with peers, social with teachers, and affective engagement to dig deeper into student involvement. Zhoc et al. (2019)

The New Five-Factor Model for engagement emphasizes cognitive engagement as more meaningful than academic engagement as key to student success. Zhoc et al. (2019) explained,

- Being cognitively and socially engaged with peers has a determining effect on students' satisfaction with the university experience;
- Social engagement with peers and affective engagement were the dimensions with the highest correlations with the social outcomes, suggesting that increased interaction with peers and participation in beyond-class activities can enhance students' communication and interpersonal skills, leadership skills as well as the ability to get along with people from different cultural backgrounds;
- Students with a higher sense of belongingness tend to have higher rates of participation and engagement, which can help to explain the improved social outcomes;
- Cognitive outcomes, cognitive engagement, and social engagement with peers were dimensions with the highest correlations. Students who are more cognitively engaged gain more cognitive outcomes. Social engagement with peers leads to the same results given that cognitive outcome achieved through active discussion of ideas, debating points of view, and critically reviewing work with peers;
- Most correlated dimensions were self-growth outcomes (such as time management, self-reflection, and lifelong learning), cognitive engagement, and social engagement with peers. For example, while students who are more cognitively engaged tend to have better self-reflection skills through interacting with peers, it allows them to learn from each other mutually and foster personal growth in different aspects. (p. 298)

Academic Engagement

Academic engagement focuses on observed behaviors within the learning process (Zhoc et al., 2019). Intellectual engagement through online learning allows contemporary societies to continuously educate and spread knowledge (Perkmann et al., 2013). Multicultural Education needs a large platform that is always available to all students (Perkmann et al., 2013). There is a direct correlation with academically engaged students persisting at a higher level to obtain academic achievement than less academically engaged students (Perkmann et al., 2013). Higher education must adopt new cultures, methodologies, theories, and languages for practices to promote academic achievement for all students, spite limitations such as reduced resources (Mathison, 2015). Academic engagement begets intellectual development (Perkmann et al., 2013).

Cognitive Engagement

Cognitive engagement goes beyond the minimal requirement to focus on understanding and mastering knowledge (Perkmann et al., 2013). Cognitive engagement consists of effective teaching strategies coupled with a high level of motivation from the learner. Cognitive engagement goes beyond the surface engagement of re-reading notes and memorizing objectives to deep engagement of thought processes and self-regulatory strategies that influences learning through processing (Joo et al., 2014). Cognitive engagement gauges students' knowledge to be meaningful through intellectually challenging themselves and others for deep understanding (Perkmann et al., 2013). Students demonstrate that cognitive engagement combines practical work with analytical work (Morris et al., 2017). The more students practice, study, and receive feedback on their writing, analyzing, or problem-solving skills, the more proficient they become (Kuh, 2003).

Peer Engagement

Peer engagement is informally gaining knowledge amongst students and friends (Perkmann et al., 2013). Cultivating trust, equalize imbalanced power, and improving relationships are the benefits of peer mentoring (Greer et al., 2016). Peer engagement is only effective with highly motivated peers and teachers (Vollet et al., 2017). Peer engagement fosters learning within and outside the classroom in clubs, organizations, student unions, athletic divisions, and shared living spaces (Perkmann et al., 2013). Peer engagement serves a multi-purpose in higher education: (a) allow students to build trust through friendship; (b) allow students to feel connected and supported by their institution of higher learning; (c) increased academic performance; (d) academic development; (e) knowledge acquisition; (f) analytical and problem-solving; (g) self- esteem; and, (h) decrease attrition (Perkmann et al., 2013).

Teacher Engagement

Teacher and faculty engagement used interchangeably collaborates with faculty in an academic space to build critical student-teacher relationships (Astin, 1993; Perkmann et al., 2013). There is an immediate need for professional development courses to properly engage with teachers in higher education, as higher learning institutions serve more students through various learning (Robson, 2018). Lekwa et al. (2019) noted that effective instructional strategies for engagement link to student success. Astin (1993) concluded that evidence of students' significant achievement is in high-grade point averages, degree completion, honors-level completion, and preparedness for graduate school. Teacher engagement with students can be challenging; however, it results in a higher, satisfying academic experience by demonstrating intellectual and personal growth (Perkmann et al., 2013). Interestingly, research challenges faculty to engage with students outside of the classroom because it increases retention (Cuseo, 2018).

Research on faculty members' role in positively incorporating cultural diversity and promoting interethnic attitudes within the classroom is needed (Geerlings et al., 2019). Faculty members play a significant role in inclusion within academic affairs and the racial climate within the classrooms. As a result of an effective teacher and positive interethnic attitudes, majority populations are more favorable to relationships with minorities due to seeing positive interactions with faculty (Geerlings et al., 2019). Curriculum development with Multicultural Education needs to promote self-empowerment, and faculty must engage in critical thinking frameworks that support developmental behavior aligning with cultural norms in academia (Jack, 2016).

Affective Engagement

Affective Engagement increases feelings of involvement at the institution of higher learning, coupled with meaningful activities (Perkmann et al., 2013). Attendance rates and completion rates have increased as Affective Engagement influences positive attitudes and behaviors due to involvement with the institution as a whole and the commitment to learning (Dunstan et al., 2017). Affective engagement is vital in higher education because it connects students to the institution based on a sense of belonging and relatedness (Perkmann et al., 2013). The academic effort, grades, and expectation of success within the college community channel to student success (Dunstan et al., 2017). There is a direct correlation between a sense of belonging, identification with the institution of higher learning, and a sense of relatedness to the success of Affective Engagement.

Multicultural Education

Multicultural Education is a strategic way of incorporating a sense of belonging and connection for Black men in STEM undergraduate programs at PWI. To be of change,

institutions must strive to educate all students about diversity and increase a sense of belonging for Black STEM students. Multicultural education encourages multicultural sensitivity (Huh et al., 2015) at PWIs. Higher education should focus on multicultural education to prepare all students with the knowledge, skills, and abilities to serve other students and communities effectively and whose lived experiences differ from their own (Cherng & Davis, 2019).

Multicultural education does not have to be a lecture or a “16 week, three-credit-hour course” that meets weekly but can take shape in many forms, including videos, individual and group activities, discussions, and simulations (Marshall, 2015). Multicultural education helps students understand non-White cultures better and builds a sense of belonging by connecting students through shared respect for these underserved cultures (Nakaya, 2018), which counters discrimination and successfully improves sensitivity within majority populations (Geerlings et al., 2019). Promoting forward-thinking and tolerance for integrating marginalized people coupled with an awareness of race, difference, and belonging should ground intercultural curricula (Taha, 2019).

Summary

Black men have the lowest completion rate in higher education and STEM undergraduate programs at PWIs (Harper, 2010; NCES, 2020). Underrepresented students face a decrease in STEM programs due to a lack of motivation, affecting persistence and achievement (Simon et al., 2015). Herrmann et al. (2016) offered dropout rates are significantly higher in STEM fields during the first two years of college due to poor performance and lost interest. The lack of representation of Black students in STEM programs at PWIs has created a well-documented academic achievement gap and is a matter of increasing concern (Love, 2008; Russell & Russell,

2015). Winkle-Wagner and McCoy (2018) noted that diversity and inclusiveness might matter to how underrepresented students experience inclusion in their academic programs.

This study consists of Black men who are graduates of a STEM undergraduate program at a PWI in the United States. First, the literature review's foundation included Shaun Harper's (2010) conceptual anti-deficit achievement framework. Second, the researcher provided an understanding of retention and attrition in higher education. Third, the literature review discussed challenges Black men in higher education faced, focusing on racial discrimination (Braveman et al., 2017; Harper, 2012a). Fourth, the researcher delved into engagement with a New Five-Factor Model of Engagement developed by Zhoc et al. (2019). Finally, the literature review explored mentoring, concentrating on the effects of faculty-student mentorship and the rewards of increased degree completion and career satisfaction (Welch et al., 2017).

Higher education has conducted minimum research on Black engagement and mentorship as it pertains to degree completion; however, it is even slimmer research conducted on degree completion of Black men in STEM undergraduate programs at PWIs in the United States. This study is necessary to provide STEM fields, faculty, and stakeholders with relevant information to influence policies and procedures that support Black men as students. This study aims to uncover valuable information from Black men who have graduated from STEM undergraduate programs at PWIs, and add to the research of self-efficacy, STEM efficacy, Black men student success, and the anti-deficit achievement framework.

CHAPTER THREE: METHODS

Overview

This transcendental phenomenological study aimed to understand how Black men in STEM undergraduate programs succeed to graduation at PWIs. Seeking ways to improve the success of all students, particularly Black men in STEM, is an urgent need in American society. The methods delineated in this chapter focus on seeking the experiences of Black men to inform the nature of this problem. Chapter Three details the research design, research questions, setting, participants, procedures, researcher role, data collection methods, data analysis, establishing trustworthiness, and ethical considerations.

Design

I focused solely on the experiences of the participants in this transcendental phenomenological study. Despite being a Black man undertaking doctoral education, I am confident in my ability to bracket my experiences to seek the truth as my participants see it. The study focused on providing themes, thick and rich descriptions (Moustakas, 1994), and not numerical data; therefore, qualitative is the method.

Qualitative Methodology

This research study is qualitative due to studying a phenomenon about which little is known (Creswell, 2018). The qualitative methodology focuses on understanding and developing meaning to a problem through collection methods of engagement, resulting in a written report displaying the implications and importance of a situation (Creswell, 2018). Creswell and Poth (2018) explained that qualitative methodology transforms the world through studying things in their natural state through interviews, conversations, memos, and recordings.

Phenomenological Research Design

This study has a phenomenological research design. This study focuses on describing the undergraduate experiences of a phenomenon (Moustakas, 1994). Therefore, the study must have meaning towards the background, as Husserl expounded upon (Staiti, 2014). I chose a phenomenological design to describe the undergraduate experiences of Black men in STEM who completed undergraduate degrees at PWIs because the study is not going to focus on studying the effect or produce a quantitative measurement.

A phenomenological design investigates realistic experiences of the phenomena (Gall et al., 2007). The phenomenon, undergraduate experiences of Black men who completed STEM programs at PWIs are of vital interest to me. Phenomena should explore programs, processes, and roles that interest the researcher (Gall et al., 2007). Phenomenology is a study of realistic experiences that intersects the sciences of philosophy and phenomena to discover absolute knowledge (Husserl, 2014).

Transcendental Design Type

The transcendental design type provided knowledge through self-evidence, such as experiencing the phenomenon (Moustakas, 1994). Moustakas (1994) explained that “from the perspective of transcendental philosophy, all objects of knowledge must conform to experience” (p. 44). I did not select hermeneutics to model this study because the author is not seeking to interpret the phenomenon’s meanings and lived experiences. This transcendental phenomenological study studies the appearance of things just as we see them and appear to us in consciousness (Moustakas, 1994). Since all knowledge and experiences connect to the phenomena, “things in consciousness that appear in the surrounding world, inevitably a unity

must exist between ourselves as knowers and the things or objects that we come to know and depend upon” (Moustakas, 1994, p. 45).

I looked at the phenomenon of undergraduate experiences as a Black man in a STEM program at a PWI. I explored the participants’ perceptions of mentoring and engagement. Creswell (2018) implied that a phenomenological study describes the phenomenon or lived experiences of various individuals with scope given to shared commonalities. This study is of a phenomenological design because it focuses on providing heavy descriptions of the phenomenon of study and understanding undergraduate experiences for Black men of science, technology, engineering, and mathematics (STEM) graduates from PWIs.

Accountability is a significant foundation for qualitative research. Accountability strengthens the voice of lived experiences in this study. Researching the undergraduate experiences of Black men who completed STEM undergraduate programs at PWIs is vital for this study’s persistence and theoretical framework.

Research Questions

The following research questions guided the study to understand PWI STEM Black men’s undergraduate experiences:

Central Research Question

What contributes to the success of Black STEM undergraduate men at predominantly White institutions of higher learning?

Sub-Question One

What role did engagement such as mentorship at a PWI play in handling challenges as a Black man who completed an undergraduate STEM program?

Sub-Question Two

How did Black men who completed undergraduate STEM programs connect to a PWI campus?

Sub-Question Three

How do Black men, who are STEM graduates of PWIs, describe their undergraduate experiences with racial discrimination?

Setting

The phenomena, undergraduate experiences of Black men in STEM PWI programs, provided discovery of knowledge to expound upon in research (Moustakas, 1994). Moustakas (1994) believes “essences are brought back into the world and enrich and clarify our knowledge and experience of everyday situations, events, and relationships that are a necessary source for explicating experiences and deriving knowledge” (p. 48).

The natural setting will be in STEM programs at small and large, predominantly White higher learning institutions in a Mid-Atlantic state. The large PWI, named LPWI, is a state-funded institution of higher learning governed by a state university system. Due to the Higher Education Reorganization Act, all 17 institutions offered post-secondary education to the people of this Mid-Atlantic state governed by one board. LPWI is a site due to be a large PWI with over 20,000 students enrolled during the 2019 academic school year. LPWI has the Ronald E. McNair Scholars program, a federal Trio program focusing on preparing underrepresented students for doctoral degrees through scholarly activities such as STEM research (McNair Scholars, 2019). As of 2019, 27% of the student population identify as African American (UNIVSTATS, 2020). According to UNIVSTATS (2020), 7.25% of students enrolled in undergraduate and graduate programs at LPWI are Black men. As of 2017, the institution has a 76% first-year retention rate.

According to The Education Trust (n.d.), the graduation rate of 29.5% (4-year), 49.5 % (5-year), and 54.3% (6-year). LPWI has 125 undergraduate programs, 154 master's degrees, and 43 doctoral degrees. LPWI is number one in the Mid-Atlantic state for social mobility in the U.S. News and World Report, ranked third for public universities in the Mid-Atlantic state, and College of Distinction, among many more. The organizational structure of this institution consists of the statewide university system, Board of Trustees, chancellor, provost, and vice-chancellor, and cabinet. The chancellor's council includes the provost and executive vice chancellor, seven vice-chancellors, a general counsel, two associate vice-chancellors, a director of intercollegiate athletics, and the chief of staff. The office of the provost oversees all academic affairs.

The small PWI referred to as SPWI is in a Mid-Atlantic state. SPWI is a private, liberal arts college that ranks in the lowest 5% of national four-year degree-granting institutions for graduation rates (The Education Trust, n.d.). SPWI offers 48 bachelor's programs, three post-bachelor's programs, and seven master's level programs (UNIVSTATS, 2020). SPWI has 946 students enrolled, and 17.2% are Black men enrolled in undergraduate and graduate programs (The Education Trust, n.d.; UNIVSTATS, 2020). According to The Education Trust (n.d.), SPWI has a 16.4% 4-year graduation rate, 16.4% 5-year graduation rate, and 16.4% 6-year graduation rate. The organizational structure of SPWI consists of a Board of Trustees, church affiliation, president of the college, vice president for academic life, and vice president of student affairs.

Participants

A phenomenological study consists of three to 17 participants that will intentionally serve as the best approach to describe the phenomenon (Creswell, 2018). Saturation will determine the final number of participants (Creswell, 2018), but I elicited the experiences of at least twelve

participants. Creswell (2018) stated that the researcher has reached an adequate sample size and point in studying no new data presented. Gall et al. (2007) noted that the researcher aims to develop a deeper understanding of the phenomenon with a small sample size. For this study, I selected participants through purposeful sampling, with the sample consisted of Black men who completed undergraduate STEM degrees at PWIs. Purposeful sampling intentionally selects participants who will provide detailed, in-depth descriptions of the phenomenon (Gall et al., 2007). I requested STEM organizations on social media platforms to help provide a list of names for five to ten participants who identify as Black men graduates from an undergraduate STEM program at a PWI. Creswell (2018) identified purposeful sampling as the primary strategy for sampling because participants will share a strong understanding of the phenomenon. I utilized criteria sampling to heighten the value of my study by ensuring all participants completed a bachelor's degree within 6 years without a break from their start date at a PWI.

Procedures

Before collecting data through individual interviews, a focus group interview, document analysis, I submitted documentation to the Institutional Review Board (hereafter referred to as IRB) for approval (Appendix A). After IRB approval, I moved forward with interviews since this study did not need site permission due to not interviewing current students enrolled at the institutions. I reached out to administrators of The STEM House, Harvard Black Men's Forum, and Black Male PhDs social media pages to get participants based on criterion sampling. The criteria included (a) identify as a Black man, (b) must have completed an undergraduate STEM degree at a PWI, and (c) must have completed the degree within 6 years of the start date of the program.

