ALUMNI PERCEPTIONS OF FORMATIVE FEEDBACK DURING THE DISSERTATION PROCESS WHILE PURSUING A DOCTORAL DEGREE IN BIOMEDICAL SCIENCE AT A HISTORICALLY BLACK COLLEGE AND UNIVERSITY:

A PHENOMENOLOGICAL STUDY

by

Shontell Stanford

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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APPROVED BY:

George Johnson, Ed.D. Committee Chair

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Abstract

The purpose of this phenomenological study is to discover through the perceptions and lived experiences of biomedical research Ph.D. alums who earned their terminal degree at a southern regional Historically Black College and University (HBCU) if the formative feedback they received impacted their dissertation process. Guided by Bandura's social learning theory and it's suggestions of how behavior cultivated by a mentor's actions and feedback changes the mentee's behavior and can mature into self-efficacy. This study sheds valuable insight through the lenses of this phenomenological qualitative research methodological strategy of one-on-one interviews, questionnaires, and document reviews. The findings not only uncovered that not only was formative feedback impactful to the success of these students but attending the HBCU, contributions from the chair, and learning how to apply the formative feedback all contributed a great deal to the dissertation process.

Keywords: formative feedback, dissertation, retention, biomedical, historically black colleges and universities, higher education

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Dedication

I dedicate this dissertation to God, who gave me the strength to do what I always wanted to do: complete my educational goals. He has also given me grace during the time I was not doing what He has called and commanded me to do. Yet, He still found me worthy to be used.

To my husband, who did not understand my pursuit and says he has yet to understand how I found time to do it all. Through it all, he stood patiently by my side, wiped my tears, and prayed with me when it felt it was all too much. He always encourages me and stands to say "you make me proud."

To my little sister, Nika Edwards, who always answers the phone when I call. Supports me in EVERYTHING I do. Tells me I can do it all and has always been my loudest cheerleader.

To my kids, who continue to ask, "*Are you done yet*"? I have done it all, so they will always be proud of me. I live my life out loud so they can hear and be encouraged. Together we have broken generational curses. We have survived the storms, and we are on the road to making it all better forever. Thank you for overcoming the obstacles with me.

To my mom, whom I love very much. I hope I have made you proud.

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The Georgia Association of Women in Higher Education where I am the current Vice President of Programs.

The Historically Black Colleges and Universities Collaborative for Excellence in Educational Quality Assurance (HBCU-CEEQA) with I have served as a founding leader and the past Director of Operations and Programs for six years.

The Higher Education Leadership Foundation (H.E.L.F.) where I am a member of the Nu-Cohort.

My forever Alpha Kappa Alpha Sorority Incorporated, Psi Alpha Omega Chapter sisters.

My church and Kingdom of God family.

Last, but certainly not least, Dr. Dequan Smith, who told me I could do it even when I said I did not want to. Your persistence and insistence got me to stop thinking about it and continue being about it!

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List of Abbreviations

All But Dissertation (ABD)

Council of Graduate Schools (CGS)

Doctor of Philosophy (Ph.D.)

Historical Black Colleges and Universities (HBCU)

National Center for Education Statistics (NCES)

National Research Council (NRC)

National Science Foundation (NSF)

Minority Servicing Institutions (MSIs)

Predominantly White Institution (PWI).

Science, Technology, Engineering, and Mathematics (STEM)

Underrepresented Minorities (URMs)

CHAPTER ONE: INTRODUCTION

Overview

This research studied the impact of formative feedback during the dissertation process of doctoral degree students in biomedical science at an Historically Black College and University (HBCU), this introductory chapter will present the background of both HBCUs and the importance of formative feedback during the dissertation process of doctoral degree students. This chapter discusses the historical context, a social context, and a theoretical context. A statement of the problem is presented as well as the purpose and significance of this study. The chapter focuses on the central research question and three sub-questions. Finally, definitions specific to this proposed study are offered.

Background

As a student pursuing a doctoral degree, there is an expectation that the assigned or chosen dissertation committee will give students the guidance needed to defend their dissertations and matriculate to graduation successfully. This expectation may be heightened for graduate students attending an Historically Black College and University. The original purpose of HBCUs is to provide learning environments specifically for African American student; later, other underrepresented students were welcomed (Abdul-Alim, 2016; Bracey, 2017; Stith & Blumenthal, 2019). HBCUs have earned a reputation for graduating minority students and diversifying the professional workforce population.

Shamoo and Resnick (2015) suggested that an influential graduate advisory committee involved providing a critical evaluation of the student's academic progress and the competencies that relate to a scientific pursuit in general. Students must receive feedback on their dissertations. An independent development plan is necessary to map out goals and plans to ensure the

proposed project is completed in a timely manner. Committee members must provide cross-checks on training in responsible research and experimental design related to reproducibility, verifying that the research notes are well-managed. A dissertation must show an active interest in the student's professional and personal development. Interactions between the student and committee should promote open dialog on the research, skills, interests, and aspirations of the student. The chair of the dissertation advisory committee plays the primary role in ensuring that the committee meets all its responsibilities (AAMC, 2008; Shamoo & Resnick, 2015).

Students pursuing an academic career, and completing a dissertation in route to a Ph.D., can be viewed at a formative stage in their academic socialization and their professional identities (Anderson et al., 2008). Recent literature showed academic community members agree that doctoral education programs aim to provide learning experiences and resources that propel doctoral students to succeed. (Roberts, 2020; Roberts & Ferro-Almeida, 2019; Woolderink et al., 2015). There is also an assumption that the individual members of the dissertation committee should be willing to assist in their mentees' study and academic progress and take an interest in the professional development of their students. This may be more critical for minority students. Unfortunately, data from numerous studies showed doctoral student drop-out rates average 50% (Craft et al., 2016).

Although the population of students of color graduating with a Ph.D. has increased, the number of students who end their academic careers without completing is still meager. This may be because many students enter programs lacking the skills to complete graduate school (Randall et al., 2018). Ph.D. candidates can become discouraged when not given what they feel is proper mentorship and guidance from their dissertation committees. The National Center for Education Statistics reported that during the academic year of 2011-2012, less than 4,000 out of 41,000

Ph.D. degrees conferred were awarded to underrepresented minorities (URMs) in United States institutions in science, technology, engineering, and math (STEM) (Aud. et al., 2013; National Center for Education Statistics, 2013). This indicated that approximately 10% of the terminal degrees conferred during that academic year were to URMs. Based on these findings, there appears to be a disconnect between the number of URMs graduating with STEM undergraduate degrees and those completing doctoral degrees in the same disciplines (Russell et al., 2018).

Similarly, a study of the experiences of a group of Black "all but dissertation" (ABD) women took an approach to reimage the dissertation committee as having diverse participants and matching graduate students to an interdisciplinary group (Johnson & Scott, 2020). That study attempted to force groups from diverse backgrounds to discover new insights into their research areas. The process allowed open dialogue and critical communications, gaining a different perspective on the student's research. (Lueck & Boehm, 2019).

Nora and Crisp's (2007) study in a minority institution uncovered significant layers of mentorship that were impactful elements for mentees: (a) psychological or emotional support, (b) goal setting and career paths, (c) academic subject knowledge support, and (d) the existence of a role model. These programs came with some advantages and disadvantages, finding that mentoring relationships were inconsistent. Mentors may provide mentees with sponsorship, coaching, exposure, visibility, protection, challenging assignments, consultation, advising, and opportunities for collaboration on research projects (Smith et al., 2000). In psychosocial functions, mentors can provide counseling, encouragement, friendship, role modeling, acceptance, and confirmation (Fuller et al., 2008). This suggests that mentoring could be a function of regular formative feedback sessions within committees in the dissertation process that could perceivably impact Ph.D. students of color.

Historical Context

Training for clinical professionals, biomedical researchers, and clinicians as competent researchers is essential for developing medical innovations and scientific knowledge. From its earliest origins, doctoral training leading to a Ph.D. began in Germany in the 1800s, spreading to the United States at Yale in 1865 and eventually to Oxford in the UK in 1917; today, it is a joint degree in universities worldwide (Barnett et al., 2017). The requirement for a Ph.D. to be awarded requires students to complete a series of graduate study courses and successfully defend a dissertation containing original research in the humanities or science (Barnett et al., 2017). However, according to North American estimations, the drop-out rate from doctoral education is 40%–50% (Nettles & Millett, 2006), which is even higher in the disciplines of arts, humanities, and social sciences but lower in natural sciences (Litalien & Guay, 2015; Nettles & Millett, 2006). Students who complete coursework but do not complete the final stages required for their dissertations become classified as "all but dissertated" (ABD) students and do not graduate (Hanson et al., 2020). For some students, this classification as uncompleted is challenging emotionally, personally, socially, and intellectually (Grasso et al., 2007).

In recent decades, the completion rate for Ph.D. degrees has become a topic of pressing national attention for graduate school deans, public and private funding agencies, faculty members, and graduate students. Over the last ten years, position papers have discussed changes that should be made to doctoral programs, including increasing the number and diversity of postgraduate researchers (Duke & Denicolo, 2017). Despite recent national attention focusing on doctoral completion, the analysis of baseline program data from the Ph.D. Completion Project, which examined private and public institutions nationally, reported that the completion rate ten years after students begin their doctoral program remains low at 56.6% (Sowell et al., 2015).

Rigler et al. (2017) found four primary reasons for the low attrition rate of doctoral students: "(a) chair agency and chair-candidate relationship; (b) candidate socialization and support systems; (c) candidate preparedness; and (d) financial considerations" (p. 14). Additional studies determined that students of color thrive in an environment where they feel more familiar, especially students within the STEM disciplines (Arif et al., 2021). Students feel challenged to matriculate to completion when they think they have yet to receive the best mentorship, training, or directions from an advisor, chair, or mentor.

HBCUs were established to create welcoming and nurturing learning environments for African American students (Abdul-Alim, 2016; Bracey, 2017; Stith & Blumenthal, 2019). Black higher education institutions were formed to provide Black Americans with quality education to better themselves (Bracey, 2017; College Atlas, 2017). The primary mission of HBCUs was equitable educational opportunities for Black Americans (Bracey, 2017) at a time when segregation was technically illegal but very much perpetuated in the education sector (Stith & Blumenthal, 2019).

In 1979, a southern regionally located HBCU established a two-year medical education program with clinical training affiliations with several established medical schools to award MD degrees. In 1981, this HBCU independently chartered a medical school. The school's research stature and reputation have grown exponentially over the past decade (Braithwaite et al., 2020). In 1992, this institution developed a Ph.D. in Biomedical Sciences degree designed to develop independent investigators with the potential to assume leadership roles in academic, government, and corporate biomedical research. It involved a core-didactic curriculum followed by extensive faculty-guided dissertation research directed toward contributing discoveries that advance the student's field (Morehouse School of Medicine, 2018). One of the primary purposes of this

degree was to diversify the employment population of URMs in medical research and medical science. The prominence of a doctorate to both an individual candidate and American society had never been greater. The individual candidate's return on investment of doctoral education can be significant for career advancement, career change, compensation, leadership development, and life quality intimations (Brill et al., 2014).

Social Context

HBCUs are defined by the Higher Education Act of 1965 as institutions formed before 1964 to provide quality education for Black Americans (College Atlas, 2017). In 2023, 107 institutions of higher education were recognized as HBCUs, but three were closed (The Hundred-Seven, 2023). Abdul-Alim (2016) described the unique tradition of HBCUs to be one of "providing their students with a culturally, socially, economically, and politically relevant education" (p. 34). Abdul-Alim (2016) and Bracey (2017) affirm that African American students feel validated, welcome, and accepted by their HBCUs' nurturing and supportive communities. Black graduate students often find that White faculty exhibit poor cultural responsiveness and do not proactively offer positive support (Baker & Moore III, 2015; Haskins et al., 2013; Henfield et al., 2013). Understandably, students of color prefer mentors who share their racial identity (Brooks et al., 2010; Brown & Grothaus, 2019). Bracey (2017) asserted, "HBCUs supported students, addressed social issues, and developed Black consciousness" (p. 678).

Freeman et al.'s (2021) showed that HBCUs' institutional factors engendered academic motivation rooted in students' racial identity and suggested the construct of racial identity-rooted academic motivation. Though HBCUs have suffered from dismal graduation rates, they have simultaneously graduated an overwhelming majority of Black degree holders in science and engineering (Abdul-Alim, 2016). Williams et al. (2021) reported that the National Science

Foundation's Survey of Earned Doctorates found that in 2017 US higher education institutions awarded 8,477 biomedical science-related doctoral degrees. However, only 6% were from URM populations. These humbling statistics indicate the need for increased attention at the doctoral training stage of career development.

Although for the past few decades, there has been a great interest from higher education researchers and policymakers (Council of Graduate Schools, 2009; National Research Council, 1995; National Science Foundation, 2006; Nettles & Millet, 2006) to study the attrition rates of URM students, the most significant concern they had has been the number of doctoral students completing the STEM programs. In the academic year 2011/12, about 41,400 research doctoral degrees in STEM fields were conferred at US institutions that award doctoral degrees as their highest degree. Still, only 8.5% were awarded to URM students (National Center for Education Statistics, 2013). By contrast, URM students earned 21% of the bachelor's degrees granted in the US (National Center for Education Statistics, 2013).

The problem of underrepresentation of race/ethnic minorities in STEM doctoral programs is magnified by the fact that their completion rates tend to be lower than those of all STEM doctoral students, and their attrition rates tend to be higher. While past efforts have explored degree completion and attrition of doctoral students in the arts and sciences (Bowen & Rudenstine, 1992; Lovitts, 2001; Most, 2008; Nettles & Millett, 2006; Sowell et al., 2008), there has not been a recent effort devoted solely to understanding degree completion and attrition of URM doctoral students in STEM fields (Sowell et al., 2015). More importantly, these students matriculate to completion at a better rate when they are mentored and given feedback from individuals that look like them or work in an environment where they feel the professional

feedback is coming from a place of commonality as nurtured within the HBCU environment (Estrada et al., 2016; Hooper, 2022).

Theoretical Context

A comparison study examined best practices for doctoral training in Europe and North America of Latino male faculty members' professional development and professional pathways after mentorship (Barnett et al., 2017). The social learning theoretical framework was evident as these Latino males expressed how valuable their mentorship relationships helped to combat the challenges that faculty of color experience. These relationships can teach persistence in accomplishing goals that lead to success (Salinas et al., 2020). Barnett et al. (2017) emphasized how necessary it was to consider mentoring as an experiential, social, transitional, and fluid process. Within this mentor-mentee relationship, a building of trust, encouragement, and critical feedback occurred. This observational learning became the mental factor facilitating the learning process to determine whether a new response was retained. Bandura's (1977) theory states that mediating processes occur between stimuli and responses. In this case, it was the relationship between the mentee and the mentors. This study showed the perceptions of the impact of behaviorial learning through apprenticeship.

Amani et al. (2022) discovered that the best practices did not relate to the institutions' dissertation strict process or the systematic structure. Instead, the students who participated in the research were motivated to defend and graduate by other stimulating factors. Some of these motivations mirrored Bandura's (1977) theory for high achievement by learners. Students here mirrored Barnett et al.'s (2017) study that expressed that some of their motivation factors derived from formative and summative feedback provided by their mentors, establishing their degree options earlier and completing their degree in a shorter time. As in Bandura's (1977) social

learning theoretical framework, the students' motivation evolved into self-efficacy. The behavior cultivated by mentors' actions and feedback became part of their normal behaviors. The students began to develop individualized motivations and learning behaviors to reach their goals.

Problem Statement

The problem is the lack of feedback for biomedical research Ph.D. candidates could be perceived as challenging and may even lead to students becoming classified as ABD (Russell et al., 2018). Previous literature has highlighted alumni perceptions of dissertation committee processes and their best practices and how receiving formative feedback from mentors within the same cultural backgrounds can positively impact students (Barnett et al., 2017; Randall et al., 2018; Salinas et al., 2020). However, a considerable gap in the literature does not speak specifically of alums of color graduating with a Ph.D. in biomedical science programs.