After receiving IRB approval, I reviewed the suggested participant list. I contacted them by email (Appendix C), consisting of the study's objective, requested information, and instructions for interested participants who meet the criteria requirements. Upon receiving emails of interest, I verified the date and time to interview. After a confirmed date and time, I sent a confirmation email with a consent letter for the participants to sign via PDF (Appendix B). Next, I conducted individual interviews and then focus-group interviews with open-ended questions to describe the phenomenon (Moustakas, 1994). Individuals who participated in the document analysis process received instructions via email to write a letter to future Black men in undergraduate STEM programs at PWIs (Appendix E). Focus groups occurred in a pseudo-structured room with prompts regarding the phenomenon. Interviews and the focus group were recorded via laptop and an iPad and transcribed in a password-protected electronic research journal located on my laptop. To ensure that there were no technology mishaps that will hold up the interviews, I brought a backup recording device such as an iPad. These documents were saved and backed up on a usual basis. The stored electronic journal served as a codebook on my secured laptop with a column for pseudonyms and real names. All post-interview communication was delivered via email and transcribed within the secured research journal. My journal had daily entries and reflections while collecting data. I analyzed data utilizing Creswell's (2018) data analysis recommendation that aligns with Moustakas's (1994) seven steps of phenomenological reduction.

The Researcher's Role

I had a distinct role in understanding phenomenology and collecting data. I collected data from participants who experienced the phenomenon (Creswell, 2018; Moustakas, 1994). All qualitative phenomenological data was analyzed, compiled, examined, and synthesized by the

researcher as the instrument (Creswell, 2018; Moustakas, 1994; Van Manen, 2016). I did not have any current working relationships with the participants that will create any conflicts of interest, biases, or assumptions that will influence the data or conduction of the analysis. To strengthen the understanding of the phenomenon, I only asked questions and captured data in genuine authenticity.

I also participated in journaling to bracket preconceived notions and personal biases (Moustakas, 1994). I separated information by reducing data that is not meaningful to the problem and purpose statements of the study (Moustakas, 1994). Reflective journaling was the primary means of bracketing during this study to increase my awareness of my biases that may affect the data analysis (Moustakas, 1994).

Once completed, I matriculated as an executive for a federal agency and lecturer in HE. Upon completing the degree, the researcher will have a strengthened knowledge of mentoring perspectives in higher education: the researcher mentors college students and volunteers in various roles within a church. In addition, the culmination of multiple experiences serves as researcher motivation and not as bias, as the researcher is a Black man.

Data Collection

Data collected through various sources will provide a thorough understanding of the phenomenon and strengthen the study's credibility (Moustakas, 1994). I gathered data through interviews, focus groups, and document analysis of letters to future Black men in STEM at PWIs to demonstrate triangulation.

Interviews

The primary source of data is participant interviews. I followed Gall et al.'s (2007) procedures for a semi-structured interview. First, I provided a cycle of structured questions.

Secondly, I further investigated data with open-ended questions. Interviews were in person for participants in my geographic location. For participants outside of my geographic area, I conducted interviews face-to-face during a mutually agreed day and time for one hour or a self-chosen place for comfortability. I recorded open-ended questions and responses on voice recording software. I transcribed interviews in an electronic research journal and member-checked each transcript with each participant. In case there were any technical malfunctions, I had an iPad recording simultaneously with my laptop. During the interview, I took notes and recorded notions in the electronic research journal.

Interview Questions:

1. Tell me about yourself and your academic background.
2. Please describe what led you to apply for college.
3. Why did you choose your specific institution of higher learning?
4. Please describe your experiences as a Black student enrolled at a PWI.
5. Please describe your overall experiences of being enrolled in a STEM program.
6. What concerns did you have when enrolling in a STEM program as a Black man at a PWI?
7. Of your undergraduate experiences, which were the most meaningful as a Black man in STEM?
8. What were the primary factors that ensured you completed your STEM degree?
9. Describe mentoring and engagement as a Black student in a STEM program at a PWI.
10. Describe a role model that you have had during your experience as a Black man in STEM at a PWI.

11. What are the top challenges that you faced as a Black man enrolled in a STEM program?
12. How did your mentor, or a supporting professional, help with your challenges?
13. As a Black man enrolled at a PWI, describe any experiences you had with racial discrimination?
14. Did a mentor or a supporting professional help you overcome racial discrimination?
15. Describe any experiences you have had with being stereotyped as a Black man enrolled at a PWI.
16. To what extent do you feel like you belonged to your college.
17. Hopefully, you found these questions to be a good exploration of your background as an undergraduate STEM student. Would you like to add anything or elaborate on any of the topics we discussed today?

Questions 1-5 of the interview gaged the interest of the participant. Also, these questions bring a generalized meaning of the study to their lived experiences during undergraduate studies. These questions allow for the participants to get familiar with some of the questions and invoke memorialization of their lived collegiate experiences while completing a STEM program. These questions created a warm climate for comfortability and ease of exchanging information during the interview (Moustakas, 1994). Questions 1-5 of the interview focused on the central research question to explore open and emerging designs and focus on the phenomenon (Creswell & Poth, 2018).

Questions 6-10 allowed me to understand more about the central research question regarding Black men and their connection to the institution, mentorship, and engagement to build self-efficacy to lead to the completion of STEM undergraduate programs at PWIs. These

questions answer Sub-question 2, which allows students to describe what mentoring and engagement look like and if their experiences led to completing STEM programs as Black men at a PWI. The Black men who were STEM graduates had the opportunity to reflect upon specific situations and describe their experiences and motivation (Morales et al., 2017). Sub-question 2 focused on mentoring and engagement as tools for retaining and completing Black men students at PWIs.

Interview Questions 11 and 13-16 delved into overcoming challenges through engagement and mentorship. These questions answer sub-question 3 that allowed me to understand the self-perceived complexities and challenges of Black men at PWIs (Harper, 2012b; Simon et al., 2015). These questions yielded data to provide thick descriptions of mentoring. The two questions provided insight into Sub-question 1 because it focused on the role mentorship played in handling challenges underrepresented students faced. Challenges can vary within higher learning institutions, yet we must continue to strengthen the need for underrepresented students, those from different ethnic backgrounds, and income brackets to feel inclusive within the learning environment (Kezar & Holcombe, 2018). Racial discrimination takes on various forms in higher education, leading to anxiety, depression, and a devalued sense of belonging (Braveman et al., 2017). These questions allowed participants to reflect upon their collegiate experience to see if they did or did not face racial discrimination. Also, these questions addressed stereotyping Black men and how they managed stereotypes (Brook et al., 2015; McGee, 2016). Furthermore, these questions will hear how Black men effectively learned and implemented self-efficacy in higher education and if engagement and mentoring played a significant role in overcoming those challenges (Harper, 2015; Ireland et al., 2018).

Question 12 focused on sub-question two. Both questions seek participants to describe their engagement experiences and mentor as a Black man STEM student at a PWI. This question sees if mentoring has been valuable enough for the participants to recognize growth and development due to mentoring and engagement. This question allows for descriptions to be provided, which evaluates whether mentoring is or is not meaningful to Black men in STEM at PWIs and will help provide knowledge about interest or disinterest within the phenomenon.

Focus Groups

Focus group interviews provided a second source of data for the study. Focus group interviews strengthen the understanding of the phenomenon as a collective voice. Gall et al. (2007) explain that a focus group interview involves the interview and specific research participants, grouped, who freely reveal common ideas and perceptions of the phenomenon. Thus, extensive data should emerge from the focus group that I encouraged group interaction (Barbour, 2007).

I invited all Black men who have completed STEM undergraduate programs at PWIs to participate in one of two focus group interviews. The two focus groups kept the participants limited to seven or fewer for maximum engagement. The focus groups followed the individual interviews after the initial data analysis of the discussions. After an agreed time, date, and location for participants in my geographical area, the focus groups were in person. I always used voice recording software on my laptop and an iPad. I transcribed the focus group interviews word-for-word for accuracy and member-checked the transcript with participants. The focus group interviews should last a minimum of one hour. The following questions (Appendix F) discussed in the focus group are as follows:

1. Please start by introducing yourself and include what STEM program you were enrolled in, what institution you attended, and your current employment.
2. Describe people who contributed to the persistence and completion of your STEM program.
3. Describe organizations that contributed to your persistence in college.
4. Describe specific services that were important to your success as a student.
5. What contributed to your academic success?
6. What role did mentors play in your degree completion?
7. Describe racial discrimination experiences related to your college experiences.
8. What advice would you give future Black men at PWIs for completing a STEM program?
9. What can higher education do better to support the success of Black men in STEM at PWIs?
10. How hard would it have been to complete college without the help of mentors, organizations, and specific services?

Only 10 questions allowed the flow of responses to occur. My most important job was to ensure that participants are focused on the experience and describe to the fullest (Moustakas, 1994). The first three questions are based on the central question to see if any new emerging themes occur regarding underrepresented STEM graduates' lived undergraduate mentoring experiences. These questions are to encourage open dialogue amongst participants. Questions four and five look at student engagement as a whole and look to see what forms were pertinent in promoting self-efficacy for participants (Bandura, 1997). Question 6 looks at racial discrimination of Black men on the campuses of PWIs, as every experience may be different, or

one may not have experienced an act of racial discrimination. Waldeck (2019) explained that racial minority students could face racial discrimination on campus that creates feelings of devaluing, lack of support, and marginalization. Questions seven through ten allow the focus group to be informal and interactive (Moustakas, 1994) by bringing together all the lived experiences from various institutions in different geographical locations. This question allows participants to reflect upon their lived experience and guide the discussion on preparing future underrepresented students for the success of completing STEM programs.

Journal Prompt

The third data source will develop through first-person written letters based on a prompt (Appendix E). Black men STEM undergraduates from PWIs provided a detailed letter to future Black men in STEM at PWIs providing descriptions from their own undergraduate experiences regarding the phenomenon (Adams & van Manen, 2017). I provided participants with an email at the end of each focus group. The composed letter to future Black men in STEM undergraduate programs at PWIs serves as “concrete, first-person descriptions of a lived experience and starting point for phenomenological reflection and exploration” (Adams & Van Manen, 2017, p. 784). The letters serve as a part of data for analysis as they are a primary source. The letters express self-perception of mentoring and engagement as a Black man in a STEM undergraduate program and how the future Black man in STEM at a PWI can develop a positive perception of mentoring and engagement in handling challenges such as racial discrimination. This method allows participants to freely express themselves in a more authentic way than completing a survey. Englander (2012) stated, “collecting descriptions from others is also an attempt at the discovery of a human scientific meaning of a particular phenomenon” (p. 15). The participants responded to the following writing prompt via email with instructions: As a Black man who has completed

a STEM program at a PWI within six years of the initial start date, write a letter to future Black men in STEM at PWIs with strategies for success inclusive of one's thoughts on engagement and mentorship. Please describe challenges and how one overcame them as a Black man in STEM at a PWI.

Data Analysis

After I collected the data, I analyzed the data with an emphasis on trustworthiness utilizing Creswell's (2018) recommended data analysis approach, which aligns well with Moustakas's (1994) seven steps of phenomenological reduction, reducing and eliminating redundancies, within data. To analyze data, "the primary researcher will place the transcribed interviews before them and studies the material through the methods and procedures of phenomenal analysis" (Moustakas, 1994, p. 118). Thick and rich descriptions allow for the qualitative methodology to keep the phenomenon "alive, illuminate its presence, accentuate its underlying meanings, enable the phenomenon to linger, retain its spirit, as near to its actual nature as possible" (Moustakas, 1994, p. 59; see also Creswell, 2018). I adjourned personal discernment on the perceptions of mentoring and engagement amongst Black men in undergraduate STEM programs at PWIs. Data analysis was the opportunity where I learned from the participants about their experiences. I focused solely on the undergraduate experiences of Black men in STEM at PWIs. I streamlined experiences into categories of the constructivist worldview. Creswell and Poth (2018) explained that "constructivism or social constructivism (often combined with interpretivism) is such as perspective and seen as an approach to qualitative research" (p. 7). Moustakas (1994) stated one could overcome obstacles by making meaning of the human experience. This research looked at Black STEM men's challenges to capture the undergraduate experiences of mentoring and engagement and how it has affected

graduates in the past. This step will also serve as a possible strategy to decrease attrition rates and increase completion rates amongst Black men in STEM at PWIs. Moustakas (1994) explained, “in phenomenological studies, the investigator abstains from making suppositions, focuses on a specific topic freshly and naively, constructs a question or problem to guide the study, and derives findings that will provide the basis for further research and reflection” (p. 47).

I followed the data analysis process described by Creswell (2018): (a) describe personal experiences with the phenomenon; (b) list significant statements; (c) group significant statements; (d) describe what the participants in the study experienced; (e) provide a structural description of the unfolding experiences; and (f) composite the descriptions of the phenomenon. These align with Moustakas’s (1994) seven steps, emphasizing reducing and eliminating redundancies within the data. Moustakas (1994) describes phenomenological reduction as “the task of describing in a textural language just what one sees, not only in terms of an external object but also the internal act of consciousness, the experience as such, the rhythm and relationship between the phenomenon and self” (p. 90). Black men who completed STEM undergraduate programs at PWIs have a story that closes the gap of attrition and historic low completion rate of Black men in STEM at PWIs. By looking at the success of STEM Black men graduates of PWIs, these experiences will show clear support of the phenomena. Moustakas (1994) explained that an interrelationship requires direct descriptions of experiences that provide an understanding of the phenomenon.

To organize the data, I transcribed all data from individual and focus group interviews. Next, I member-checked the data by having all participants review the transcriptions once completed. Next, the data was reviewed and highlight significant statements to identify themes. Moustakas (1994) refers to this as horizontalizing. The process of phenomenal analysis includes

horizontalizing data, which requires compiling all data relevant to the research phenomenon (Moustakas, 1994). Creswell (2018) explained, “Building on the data from the first and second research questions, data analysts go through the data and highlight significant statements, sentences, or quotes that provide an understanding of how the participants experienced the phenomenon” (p. 79). After the first two steps, I coded the data and developed clusters of meaning. Creswell (2018) describes the third step as a point of grouping the statements into themes and “removing overlapping and repetitive statements” (p. 313). I did not use software to help code the analyzed data. Next, I found meaning and developed themes.

Next, I synthesized data presented in themes and categories to understand the phenomenon. Moustakas (1994) said, “develop the textural descriptions, structural descriptions, and integration of textures and structures into the meanings and essences of the phenomenon constructed” (p. 119). I developed textural descriptions, structural descriptions, and a mixture of the two to detail the lived experiences. A textural report describes what Black men who have completed STEM undergraduate programs at PWIs, experienced. The structural descriptions provide how Black men experienced the phenomenon. Structural descriptions connect the meaning and relationships between participants and the phenomenon (Gall et al., 2007).

Trustworthiness

Overall, my qualitative study will produce reliable results. Credibility, dependability, confirmability, and transferability must be evident within qualitative research. I authentically collected data, analyzed, and interpreted the results to demonstrate meaningfulness for the phenomenon. To increase trustworthiness, (a) I incorporated triangulation to help reduce bias and cross-examine the integrity of responses; (b) allowed member checks, as it is the foundation of credibility, to allow participants to review their own words in the transcript; and (c) was sure to

include negative case analysis to account for any contradictions that may occur, if any were to develop. Moustakas (1994) encourages researchers to continue to bracket through data collection with a journal or memo, allowing reliable data. Creswell (2008) explained documents as the following:

1. Journal during the research study;
2. Have a participant keep a journal or diary during the research study;
3. Collect personal letters from participants;
4. Analyze public documents such as official memos, minutes of meetings, records, or archival material;
5. Analyze school documents like attendance reports, retention rates, dropout rates, or discipline referrals;
6. Examine autobiographies and biographies;
7. Collect or draw maps and seating charts;
8. Examine portfolios or less formal examples of students' work; and,
9. Collect emails or electronic data (p. 221).

Credibility

I utilized triangulation to verify findings are accurate. Gall et al. (2007) explained triangulation as “the use of multiple data- collection methods, data sources, analysts, or theories as corroborative evidence for the validity of qualitative research findings” (p. 657). Member checking was pivotal because it builds credibility for the study by letting participants review the interpretations to ensure it is identical to their thoughts.

Dependability and Confirmability

I demonstrated evidence of dependability in the study by documenting every step of the research process. Dependability and conformability allow for the operation of replicated to produce findings (Creswell, 2018). I displayed dependability throughout the study by developing a research journal, writing memos, and having the findings evaluated to confirm participants' voices within interpretations and results. As far as confirmability, I created a clear audit trail for all that encompassed all data analysis steps. I obtained confirmability in the study by taking all data to the participants to confirm for accuracy. Creswell (2018) describes the point of confirmability as a period of judging for accuracy and credibility.

Transferability

I demonstrated transferability, thickly describing the phenomenon under study about the participants' lived experiences of mentoring. To increase the story's validity, I used heavy descriptions of the participants' context, circumstances, and situations of the phenomenon. Moustakas (1994) provided a foundation for transcendental phenomenology. Qualitative methodology is needed to give meaning and understanding to mentoring. The study allows me to become an expert on the topic because they "know the nature and findings of prior research, has developed new knowledge on the topic and has become proficient in recognizing the kinds of future research that would deepen and extend knowledge" (Moustakas, 1994, p. 162).