One of the common themes in previous studies was that frequent communication between the dissertation committee and Ph.D. students through formative assessment helped improve their perception of program completion (Saaris, 2017). Formative feedback assessments are one of the pedagogical foundations that build a strategy to improve performance. Formative assessment helps measure how well a student is doing and if an instructor has met teaching instructional expectations by evaluating student learning outcomes and accomplishments (Saaris, 2017). Formative feedback is an assessment that helps reflect on whether the student has mastered a skill or concept (Saaris, 2017).

Purpose Statement

The purpose of this qualitative phenomenological study is to explore the perceptions and lived experiences of biomedical Ph.D. alums concerning formative feedback during their dissertation process at an HBCU in the southern United States. At this stage in the research,

formative feedback will be defined as methods that chairs and committee members use to conduct in-process assessments of candidate comprehension, learning, and progress during the dissertation phase of a Ph.D.

Significance of the Study

This qualitative study investigates alums' perceptions of their experiences, feelings, and values gained from receiving or not receiving formative feedback during the dissertation process. The significance of the study will provide new insights into best practices for minority students matriculating in Ph.D. biomedical sciences programs at HBCUs and other minority-serving institutions (MSIs) and will offer insight into using formative feedback when assessing students. The data gathered from this study can be used by HBCUs and MSIs for quality assurance and best practice benchmarks to enhance the biomedical research dissertation process and assessment methods. By Ph.D. alums sharing their perceptions and impact experiences, a better understanding and value for students of color was gained when mentored by professionals of color from the same or similar scientific discipline. Additionally, the study will close the gap in the literature about formative feedback within the dissertation process for Ph.D. biomedical sciences at HBCUs.

Practical Significance

This phenomenological study aims to improve the dissertation process for biomedical students at a southern HBCU. This study may also be used to conduct program reviews for continuous quality improvements and make data-driven enhancement decisions at other HBCUs with biomedical programs. There are studies on the perception of the impact of other ethnic students receiving formative feedback and critical communications from professionals within their fields. Nevertheless, studies have yet to be found that identify students in biomedical

sciences within HBCUs. Furthermore, research on how alums feel about their engagement with feedback has needed to be researched in more detail (Winstone et al. 2017).

This research study seeks to understand student feelings of disappointment and discouragement in working with dissertation committees when students do not receive adequate communication. This study will reveal the feelings of alums and their perceptions of formative feedback as a preventive measure, their perception of value, and the impact of being given guidance from professionals with the same ethnic backgrounds. As with other studies, this information can be used to set a precedent for improving the dissertation process and promoting a best practice model for HBCUs that offer biomedical science Ph.D. programs.

Theoretical Significance

Just as Lave and Wenger's (1991) situated learning theory was a learning model encompassing the student's community, formative feedback being integrated within the dissertation committee meeting takes on the same applied learning practice. Situated learning is co-participation. It focuses on social engagements that provide the proper environment and facilitate learning. Knowledge can be developed through social and spontaneous communities driven by common interests and passions, such as with students within cultures where they can relate to others.

Lave and Wenger (1991) believed that learning was a social process whereby knowledge was co-constructed. Learning becomes more manageable and second nature due to a particular social and physical environment. Students can learn in an atmosphere where they feel fit to be given mentorship from dissertation committees that afford doctoral candidates the significant assistance needed (Lave & Wenger, 1991). These patterns are like other learning environments (e.g., general education, healthcare, and organizational development) and may reflect confusion

about situated learning theory's purpose, stance, and terminology (Lave & Wenger, 199l; O'Brien & Battista, 2020).

Empirical Significance

The primary charge of a dissertation committee is to evaluate student progress. An essential role in a dissertation committee is that of a guide who helps learners through the process. This proposed study aims to assist students and committee members with the conduct basics during the dissertation process. A dissertation serves as an early exercise for students who was researchers. Even for people who may never do research after their degrees, a dissertation will help them discern the merits of new treatment options available in the literature to benefit their patients or themselves. Individual dissertation committee members should be willing to assist in other facets of the student's scientific and professional development (Harsoor et al., 2022).

The committee mentor and the student must work closely while researching the topic initially and while finalizing the dissertation's submission. However, the role of the guide in perusing the document in detail and guiding the candidate through the required corrections through periodic updates and discussions must be balanced (Harsoor et al., 2022). The chair of the dissertation advisory committee also plays a primary role in ensuring that the committee meets all its responsibilities (Shamoo & Resnick, 2015). This current research study will explore the perceptions and lived experiences of a specific group of Ph.D. alums (biomedical research students) concerning formative feedback during their dissertation process at an HBCU in the southern United States.

Research Questions

Shampoo and Resnick (2015) suggested that an influential graduate advisory committee involves providing a critical evaluation of the student's scientific progress and the competencies that relate to a scientific pursuit in general. The expectation of those in the chair and committee member roles would be to help the student lay out a strategic plan to accomplish specific goals and meet required milestones. Additionally, according to Randall et al. (2018), it is an added value for biomedical science students of color to receive feedback from professionals of color in the same or similar discipline of study. The following questions serve as a guide for the study.

Central Research Question

What are the perceptions and lived experiences of biomedical research Ph.D. alums from the southern regional HBCU about formative feedback received during their dissertation process?

As social learning theory describes, students are influenced by mentors through formative and summative feedback experiences develop academic self-efficacy (Bandua (1977). HBCUs were designed to be a learning hub for African American students to learn from professionals of color, especially during the historical period when other institutions were not available to African American people (Abdul, 2016; Bracey, 2021). This sets the tone for students to be encouraged, motivated, and urged to succeed and take ownership of their learning goals.

Sub-Question One

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU about the mentoring experience during the dissertation process?

Quality mentoring can have a profound positive effect on the success of research careers (Harawa et al., 2017), academic performance (Campbell, T.A. & Campbell; D. E., 1997), social integration (Allen et al., 2006), physiological health (DuBois & Silverthorn, 2005), college

retention rates (Mangold et al., 2002), career development and training (Parks-Yancy, 2012), professional identity (Murdock et al., 2013), and role modeling (Ragins & Kram, 2007). Mentors provide knowledge, advice, and support for the psychosocial needs of mentees (Zaniewski & Reinholz, 2016) by helping them establish a professional identity, develop networks, and acculturate within their field.

Sub-Question Two

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on mentoring during the dissertation process at an HBCU instead of another type of institution?

Literature can be found on how the effects of race, gender, perceived similarity, and contact influence the quality and effectiveness of mentoring (Duran et al., 2020; Ensher & Murphy, 1997; Gaddis, 2012; Hurtado et al., 2015). Ensher and Murphy (1997) and Hurtado et al. (2015) noted that a degree of similarity between the mentor and the mentee, either actual or perceived, could affect the quality of the mentoring relationship. The perception of perceived similarity and contact between mentor and mentee pairs had far more of an impact on overall satisfaction than actual same-race pairings with little contact (Duran et al., 2020). This relationship proves necessary for STEM programs where students may not persist to graduation because they feel they need to fit in the profile of others in their field (Randall et al., 2018).

Sub-Question Three

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on whether receiving formative feedback influenced a sense of self-efficacy and motivation to persist to completion of the Ph.D. program?

According to Lave and Wenger's (1991) situated learning theory, knowledge can be obtained or developed through social and spontaneous communities driven by common interests and passions, such as with students within cultures that relate to others. Learning potentials of formative assessments can be transferable across contexts and cultures. This could, in turn, "boost the deeper and wider application of formative assessment." (Chen et al., 2021, p. 364). Integrating formative feedback within the dissertation process might be a necessary and dynamically impactful experience for mentees when the mentor and mentees can relate or connect on a deeper level. For African American students earning a Ph.D. in biomedical sciences, a more profound connection can come from mentors of color who work in the same discipline.

Definitions

1. *All but dissertation (ABD)*. Doctoral students who have completed all coursework related to their doctoral education except finishing a dissertation when one is required (Hanson et al., 2020).
2. *Formative feedback*. This communication assessment helps measure how well a student is doing and if an instructor has met teaching instruction expectations by continuing the evaluation process of student learning outcomes and accomplishments (Saaris, 2017).
3. *HBCU*. A Historically Black College and University was established before 1964 to educate African Americans (College Atlas, 2017).
4. *Ph.D*. A Doctor of Philosophy degree is earned after three or more years of graduate-level study (Haidar, 2022).
5. *Situated learning theory*. Like Bandura's social learning theory, people learn by what they see while situated within their roles as community members (Lave & Wenger, 1991).

6. *Social learning theory.* People learn by observing, modeling, and imitating the behaviors and attitudes they see. Both the mind and the environment influence learning (Bandura, 1977).

Summary

Little is known about the perceptions and lived experiences of biomedical research Ph.D. alums who received formative feedback at HBCUs during their dissertation process. This study seeks to explore this area of a phenomenon. Qualitative methods was used to examine the lived experiences shared by a small sample population of Ph.D. alums from a small HBCU southernly located. The data from this proposed study was analyzed and interpreted to understand how the alums perceive their experience with formative feedback and how it contributed to their dissertation process. The results of this study provided valuable insights into the experiences of biomedical research Ph.D. candidates at HBCUs and shed light on how formative feedback can be used to improve their dissertation process with an emphasis on African American Ph.D. students in biomedical research.

The literature has found that race, gender, perceived similarity, and contact influenced the quality and effectiveness of mentoring (Duran et al., 2020; Ensher & Murphy, 1997; Gaddis, 2012; Hurtado et al., 2015). Ensher and Murphy (1997) and Hurtado et al. (2015) noted that a degree of similarity between the mentor and the mentee, either actual or perceived, could affect the quality of the mentoring relationship. The literature reviewed has identified a gap in knowledge of student perceptions of formative feedback within the biomedical Ph.D. programs within HBCU institutions. Whereas all mentors at HBCUs may not be African American, the likelihood of African American students being exposed to a professional in their field of study and benefiting from the HBCU synergistic environment is excellent. This qualitative

phenomenological study explored the perceptions and lived experiences of biomedical research Ph.D. alums concerning formative feedback during their dissertation process at an HBCU in the southern United States.

CHAPTER TWO: LITERATURE REVIEW

Overview

This chapter will present a review of the current literature related to Ph.D. alums who received formative feedback assessment at HBCUs. The first section will discuss how social learning theory plays a role in the impact of the dissertation process of African American alums as they were mentored at an HBCU. The second section will synthesize recent relevant literature studies emphasizing the use of formative feedback with doctoral students of color from their mentors or dissertation committees. The third section discusses literature on mentorship relationships and the likelihood of African American students being exposed to a professional in their field of study and benefiting from the HBCU synergistic environment is great. The last section will discuss an identified gap in literature, presenting a need for the current study.

Theoretical Framework

The social-learning theory was selected as the theoretical framework to approach the central research question because of its focus on the impact of mentorship (Kitchenham, 2008; Menzirow,1997) and the influential role models (Salinas et al., 2020) have on mentees. Albert Bandura developed social learning theory in the late 1970s. It has been widely applied in various fields, including psychology, education, and communication. The social learning theory emphasizes the role of observations and modeling in learning new behaviors and skills. According to Bandura (1977), learning occurs through a combination of four factors: observing and modeling behaviors, attitudes, and emotional reactions. Bandura (1977) argued that “most human behavior is learned observationally through modeling; from observing others, one forms an idea of how new behaviors are performed, and on later occasions, this coded information serves as a guide for action” (p. 22).

Bandura (1977) believed most human behavior is learned by watching others. Through modeling others, individuals grow, learn, and develop innovative ideas and learn through modeling and observing activities (Bandura, 1977). This was essential for those desiring a behavior change (Muro & Jeffrey, 2008). According to the social learning theory, it would be challenging and more time-consuming if people relied solely on the knowledge, they gained by themselves (Bandura, 1977).

Several authors have studied and expanded Bandura's Social Learning Theory. Akers (1998) applied the theory to criminology and proposed that individuals learn criminal behavior through observation and imitation. He posited that individuals' behavior is influenced by their social environment, including family, peers, and the media. Similarly, Bandura's theory has been applied in education, where it has been used to explain how students learn through observation and modeling of behaviors exhibited by their teachers (Bandura, 1989).

Social learning theory suggests that the environment and its interactions drive learning. Formative feedback from a committee chair or mentor can be especially beneficial for Ph.D. students working on their dissertations. This feedback can help students adjust their approach and refine their ideas, providing the necessary guidance and support to complete their projects successfully. Minnett (2020) found that students who receive formative feedback from their committee chairs or mentors have higher levels of academic achievement than those who do not. Furthermore, formative feedback has increased student confidence, problem-solving skills, and autonomy and self-regulation (Liu et al., 2018). Providing Ph.D. students with formative feedback, committee chairs and mentors can play a vital role in helping them succeed in their studies.

Mentors and Social Learning

There are three concepts of social learning theory: people can learn through observation (observational learning), mental states are an essential factor for education, and understanding does not necessarily lead to a change in behavior (Nabavi, 2012). Learning interaction has a more significant impact in mentoring experiences (Kitchenham, 2008; Menzirow, 1997). Much learning occurs through mentor relationships, crucial conversations, formative feedback, and other social interactions.

The dissertation process is a challenging journey for doctoral students, and it requires not only research skills but also the ability to incorporate feedback from mentors. Mentors play a crucial role in the dissertation process, providing formative feedback to help the student improve their work. However, research has shown that doctoral students from underrepresented groups face unique challenges in the dissertation process, including a lack of access to mentors who share their racial and ethnic backgrounds (Barnes & Austin, 2009). This lack of representation can lead to feelings of isolation and difficulties in receiving feedback from mentors who may not fully understand their experiences (Byars-Winston et al., 2011). This is where social learning theory can be used as a framework to understand how doctoral students learn from formative feedback from mentors from the same race in the dissertation process.

In the context of the dissertation process, social learning theory suggests that doctoral students can learn from observing and imitating the behaviors and feedback of mentors who share their racial and ethnic backgrounds. Research has shown that mentorship from individuals who share the same racial and ethnic background can be particularly impactful for underrepresented students in the dissertation process (Ong et al., 2011). Mentors who share similar experiences can provide a sense of belonging and a safe space to discuss challenges and

concerns (Byars-Winston et al., 2011). Mentorship has been identified as a critical factor in the success of graduate students, particularly those from historically underrepresented groups (e.g., women, racial/ethnic minorities) (Johnson, 2007).

Johnson (2007) found that African American doctoral students who had same-race mentors reported greater satisfaction with their graduate education and were more likely to complete their degrees than those without same-race mentors. Similarly, Baker and Griffin (2010) found that African American doctoral students who had same-race mentors reported higher levels of academic and social support, as well as greater success in publishing and securing academic positions.

Other scholars have highlighted the importance of same-race mentorship in promoting a sense of belonging and identity development for graduate students from underrepresented groups. For example, Mendoza and colleagues (2017) found that Latina doctoral students who had same-race mentors reported feeling more connected to their academic community and more confident in their ability to navigate predominantly white academic spaces. Similarly, Carter and colleagues (2019) found that African American doctoral students who had same-race mentors reported greater affirmation of their racial and cultural identities, as well as more opportunities to engage in culturally relevant research.

Overall, these studies suggested that mentorship from the same race can play a critical role in supporting the success and well-being of graduate students from underrepresented groups. Understanding how individuals learn is critical in developing effective interventions and strategies to promote a change in behaviors or for learners to better understand introduced concepts. More research is needed to understand the mechanisms through which same-race mentorship operates, as well as the unique challenges and opportunities that arise in these

mentoring relationships. Additionally, mentors who share the same racial and ethnic background can better understand cultural nuances and provide feedback that is more relevant and tailored to the student's experiences (Barnes & Austin, 2009).

Self-Efficacy and Social Learning

Bandura's (1977) pivotal research defined *self-efficacy* as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 2). The following factors influenced self-efficacy: mastery of experiences, social modeling, social persuasion, and physiological states (Bandura,1977). Mastery of experiences or the confidence that comes from accomplishing goals can be demonstrated through social modeling, which means that one's belief in self is positively influenced by seeing others excel in similar situations (Bandura, 1977).