Ethical Considerations

I paid close attention to ethical considerations to secure the data of the study. Ensuring that the participants' identities remained anonymous was of extreme importance. All electronic files were password-protected to secure electronic data. I safeguarded all consent forms, notes, and items that could jeopardize the participants' identification. I obtained all permissions before starting the study, and each participant received changed names. The IRB is the foundation of

ethical considerations that research must address. I will follow the following points as outlined by Creswell (2018):

- Obtain permission for the use of unpublished instruments, procedures, or data that other researchers might consider theirs (propriety);
- Properly cite other published work presented in portions of the manuscript;
- Prepare to answer questions about the institutional review of the study;
- Prepare to answer editorial questions about the informed consent and debriefing procedures used in the study;
- Allow authors to review manuscripts and agree on the responsibility of the content;
- Adequately protect the confidentiality of research participants, clients- patients, organizations, third parties, or others who were the source of information presented in the manuscript; and,
- Obtain permission for the use of any copyrighted material included (p. 227).

Summary

Transferability, evidenced in this chapter, demonstrates clear steps for completing the study. Transferability allows the repetition of the study. Moustakas (1994) guided the procedures for this transcendental phenomenological study, and the steps outline transferability. This chapter provided the topic's appropriateness, data collection, data analysis, ethical considerations, trustworthiness, and detailed procedures for completing the study. This transcendental phenomenological qualitative study will focus on the undergraduate experiences of Black men who have completed STEM undergraduate programs at PWIs. The next chapter will discuss the findings.

CHAPTER FOUR: FINDINGS

Overview

This transcendental phenomenological study was designed to understand how Black men in STEM undergraduate programs succeed at PWIs. This chapter will provide thick and rich descriptions of Black men who completed STEM undergraduate programs at predominantly White institutions in America. Transcendental phenomenology as a research design allowed me to conduct detailed data collection, analysis, explanation of study participants, and summarize findings of the study as they related to the (my) research questions (Moustakas, 1994). Through this study, I sought to provide detailed descriptions of 17 Black men who completed a bachelor's level STEM degree at a PWI as evidence and knowledge of the lived experiences of the phenomenon through a transcendental design approach.

This study sought to answer the central question, "What contributes to the success of Black STEM undergraduate men at predominantly White institutions of higher learning?" The following sub-questions support the central research question: What role did engagement such as mentorship at a PWI play in handling challenges as a Black man who completed an undergraduate STEM program? How did Black men who completed undergraduate STEM programs connect to a PWI campus? How do Black men, who are STEM graduates of PWIs, describe their undergraduate experiences with racial discrimination?

To understand the lived experience of Black men completing STEM degrees at PWIs, I collected data from participants through individual interviews, a letter to future Black men in STEM at PWIs, and focus groups. This study was not designed to interpret the meaning and lived experiences of the phenomenon but to provide knowledge and experiences that connect to the phenomenon (Moustakas, 1994). The themes presented in this study demonstrated how Black

men who have completed undergraduate STEM programs at PWIs experienced college. I analyzed the data and developed themes by reducing information to significant statements and quotes (Creswell, 2018). Overall, I practiced epoché through bracketing their own biases to maintain authenticity to the study.

Participants

This study consisted of 17 individuals identified as Black men who graduated from a PWI with an undergraduate degree in STEM within 6 years of their start date. The participants attended both small private colleges and large public institutions identified as PWIs in North Carolina, Kansas, Virginia, and Pennsylvania. All participants had jobs within the STEM fields or teaching. The participants met the minimum criteria of completing a bachelor's level STEM degree at a PWI within 6 years of enrollment as a Black man. Participants in the study ranged in age from 24 to 37 years of age. The level of education for participants ranged from bachelor's to master's degrees. All participants, except for five, started college as student-athletes.

Table 1 provides background information on each of the participants based on the following criteria: the type of undergraduate program they attended, the size of the institution, additional degrees earned, and their status as a student-athlete or student leader.

Table 1

Portrait of Participants

Participant	Undergraduate Program	PWI Type	Associate degree	Student-Athlete	Student Leader
Carver	Science and Business	L			
Julian	Science	S		X	X
Jemison	Kinesiology and Science	S		X	X
Johnson	Physiology	L	X	X	
West	Environmental Health	L	X		
Daly	Technology and Engineering	L	X		

Participant	Undergraduate Program	PWI Type	Associate degree	Student-Athlete	Student Leader
Bouchet	Industrial Engineering	L	X		
Easley	Science Technology and Business	L			
Hawkins	Engineering	L			
Canady	Science	L			X
McNair	Science and Business	S		X	X
Greene	Mathematics and Education	L			X
Bluford	Science	S			
Emtage	Architecture Engineering	L			
Dean	Science and Business	S			
Olukoton	Kinesiology	S		X	
Chinery-Hess	Marine Science	S			

Results

This section provides a platform for the participants' voices without any interpretation of their experiences of the phenomenon. Everyday experiences unfolded as Black men provided their experiences of being enrolled in STEM programs at PWIs through individual interviews, focus groups, and journal entries. Three themes that emerged were (a) the village, (b) engagement, and (c) barriers of racial injustice. The themes derived from categories such as (a) family, (b) peers, (c) faculty, staff, and alumni support, (d) athleticism, (e) clubs and organizations, (f) experiences before enrolling in the bachelor's level program, (g) mentoring, (h) racial discrimination and stereotyping, (i) academic life, (j) campus life, and (k) law enforcement.

Theme 1 – The Village

The study participants expressed the importance of interdependence with their support system, otherwise known as the village, a term used in the Black community to describe support systems that aid in accomplishing a goal. The village consists of biological family members,

friends, peers, faculty, and staff members who supported them to complete their degrees. The shared purpose of seeing a Black man obtain their bachelor's level STEM degree is the principal focus of the village. All members of the village serve as positive role models for the participants. McNair penned the importance of Black men finding community within fellow students, faculty, and staff "that look like you" within safe spaces such as clubs and organizations.

Family

An African proverb reads, "If you want to go quickly, go alone. If you want to go far, go together." Family played a significant role in the success of all participants completing their degrees. Some participants noted that family members are not by blood alone but can be anyone who feels like a family. Participants considered interdependency with family because they did not want to disappoint them, and they used family to support them. Green stated the people who contributed to the success of his degree were "the support of both my parents, grandparents, siblings and close relatives." Jemison confirmed that one of the essential things that encouraged him through school was his family. Bouchet and West mentioned his family served as a role model of success due to them setting the example of obtaining a degree; however, West was a third-generation graduate from his institution. Julian stated that he was motivated to complete his degree because he promised his grandmother before she died that he would complete college. McNair discussed as a first-generation college student, the thought of making my parents proud pushed him through the finish line. Daly spoke of his basketball coach and youth minister as a father figure to him, although not a blood relationship.

Peers

Whether from childhood or developed in college, it played a vital role in the success of Black men in STEM at PWIs. Peers or friends were identified as another contributor that Black

men considered being family. These Black men shared friends' experiences, who were like a family, that created a "home away from home" feeling. Johnson penned in a letter that it is essential to "support your brothers and sisters and always surround yourself with individuals who are on a higher level than you." Dean reminisced on his undergraduate support system consisting of a group of friends who became a supportive family. Emtage furthered this thought by identifying that the friends who were like family served as an emotional support system. Jemison recounted two friends who were like his brother and sister that provided experiences of overcoming obstacles:

He was a Black male on the basketball team. So, I spoke with him quite a lot about many things. He was kind of like that big brother. So, I connected to him and gravitated towards him and just saw how he was doing positive things like starting his family while he was in school. Then on the other side, I also had another friend who pretty much just played that same role from a female perspective. But, again, she was like an older sister who already had kids and still completed her degree.

Faculty

Faculty, staff, and alumni play an intractable role in ensuring students persist from year to year until they graduate. Black men noted that they felt as if they deserved a top-notch education. However, they understood the importance of advocating the need for resources. One of the strategies for learning how to advocate those needs was through support from faculty and staff. Faculty relationships are essential factors to the persistence of Black men completing degrees. McNair and Bluford penned that Black men should seek out high-quality Black faculty members to make an emotional connection through solid relationships that contribute to academic success. Emtage confirmed that professors, in their way, will find a way to push you above the norm

within academics. Carver explored how his law professor made it her mission to see him succeed, going him out of his comfort zone. Julian described his faculty experiences as an excellent opportunity to learn new things. Julian continued that everyone was vested in his success, from department heads to instructors, “challenged me to become a better writer and critical thinker because I wasn’t exposed to those things in high school.” West provided,

My professors were outstanding. During my last year of college, a lot of life happened, my mom became ill, and it took me away from school a lot because I had to go to the hospital to check to see how she was doing. So ... or even while I’m at the hospital, helping my mom, we were able to talk on the computer to get online to get one of my tasks done in a reasonably timely manner. And they were completely understanding, and they were like family.

Staff

Students build relationships with employees of institutions of higher learning with professionals such as staff members. These individuals serve students in a non-teaching role. Staff members such as police officers, student support services, and student affairs professionals such as residence life build strong relationships with students to ensure they are connected to the institution and are devoted to seeing them graduate. McNair credits completing his degree within 4 academic years to his advisor’s help and determination by developing a degree completion plan. This section will explore the experiences of Black men and their relationships with staff members at PWIs. Bouchet reminisced over his college career and expressed how two residence life professionals always offered words of kindness and guidance throughout their college careers. He stated, “They offered advice and taught me to sit back for a second, look at the big

picture of the completed task or goals, and pick a small portion to focus on instead of tackling the whole thing.” Hawkins provided a rewarding experience with his academic advisor:

If it hadn’t been for my academic advisor, I am not sure I would have completed my program. My Black professors also pushed me to complete the program. My advisor also made sure that I had a mentor during my freshman and sophomore years. That made quite a difference. I also had to make sure that I found like-minded classmates. We knew we entered that university for a reason, and the odds stacked against us. We also know that having a degree from that particular university would open doors for us that closed for our ancestors. My Mom and Dad were also contributing factors. They were supportive of me changing my major; however, the deal was I had to finish school. Dropping out was never a factor. Changing majors is one thing. Leaving was another.

Alumni

Alumni serve as an example of self-efficacy; if one can make an accomplishment, another one can succeed. Therefore, it is imperative for those who have completed the journey to give back to those on their journey of completing their college degrees. This section will provide Black men who graduated from STEM programs at PWIs influenced by alumni relationships. Jemison provided a strong example of alumni who supported him through school by offering him an internship at one of the most extensive corporate fitness facilities that transitioned to a full-time career once he graduated. This opportunity developed through networking with alumni. Overwhelmingly, participants suggested resources such as a Black mentor will yield rich college experiences for Black men because of the connection and knowing they have your best interest at heart. Daly penned,

If you need academic help, reach out to your professors and academic tutors. If you need financial assistance, reach out to your office of financial aid. You'll be surprised how many people will try and help you achieve greatness as long as you're stretching yourself.

Theme 2 – Barriers of Racial Discrimination, Microaggression, and Stereotyping

Barriers will present themselves for Black men at PWIs. Whether it is racial discrimination, microaggression, or stereotyping, these experiences are shared from first-hand experiences in academics and outside of academic life in higher education by Black men who graduated in STEM programs at PWIs. The goal of this section is to provide the unadulterated experiences of Black men in STEM programs at PWIs. Canady penned, "There will be pressures you face but remember you do not face this journey alone." Johnson wrote to Black men at PWIs that they would experience discrimination, feel overlooked, judged, and treated unfairly, but they should remind themselves that they have a purpose.

Academic Experiences

Participants provided that at PWIs, there is a continuous campus culture cultivated without Black students' experiences in mind, which can lead to Black students feeling like imposters on campus. Participants strongly agreed that safety was a concern on campus. They described safety not in a physical form but how they would be treated with objectivity if they were to speak to a faculty member about experiences that affected me differently from a White student. Additionally, all participants mentioned that the number of Black faculty paled compared to White faculty, which left them with little hope for effective outcomes when confiding in White faculty members. McNair stated how a librarian's action interpreted as an act of racial discrimination that still bothers him to the present day:

I needed a stapler. I asked someone who appeared to be the librarian if there was a stapler I could use. The White woman, who had her back to me, turned and said, “Not for you.” It caught me off guard, so I muttered a “huh?” hoping I misheard her. Again, she looked at me and said, “Not for you,” and then went on about her business. I did not know how to feel, and I honestly cannot prove my Blackness was the cause for her response, but I know it was.

West talked about his experience with racial discrimination within academic life:

There was a time when I was taking a construction class, and it was an intimidating class because I walked in there, and I’m the only person of color with 30 people in this class. Everybody’s a White male. So, me being an only Black male, it was slightly uncomfortable. There was one event, in particular, where we chatted about the conversation of fathers. And I guess it was a joke? They made a joke towards me like, (referred to me by name) probably doesn’t even have his dad at home. So, I thought, “Oh, okay. You don’t even know me, but you’re making assumptions.” Also, my professor didn’t step in to defend me.

Easley shared an experience that he interpreted as racial discrimination before a health crises COVID-19:

I was with the university president at a very high elite event, where distinguished guests will come in, and it was 200 millionaires and billionaires. I was greeting all of them because I was doing a business pitch. One of the 200 individuals coming through the door shook my hand, but I saw him wipe his hands on his pants to like, get my, whatever residue of his hands.

Canady shared experiences of microaggression that encompasses both academic and campus life:

I was student government association (SGA) president, and we had an event on literacy day. I called and spoke with an elementary school principal to volunteer at a school.

When I arrived at the school and the principal came out, she spoke with my White counterparts and discarded me as a Black person. After I reminded her I was the president, she said I spoke very [eloquently], a form of microaggression. Going to meetings, people would not call me [by my government name]; they would call me [their formal names], and I would have to correct them multiple times. One time someone asked me if my name on my birth certificate—another form of microaggression.

During a focus group, Dean shared that his advisor forced him to change a class and retake the placement exam in front of them because they could not believe he scored as high as he did. Dean shared, “I took the exam and scored higher than the initial score, and this left a horrible impression on me.”

Campus Life

Forms of microaggression, racism, and stereotyping occur outside of academic affairs. This portion will focus on experiences of microaggression, racial discrimination, and stereotyping that happened beyond the classroom walls within residence halls and campus law enforcement. Harper (2009) informed higher education that racial discrimination, microaggression, and stereotyping occur in the most diverse place of America. The participants of this study demonstrate that over 10 years later, it remains the same. Hawkins stated that he grew up in an area where racial discrimination was prominent, so it prepared him for attending a PWI. Jemison noted that calling a Black man-boy is degrading, yet most White people are uneducated or ignore such requests to call Black people by their names. Johnson provided three incidents that occurred: (a) a White person lit something on fire in front of his dorm room,

simply because he was Black; (b) witnessing a hate crime on campus where White guys beat up Middle Eastern students; and (c) the first White girl he dated took him home to meet her family and when he got to the house and walked in the door, and her mom's eyes got huge, and her dad walked down the stairs and told her to "get this out my house what is this doing in my house?" Jemison continued to explain that he faced some unsettling experiences on campus, such as walking past a White lady after a slew of White people, and suddenly, she switched her purse to the other side before passing him. Daly recounted being in college when President Obama was campaigning; he did see ignorance from the student population, but never from any of the staff or the, you know, administrators or anything like that.

Law Enforcement Officials

Participants mentioned Law enforcement in the study. It is imperative to note that in the state of North Carolina, the law enforcement officers at public institutions are hired and trained by the state, just as any public law enforcement officer. However, it is imperative to know that all law enforcement, whether on campus, local city, and state, all work together to ensure the safety of citizens. Two of the participants shared college experiences with law enforcement that forever affected them. Johnson stated,

I, a student-athlete, will never forget it. I shadow boxed to prepare for my fights. There would always be a police officer driving around the neighborhood. If you see a Black man in a school hoodie, you should know he was training. He watched me boxing and complimented me. The next night the police came and banged on the door and said they have reason to believe there were drugs in our apartment. The same cop who complimented me went into my room, stayed the longest, and went through all my stuff.

They didn't find anything, left, and never heard anything about it. They gave me an ultimatum to let them search my apartment or automatically get arrested.

Hawkins recounted a painful memory of being pulled over by the police:

Before going to college, I had never been stopped by the police before. My parents drilled into me about what I should do if an officer stopped me. Summer school got a little darker. To graduate on time, many Black students attended summer school. I remember returning to my dorm one night after playing ball with my boys. I was driving a gray Nissan Sentra—nothing flashy—just a regular car. As I turned onto the main strip of the campus, I saw lights in my rearview mirror. My heart started to race because I knew I hadn't run the stop sign. Was my brake light out? Was my license plate still valid? I kept my hands on the steering wheel as the officers approached my car with their guns drawn. When they demanded I get out of the car, I was terrified. One of the officers had me up against the hood of the vehicle. I couldn't believe I was frisked. I was humiliated because we were on the main strip. There were several students outside. What would they think of me?

Furthermore, what would my parents say? How would this situation turn out? Then I started to get mad as the officers heard a call over their radios. The officer who patted me down loosened his grip and said, "well ... it looks like tonight is your lucky night. You are not the person we are looking for." The other officer shared that my car matched the description of a vehicle in an armed robbery not far from the campus. Then they let me go. It took me a long time to get over that incident. I wish I would have stood up for myself, but I felt there was nothing more I could do at the time. After relaying the

incident to my parents, they were just glad that I was alive. My dad, more so than my mom, understood the anger and frustration that I was feeling.