Interactions through crucial conversations, formative feedback, and mentor relationships help build self-confidence and the evolution of self-efficiency (Kitchenham, 2008). Self-efficacy is the expression of confidence in reaching specific goals (Bandura, 1977). For Ph.D. students, self-efficacy is confidence in academic performance (Han et al., 2017). A key empirical issue concerns the validity of self-efficacy beliefs in predicting students' motivation. Bandura (1977) hypothesized that efficacy beliefs influence effort, persistence, and choice of activities toward a goal. Students with a high sense of efficacy in accomplishing an educational task will participate more readily, work harder, and persist longer when encountering difficulties than those who doubt their capabilities (Zimmerman, 1995).

Social persuasion through verbal exchanges can encourage someone to put forth more effort. When formative feedback is accepted positively, individuals who receive it excel and feel confident they can achieve their goals. Bandura (1977) suggested that social modeling, social

persuasion, and physiological states develop one's perceived self-efficacy, which is interconnected with people's goals, the amount of effort they put forth, and resilience.

When learning becomes transformative and impactful, students tend to feel motivated. This motivation leads to a place of self-efficiency and life-long learning. Bandura (1977) further defined self-efficacy as the belief people have in their capabilities to exercise control over their functioning and over events that affect their lives. Each student who achieves self-efficacy exhibits motivation, well-being, and personal accomplishment. People's beliefs in their efficacy are developed by four main sources of influence: mastery experiences, vicarious experiences, social persuasion, and emotional states (Bandura, 1977). High self-efficacy has numerous benefits to daily life, such as resilience to adversity and stress, healthy lifestyle habits, improved employee performance, and educational achievement (Zimmerman, 2000).

Zainal Abiddin (2005) stated that to progress well in research, a student must be involved in more regular meetings or discussions and fully participate before, during, and after each meeting. Formative feedback becomes a tool that ensures the meeting with the advisor is useful to research students. The feedback given to students may not be effective if it does not bring about continuous quality improvement for their projects or guide them to be better beyond their research.

Formative Feedback

Formative feedback, formative assessment, and formative evaluation are terms often used by educators about some ongoing evaluation. Black and Wiliam (2010) defined *formative assessment* as "…all those activities undertaken by teachers and by their students in assessing themselves that provide information to be used as feedback to modify teaching and learning

activities" (p. 140). This definition does not limit itself to formal tests, quizzes, or homework but allows the student latitude to improve (Stanford Teaching Commons, n.d.).

Assessment is a collection of evidence about student learning through numerous ways, such as portfolios, journals, dialogue, questioning, interviewing, work samples, formal testing, and projects. They defined *formative assessment* as "such assessment…when the evidence is used to adapt the teaching to meet student needs" (Black & William, 2010, p. 140). *Formative feedback assessment* can also be defined as integrating processes and tools that generate meaningful feedback about learning that can support inferences about the next steps in learning and instruction (Andrade, 2016). It is a planned, ongoing process that is continuous and comprised of practices, methods, and tools that are selected to support students in reaching their goals and strengthen them through their learning challenges and barriers (Black & William, 2010). Through collaboration, teachers and students use formative assessment in responsive ways that positively impact learners and learning to know and respond to strengths, interests, and needs (Andrade, 2016).

Shavelson et al. (2008) described a continuum of formative assessment practices that included on-the-fly planning for interactions and was embedded in the curriculum. Critically, formative assessment should be evident in every lesson, whether through a discussion of learning goals, feedback from students on their self-assessments, observed patterns in student group discussions that would be productive to share with the whole class, peer feedback, teacher conferences with individuals or small groups to help them plan revisions of their work or their thinking or a carefully planned question for the end of the lesson to support planning for the next meeting (Wright & Moffat Miller, 2018).

Formative feedback is an assessment tool used in collaboration with learners, teachers, mentees, advisors, or other stakeholders. It is a learning process that happens with students and not to students and uses evidence of student learning to improve student understanding of intended disciplinary learning outcomes (Wright & Moffat Miller, 2018). The formative assessment process captures knowledge and skill levels along the learning journey so teachers and students can make small, immediate, impactful decisions to support well-being, learning-goal achievement, and self-efficacy (Shavelson et al., 2008). Using formative assessment evidence is appropriate for making decisions during the practice phases of learning.

Formative assessments are not always scored and are not an appropriate measurement for calculating grades or making final placement decisions (Beard, 2021). Rather, formative feedback is a tool to support students to become self-directed learners, making students active agents in the learning journey and encouraging goal setting, which fuels learning and agency in learning environments and beyond (Beard, 2021).

The Potential Impact of Formative Feedback

Formative assessment leads to numerous benefits to improve, inform, and support the student experience from both a student learning perspective and an institutional effectiveness perspective. It can help review the effectiveness and alignment of curricula, improve curricular and co-curricular program outcomes, inform planning and decision-making, understand the impact of program changes, and highlight program successes. Provide evidence when requesting resources and inform students of the intended learning outcomes (Ursinus College, 2015).

Formative assessment can be conducted during the classroom or program experience and is intended to provide real-time feedback on student learning. This offers the opportunity to

engage in an immediate change to the learning experience. Formative assessment is used internally, primarily by those responsible for directing the learning or program (Beard, 2021).

In contrast, summative assessment occurs at the end of a course or program and usually is tied to final grades and leaves little room for a change of action unless a retake is given. This type of assessment aims to determine if overall goals have been achieved (Ursinus College, 2015). The key difference between summative and formative assessment is what is done with the information. The summative assessment uses the information to show how the student performed against others or how many learning goals he or she mastered by the end of a learning period. The formative assessment uses the information collected to determine where the gap of learning is for the student and then is used to determine how to close the gap. Stiggins and Chappius (2005) explained assessment for learning as a formative assessment philosophy that involved the student in the assessment process by giving the students clear classroom-level targets based on state or local standards.

Much research surrounding formative assessment attributes has supported the claim that the process will improve student academic performance. Some of this research described the results from experimental tests examining distinctive feedback features, and several represented important historical reviews (Kluger& DeNisi, 1996; Kulhavy & Stock, 1989; Mory, 2004). Despite this research, the specific mechanisms relating feedback to learning still sit in a gray area. There are very few (if any) general conclusions on how it can assist the dissertation process.

Stiggins (2007) has claimed that formative assessment has this impact because its philosophy is rooted in changing the student's effect concerning the use of assessments and in including the student as the number one user of that data. Leahy et al. (2005) supported this

claim, stating that education needs to change its function of collecting the number of rights and wrongs and encouraging teachers to collect information to inform instructional decisions. Likewise, students should also be aware of information to make decisions about learning. Leahy et al. (2005) compared that current education is like *quality control* in manufacturing that identifies those who did not learn at the end of teaching. They suggested that education should be a *quality assurance* process that collects information through formative assessments to determine what needs to happen so each student learns (Leahy et al., 2005).

Formative feedback integrated within the dissertation committee meeting takes on the same applied learning practice. This type of learning theory can be viewed in relation to Lave and Wenger's (1991) situated learning theory as a co-participation in Bandura's (1977) social learning theory approach to learning. There is an ongoing process when the two theories are coupled, as in students receiving formative feedback. This process within the dissertation journey can often be viewed as a summative assessment. However, a different type of learning is facilitated when there is a greater focus on interactions that provide the proper environment, continual review, and communication about student efforts through formative assessments.

In addition to the culture of assessment and learning in which feedback was given and received, the nature of the feedback played a role in how students responded to it. Lipnevich and Smith (2009) concluded in their study with college students that the type of feedback that students found most helpful was "tell me what I did wrong, where I could change it. Just comments and error marks" (p. 365). To respond positively to formative feedback, it is essential to cultivate a positive assessment culture in which formative assessment practices are effectively incorporated. Ekholm et al. (2015) noted that "feedback is one of the most effective interventions instructors can use to improve student writing. However, it is ineffectual if students do not

welcome the feedback they receive" (p. 204). Similarly, Jonsson and Panadero (2018) asserted that "feedback needs to be perceived as useful by the students" (p. 546) as an important condition for the productive use of feedback. Lui and Andrade's (2022) study found that students with positive feedback judgments reported more constructive next steps.