Stereotyping

Over 10 years ago, the literature presented racial discrimination being customary within PWIs (Guess, 2006). This study sustains that Black students at PWIs still encounter stereotypes of the Black culture (Harper, 2015). Black men shared experiences of stereotyping from White people equating Johnson spending hundreds of dollars on shoes to not being fiscally responsible to Daly. Because he was Black, people on campus automatically assumed he would support President Barack Obama during his campaign to make racial comments. Canady provided that most White people on campus did not respect Black people because they thought “Blacks were not articulate, and they were only in school on financial aid.” Carver shared that he faced archetypal “you aren’t Black because you dress and speak well” as to say, “Black students were grossly incompetent.” Chinery-Hess penned in an open letter to future Black men in STEM undergraduate and graduate programs at PWIs that they will still face stereotyping in an academic atmosphere. Chinery-Hess described how the lab director targeted him and told him that he would have a hard time because he would be competing with students who grew up with technology. Chinery-Hess did not know why the lab director, a White man, would single him out, but he remained silent and persevered, earning a B+ on the first exam and an A on the next exam. Chinery-Hess demonstrated his steadfastness and dedication to completing his degree. Hawkins stated,

Whenever I would meet new people, they automatically think I was an athlete on campus. I used to feel a little insulted by that. In their minds, how could this guy make it to that university other than through athletics? It never crossed their minds to think I might be

strong academically. Of course, there were microaggressions here or there, but I was able to get through them. How dare I am a 6'2" Black man who didn't dribble a ball? Sadly, that's all some people think we can do. Whenever that would happen, it fueled my desire to be the best.

The N-Word

One of the biggest acts of racial discrimination evident in the study was the participants' experiences with the negative terms "nigga" and "nigger." Over 20 years ago, "nigga" and "nigger" identified in higher education as some of the most racially charged terms in the English language (Nelson, 1998). This study demonstrates continued utilization from the mid-1800s to the 21st century by White people as a referential form of disfavored (Rahman, 2012).

Participants shared that some of their White peers did not understand how the terms "nigga" and "nigger" were derogatory or considered a racial slur. Johnson reflected how he was called the N-word by drunk White men, and it angered him, but he could not react with fear of being expelled from college. Jemison witnessed White people using the N-word in rap lyrics and regular conversation; however, they utilized it as a teachable moment to explain the inappropriateness of the phrase. The two experiences of Black men at PWIs who dealt with the terms "nigga" and "niggers" will be shared in this section.

Julian shared,

The biggest event dealing with this topic was probably when the football team got into a racial fight because someone used the N-word. One of our teammates, who I mean, was used to running with the boys (Black men). So some of the older Black classmen were letting him use the N-word. And before you knew it, one of our younger White guys, who

was a freshman at the time, was getting to know all of the guys; he felt it was okay to use the N-word, and it turned into a big, old, physical and verbally racial fight.

Carver discussed,

My first actual encounter of the differences between different races colliding at a PWI was my junior year when my friends and I attended a rugby party. I was associates with many rugby players and assumed I got along with the majority of them. I was blindsided when a few of my friends arrived late and were called ‘nigger’ by some rugby players and not allowed inside, mainly because they were Black. I was already inside with a few of my friends who are also Black, so I was pretty upset, leading to an altercation. My first experience of a situation like that at that university, but not my friends’ (first experiences), made me analyze why this hasn’t happened to me but has to them. It led to progressive dialogue that shifted my mentality of what it means to be Black.

Theme 3 – Engagement

Daly penned that college is a different world of “great opportunities and possibilities of making a difference. Stay true to yourself while also being open to learning from cultures outside of what you’re used to seeing.” While the theme of support from family, peers, faculty, and staff was pertinent, the next article emerged that Black men who completed STEM degrees at PWIs took pride in their accomplishment as individuals by becoming involved. Emtage penned, “college is one of the places you make lifelong companions and learn the most about yourself. You are investing in yourself and make decisions based on what will get you a better return on investment.” McNair furthered the notion of Black men investing in themselves and can craft the college experience they wish to have, even at PWIs. Many of the participants were either student-athletes, participated in clubs and organizations or academic events that strengthened

their knowledge, skills, and abilities in their fields. This section will discuss how Black men who completed their STEM degrees at PWIs engaged themselves within the college community through athletics, clubs, and organizations, mentoring, and internships.

Athletics

Black men participate in various extracurricular activities on campus, and one is athletics. Participation in athletics can be informal or formal, intramural, for-fun, or competitive because they received a scholarship. Athletics may shape the way Black men engage within the school. Bouchet stated that he participated in intramural sports to stay engaged and meet new people versus secluding himself in his residence hall. McNair explained, “Being an athlete helped me to fit in and meet people, so while I’m an introvert, I never felt ‘alone.’ Also, it taught me responsibility, punctuality, thriving in a team environment, and mental toughness.” Canady and Johnson both played collegiate football and endured great experiences that were rewarding, whether positive or negative. Johnson was a member of the boxing team at his school, allowing him to learn how to master and channel his energy in positive and productive ways. Julian stated,

One of the most valuable forms of engagement for me was being a team captain of the football team. I appreciated assisting those guys on being a true student-athlete or learning how to be away from home without getting in trouble on and off-campus.

Clubs and Organizations

The participants shared that student clubs and organizations are other ways to keep Black men engaged on campus. There are clubs and organizations to cultivate every student in their collegiate journey. From academic clubs and organizations to fraternities, the following participants shared their experiences. Bouchet expressed how the leadership academy and an honors society helped him develop his leadership and academic skills. Julian attributed

engagement in Greek life and as a residence hall assistant to being known around the school, building relationships with incoming first-year students and just people in general, ultimately leading to me being a teaching assistant in a lab. Finally, Jemison reminisced a time when he was contemplating withdrawing from school and how being involved in clubs and organizations gave him the courage to complete his degree:

Through conversations with multiple people and networks that I've had kind of talked me out of it, I was able to stay in school and re-motivate myself, I found. Again, I reconnected with UAAS (United African American Society) because I had stopped doing that, and my sophomore year, I picked it back up. And then that kind of really helped me ease back into things to get my head on straight. And then, just as I got closer and closer to the goal, I started connecting with my career to where my major was beginning to lend its way into paths of a financial future. And as I saw that coming into being, that helped me finish through that last bit. So, the organization of UAAS was very impactful, helping me quite a lot with not only academics but just kind of feeling more comfortable and essentially making college home away from home.

Easley provided how his student engagement prepared him for entrepreneurship in a White male majority society:

I've just been in situations where I was the only Black person, but I was a person of control and power. I'm just that type of person coming from the military; if I'm going to do something, I will try to be the best at it. So, these opportunities prepared me for the technology business I own right now. I'm sitting in these meetings with CEOs, executives and doing these business pitches. And the bit college allowed me to realize is that I'm going to be one of the only African Americans or minorities in the room most of

the time. So, I think it just prepared me for that and allowed me to kind of use it in the positive.

Mentoring

Mentoring is a part of engagement because it allows individuals to be strengthened by another (Kram, 1983; Liao & Sanchez, 2015; McCoy et al., 2015). Canady penned to younger Black men traveling the journey that he conquered to find a mentor and a group of individuals with whom they'll be able to share ideas, concerns, and sound advice. Mentoring does not have to occur with a faculty or staff member; it can happen with other students, members of the community, and alumni (Mondisa, 2018). McNair stated that he relied on upper-level students to provide mentoring because they are closer in age and have recently been through the struggles that he is facing. Canady expressed how vital the mentoring he received from faculty and staff was to complete his degree. Easley stated that he participated in a program that offered mentoring and engagement for a science and technology business providing grant money and over \$150,000 in legal services for free to help navigate taxes for his science and technology business. Finally, McNair provided his experience of Black mentorship from upper-level students on the football team:

A couple of my teammates took me under their wing and introduced me to people on campus and others around the city they knew. They'd also lend an ear whenever I had a question about college life or my studies. I was spending multiple hours every day with them (practice, weightlifting) made it easier for me to open up to them and trust them.

Serving as a Peer Mentor

Participants shared that they found equal joy serving as mentors to first-year students, sophomores, juniors, and even their classmates. Finding one's place through engagement can

occur through various forms of activities. Participants expressed that serving as a peer mentor was fulfilling. Hawkins stated he knew the path ahead of younger Black students, so he wanted to serve as a teacher, role model, and mentor. Hawkins encouraged them to consider professions in STEM because of the flexibility they could have. From teaching to engineering to becoming a geneticist, there were so many options. In his prominent role in serving as a peer mentor and co-advisor for the school's STEM club, Hawkins noted that the students found it easier to relate to him because he was younger than the other advisor. Carver explained that it was vital for him to share his experiences with first-year and second-year students to help guide them to make significant decisions and avoid mistakes, which he did not receive as an underclassman. Jemison penned that he had faced culture shock his freshman year; however, he encourages younger Black men at PWIs to embrace cultural differences and find themselves bridges to races. West expressed what mentoring and engagement meant to him:

Whenever I think about [it], especially for my field, I talk about this all the time ... I advocate for more people of color to come into this field. Environmental health was necessary. And it's going to last forever as a field in all levels of government, federal and state. So I want to bring more people of color in to know that there are way more options out there. Black scientists are just as important as what we see on TV or when you're going to school to primary majors that you see all the time. Not saying they aren't great majors, but there's so much more in school besides English, and I want to advocate for environmental health.

Julian stated,

I served as a mentor with the actual title, position, and official role. Meeting up with some of the brothers and talking with one another, and sharing different experiences was

rewarding. Mainly because some people expected college to be a certain way, and the fact that we were at a PWI showed that it wasn't like what we saw on TV, specifically in shows like *A Different World*. I was used to the front and how Black students experienced college, but my college experience was different and nothing like the show. So, to talk to people that way and mentor them through those things, we can talk to each other about feelings of value to being on a small campus.

Student Support Services

Student support services are provided to all students to help them succeed in college. Student Support Services has a wide range of services, including counseling services, tutoring services, intercultural engagement, military and veteran resources, and career and development services, to name a few. McNair described services that he took advantage of where the career center provided resume-building services that significantly impacted his success as an undergraduate student. Participants shared that student support services helped prepare them for transitioning to life after undergrad and tips on best practices for interviewing. Greene shared the most valuable student support service: being a part of an academic support center on campus for first-generation single-parent households on campus all four years through the Academic Support Center. Julian also shared how student support services allowed them to push towards success and become the first person to graduate college in his family. Easley expressed how his institution's student support services provided adaptive resources as a disabled veteran. Finally, Greene advised future Black men to research the institution and support services they have to offer:

Find a college that has a support program for you! What are the statistics of Black men graduating from the university? Are there opportunities for faculty mentors? Does the

university assist with internships or job placement before graduation? What services does the alumni network provide? Are there programs for peer mentors? What are student leadership positions available to participate in that come with a stipend?

Counseling and Mental Health

Guidance, direction, or simply having someone to listen to problems is essential, especially to Black men who have to endure challenges on the road to completing a degree. Sometimes counseling goes beyond mentorship; however, Black men have not always welcomed counseling. Here are some experiences and advice from participants. Bluford stated, “The school’s Psychological Services department was important to my success as a student. It was helpful to have a trained professional to talk to and completely removed from my social circles. That allowed comfort with talking through my feelings.” Emtage stated that he transferred from a small institution to a large PWI and being able to see a counselor as an impartial party was very helpful. Because of those few sessions, I learned to cope and deal with similar situations without assistance. Johnson explained that his responsibilities of working to pay for rent and continue to contribute to his family’s bills did not allow him to focus on mental health:

I had a hard time managing my time and my headspace. At that time, I did not focus on mental health. Black folk use religion as compensation for mental health; “Jesus will fix it; God will fix it,” and we take it a day at a time. Neither is correct. Yes, we need to focus on God, but we need to get healthy. Mental health is never talked about in the Black community unless you [are] considered crazy. Black people frowned upon counseling. We don’t trust people with our trauma, and we don’t want to help folk. We are the most compassionate, most afraid, most feared population out there.

Internships and Practices

Internships and practices presented opportunities for growth and development for Black men in STEM programs at PWIs. Meaningful internships and training allowed students to go beyond knowledge in the classroom and participate in activities that provided exploratory education and application. While Daly did not have an internship, he noted that he did have a lot of hands-on experience with the different programs at the university. McNair shared the memory of writing for the school newspaper and winning an award for one of his stories and was able to leverage that to gain acceptance into a highly regarded journalism program at a large and prominent university. Carver stated that mentoring led him to be confident to pursue extracurricular activities, leave his comfort zone, join an academic fraternity, and eventually become a web development intern. West boasted about his government internship and the opportunity to work with his professors in a lab:

I did an internship at a government facility, and it was a fantastic experience. Also, when I was working with two of my professors, we had a significant research project they wanted to get done, they had hired me on as a lab intern, and it was enriching because I got to see my professors do what they genuinely love, besides teaching.

Easley stated that he was supposed to complete an internship at a company but was allowed by the faculty administration to build his science and technology business:

I wrote a letter to the dean in the department, and I told them that my goal is not to work for anyone else when I graduate. So I said, it's a waste of my time for you guys to send me to a company to learn something that I'm not going to do. I'm 100% sure when I graduate, I'm going to work on my business full time, and my business will be successful. So, I wrote a letter with key performance indicators in which I would follow,

and they pivoted the entire schedule to fit what I wanted to do in my execution strategy. I successfully worked my startup as my internship, and I don't think that has been done more than once or twice ever at my institution.

Greene shared in the focus group how he had to complete clinical hours for his program and how his faculty mentor played a vital role in his clinical placement. He felt valued because the faculty member served as a liaison with his other professors and mediated conferences for him and his clinical professor.

Outlier Finding #1 - It Was Not the Village, It Was Me

While most Black men credited their success to family, friends, alumni and faculty, and staff members of their institution of higher learning, some participants took sole credit for their success. These Black men acknowledged that there were barriers that they faced, but they are the ones who had to endure them and overcome them. Emtage stated that he attributes the completion of his degree to his determination to graduate. The stress of my coursework and working full-time hours was draining to the point of depression, but he kept it together, not missing assignments and earning good grades. Bluford reminisced and firmly stated that he attended classes, took, and passed exams, stressed out over papers hours before they were due, and was the one who put in the time and effort to complete his degree. He acknowledged being fortunate to have a few fantastic teachers, but he made it happen at the end of the day. Carver stated,

My hard work and determination were the primary factors that ensured degree completion; knowing the advantages one has with a degree was the primary motivation to help me graduate in four years. In my senior year, I took 18 credits the first semester and 21 credits the second semester to maintain the promise I made to myself when starting

college. Not my family or friends. The main challenge I faced was making my worth objectively present. The coursework caused me to overwork myself in many instances and bear the weight of the majority of the various projects I worked on, which I accomplished without the help of other students, faculty, or staff.

Outlier #2 – We Need More Black Mentors

Though a good percentage of the participants stated they had a mentor of some sort, one participant did not find mentoring beneficial. He noted that it was hard for him to find a Black mentor; therefore, he chose not to participate in mentorship. Jemison stated,

I felt lacking was that self-mentor, not necessarily me mentoring myself, but someone who represented me, helping to mentor me. The overwhelming majority of the staff outside of security is all White. It was a barrier because there were just a lot of things that I had going on in my head. So as far as staff goes, it was a bit of a struggle to find that person there, especially in my major.

Research Question Responses

This section will provide concise answers to the research questions. First, listed are the central research question and sub-questions with an explanation. In addition, short and direct narrative answers to each of the research questions, using primarily the themes developed in the previous section by participants, will be included below.

Central Research Question

What contributes to the success of Black STEM undergraduate men at predominantly White institutions of higher learning? The first contributor discussed was the support of family and family-like individuals, known as *the village* or *fictive kin*. Bouchet explained that his family all had degrees, so they served as role models. McNair offered that Black men will likely face

challenges, but “it is good to find faculty, staff, and students that look like you” to provide emotional support. The second contributor discussed in this study was engagement. Engagement consisted of athletics, volunteering, involvement in organizations, and mentoring. All these activities led these Black men to overcome barriers such as acts of microaggression, stereotyping, and racial discrimination to complete their degree.

Sub-Question 1

What role did engagement such as mentorship at a PWI play in handling challenges as a Black man who completed an undergraduate STEM program? Engagement such as mentorship for Black men who completed their STEM degree at a PWI played a significant role in their success. Green stated, “My college experience was very rich because I connected myself to someone who had my best interest at heart, a mentor who looked like me.”

Sub-Question 2

How did Black men who completed undergraduate STEM programs connect to a PWI campus? The participants of this study revealed that they connected to the institution through student engagement, such as being involved in clubs and organizations, athletics, being mentored, and exploratory learning activities, all of which served as contributors to the success of Black men who completed STEM degrees at PWIs. Jemison recounted, “I would say the United African American Society was impactful, allowed me to connect with other Black kids from other classes.” Hawkins stated, “The most meaningful experiences were working with local students during my practicum. To be able to work with high school students and giving back to students who looked like me were some of the best things that could have happened to me.”

Sub-Question 3

How do Black men, who are STEM graduates of PWIs, describe their undergraduate experiences with racial discrimination? Black men who completed their STEM degrees at PWI provided concrete examples of racial discrimination, microaggression, and stereotyping. Most of them recalled that their attitude determined their reaction. Julian shared the stereotypes he faced in college were that “people thought that because I was a jock, athlete, and Black, I would major in physical education. While there is nothing wrong with that major, they acted as if I wasn’t able to accomplish a challenging degree program academically.” McNair stated that he was offended by microinvalidation, a form of microaggression, “faculty and staff’s micro-aggressive things like being told how ‘exceptional’ I was, or how I was ‘articulate.’”

Summary

This phenomenological study exuded the importance of degree completion experiences grounded upon Black men at PWIs being interactive, interconnected, and interdependent with their family, friends, and higher learning institutions. The acts of being interactive, interconnected, and interdependent within the college community ensured completion regardless of challenges or barriers. Black men valued the positive and challenging experiences of completing a degree as life-changing and rewarding. Black men who participated in this study provided strong examples of persistence to the audience. Black men utilized barriers as steppingstones to push them towards degree completion at PWIs instead of hindrances that led to college withdrawal. Black men who participated in this study persevered through challenges through self-efficacy or support such as mentoring, engagement, or meaningful experiences with peers, family, or alumni. Although there is a small amount of literature on Black men in higher education, even smaller amount of literature on Black men in STEM, and the smallest amount of

literature on Black men who complete STEM degrees at PWIs in America, the findings of this study identify barriers but also contributors of success. This study provided essential roles that family, faculty, and staff play in Black men STEM degree completers at PWIs.

CHAPTER FIVE: CONCLUSION

Overview

This qualitative study gives voice to Black men who completed STEM degrees at predominantly White institutions. The purpose of this transcendental phenomenological study was to understand how Black men in STEM undergraduate programs succeed at PWIs. At this stage of the research, success is graduating within 6 years from the initial start of a STEM degree program. Harper's (2010) anti-deficit achievement framework was the conceptual framework for this study. This study consisted of individual interviews, two focus groups, and a prompted writing exercise. Chapter Five gives a clear and concise (a) interpretation of findings; (b) implications for policy and practice; (c) theoretical and empirical implications; (d) limitations and delimitations; and (e) recommendations for future research.

Discussion

I know that Black men have different barriers that they face in higher education, one of the most diverse places in America; however, this study focused on contributors to the success of Black men in STEM programs of PWIs. From the beginning to the end of the study, I sought to provide a voice to successful Black men and bring awareness of this phenomenon to a broader audience. Some studies present the struggles of Black men, but this study focused on Black men's success. With great hopes, the results presented in this study will encourage college communities from alumni, administrators, faculty, staff, and students to become more aware of how to help Black men succeed in predominantly White colleges and universities. This section discusses the study's findings in light of the themes that emerged from the data. Empirical and theoretical sources, along with hard evidence from the study, support the interpretations of the findings. This section has five major subsections, including: (a) Interpretation of Findings; (b)

Implications for Policy and Practice; (c) Theoretical and Empirical Implications; (d) Limitations and Delimitations; and (e) Recommendations for Future Research.

Interpretation of Findings

The purpose of this study was to understand how Black men in STEM undergraduate programs succeed at PWIs. Barriers exist in a Black man's world; however, the focus is on Black men who have persevered and completed their degree at PWIs. The transcendental phenomenological approach allowed me to gather data through individual interviews, focus groups, and writing prompts from Black men who completed STEM degrees at PWIs in the United States of America. Of the major ethnic demographics, Black men have the least amount of research focusing on completing undergraduate degrees. Therefore, the research was needed to understand how Black men in STEM programs at PWIs excel. This study is just a tiny portion of a large amount of research continuously required to increase the number of Black men who graduate from 4-year degree programs within 6 years of their start date. The study was conducted with Black men nationwide to strengthen the voice eliminating doubts due to the specificity of one geographic location.

Summary of Thematic Findings

I transcribed all the interviews and focus groups, producing thick and rich descriptions of the phenomenon. The researcher started coding by categorizing, describing, identifying, and naming the phenomenon called open coding. The researcher followed up by relating categories with concepts known as axial coding. Next, the researcher reduced the codes to 29 codes. Of those 29 codes, the researcher identified categories of (a) family, (b) peers, (c) faculty, staff, and alumni support, (d) athleticism, (e) clubs and organizations, (f) mentoring, (g) racial discrimination and stereotyping, (h) academic life, (i) campus life, and (j) law enforcement.

These cyphered into themes: (a) the village or fictive kin, (b) engagement, and (c) barriers of racial injustice. These themes aligned with the literature presented in chapter two spoke on mentoring, engagement, racial injustice on college campuses, and bonds with faculty and staff. This study adds to higher education because little research exists on Black men who have completed STEM programs at PWIs. This research contributes to increasing the percentage of Black men who complete their degrees in America. This study shed new light on the Anti-Achievement Deficit Framework theories because it deals directly with Black men who graduated from PWIs. This section begins with a Summary of the Thematic Findings as offered in Chapter Four, followed by several interpretations I deemed significant.

All the participants expressed the importance of different contributors that led to their success as Black men who completed a STEM degree at a predominantly White institution. Participants' contributions were family, engagement, and overcoming barriers such as racial discrimination and microaggressions. Another factor that contributed to success was autonomy and self-efficacy.

Fictive Kin. One of the themes reflects how Black men took ownership and appreciation of completing their STEM degree at PWIs. The village is one of the most effective strategies for Black men's success in the study, which consists of fictive kin, which is an individual or groups of individuals that operate as a family, although there is no blood relation (Sussman, 1976). The village is a strong example of fictive kin because these individuals such as peers, close friends, or mentors are not family based on the extent of relationships and ability to share resources (Chatters et al., 1994; Dilworth-Anderson, 1992; Lamborn & Ngyuen, 2004). Brooks and Allen (2016) researched fictive kin in the African American community at HBCUs and found that fictive kin strengthen the culture of Black families, biological or extended. Chapter Four

exhibited examples of contributors that Black men in STEM at PWIs deemed necessary to their success. Little to no evidence in the extant literature connects Black men with fictive kin. Brooks and Allen (2016) noted fictive kin is an essential contributor to the success of Black students because they serve as a support system both emotionally and financially. Furthermore, Brooks and Allen (2016) explored that fictive kinship enhanced college experiences for their Black participants by making the journey easier as students made college home. Additionally, fictive kin have positive impacts on identity development, professional aspirations, self-determination, and perseverance (Bunce et al., 2019; Wilson, 2017).

They Owned the Experience. After conducting data analysis, engagement such as mentorship played a significant role in Black men who participated in the study. Black men completed undergraduate STEM programs connected to their PWI campuses by building relationships with faculty, staff, peers, and alumni. Participants' engagement was presented as mentorship, cultivating relationships with faculty, staff, alumni, and peers. Engagement also was exemplified in participating in athletics, student activities, and academic activities. The results of this study confirm that Black men need a connection to coursework, counseling, and academic and student affairs to be successful (Ahren, 2008).

Testimony of Challenges. The participants of this study provided strong examples of racial discrimination. Participants shared experiences of racial discrimination on the college campus in places such as residence life. Other incidents that participants considered as racial discrimination or microaggression occurred within the learning environment and library. One of the participants provided an example of how he experienced racial discrimination from the family of another student he was dating. Some of the participants recalled racial discrimination that led to physical altercations within the athletics division of their institution. While racial

discrimination was evident in most participants, many participants shared that their attitudes toward racial discrimination and microaggression were more learning experiences to teach White students about diversity and inclusion instead of barriers.

Implications for Policy and Practice

As America is becoming more diverse, higher education institutions must be aware of updated knowledge for ensuring all students succeed. This study will provide knowledge based on experiences to offer recommendations for policy and practice on embracing diversity, equity, and inclusion. This section includes specific recommendations for administrators, faculty, and staff of predominantly White institutions on policies and practice. Also, there will be a section of advice for the families of Black men who will attend PWIs.

Implications for Policy

The results of this study are the foundation for significant policy recommendations. This study yielded results to implement a policy for commitment to diversity and inclusion through institutions of higher education. I recommend that each institution have multicultural competency enforced throughout the college community. Multicultural competency as a policy looks like a commitment to diversity and inclusion in every institution's area. Hamilton (2006) expressed the importance of developing multicultural competence that addresses multicultural issues on college campuses; however, this study affirms that there should be an increase in exploring issues about Black men in higher education. A policy that allows faculty to research and express multiculturalism and student affairs to support multiculturalism would be deeply valued. Multicultural competency will provide the institution with the necessary tools to embrace all students of social identities such as disability, ethnicity, gender, race, religion, sexual orientation, socioeconomic class, and spirituality (Kelly & Gayles, 2010).

I recommend a zero-tolerance for hate crimes and racial discrimination policy on campus. A zero-tolerance approach means that everyone found guilty of a hate crime should go through a judicial process and be sanctioned with expulsion. The campus should have known procedures for reporting incidents. The policy should include a thorough investigation of such instances—sanctions including expulsion from school for students and immediate removal of guilty faculty and staff. Black men who have been accepted, connected, supported, cared for, and valued within the community are those who feel like they belonged within a student population (Strayhorn, 2018). Belongingness is a positive attribute to success in a collegiate atmosphere (Brooms, 2019). The following are experiences that Black men who graduated from STEM programs at PWIs shared. Chinery-Hess penned, “Dear future Black men in STEM at PWI, you belong in STEM. There will be times when you will have to prove yourself. Do so and go beyond that!” Easley stated that he felt like he belonged to his institution “Through my previous shared experiences with serving in leadership roles within organizations, my internship, and connections that I made.”

The last policy recommendation would be an agreement to hire faculty that reflect the student population. This policy allows for self-efficacy to shape younger Black men because they see examples of success through faculty members who look like them (Hamilton & Haozous, 2017; Harper & Davis III, 2012). A significant percentage of the participants from this study recounted their most meaningful interactions were from faculty and staff members of the same race and, in some cases, gender. This policy is an effective strategy to ensuring Black men feel inclusive (Hughes, 2010). In chapter four, West recounted one of the most valuable experiences he received was through the preparation from a Black man in a field dominated by White men. Easley shared how mentoring moments with his chancellor of a PWI, a Black woman

empowered him to complete his degree. Greene shared how a faculty member who looked like him became his advocate in the face of adversity because of their history of solid communication. Daly stated, “Outside of peer mentorship, I attended professors’ office hours, a couple of times, but nothing too concrete. Largely because I don’t remember having a single Black male or female faculty member at my time at the university.” Over 20 years ago, faculty-student relationships motivated students to perform above average in academics (Huba & Freed, 2000). This study provided evidence from Black men who graduated from STEM programs at PWIs that engagement and mentoring from faculty and staff members motivated them to have their talents recognized, identified, and cultivated to a core purpose with core values (Cashman, 2008).

Implications for Practice

Grounded in the study results, I recommend that PWIs implement the following initiatives (a) once a year professional development for all institution employees; and (b) provide regular programs that highlight the successes and contributions to the college community of current and former community members who are Black men, not just during Black History Month. Professional development and first-year seminar curriculums will have one main goal: to spread diversity and inclusion throughout the college campus. These practices will encourage Black men to connect with the institution, facilitating the success of Black men seeking STEM degrees.

The chief academic officer, such as the office of the provost or vice president of academic affairs, should develop a professional development program geared towards faculty and address racial climate within the classrooms, such as West experienced when dealing with stereotyping in his school. Human resources should offer general professional development on

diversity and inclusion to all new hires. The professional development should encompass the institution's mission regarding diversity and inclusion. Student affairs departments should conduct research and be accountable for increasing diversity and inclusion in all offices connected to student affairs. To ensure that the institution aligns with diversity and inclusion, a chief diversity officer on campus should provide resources to academic affairs, student affairs, and administration. The chief diversity officer should have the sole responsibility of implementing and evaluating diversity, equity, and inclusion policies within the college community through research and practice.

Additionally, I recommended that institutions clearly state their position on diversity and inclusion to every newly enrolled student. Finally, Hornak (2009) challenged student affairs professionals to “develop programs, services to meet the needs of students, and create unique challenges to addressing ethical issues that arise daily” (p. 56). Over 12 years later, this study provides a voice from Black men that continues to challenge the system of higher education to meet the needs of Black men through programming and services. Emtage noted that it is indicative of the success of Black men to have a support system in place:

It's not a foreign fact that Black men have a callous time navigating their existence, let alone trying to survive in a PWI. Be vigilant and empathetic. Don't tell students who have to work while studying that “maybe you should give up on a school until you can save enough money” when there are ample financial aid options.

Theoretical and Empirical Implications

Though educational practices are grounded in theories, the researcher has not found a theory that specifically theorizes the success of Black men in higher education. Minimal theories supporting the success of Black men in higher education could be why Black men have the

lowest graduation rate at four-year institutions. My study did not seek to understand barriers that hindered Black men from graduating from PWI STEM programs. Instead, I sought to understand how Black men persevered and completed their STEM degrees at PWIs regardless of the barriers they faced. This study utilized the anti- deficit achievement framework by Shaun Harper, and it confirmed some of the theories, such as Bandura's self-efficacy theory. Harper's framework was affirmed when Black men who completed their STEM degrees at PWIs mentioned the effects of fictive kinship. The participants looked up to and followed the example of completing a degree that their peers, family members, faculty, and staff set before them. Fictive kin allowed these Black men to mirror success. This study offers that Black men who attend PWI STEM programs can overcome obstacles such as racial injustice, struggle with identity, or financial restrictions to complete their degree.

Themes emerged by analyzing individual interviews, focus groups, and a written exercise that supported literature in Chapter Two. The authors in Chapter Two each have contributed to their fields of study, especially Shaun Harper, focusing on Black men in higher education. In Chapter Two, I discussed barriers of racial injustice such as racial discrimination, hate-based crimes, and stereotyping. There has been a heightened awareness of social inequity, microaggression, campus-wide racial discrimination, omission, devaluation, and cultural misunderstanding about Black men in higher education (Louis, 2015; Waldeck, 2019). My study provided knowledge through shared experiences of Black men who completed STEM degrees at PWIs. This study confirms that Black men still face racial discrimination, stereotyping, and hate crimes within higher education, both academically and in student life. Participants provided strong evidence of racial injustice that they have experienced in their college careers.

Limitations and Delimitations

Limitations are potential uncontrollable weaknesses of the study. The limitations of this study are within the sample of participants. Specifically, the researcher faced rejection from prospective participants because there was no definition or inclusiveness of those who may identify as non-binary. In addition, pronouns played a significant role in how prospects would or would not participate in the study. The most important limitation was conducting this study amid a pandemic. A good amount of rejection to participate in the study was from Black men who graduated from STEM programs at PWIs but were professionals in the medical field, limiting free time. One individual shared that he wanted to participate, but he had limited time as he worked at two emergency rooms as a limited number of medical physicians were available who did not contract the virus or had to take care of family members prevented him from participating.

Delimitations are purposeful decisions the researcher makes to limit or define the boundaries of the study. The delimitation in future research recommendations is studying only Black men who completed STEM degrees at PWIs. My study presented a gap in the literature regarding Black men who completed STEM degrees at PWIs in America. While conducting my literature review, I recognized that Black men are not completing degrees on a competitive level as others; however, there is little research to decrease the gap of completion. Therefore, I decided that it was imperative to look at Black men who completed STEM degrees at PWIs because I wanted to provide data on the intersectionality of being a Black man, overcoming challenges, and connecting with the institution of higher learning through engagement leads to success. By focusing on these elements, I reflected on my own experiences as a Black man who graduated

from a PWI. Also, as a Black man, researching other Black men who completed their degrees at a PWI led to thick and rich descriptions due to the comfortability of participants sharing experiences with which they felt the researcher could identify, sympathize, or empathize.

Recommendations for Future Research

There has been a call for decades for higher education administrators to commit to the continuous research of multiculturalism (Morales et al., 2017). This study provides evidence that there is a continued need to investigate Black men in higher education through the lens of those who have succeeded. Future research should include Black men who have graduated from Historically Black Colleges and Universities (HBCU). Furthermore, there should be a study conducted of Black men who graduated from institutions of higher learning in Canada to compare contributors for success. Future research should also incorporate quantitative studies to confirm barriers that Black men are facing in higher education. Lastly, future research should study those involved with Black men's success at PWIs, such as mentors, administrators, faculty, and staff. If higher education emphasizes studies to increase the completion rate of Black men in higher education, this will provide evidence that even the most diverse places in America want all to succeed.