Knowledge can be developed through social and spontaneous communities driven by common interests and passions, especially with students within cultures where they can relate to others, such as with mentors relaying formative feedback to their students (Lui & Andrade, 2022). Lave and Wenger (1991) believed that learning was a social process whereby knowledge was co-constructed. Learning becomes more manageable and second nature due to a particular social and physical environment where students feel they fit (Monday, 2021; Murdoch et al., 2013; Paglis et al., 2006).

Formative Feedback as an Assessment in the Dissertation Process

Formative feedback assessments are one of the pedagogical foundations that build a strategy to improve performance. Formative assessment helps measure how well a student is doing and if an instructor has met teaching instructional expectations by evaluating student learning outcomes and accomplishments. This type of assessment reflects whether the student has mastered a skill or concept (Saaris, 2017). But how influential is formative feedback within the dissertation process? How important is communication through formative feedback assessment through the dissertation process for Ph.D. students?

In the past, it was customary at some medical colleges for the dissertation chairs to review, give a pass-fail grade, and offer feedback during a once-a-semester milestone checkpoint (Kumar & Stracke, 2017). This process was like making a summative evaluation rather than a formative assessment. Kumar and Stracke (2017) found that this summative approach did not

include expectations or guidance on how a candidate could fix critical issues. In this manner, dissertation chairs or committees made choices for assessment or feedback based on individual preferences rather than institutional guidelines. Kumar and Stracke's (2017) study reported that chairs and dissertation committees were more engaged when interacting with their students. While their roles were to assess, the chair or committee member often could teach by giving the student feedback so the student could close the gap between their current and expected performance. Only then was the assessment for learning realized and self-efficacy developed (Kumar & Stracke, 2017).

Formative feedback, therefore, was crucial throughout the process because the doctoral assessment is a unique process. Unlike conventional forms of assessment, doctoral candidates are expected to take in the views of their chairs and revise their dissertations before final acceptance. The exception was only when a written dissertation was rejected or accepted without revision. Dissertation chairs work within the dissertation progress (Bourke, Hattie & Anderson, 2004). Considering the Ph.D. as a work in progress allows instructive feedback as part of assessment and teaching (Kumar & Stracke, 2017).

Guloy et al. (2019) explored the use of comprehensive examination to assess students before completing the dissertation defense. Though students had been privy to discussions concerning the design and development of what incorporated dissertation assessment, they often did not understand the complexity of it (Guloy et al., 2019). Black & Wiliam (1998; 2010) found that formative assessment led to substantial learning gains.

Krulwich (2009) studied what was described as systematic coaching. Systematic coaching and formative feedback are similar. Systematic coaching paired mentees with mentors who are professionals in the field of biomedical science. This was an intensive skill-development

process to encourage persistence in biomedical careers beyond the undergraduate level (Krulwich, 2009).

Taylor et al. (2018) discovered there was a high expectation and great benefit of having mentoring advisors for doctoral candidates, graduates, the doctoral program, and the college or university. Commitment to the candidate and successful completion was grounded in the willingness of the advisor to provide time and helpful and timely feedback, as well as to develop the doctoral student into an independent researcher and eventually a colleague (Taylor et al., 2018). The study, however, found that lofty expectations for the scholarship may not have the positive results in program completion that were usually hoped for. Furthermore, academic advisors who preferred to continue in a subordinate–superior relationship and not scaffold the candidate to mastery, independence, or colleague status were not as effective as those who saw their work as developmental and instructive (Taylor et al., 2018). This was echoed in Yusef et al.'s (2017) study that found when formative feedback sessions conducted by mentors were introduced, students reported that the formative feedback session gave them the provisions to improve their competence when integrated with content, interpersonal relationship, and management.

Ajjawi and Boud (2017) explored how feedback was not just the transmission of information but was a dialogue between education and students. They further stated that feedback could help students enhance their ability to evaluate and adjust their learning to have more self-efficacy. Hattie and Gan (2011) also stressed the importance of formative feedback but echoed Kluger and DeNisi's (1996) earlier observation that not all feedback was as effective as others. In addition, Van der Kleij (2019) also found that when formative feedback was offered, especially in a mentorship relationship, improvement was found in student academic work.

Of equal importance, Ciampa and Wolfe (2020) reported that students often felt isolated during the dissertation writing process. They indicated the importance of their peer group in the dissertation journey and wished for more structured opportunities for peer support and faculty feedback (Ciampa & Wolfe, 2020). Many of these reports came from African American and other minority students (Ciampa & Wolfe, 2020).

African American Students in STEM Degrees

The National Center for Education Statistics (2013) reported that during the academic year of 2011-2012, less than 4,000 out of 41,000 Ph.D. degrees were awarded to URM students in United States institutions in STEM (Aud. et al., 2013). This indicates that only approximately 10% of the terminal degrees conferred during that academic year were to URM students. Based on these findings, there appears to be a disconnect between the number of URM students graduating with STEM undergraduate degrees and those completing doctoral degrees in the same disciplines (Russell et al., 2018).

David Jan Skorton, MD (2022), President and Chief Executive, Association of American Medical Colleges (AAMC) discussed the dearth of medical and biomedical researchers of color. There have been slight increases in Black male physicians since the 1970s but little increases in Hispanic or other minorities in medicine (Skorton, 2022). The National Institutes of Health (NIH) addressed the lack of racial and ethnic equity in the biomedical sciences and the challenges in disparities in grant funding among URM investigators (Hooper, 2022). It was also noted that HBCUs lacked the research infrastructure and support to be competitive in the NIH grant application process (Hooper, 2022). In addition, there was a great emphasis on the importance of HBCU faculty member representation in biomedical science training and capacity-

building programs to increase diversity in the biomedical science fields and increase research funding for URM faculty members at MSIs (Hooper, 2022).

It is well established that African Americans, Hispanics, and Native Americans are highly underrepresented in science and engineering. While these groups make up more than 30% of the U.S. population, African American and Hispanic students receive 16% of bachelor's degrees in biological sciences, 11% of graduate degrees in these fields, and less than 7% of PhDs in STEM studies (Remich et al., 2016).

Doctoral study experiences in the USA are often framed as an almost sacred relationship between a candidate and his or her academic advisor. These advisors guide the student through the dissertation process to completion and graduation. Due to the relationship between Ph.D. students and mentors, Taylor et al. (2018) gathered information from recent graduates and their graduate advisors (Taylor et al., 2018). This study found that structure was vital during the process, as well as instructive and timely feedback. Regular communication and emotional support were important, resulting in a professional relationship that transitioned to collegial toward the end of the student's doctoral journey.

African American Earning Doctoral Degrees

Educational journals reveal that African Americans who receive earn their doctoral programs are twofold: 1) Acquiring the necessary academic training to advance professionally, and 2) learning to employ critical navigational skills to personally survive (Gildersleeve et al., 2011; Truong & Museus, 2012). The socialization experiences and environment in doctoral education have lasting effects that transcend well after completion (Platow et al., 2012). In graduate school at predominantly White institutions, students of color often contend with

isolation, racial discrimination, and exclusion in their academic programs which can negatively influence their overall well-being and success (Truong et al., 2016).

As prior research acknowledges (Burt et al., 2021; Gildversleeve et al., 2011; Hussain & Jones, 2021), African American students must learn to navigate hostile terrains in their graduate programs to succeed. However, the navigational strategies that graduate students of color employ to survive negative racial climates in their programs can have negative consequences, such as self-isolation and negative perceptions of the academy (Gonzalez, 2006). Using Sverdlik et al.'s (2018) comprehensive analysis of factors that lead to doctoral student success and Twale et al.'s (2016) socialization factors, much of doctoral socialization is based on relationships with faculty and peers.