Conclusion

The purpose of this transcendental phenomenological study was to provide an understanding of the undergraduate experiences of Black men who completed bachelor's degrees in science, technology, engineering, and mathematics (STEM) at small and large predominantly White institutions (PWIs) of higher learning in the United States. This study delved into contributors for success for the participants. The central research question for this study was, "What contributes to the success of Black STEM undergraduate men at predominantly White

institutions of higher learning?” Shaun Harper’s (2010) anti-deficit achievement framework provided a conceptual framework for the study in collaboration with Bandura’s self-efficacy theory. The study setting was non-specific; it included both small and large PWI campuses, as this was not an assessment of specific campuses and explored the experiences of 17 Black men who completed their undergraduate STEM programs at PWIs within 6 years of their start date. Data methods included individual interviews, two focus groups, and journal prompts to develop detailed and thick descriptions of the participants’ experiences. The data were analyzed using a combination of phenomenological reduction methods described by Moustakas and Creswell. A literature review provided barriers Black men face at PWIs, such as racial discrimination, stereotyping, and microaggression; however, this study added to the literature of how Black men persevered and completed their degree. The study’s findings demonstrated that contributors to the success of Black men at PWIs in STEM programs are fictive kin, engagement, and mentoring. I recommend that future research on Black men is continuously practiced in policies and practices to ensure the completion of degrees.

REFERENCES

- Adams, C., & van Manen, M. A. (2017). Teaching phenomenological research and writing. *Qualitative Health Research*, 27(6), 780–791.
<https://doi.org/10.1177/1049732317698960>
- Ahren, C. (2008). Closing the gap with student affairs staff: From margin to mainstream. *New Directions for Higher Education*, 143, 83–91. <https://doi.org/10.1002/he.316>
- Aldana, A., & Byrd, C. (2015). School ethnic–racial socialization: Learning about race and ethnicity among African American students. *The Urban Review*, 47(3), 563–576.
<https://doi.org/10.1007/s11256-014-0319-0>
- Alexander, K., & Alexander, K. (2017). *Higher education law: Policy and perspectives* (2nd ed.). Routledge.
- Alexander, M. (2010). *The new Jim Crow: Mass incarceration in the age of colorblindness*. New Press.
- Allen, W. (1988). Improving Black student access and achievement in higher education. *The Review of Higher Education*, 11(4), 403–416. <https://doi.org/10.1353/rhe.1988.0012>
- Allen, W. (2001). The struggle continues: Race, equity and affirmative action in U.S. higher education. *The State of Black America*, 1(1), 87–87.
- Allen, W. (2005). A forward glance in a mirror: Diversity Challenged—Access, equity, and success in higher education. *Educational Researcher*, 34(7), 18–23.
<https://doi.org/10.3102/0013189X034007018>
- Anyiwo, N., Bañales, J., Rowley, S., Watkins, D., & Richards-Schuster, K. (2018). Sociocultural influences on the sociopolitical development of African American youth. *Child Development Perspectives*, 12(3), 165–170. <https://doi.org/10.1111/cdep.12276>

- Apprey, M., Preston-Grimes, P., Bassett, K., Lewis, D., & Rideau, R. (2014). From crisis management to academic achievement: A university cluster-mentoring model for Black undergraduates. *Peabody Journal of Education*, 89(3), 318–335.
<https://doi:10.1080/0161956X.2014.913446>
- Argos, G. (2014). ASU fraternity suspended after “offensive” MLK party. *CBS 5 KPHO*.
<http://www.kpho.com/story/24502600/asu-fraternity-suspended-after-offensive-mlk-party>
- Ashburn, E. (2007). 2-year-college leaders discuss achievement gaps and accountability. *The Chronicle of Higher Education*, 53(34).
- Astin, A. (1993). *What matters in college: Four critical years revisited*. Jossey-Bass.
- Axelson, R., & Flick, A. (2011). Defining student engagement. *Change*, 43(1), 38–43.
www.jstor.org/stable/23568219
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management*, 38(1), 9–44. <https://doi.org/10.1177/0149206311410606>
- Barbour, R. (2007). *Doing focus groups*. Sage.
- Barker, M. (2007). Cross-cultural mentoring in institutional contexts. *Negro Educational Review*, 58(1), 85–103, 131.
- Beer, C., & Lawson, C. (2017). The problem of student attrition in higher education: An alternative perspective. *Journal of Further and Higher Education*, 41(6), 773–784.
<https://doi:10.1080/0309877X.2016.1177171>
- Belch, H., Gebel, M., & Maas, G. (2001). Relationship between student recreation complex use, academic performance, and persistence of first-time freshmen. *NASPA Journal*, 38(2), 254–268. <https://doi.org/10.2202/1949-6605.1138>

- Bell, D. (1995). Who's afraid of critical race theory? *University of Illinois Law Review*.
- Berger, J., Blanco Ramírez, G., & Lyon, S. (2012). Past to present: A historical look at retention. In A. Seidman (Ed.), *College student retention: Formula for student success* (pp. 7–34). Rowman & Littlefield.
- Bernstein-Sierra, S., & Kezar, A. (2017). Identifying and overcoming challenges in STEM reform: A study of four national STEM reform communities of practice. *Innovative Higher Education*, 42(5-6), 407–420. <http://doi.org/10.1007/s10755-017-9395-x>
- Berrett, D. (2020, December 17). Fall's enrollment decline now has a final tally. Here's what's behind it. *The Chronicle of Higher Education*. <https://www.chronicle.com/article/falls-enrollment-decline-now-has-a-final-tally-heres-whats-behind-it>
- Bonner, F. (2010). *Academically gifted African American male college students*. Praeger/ABC-CLIO.
- Borgen, S., & Borgen, N. (2016). Student retention in higher education: Folk high schools and educational decisions. *Higher Education*, 71(4), 505–523. <https://doi:10.1007/s10734-015-9921-7>
- Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). Greenwood Press.
- Bourdieu, P. (1987). What makes a social class? On the theoretical and practical existence of groups. *Berkeley Journal of Sociology*, 32(1), 1–17. <https://www.jstor.org/stable/41035356>
- Boykin, T., & Palmer, R. (2016). Examining the paradox between dismantling de jure segregation and affirmative action: Implications from contemporary higher education

case law. *The Journal of Negro Education*, 85(2), 114–128.

<https://doi:10.7709/jnegroeducation.85.2.0114>

Braveman, P., Heck, K., Egerter, S., Dominguez, T., Rinki, C., Marchi, K., & Curtis, M. (2017).

Worry about racial discrimination: A missing piece of the puzzle of Black-White disparities in preterm birth? *PloS One*, 12(10), e0186151.

<https://doi:10.1371/journal.pone.0186151>

Brook, F., Ellenwood, D., & Lazzaro, A. (2015). In pursuit of antiracist social justice:

Denaturalizing Whiteness in the academic library. *Library Trends*, 64(2), 246–284.

<https://doi.org/10.1353/lib.2015.0048>

Brooks, J. E., & Allen, K. R. (2016). The influence of fictive kin relationships and religiosity on the academic persistence of African American college students attending an HBCU.

Journal of Family Issues, 37(6), 814–832. <https://doi.org/10.1177/0192513X14540160>

Brooms, D. R. (2019). Not in this alone: Black men's bonding, learning, and sense of belonging in Black male initiative programs. *The Urban Review*, 51(5), 748–767.

<https://doi.org/10.1007/s11256-019-00506-5>

Brooms, D., Clark, J., & Smith, M. (2018). *Empowering men of color on campus: Building student community in higher education*. Rutgers University Press.

Brown v. Board of Education of Topeka, 347 U.S. 483 (1954).

Bunce, L., King, N., Saran, S., & Talib, N. (2019). Experiences of Black and minority ethnic (BME) students in higher education: Applying self-determination theory to understand the BME attainment gap. *Studies in Higher Education*, 1–14.

<https://doi:10.1080/03075079.2019.1643305>

- Burke, A. (2019). Student retention models in higher education: A literature review. *College and University*, 94(2), 12–21.
- Burt, B., Williams, K., & Palmer, G. (2019). It takes a village: The role of emic and etic adaptive strengths in the persistence of Black men in engineering graduate programs. *American Educational Research Journal*, 56(1), 39–74. <https://doi.org/10.3102/0002831218789595>
- Carini, R., Kuh, G., & Klein, S. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education*, 47(1), 1–32. <https://doi:10.1007/s11162-005-8150-9>
- Carter, D. (2006). Key issues in the persistence of underrepresented minority students. *New Directions for Institutional Research*, 130, 33–46. <http://doi.org/10.1002/ir.178>
- Cashman, K. (2008). *Leadership from the inside out: Becoming a leader for life* (2nd ed.). Executive Excellence Publishing.
- Cati, V., López, J., & Morrell, E. (2015). Toward a critical pedagogy of race: Ethnic studies and literacies of power in high school classrooms. *Race and Social Problems*, 7(1), 84–96. <https://doi.org/10.1007/s12552-014-9142-1>
- Chadiha, Letha, A., Maria, P., David, E., & Ching-Wen, C. (2014). The importance of mentoring faculty members of color in schools of social work. *Journal of Teaching in Social Work*, 34(4), 351–362. <https://doi:10.1080/08841233.2014.937891>
- Chatters, L., Taylor, R., & Jayakody, R. (1994). Fictive kin relationships in Black extended families. *Journal of Comparative Family Studies*, 25(3), 297–312. <https://www.jstor.org/stable/41602341>
- Cherng, H., & Davis, L. (2019). *Multicultural matters: An investigation of key assumptions of multicultural education reform in teacher education*. Sage.

- Childs, K. (2017). Integrating multiculturalism in education for the 2020 classroom. *Journal for Multicultural Education*, 11(1), 31–36.
- Coates, H., & Matthews, K. (2018). Frontier perspectives and insights into higher education student success. *Higher Education Research & Development*, 37(5), 903–907.
<https://doi:10.1080/07294360.2018.1474539>
- Cole, E., & Harper, S. (2017). Race and rhetoric: An analysis of college presidents' statements on campus racial incidents. *Journal of Diversity in Higher Education*, 10(4), 318–333.
<https://doi.org/10.1037/dhe0000044>
- Comeaux, E., & Harrison, K. (2011). A conceptual model of academic success for student-athletes. *Educational Researcher*, 40(5), 235–245.
<https://doi:10.3102/0013189X11415260>
- Creswell, J. (2008). *Educational research: Planning, conducting, and evaluating qualitative and quantitative research* (3rd ed.). Prentice Hall PTR.
- Creswell, J. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Sage.
- Criminal Justice Information Service Division. (2018). *Uniform crime report*.
<https://ucr.fbi.gov/hate-crime/2018>
- Crisp, G., Baker, V., Griffin, K., Lunsford, L., & Pifer, M. (2017). Mentoring undergraduate students. *ASHE Higher Education Report*, 43(1), 7–103.
<https://doi.org/10.1002/aehe.20117>

- Cullen, D., Shieh, C., McLennon, S., Pike, C., Hartman, T., & Shah, H. (2017). Mentoring nontenured track nursing faculty: A systematic review. *Nurse Educator*, 42(6), 290–294. <https://doi.org/10.1097/NNE.0000000000000394>
- Cuseo, J. (2018). Student–faculty engagement. *New Directions for Teaching and Learning*, 2018(154), 87–97. <https://doi:10.1002/tl.20294>
- Dache-Gerbino, A. (2017). Mapping the postcolonial across urban and suburban college access geographies. *Equity & Excellence in Education*, 50(4), 368–386.
- Dancy, T., & Jean-Marie, G. (2014). Faculty of color in higher education: Exploring the intersections of identity, impostorship, and internalized racism. *Mentoring & Tutoring*, 22(4), 354–354. <https://doi.org/10.1080/13611267.2014.945736>
- Daniels, K., Billingsley, K., Billingsley, J., Long, Y., & Young, D. (2015). Impacting resilience and persistence in underrepresented populations through service-learning. *Journal for Multicultural Education*, 9(3), 174–192. <https://doi:10.1108/JME-02-2015-0005>
- Darder, A., & Torres, R. (2004). *After race: Racism after multiculturalism*. New York University Press.
- Dilworth-Anderson, P. (1992). Extended kin networks in Black families. *Generations*, 16, 29–32.
- Du, F. (2016). Using National Survey of Student Engagement (NSSE) findings to enhance the cocurricular and advising aspects of a First-Year seminar. *Assessment Update*, 28(3), 1–16. <https://doi:10.1002/au.30056>
- Dunstan, L., Hewitt, B., & Tomaszewski, W. (2017). Indigenous children’s affective engagement with school: The influence of socio-structural, subjective and relational factors.

- Australian Journal of Education*, 61(3), 250–269.
<https://doi.org/10.1177/0004944117732637>
- Edwards, C. W. (2019). Overcoming imposter syndrome and stereotype threat: Reconceptualizing the definition of a scholar. *Taboo*, 18(1), 18–34.
<https://doi.org/10.31390/taboo.18.1.03>
- Eller, C., DiPrete, T., & Ciocca Eller, C. (2018). The paradox of persistence: Explaining the Black-White gap in bachelor's degree completion. *American Sociological Review*, 83(6), 1171–1214. <https://doi.org/10.1177/0003122418808005>
- Emekalam, A. (2019). Reducing attrition from STEM disciplines: Understanding the student athletes' perspective (science, technology, engineering and math). *Peer Review*, 21(1-2), 34–37. <https://www.aacu.org/peerreview/2019/winter-spring/Emekalam>
- Englander, M. (2012). The interview: Data collection in descriptive phenomenological human scientific research. *Journal of Phenomenological Psychology*, 43(1), 13–35.
<https://doi.org/10.1163/156916212X632943>
- Estrada, M., Burnett, M., Campbell, A., Campbell, P., Denetclaw, W., Gutiérrez, C., Zavala, M. (2016). Improving underrepresented minority student persistence in STEM. *CBE Life Sciences Education*, 15(3), es5. <https://doi:10.1187/cbe.16-01-0038>
- Everett, R. (2014). “That was not just his door, that was our door”: UMass students respond to racist threats written on dorm room doors. *The Daily Hampshire Gazette*.
<http://www.gazettenet.com/home/13948550-95/that-was-not-just-his-door-that-was-our-door-students-respond-to-racist>
- Fredrickson, G. (2002). *Racism: A short history*. Princeton University Press

- Gaither, G. (2005). *Minority retention: What works?* New Directions for Institutional Research, No. 125. Jossey-Bass.
- Gall, M., Gall, J., & Borg, W. (2007). *Educational research: An introduction* (8th ed.). Pearson.
- Gaxiola-Serrano, T. J. (2017). “Wait, what do you mean by college?” A critical race analysis of Latina/o students and their pathways to community college. *Community College Journal of Research and Practice*, 41(4-5), 239–252.
- Geerlings, J., Thijs, J., & Verkuyten, M. (2019). *Preaching and practicing multicultural education: Predicting students’ outgroup attitudes from perceived teacher norms and perceived teacher–classmate relations*. Elsevier Ltd.
<https://doi:10.1016/j.jsp.2019.07.003>
- Graham, J., & McClain, S. (2019). A canonical correlational analysis examining the relationship between peer mentorship, belongingness, impostor feelings, and Black collegians’ academic and psychosocial outcomes. *American Educational Research Journal*, 56(6), 2333–2367. <https://doi:10.3102/0002831219842571>
- Greer, A., Luchenski, S., Amlani, A., Lacroix, K., Burmeister, C., & Buxton, J. (2016). Peer engagement in harm reduction strategies and services: A critical case study and evaluation framework from British Columbia, Canada. *BMC Public Health*, 16(1), 452–459. <https://doi:10.1186/s12889-016-3136-4>
- Groccia, J. (2018). What is student engagement? *New Directions for Teaching and Learning*, 2018(154), 11–20. <https://doi.org/10.1002/tl.20287>
- Guess, T. (2006). The social construction of Whiteness: Racism by intent, racism by consequences. *Critical Sociology*, 32(4), 649–673.
<https://doi.org/10.1163/156916306779155199>

Gusa, D. (2010). White institutional presence: The impact of Whiteness on campus climate.

Harvard Educational Review, 80(4), 464–489, 586.

Haeger, H., & Fresquez, C. (2016). Mentoring for inclusion: The impact of mentoring on

undergraduate researchers in the sciences. *CBE—Life Sciences Education*, 15(3), ar36.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5008883/?tool=pmcentrez&report=abstract>

Haley, K., & Jaeger, A. (2012). “I didn’t do it the right way”: Women’s careers as faculty in higher education administration. *Journal of the Professoriate*, 6(2), 1–26.

Hamilton, J. (2006). Multicultural competence in student affairs. *Journal of Higher Education*, 77(6), 1110–1112.

Hamilton, N., & Haozous, E. A. (2017). Retention of faculty of color in academic

nursing. *Nursing Outlook*, 65(2), 212–221. <https://doi.org/10.1016/j.outlook.2016.11.003>

Harper, S. R. (2009). Niggers no more: A critical race counternarrative on Black male student achievement at predominantly White colleges and universities. *International Journal of Qualitative Studies in Education*, 22(6), 697–712.

<https://doi.org/10.1080/09518390903333889>

Harper, S. (2010). An anti-deficit achievement framework for research on students of color in

STEM. *New Directions for Institutional Research*, 2010, 63–74.

<https://doi.org/10.1002/ir.362>

Harper, S. (2012a). *Black male student success in higher education: A report from the National Black Male College Achievement Study*. The University of Pennsylvania, Center for the Study of Race and Equity in Education.

- Harper, S. (2012b). Race without racism: How higher education researchers minimize racist institutional norms. *Review of Higher Education*, 36, 9–29.
- Harper, S. (2013). Am I my brother's teacher? Black undergraduates, racial socialization, and peer pedagogies in predominantly White postsecondary contexts. *Review of Research in Education*, 37(1), 183–211.
- Harper, S. (2015). Black male college achievers and resistant responses to racist stereotypes at predominantly White colleges and universities. *Harvard Educational Review*, 85(4), 646–674.
- Harper, S., & Davis III, C. (2012). They (don't) care about education: A counternarrative on Black male students' responses to inequitable schooling. *Educational Foundations*, 26, 103–120.
- Harper, S., & Hurtado, S. (2007). Nine themes in campus racial climates and implications for institutional transformation. *New directions for student services*, 2007(120), 7–24.
<https://doi.org/10.1002/ss.254>
- Harper, S., Patton, L., & Wooden, O. (2009). Access and equity for African American students in higher education: A critical race historical analysis of policy efforts. *The Journal of Higher Education*, 80(4), 389–414. www.jstor.org/stable/25511120
- Harris, T., & Lee, C. (2019). Advocate-mentoring: A communicative response to diversity in higher education. *Communication Education*, 68(1), 103–113.
<https://doi.org/10.1080/03634523.2018.1536272>
- Heaven, A. (2015). A conceptual framework for transforming African American males through student affairs programs. *Race, Gender & Class*, 22(1), 54–64.

- Heim, M. (2012). North Alabama player tweets racist Obama comment after speech pre-empted NFL game, now gone from team. *The Mobile Press-Register*.
http://www.al.com/sports/index.ssf/2012/12/north_alabama_player_tweets_ra.html
- Herrmann, S., Adelman, R., Bodford, J., Graudejus, O., Okun, M., & Kwan, V. (2016). The effects of a female role model on academic performance and persistence of women in STEM courses. *Basic and Applied Social Psychology*, 38(5), 258–268,
<https://doi.org/10.1080/01973533.2016.1209757>
- Holmegaard, H. (2015). Performing a choice-narrative: A qualitative study of the patterns in STEM students' higher education choices. *International Journal of Science Education*, 37(9), 1454–1477. <https://doi:10.1080/09500693.2015.1042940>
- Hope, E., Skoog, A., & Jagers, R. (2015). “It’ll never be the White kids, it’ll always be us”: Black high school students’ evolving critical analysis of racial discrimination and inequity in schools. *Journal of Adolescent Research*, 30(1), 83–112.
<https://doi.org/10.1177/0743558414550688>
- Hornak, A. M. (2009). Ethical issues for community college student affairs professionals. *New Directions for Community Colleges*, 148, 53–62.
- Hott, B., & Tietjen-Smith, T. (2018). The professional development needs of tenure track faculty at a regional university. *Research in Higher Education Journal*, 35.
<https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1194407>
- Howard, C. (2012). *Message from President Howard*. <http://www.hsc.edu/News/News-Archive/2012/Incident.html>
- Huba, M. E., & Freed, J. E. (2000). *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning*. Allyn and Bacon.

- Hughes, R. (2010). Engaging African American males for educational success. *Gifted Child Today*, 33(2), 55–60. <https://doi:10.1177/107621751003300213>
- Huh, H., Choi, S., & Jun, J. (2015). Relationships among multicultural sensitivity, multicultural education awareness, and level of multicultural education practice of South Korean teachers. *KEDI Journal of Educational Policy*, 12(1).
- Husserl, E. (2014). *Ideas I* (Daniel Dahlstrom, Trans.). Hackett Publishing Company, Inc.
- Hurtado, S., Alvarado, A., & Guillermo-Wann, C. (2015). Thinking about race: The salience of racial identity at two-and four-year colleges and the climate for diversity. *The Journal of Higher Education*, 86(1), 127–155.
- Hurtado, S., Eagan, M., Tran, M., Newman, C., Chang, M., & Velasco, P. (2011). “We do science here”: Underrepresented students’ interactions with faculty in different college contexts. *Journal of social issues*, 67(3), 553–579. <https://doi.org/10.1111/j.1540-4560.2011.01714.x>
- Hutchins, H. (2015). Outing the imposter: A study exploring imposter phenomenon among higher education faculty. *New Horizons in Adult Education & Human Resource Development*, 27(2), 3–12.
- Irby, D. (2014). Excellence in clinical teaching: Knowledge transformation and development required. *Medical Education*, 48(8), 776–784. <https://doi:10.1111/medu.12507>
- Ireland, D., Freeman, K., Winston-Proctor, C., DeLaine, K., McDonald Lowe, S., & Woodson, K. (2018). (Un) hidden figures: A synthesis of research examining the intersectional experiences of Black women and girls in STEM education. *Review of Research in Education*, 42(1), 226–254. <https://doi.org/10.3102/0091732X18759072>

- Jack, A. (2016). (No) harm in asking: Class, acquired cultural capital, and academic engagement at an elite university. *Sociology of Education*, 89(1), 1–19.
<https://doi.org/10.1177/0038040715614913>
- Johnson, D., Wasserman, T., Yildirim, N., & Yonai, B. (2014). Examining the effects of stress and campus climate on the persistence of students of color and White students: An application of Bean and Eaton’s psychological model of retention. *Research in Higher Education*, 55(1), 75–100.
- Jones, V., & Reddick, R. (2017). The heterogeneity of resistance: How Black students utilize engagement and activism to challenge PWI inequalities. *The Journal of Negro Education*, 86(3), 204–219.
- Joo, K., Andrés, C., & Shearer, R. (2014). Promoting distance learners’ cognitive engagement and learning outcomes: Design-based research in the Costa Rican National University of distance education. *International Review of Research in Open and Distributed Learning*, 15(6), 188–210. <https://doi:10.19173/irrodl.v15i6.1908>
- Karkouti, I. (2016). Black students’ educational experiences in predominantly White universities: A review of the related literature. *College Student Journal*, 50(1), 59–70.
- Kelly, B. T., & Gayles, J. G. (2010). Resistance to racial/ethnic dialog in graduate preparation programs: Implications for developing multicultural competence. *College Student Affairs Journal*, 29(1), 75–85, 91–92. <https://eric.ed.gov/?id=EJ969827>
- Kezar, A., & Holcombe, E. (2018). Challenges of implementing integrated programs for underrepresented students in STEM: A study of the CSU STEM collaboratives. *Educational Policy*. <https://doi.org/10.1177/0895904818802091>

- Knaggs, C., Sondergeld, T., & Schardt, B. (2015). Overcoming barriers to college enrollment, persistence, and perceptions for urban high school students in a college preparatory program. *Journal of Mixed Methods Research*, 9(1), 7–30.
- Kram, K. (1983). Phases of the mentor relationship. *Academy of Management Journal*, 26, 608–625. <https://doi.org/10.2307/255910>
- Kuh, G. (2003). What we're learning about student engagement from NSSE: Benchmarks for effective educational practices. *Change: The Magazine of Higher Learning*, 35(2), 24–32. <https://doi:10.1080/00091380309604090>
- Lamborn, S. D., Nguyen, D. T. (2004). African American adolescents' perceptions of family interactions: Kinship support, parent-child relationships, and teen adjustments. *Journal of Youth and Adolescence*, 33, 547–558. <https://doi.org/10.1023/B:JOYO.0000048068.55441.d6>
- Lancaster, C., & Xu, Y. (2017). Challenges and supports for African American STEM student persistence: A case study at a racially diverse four-year institution. *The Journal of Negro Education*, 86(2), 176–189. <https://doi.org/10.7709/jnegroeducation.86.2.0176>
- Lane, T. (2016). Beyond academic and social integration: Understanding the impact of a STEM enrichment program on the retention and degree attainment of underrepresented students. *CBE Life Sciences Education*, 15(3), ar39. <https://doi:10.1187/cbe.16-01-0070>
- Lekwa, A., Reddy, L., & Shernoff, E. (2019). Measuring teacher practices and student academic engagement: A convergent validity study. *School Psychology Quarterly: The Official Journal of the Division of School Psychology, American Psychological Association*, 34(1), 109–118. <https://doi.org/10.1037/spq0000268>

- Liao, L. C., & Sánchez, B. (2015). An exploratory study of the role of mentoring in the acculturation of Latino/a youth. *Journal of Community Psychology*, 43(7), 868–877.
<https://doi:10.1002/jcop.21717>
- Liao, L. C., & Sánchez, B. (2019). Mentoring relationship quality profiles and their association with urban, low-income Youth's academic outcomes. *Youth & Society*, 51(4), 443–462.
<https://doi:10.1177/0044118X16668058>
- Linder, C., Quaye, S., Lange, A., Roberts, R., Lacy, M., & Okello, W. (2019). “A student should have the privilege of just being a student”: Student activism as labor. *The Review of Higher Education*, 42(5), 37–62. <https://doi:10.1353/rhe.2019.0044>
- Linnenbrink-Garcia, L., Perez, T., Barger, M., Wormington, S., Godin, E., Snyder, K., Schwartz-Bloom, R. (2018). Repairing the leaky pipeline: A motivationally supportive intervention to enhance persistence in undergraduate science pathways. *Contemporary Educational Psychology*, 53, 181–195. <https://doi:10.1016/j.cedpsych.2018.03.001>
- Litzler, E., Samuelson, C., & Lorah, J. (2014). Breaking it down: Engineering student STEM confidence at the intersection of race/ethnicity and gender. *Research in Higher Education*, 55(8), 810–832. <https://doi:10.1007/s11162-014-9333-z>
- Liu, S. (2018). Entering the STEM pipeline: Exploring the impacts of a summer bridge program on students' readiness. *Journal of College Student Development*, 59(5), 635–640.
<https://doi.org/10.1353/csd.2018.0060>
- Lopatto, D. (2010). Undergraduate research as a high-impact student experience. *Peer Review*, 12(2). <http://www.aacu.org/publications-research/periodicals/undergraduate-researchhigh-impact-student-experience>

- Louis, D. (2015). Cross-cultural peer mentoring: one approach to enhancing White faculty adjustment at Black colleges. *International Journal of Multicultural Education*, 17(2), 1–19. <http://doi.org/10.18251/ijme.v17i2.900>
- Love, D. (2008). Revitalizing retention efforts for African American college students at predominantly White institutions. In *Proceedings of the Academy of Educational Leadership*, 13(2), 41–46.
<https://www.abacademies.org/Public/Proceedings/Proceedings23/AEL%20Proceedings.pdf#page=47>
- Luna, G. (2018). Making visible our invisible faculty: Mentoring for contingent online faculty. *Journal of Higher Education Theory & Practice*, 18(2), 52–65.
<https://doi.org/10.33423/jhetp.v18i2.546>
- Lykkegaard, E., & Ulriksen, L. (2019). In and out of the STEM pipeline – a longitudinal study of a misleading metaphor. *International Journal of Science Education*, 41(12), 1600–1625.
<https://doi.org/10.1080/09500693.2019.1622054>
- Małota, W. (2019). Why managers want to be mentors? The role of intrinsic and extrinsic motivation and the anticipated costs of mentoring for the propensity to mentor by managers in formal mentoring in organizations. *Journal of Management and Business Administration Central Europe*, 27(2), 64–82. <https://doi.org/10.7206/jmba.ce.2450-7814.253>
- Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41(9), 954–969.
<https://doi.org/10.1037/0003-066X.41.9.954>
- Marshall, P. (2015). *Using my ‘You lie moment’ to theorize persistent resistance to critical multicultural education*. Eastern College, Department of Education.
<https://doi.org/10.18251/ijme.v17i2.916>

- Mathison, K. (2015). Effects of the performance management context on Australian academics' engagement with the scholarship of teaching and learning: A pilot study. *The Australian Educational Researcher*, 42(1), 97–116. <https://doi:10.1007/s13384-014-0154-z>
- Maton, K., Hrabowski, F., & Schmitt, C. (2000). African American college students excelling in the sciences: College and post-college outcomes in the Meyerhoff Scholars Program. *Journal of Research in Science Teaching*, 37(7), 629–654. [https://doi.org/10.1002/1098-2736\(200009\)37:7<629::AID-TEA2>3.0.CO;2-8](https://doi.org/10.1002/1098-2736(200009)37:7<629::AID-TEA2>3.0.CO;2-8)
- Maton, K., Sto. Domingo, M., Stolle-McAllister, K., Zimmerman, J., & Hrabowski III, F. (2009). Enhancing the number of African-Americans who pursue STEM PhDs: Meyerhoff Scholarship Program outcomes, processes, and individual predictors. *Journal of Women and Minorities in Science and Engineering*, 15, 15–37. <https://doi.org/10.1615/JWomenMinorScienEng.v15.i1.20>
- Mayer, A., Blair, J., Ko, M., Patel, S., & Files, J. (2014). Long-term follow-up of a facilitated peer mentoring program. *Medical Teacher*, 36(3), 260–266. <https://doi.org/10.3109/0142159X.2013.858111>
- McCoy, D., Luedke, C., & Winkle-Wagner, R. (2017). Encouraged or weeded out: Perspectives of students of color in the STEM disciplines on faculty interactions. *Journal of College Student Development*, 58(5), 657–673.
- McCoy, D., Winkle-Wagner, R., & Luedke, C. (2015). Colorblind mentoring? Exploring White faculty mentoring of students of color. *Journal of Diversity in Higher Education*, 8(4), 225.

- McGee, E. (2016). Devalued Black and Latino racial identities: A by-product of STEM college culture? *American Educational Research Journal*, 53(6), 1626–1662.
<https://doi.org/10.3102/0002831216676572>
- McGowan, B. (2017). Visualizing peer connections: The gendered realities of African American college men's interpersonal relationships. *Journal of College Student Development*, 58(7), 983–1000. <https://doi.org/10.1353/csd.2017.0079>
- McKinsey, E. (2016). Faculty mentoring undergraduates: The nature, development, and benefits of mentoring relationships. *Teaching & Learning Inquiry*, 4(1), 1–15.
<https://files.eric.ed.gov/fulltext/EJ1148637.pdf>
- McNair Scholars. (2019). *McNair Scholars Program*. <https://mcnairscholars.com/>
- McRae, M., & Zimmerman, K. (2019). Identifying components of success within health sciences: Focused mentoring programs through a review of the literature. *American Journal of Pharmaceutical Education*, 83(1), 50–68. <https://doi.org/10.5688/ajpe6976>
- Miorelli, J., Stambach, N., Moskal, B., & Dwyer, J. (2015). *Improving faculty perception of and engagement in STEM education*. Paper presented at the 1-6.
<https://doi:10.1109/FIE.2015.7344220>
- Mitchell, G. (2008). Racial incidents and threats against Obama soar: Here is a chronicle. *The Huffington Post*. https://www.huffpost.com/entry/racial-incidents-and-thre_b_144061
- Mondisa, J. (2018). Examining the mentoring approaches of African-American mentors. *Journal of African American Studies*, 22(4), 293–308. <https://doi.org/10.1007/s12111-018-9411-y>
- Moos, R. H. (1986). *The human context: Environmental determinants of behavior*. Krieger.

- Morales, D., Grineski, S., & Collins, T. (2017). Faculty motivation to mentor students through undergraduate research programs: A study of enabling and constraining factors. *Research in Higher Education*, 58(5), 520–544. <https://doi.org/10.1007/s11162-016-9435-x>
- Morris, J., Lummis, G., & Lock, G. (2017). Questioning art: Factors affecting students' cognitive engagement in responding. *Issues in Educational Research*, 27(3), 493.
- Morrison, L., Lorens, E., Bandiera, G., Liles, W., Lee, L., Hyland, R., & Levinson, W. (2014). Impact of a formal mentoring program on academic promotion of Department of Medicine faculty: A comparative study. *Medical Teacher*, 36(7), 608–614. <https://doi.org/10.3109/0142159X.2014.899683>
- Moustakas, C. (1994). *Phenomenological research methods*. Sage.
- Myers, S. L., & Turner, C. S. (2004). The effects of Ph.D. supply on minority faculty representation. *The American Economic Review*, 94(2), 296–301. <https://doi:10.1257/0002828041301614>
- Nakaya, A. (2018). *Overcoming ethnic conflict through multicultural education: The case of West Kalimantan, Indonesia*. Eastern College, Department of Education. <https://doi:10.18251/ijme.v20i1.1549>
- Nash, R., & Jang, J. (2013). The time has come to create meaning-making centers on college campuses. *About Campus*, 18(4), 2–9. <https://doi.org/10.1002/abc.21124>
- Nash, R., & Murray, M. (2010). *Helping college students find purpose: The campus guide to meaning-making*. Jossey-Bass.
- National Academy of Sciences (U.S.), National Academy of Engineering, & Institute of Medicine (U.S.). (1997). *Adviser, teacher, role model, friend: On being a mentor to students in science and engineering*. National Academy Press.