The importance of African American scientific Ph.D. students receiving guidance and support from their mentor or committee chair must be recognized. A study by the University of California, Berkeley found that mentoring is a significant factor in the success of doctoral students from underrepresented backgrounds (Gonzalez, 2017). African American students, who often face unique cultural and racial challenges in STEM fields, can benefit significantly from having a mentor or committee chair who can provide them with academic and personal support. Furthermore, having such a mentor can increase their confidence in their abilities and help them navigate the research process and academic politics. Additionally, mentoring can be a valuable tool for creating "transdisciplinary bridge" (Gonzalez, 2017) that connects minority students to the broader research community.

For African American students to have successful careers in STEM fields, they need mentors who can provide them with a broad knowledge of the field and personal and professional guidance during their graduate school careers. The conversation surrounding

diversity in STEM has grown exponentially over the past decade. In addition to bringing more diverse perspectives into scientific fields, these fields must become more inclusive in their workforce.

Murphy et al. (2007) also examined the perceptions of doctoral candidates and advisors as those perceptions tied directly to the supervisory relationship. There were two major distinctions found about supervision. One was a controlling attitude that was task-focused on completing steps toward graduation. The other was a guiding attitude that was person-focused that concentrated on developing the doctoral student as a professional (Murphy et al., 2007) Historically, Black persons have had high mistrust of White persons in the U.S., especially about their academic well-being (Terrell & Terrell, 1981). Interracial mistrust, which serves as a protective factor for Black persons, decreases the chances of the type of interracial academic relationships that would propel Black professionals forward into their careers (Brown & Grothaus, 2021). However, as Kirk Calhoun, MD, stated during the AAMC conference, “You cannot be what you do not see” (Calhoun, 2022, para 8).

The United States’ inability to achieve science, technology, engineering, and mathematics (STEM) workforce diversity goals has long been attributed to the failure of the academic pipeline to maintain a steady flow of URM students. This includes the field of biomedical science. While there have been little gains, national data continue to show that the disparity in STEM degree attainment for URM students (i.e., African American, Hispanic or Latino/Latina, Native American, and Alaska Natives) increases at each degree level, compared with White and Asian students, there is an assumption that there is an institutional barrier that needs to be removed and the types of interventions that lift students’ interests, commitment, and ability to persist in STEM fields needs to be put in place (Estrada et al., 2016).

Individual institutions have taken the time to conduct their research into identifying characteristics of programs that do and do not result in short- and longer-term positive outcomes (Estrada, 2014; Linn et al., 2015). During several of these research explorations, there were two levels of contributions to program success: individual (person-level) and contextual (institutional-environmental) interventions. Primarily program interventions that support and develop students' science efficacy, identity, motivation, and values have been found to promote persistence (Chang et al., 2011; Chemers et al., 2011; Graham et al., 2013; Hernandez et al., 2012; Syed et al., 2011).

One example of these research explorations occurred at Spelman College, an HBCU in Atlanta, Georgia. Spelman College is also a female-only institute, with the majority being URM African American students. Spelman College is the top producer of African American women STEM undergraduates who has gone on to receive science doctorates since 2008 (National Science Foundation, 2015a, b). In response to Spelman being identified as a model institution for excellence in undergraduate science and mathematics education, Thompson and Scriven (2008) documented Spelman's successful approach to STEM education, dating back to 1972, which includes pre-first-year summer science programs, on- and off- campus research experiences, and strong faculty mentoring.

Although Spelman is a four-year undergraduate institution offering Bachelor of Arts and Bachelor of Science degrees, they have successfully tapped into one significant indicator: graduating students of color by recognizing the impact of faculty-student relationships (Thompson & Scriven, 2008). This was found to be just as important regarding the doctoral student and dissertation advisor relationship, if not even more so.

The faculty-student relationship in doctoral education is one of the most unique and key factors that distinguish doctoral education from other forms of education (Austin, 2002; Rosser, 2004) and can significantly impact doctoral professional outcomes (Barnes & Austin, 2009; Schneijderberg, 2019). This unique relationship is vital to understanding how doctoral students receive implicit and explicit messages from academia, are introduced to discipline and department-specific values, and intend to enter the professoriate (Hottenrott & Lawson, 2017). Positive doctoral supervision relationships that support students personally and professionally profoundly impact self-efficacy and scholarly productivity (Jairam & Kahl, 2012; Paglis et al., 2006).

For students of color, relationships with faculty are also related to positive student outcomes, but often mentorship is found outside of the department and/or institution (Winkle-Wagner et al., 2010). Felder (2010) found that "faculty mentoring, and support are critical to promoting Black doctoral students' socialization, scholarship, research, and career development for post-degree completion" (p. 463). Through formal and informal interactions, students gain professional and personal knowledge and support (Griffin, 2013; Griffin et al., 2018). Mentors' collegial interactions with their doctoral students produce positive outcomes by creating healthier social environments (Curtin et al., 2016; Jairam & Kahl, 2012) and a more positive orientation to a potential faculty career (O'Meara et al., 2014).

HBCUs were established to welcome and nurture learning environments specifically for African American students (Abdul-Alim, 2016; Bracey, 2017; Stith & Blumenthal, 2019). HBCUs were created to provide a safe, respectable place for African Americans to learn and receive a quality education (College Atlas, 2017). Black students typically thrive at these institutions because of their nurturing, welcoming, and supportive environments (Bracey, 2017).

Unsurprisingly, Spelman College has had such enormous success with its STEM programs, and so many of its undergraduate students find themselves going forward to complete their doctoral degrees (Beeks & Graves, 2017). The positive experiences resulted from the school being designed intentionally and exclusively for African American students' equitable education, purposeful engagement, and successful matriculation (Beeks & Graves, 2017; Bracey, 2017). While HBCUs accept students of all races, they are unapologetic about their pride in African American history (Adul-Alim, 2016). Black students who attended HBCUs reported having better experiences, higher retention and graduation rates and were more likely to pursue graduate education than their peers at White institutions (Abdul-Alim, 2016; Beeks & Graves, 2017).

When a mentee of color is being mentored and advised by a professional of color in the same field of study, coupled with the experiences of the HBCU culture, there is a greater expectation of success (Louie & Wilson-Ahlstrom, 2018). While longstanding structural challenges in the professional development of junior scholars of color can be confronted through strong mentoring relationships, the potential power of effective mentoring will only be realized when the environments in which these relationships exist begin to change (Louie & Wilson-Ahlstrom, 2018). The structures whereby the mentorship relationship can be cultivated must be strong for them to be as effective as possible.

Insights from Dr. Cheryl Talley, an associate professor in the Department of Psychology at Virginia State University, put a human face on this experience. Dr. Talley teaches Neuroscience in the Behavioral and Community Health graduate program and research student retention in STEM. In a podcast interview, Dr. Talley (2022) recognized the experiences of her up-and-coming colleagues and the challenges they face.

> The issues around being a Black scientist, for me, were never conscious. I knew I was working hard and had a relationship with my students. I was advising my

> students and other peoples' students all while trying to keep a research program afloat. I looked at my colleagues and at my faculty evaluations, and I knew that I was doing things that other people were not doing and I was not getting credit for some of those things. Like advising other students and inviting students to be a part of a research team who had an interest but not necessarily a background. So, this idea of a mission has resonated with me for a long time because I felt I had received so much from other people, and I owed it to the community to do more with my PhD than just sustain for myself. I had never actually written these words down, but I knew I was living it. And this really came about when a graduate student asked me that question, "What does it mean to be a Black scientist" and as I started to answer him, I started choking up. Tears started to come to my eyes, and I had to stop myself and inquire what is all this emotion and that is when I started to write. (para 4)

Dr. Talley also shared how she makes connections with her students when she is advising them because she knows the struggles they face. As a student herself, she admitted she was trying to raise a family, work, and keep up with her studies, all in an environment of individuals that did not look like she did not connect with her and did not make her feel like there was room for her.

Institutions have the power to cultivate a positive experience for their scholars. Professors connected students with professional organizations of which they were active members and leaders. When students are exposed to counselors and educators who look like them, they see themselves. It develops one of the tenets of self-efficacy: vicarious experiences. (Lomax, 2021) As it is recognized that there is a relationship between pedagogy and inclusive experiences (Tingle, 2021), there is a deficiency of information on how formative feedback assessment measures impact the student population (Wilcox et al., 2014). Despite the importance of mentoring to graduate research training and professional development, there is little conversation in academia about what effective mentoring looks like and how to achieve it (Louie & Wilson-Ahlstrom, 2018).