National Center for Education Statistics. (2020). *Digest of educational statistics*.

https://nces.ed.gov/programs/digest/current_tables.asp

National Student Clearinghouse Resource Center. (2017). *Completing college: National by race and ethnicity*. <https://nscresearchcenter.org/signaturereport12-supplement-2/>

Nelson, R. (1998). The word “nigga” is only for slaves and sambos. *The Journal of Blacks in Higher Education*, 21, 117. <https://doi:10.2307/2999021>

NOLO. (n.d.). *Law for all: Legal research*. <http://supreme.nolo.com/us/347/483/>

Okahana, H., Klein, C., Allum, J., & Sowell, R. (2018). STEM doctoral completion of underrepresented minority students: Challenges and opportunities for improving participation in the doctoral workforce. *Innovative Higher Education*, 43, 237–255. <https://doi.org/10.1007/s10755-018-9425-3>

Oklahoma Daily. (2015). Sigma Alpha Epsilon fraternity disbanded at OU after video of members chanting racist slurs surfaces. *The Oklahoma Daily*. http://www.oudaily.com/news/sigma-alpha-epsilon-fraternity-disbanded-at-ou-after-video-of/article_9b58c58c-c612-11e4-b671-eb2054315c93.html

Omi, M., & Winant, H. (1994). *Racial formation in the United States: From the 1960s to the 1990s*. Routledge.

Outten, D., & Hilton, A. (2013, April). *How to identify, recruit and retain faculty of color in critical shortage teaching areas when some administrators say they cannot find qualified minorities*. Presentation at the Keeping Our Faculties of Color Symposium at University of Minnesota, Saint Paul, Minnesota.

- Oyserman, D., Gant, L., & Ager, J. (1995). A socially contextualized model of African American identity: Possible selves and school persistence. *Journal of Personality and Social Psychology*, 69(6), 1216–1232. <https://doi.org/10.1037/0022-3514.69.6.1216>
- Patton, L. (2016). Disrupting postsecondary prose: Toward a critical race theory of higher education. *Urban Education*, 51(3), 315–342. <https://doi.org/10.1177/0042085915602542>
- Peifer, J., Lawrence, E., Williams, J., & Leyton-Armakan, J. (2016). The culture of mentoring: Ethnocultural empathy and ethnic identity in mentoring for minority girls. *Cultural Diversity & Ethnic Minority Psychology*, 22(3), 440–446. <https://doi.org/10.1037/cdp0000078>
- Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D’Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A., & Sobrero, M. (2013). Academic engagement and commercialization: A review of the literature on university–industry relations. *Research Policy*, 42(2), 423–442. <https://doi:10.1016/j.respol.2012.09.007>
- Perry, A., Dean, S., & Hilton, A. (2019). New faculty transitions and obstacles: An auto-ethnographic exploration. *Journal of Professoriate*, 10(1), 43–72.
- Rahman, J. (2012). The n word: Its history and use in the African American community. *Journal of English Linguistics*, 40(2), 137–171. <https://doi.org/10.1177/0075424211414807>
- Robson, J. (2018). Performance, structure, and ideal identity: Reconceptualizing teachers’ engagement in online social spaces. *British Journal of Educational Technology*, 49(3), 439–450. <https://doi.org/10.1111/bjet.12551>
- Russell, M., & Russell, J. (2015). Black American undergraduate women at a PWI: Switching majors in STEM. *Negro Educational Review*, 66(1-4), 101.

- Santos, S., & Reigadas, E. (2002). Latinos in higher education: An evaluation of a university faculty mentoring program. *Journal of Hispanic Higher Education*, 1(1), 40–50.
<https://doi.org/10.1177/1538192702001001004>
- Seaton, E. K., Upton, R., Gilbert, A., & Volpe, V. (2014). A moderated mediation model: Racial discrimination, coping strategies, and racial identity among Black adolescents. *Child Development*, 85(3), 882–890. <https://doi:10.1111/cdev.12122>
- Simon, R., Aulls, M., Dedic, H., Hubbard, K., & Hall, N. (2015). Exploring student persistence in STEM programs: A motivational model. *Canadian Journal of Education/Revue Canadienne De L'éducation*, 38(1), 1–27.
<http://www.jstor.org/stable/canajeducrevucan.38.1.09>
- Smith, D. (2000). How to diversify the faculty. *Academe Online*, 86(5).
<http://search.proquest.com.ezproxy.gvsu.edu/docview/232308011>
- Solórzano, D. G., & Yosso, T. J. (2002). Critical race methodology: Counter-storytelling as an analytical framework for education research. *Qualitative Inquiry*, 8(1), 23–44.
<https://doi.org/10.1177/107780040200800103>
- Staiti, A. (2014). *Husserl's Transcendental Phenomenology: Nature, Spirit, and Life*. Cambridge University Press.
- Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, 52(6), 613–629. <https://doi.org/10.1037//0003-066x.52.6.613>
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual performance of African Americans. *Journal of Personality and Social Psychology*, 69(5), 797–811.
<https://doi.org/10.1037//0022-3514.69.5.797>

- Stipanovic, N., & Woo, H. (2017). Understanding African American students' experiences in STEM education: An ecological systems approach. *The Career Development Quarterly*, 65(3), 192–206. <https://dx.doi.org.ezproxy.liberty.edu/10.1002/cdq.12092>
- Stovall, A. (2005). Why Black cultural centers? The philosophical bases for Black cultural centers. In F. Hord (Ed.), *Black cultural centers: Politics of survival and identity* (pp. 102–112). Third World Press and Association for Black Cultural Centers.
- Strange, C. C., & Banning, J. H. (2001). *Educating by design: Creating campus learning environments that work*. Jossey-Bass.
- Strayhorn, T. L. (2018). *College students' sense of belonging: A key to educational success for all students* (2nd ed.). Routledge. <https://doi.org/10.4324/9781315297293>
- Stronger Together: Plugging the leaks in the STEM development pipeline. (2017, October 5). *Premium Official News*.
- Sussman, M. (1976). The family life of old people. In R. H. Binstock & E. Shanas (Eds.), *Handbook of aging and the social sciences* (pp. 218–243). Van Nostrand Reinhold.
- Swail, W. S., Redd, K. E., & Perna, L. W. (2003). Retaining minority students in higher education: A framework for success. In *ASHE-ERIC Higher Education Report* (Vol. 30, No. 2). Jossey-Bass.
- Taha, M. (2019). *Confusion and frustration as catalysts for change: 'rich points' in multicultural education*. Routledge. <https://doi.org/10.1080/17457823.2019.1578982>
- The Education Trust. (n.d.). <https://edtrust.org/>
- Thelin, J. (2011). *A history of American higher education*. Johns Hopkins University Press.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. University of Chicago Press.

- Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: Four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *Elementary School Journal*, 110(2), 228–245.
<https://doi.org/10.1086/605771>
- Turner, C., & Gonzalez, J. (2015). *Modeling mentoring across race/ethnicity and gender: Practices to cultivate the next generation of diverse faculty*. Stylus Publishing.
- Umbach, P. (2006). The contribution of faculty of color to undergraduate education. *Research in Higher Education*, 47(3), 317–345. <https://www.jstor.org/stable/40197402>
- UNIVSTATS. (2020). *College statistics*. <https://www.univstats.com/>
- Urban, E., Navarro, M., & Borron, A. (2017). Long-term impacts of a faculty development program for the internationalization of curriculum in higher education. *Journal of Agricultural Education*, 58(3), 219–238. <https://doi.org/10.5032/jae.2017.0321>
- Vacchi, D., Hammond, S., & Diamond, A. (2017). Conceptual models of student veteran college experiences. *New Directions for Institutional Research*, 2016(171), 23–41.
<https://doi.org/10.1002/ir.20192>
- Van Manen, M. (2016). *Researching lived experience: Human science for an action sensitive pedagogy* (2nd ed.). Routledge.
- Vollet, J., Kindermann, T., & Skinner, E. (2017). In peer matters, teachers matter: Peer group influences on students' engagement depend on teacher involvement. *Journal of Educational Psychology*, 109(5), 635–652. <https://doi.org/10.1037/edu0000172>
- Waldeck, J. (2019). Prosocial advocacy communication and mentoring in higher education. *Communication Education*, 68(1), 113–121. <https://doi.org/10.1080/03634523.2018.1538525>

- Weiner, B. (1985). An attribution theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548–573. <https://doi.org/10.1037/0033-295X.92.4.548>
- Welch, J., Sawtelle, S., Cheng, D., Perkins, T., Ownbey, M., MacNeill, E., & Rusyniak, D. (2017). Faculty mentoring practices in academic emergency medicine. *Academic Emergency Medicine*, 24(3), 362–370. <https://doi:10.1111/acem.13136>
- Williams, E., Dismuke, C., Faith, T., Smalls, B., Brown, E., Oates, J., & Egede, L. (2019). Cost-effectiveness of a peer mentoring intervention to improve disease self-management practices and self-efficacy among African American women with systemic lupus erythematosus: Analysis of the peer approaches to lupus self-management (PALS) pilot study. *Lupus*, 28(8), 937-944. <https://doi:10.1177/0961203319851559>
- Winkle-Wagner, R., & McCoy, D. (2018). Feeling like an “alien” or “family”? Comparing students and faculty experiences of diversity in STEM disciplines at a PWI and an HBCU. *Race Ethnicity and Education*, 21(5), 593–606. <https://doi.org/10.1080/13613324.2016.1248835>
- Wilson, G. (2017). Fictive kinship in the aspirations, agency, and (im)possible selves of the Black American art teacher. *The Journal of Social Theory in Art Education*, 37, 49–60.
- Wren, T. (1982). Social learning theory, self-regulation, and morality. *Ethics*, 92(3), 409–424. <http://www.jstor.org.libproxy.uncg.edu/stable/2380729>
- Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race Ethnicity and Education*, 8(1), 69–91. <https://doi/abs/10.1080/1361332052000341006>
- Zhoc, K., Webster, B., King, R., Li, J., & Chung, T. (2019). *Higher education student engagement scale (HESES): Development and psychometric evidence*. Springer.

Zilvinskis, J., Masseria, A., & Pike, G. (2017). Student engagement and student learning:

Examining the convergent and discriminant validity of the revised national survey of student engagement. *Research in Higher Education*, 58(8), 880–903.

<https://doi:10.1007/s11162-017-9450-6>

Zirkel, S. (2002). Is there a place for me? Role models and academic identity among White students and students of color. *Teachers College Record*, 104(2), 357–376.

<https://doi.org/10.1111/1467-9620.00166>

APPENDIX A: IRB APPROVAL LETTER**LIBERTY UNIVERSITY**
INSTITUTIONAL REVIEW BOARD

2020-10-19

James Hairston, David Vacchi

Re: IRB Approval - IRB-FY20-21-103 The Recount: Black Men's Experiences of
Predominantly White Institution's Undergraduate STEM Programs in the United States

Dear James Hairston, David Vacchi:

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the date of the IRB meeting at which the protocol was approved: 2020-10-19. If data collection proceeds past one year, or if you make modifications in the methodology as it pertains to human subjects, you must submit an appropriate update submission to the IRB.

These submissions can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your stamped consent form can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. This form should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document should be made available without

alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

APPENDIX B: CONSENT FORM

Consent

Title of the Project: The Recount: Black Men's Experiences of Predominantly White Institutions' Undergraduate STEM Programs in the United States

Principal Investigator: James Hairston, doctoral candidate, Liberty University

Invitation to be part of a research study

You are invited to participate in a research study. To participate, you must be at least 18 years of age or older, identify as a Black man, have completed an undergraduate STEM degree, and have graduated from a predominantly White institution of higher learning within six years of your initial start date. Taking part in this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to participate in this research project.

What is the study about, and why is it being done?

The purpose of the study is to understand the undergraduate experiences of Black men who completed bachelor's degrees in science, technology, engineering, and mathematics (STEM) at small and large predominantly White institutions (PWIs) of higher learning in the United States. This study will focus on student engagement, mentorship, and experiences of racism and discrimination as three factors that might influence Black men's completion of STEM bachelor's degrees at PWIs in the United States.

What will happen if you take part in this study?

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

1. Complete an audio and video-recorded, in-person interview. This should take approximately 45-60 minutes to complete.
2. Review your interview transcript. This will take approximately 30-60 minutes. The transcript will be emailed to you 1 week after the interview and should be returned 1 week after receipt by email.
3. Complete a journal exercise by email. This will take approximately 15 minutes. You will receive the journal prompt by email at the conclusion of your interview. You will have 1 week to respond by email after receipt of the journal prompt.
4. Participate in an audio and video-recorded, in-person focus group. This should take approximately 45-60 minutes to complete.

How could you or others benefit from this study?

Participants should not expect to receive any direct benefits from taking part in this study.

Benefits to society include (1) an increased knowledge on the topic of STEM undergraduate program completion by Black men at predominantly White institutions and (2) providing relevant, up-to-date data for higher education administrators regarding the overall persistence of Black men in higher education.

What risks might you experience from being in this study?

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

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. Data collected from you may be shared for use in future research studies or with other researchers. If data collected from you is shared, any information that could identify you, if applicable, will be removed before the data is shared.

- Participant responses will be kept confidential through the use of pseudonyms.
- Data collected will be stored on a password-locked computer and may be used in future presentations. After three years, all electronic records will be deleted.
- Interviews and focus groups will be recorded and transcribed. Recordings will be stored on a password-locked computer for 3 years and then erased. Only the researcher will have access to these recordings.
- Confidentiality cannot be guaranteed in focus group settings. While discouraged, other focus group members may share what was discussed with persons outside of the group.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free not to answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you, aside from the focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but your contributions to the focus group will not be included in the study if you choose to withdraw.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is James Hairston. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at xxx-xxx-xxxx or by email. You may also contact the researcher's faculty sponsor, Dr. David Vacchi, by email.

Whom do you contact if you have questions about your rights as a research participant?

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, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Your Consent

Before agreeing to be part of the research, please be sure you understand what the study is about. By signing this document, you agree to be in this study. You can print a copy of the document for your records. The researcher will keep a copy with the study records. If you later have any questions about the study, you can contact the researcher using the above information.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio- and video-record me as part of my participation in this study.

Printed Subject Name

Signature & Date

APPENDIX C: RECRUITMENT LETTER

Dear [Recipient]:

As a doctoral candidate in the School of Education at Liberty University, I am conducting research to gain a better understanding of the undergraduate science, technology, engineering, and mathematics (STEM) success of Black men in higher education at predominantly White institutions. The purpose of my research is to understand how Black men in STEM undergraduate programs succeed at predominantly White institutions, and I am writing to invite eligible participants to join my study.

Participants must be at least 18 years of age, identify as a Black man, and have completed a bachelor's level STEM degree at a predominantly White institution in the United States. Participants, if willing, will be asked to participate in one or more collection methods: individual interview (45-60 minutes), focus group (45-60 minutes), and journal exercise (15 minutes). You will have the option to participate in member checking (20 minutes). Names and other identifying information will be requested as part of this study, but the information will remain confidential.

To participate, please contact me at xxx-xxx-xxxx or [email](#) for more information and to schedule an interview.

Sincerely,

James Hairston

Candidate for Doctor of Philosophy: Higher Education Administration

APPENDIX D: INTERVIEW QUESTIONS/GUIDE

1. Tell me about yourself and your academic background.
2. Please describe what led you to apply for college.
3. Why did you choose your specific institution of higher learning?
4. Please describe your experiences as a Black student enrolled at a PWI.
5. Please describe your overall experiences of being enrolled in a STEM program.
6. What concerns did you have when enrolling in a STEM program as a Black man at a PWI?
7. Of your undergraduate experiences, which were the most meaningful as a Black man in STEM?
8. What were the primary factors that ensured you completed your STEM degree?
9. Describe mentoring and engagement as a Black student in a STEM program at a PWI.
10. Describe a role model that you have had during your experience as a Black man in STEM at a PWI.
11. What are the top challenges that you faced as a Black man enrolled in a STEM program?
12. How did your mentor, or a supporting professional, help with your challenges?
13. As a Black man enrolled at a PWI, describe any experiences you had with racial discrimination?
14. Did a mentor or a supporting professional help you overcome racial discrimination?
15. Describe any experiences you have had with being stereotyped as a Black man enrolled at a PWI.

16. To what extent do you feel like you belonged to your college.
17. Hopefully, you found these questions to be a good exploration of your background as an undergraduate STEM student. Would you like to add anything or elaborate on any of the topics we discussed today?

APPENDIX E: LETTER TO FUTURE BLACK MEN IN STEM AT PWIs

As a Black man who has completed a program at a PWI within 6 years of the initial start date, write a letter to future Black men at PWIs with strategies for success inclusive of one's thoughts on engagement and mentorship. Please describe challenges and how one overcame them as a Black man at a PWI.

APPENDIX F: FOCUS GROUP QUESTIONS

1. Please start by introducing yourself and include what STEM program you were enrolled in, what institution you attended, and your current employment.
2. Describe people who contributed to the persistence and completion of your STEM program.
3. Describe organizations that contributed to your persistence in college.
4. Describe specific services that were important to your success as a student.
5. What contributed to your academic success?
6. What role did mentors play in your degree completion?
7. Describe racial discrimination experiences related to your college experiences.
8. What advice would you give future Black men at PWIs for completing a STEM program?
9. What can higher education do better to support the success of Black men in STEM at PWIs?
10. How hard would it have been to complete college without the help of mentors, organizations, and specific services?