Ph.D. Student and Dissertation Committee Relationships

Training for clinical professionals, biomedical researchers, and clinicians as competent researchers is essential for continued medical innovations and scientific knowledge development. The requirement for a Ph.D. to be awarded to students is to complete a prescribed graduate course of study, to conduct original research in science or the humanities, and to successfully defend a dissertation about that research. This requirement remains the basis for current Ph.D. training in most institutions worldwide. (Barnett et al., 2017)

For students pursuing an academic career, completing a dissertation in route to a Ph.D. can be viewed as a stage in their academic socialization and forming their future identity (Anderson et al., 2008). Academic community members agreed that the goal of programs in doctoral education is to provide learning experiences and resources that propel doctoral students to success (Baker & Pifer, 2011; Lovitts, 2001; Roberts, 2020; Roberts & Ferro-Almeida, 2019; Woolderink et al., 2015).

Unfortunately, data from numerous studies show doctoral student drop-out rates average 50% (Craft et al., 2016). Students in this category are called “all but dissertation” (ABD). These ABD students often do not continue to graduate (Hanson et al., 2022). This stage is challenging emotionally, personally, socially, and intellectually (Council of Graduate Schools, 2009). In recent decades, the completion rate for Ph.D. degrees has become a topic of pressing national attention for graduate school deans, public and private funding agencies, faculty members, and graduate students.

In addition to tracking student performance in STEM, institutional data is included.

- time to degree,
- existing funded and unfunded underrepresented minority (URM) student intervention programs at institutions, and
- participation in research training experiences for URM and non-URM students.

However, this data is limited, but its value to enhance educators' and researchers' ability to identify the characteristics of institutions with programs successfully recruiting and retaining URM students is vital (Estrada, 2014). More institutional data of this type would complement current social science findings that show how empowering URM students with the skills, scientific identity, and values of scientists resulted in students experiencing greater integration into the scientific community and increased the likelihood of their persistence (Hurtado, 2010; Estrada et al., 2011; Estrada et al., 2016).

Some efforts have been made to see what intervention for persistence can be implemented. For example, the National Center for Education Statistics (NCES) (2013) conducted an aggregate tracking of persistence in STEM across all colleges and universities in the United States. Their report on undergraduate attrition found that 48% of the students who enter college with STEM majors leave those majors before graduation (Chen & Soldier, 2013). According to the NCES (2013), students of color, primarily African American students, are the most likely ethnic group to leave STEM majors by dropping out of college (29%) or switching to a non-STEM degree (36%). The NIH-funded Diversity Program Consortium also tracks institutional data from multiple institutions across the United States. However, it has focused more on developing programming to recruit URM students into STEM fields and retain them (Oh, 2022).

Duke and Denicolo (2017) reported the need for institutions to increase the number and diversity of postgraduate researchers.

Sowell et al. (2015) reported analyzing baseline data from the Ph.D. Completion Project, which examined private and public institutions nationally, found that the completion rate ten years after students began their doctoral program remained low at 56.6%. Randall et al. (2018) found that though biomedical science students at a southern HBCU were highly motivated, many students entered programs lacking the skills to complete graduate school.

Lueck and Boehm's (2019) study took an approach to reimagine the dissertation committee by adding diverse participants and matching graduate students to them in an interdisciplinary group. This study encouraged individuals from diverse backgrounds to discover new insights into their research areas. The process allowed open dialogue and critical communications to gain a different perspective on the student's research (Lueck & Boehm, 2019). Similarly, Nora & Crisp's (2007) study of Latino students in higher education discovered four significant layers of mentorship that were impactful elements for mentees. They were psychological or emotional support, goal setting and career paths, academic subject knowledge support, and offering role models (Nora & Crisp, 2007).

These programs came with some advantages and disadvantages. Mentors provided mentees with sponsorship, coaching, exposure, visibility, protection, challenging assignments, consultation, advising, and opportunities for collaboration on research projects (Smith et al., 2000). In psychosocial functions, mentors provided counseling, encouragement, friendship, role modeling, acceptance, and confirmation (Fuller et al., 2008). However, it was found that no mentoring relationship was consistent with others (Salinas et al., 2020).

As previously stated, national and governmental agencies have found a disparity in students of color having adequate mentorship. The National Institutes of Health (NIH) conducted a virtual listening session and found that participants reported challenges and inequities in the biomedical sciences experienced by HBCUs (Hooper, 2022). Among the challenges noted were the disparities in grant funding among underrepresented minority investigators due to the high need for building the research infrastructure and was extremely competitive in the NIH grant application process. They also emphasized the importance of HBCU faculty member representation in biomedical science training and capacity-building programs, which could increase diversity in the biomedical science fields and increase search funding for URM faculty members at MSIs (Hooper, 2022).

Johnson and Scott (2020) conducted a qualitative phenomenological study where participants shared their perspectives and experiences of how mentorship and formative feedback influenced their desire to defend their research and complete their dissertation programs successfully. Over half of the student participants indicated that critical conversations and formative feedback helped to enhance their relationships with mentors who encouraged them to persist to completion (Johnson & Scott, 2020). This leads to further research on how implementing regular formative feedback sessions within dissertation committees into the dissertation process impacts the Ph.D. students.

Using Formative Feedback to Connect

African American biomedical Ph.D. students have historically faced numerous obstacles in completing their degrees. Despite this, researchers have found that African American students may benefit from being able to model their committee chairs in terms of receiving formative feedback (Hammond et al., 2018). Formative feedback is essential for African American doctoral

students, as it helps them understand the expectations of the doctoral program and how to approach their research while offering support and guidance.

This formative feedback can come through mentoring, conversations with faculty, and/or individualized feedback on their research. A key component is also providing African American Ph.D. students with role models who can be examples of successful research (Smith et al., 2020). This way, they can learn from the experiences of their peers and gain the knowledge and skills necessary to complete their doctoral program. Additionally, it is beneficial for the committee chair to provide these students with clear and detailed feedback on their research progress and to ensure they are supported in their research endeavors.

Maestas et al.'s (2007) study of Hispanic students being mentored in a midsize faith-based graduate school showed that they exhibited higher levels of belonging and academic self-efficacy after being mentored. The authors contend relationships with mentors provide strategies to find one's place within the institution while also bolstering feelings of academic self-efficacy. Hurtado and Ponjuan's (2005) study and Curtin et al.'s (2016) found that students who successfully integrated into the intellectual, academic, and social context reported greater confidence to enter their professional field or discipline. These researchers found positive relationships with mentors fostered a sense of belonging and academic self-efficacy among underrepresented minority graduate students. These findings were consistent with prior empirical work on historically underrepresented groups of graduate students (Curtin et al., 2016; Holloway-Friesen, 2018; Sowell et al., 2015). All of these authors conceptualized mentoring would provide important strategies for graduate students to successfully navigate the academic and social landscape of graduate school by fostering students' sense of belonging and academic

self-efficacy (Curtin et al., 2016; Holloway-Friesen, 2018; Hurtado and Ponjuan's (2005); Maestas et al., 2007; Sowell et al., 2015).

Graduate students in other institutions have reported that graduate school can be lonely and impede students' success (Hawlery, 2003; Ali & Kohun, 2006). The graduate school experience can sometimes be overwhelming and impede the performance of otherwise outstanding students. Thus, if students are to be successful in graduate school, it is imperative that they quickly understand the learning environment and culture in which they are immersed. Literature has addressed race-matched mentoring relationships and how they may or may not have made a difference in the outcome of the student's success (Duran et al., 2020; Hurtado & Carter, 1997; Johnson et al., 2007; Maramba & Museus, 2013; Means & Pyne; 2017; Strayhorn, 2019). Mentoring can influence a sense of belonging. Maestas et al. (2007) and O'Keefe (2013) reported that students' sense of belonging fills an important gap in understanding student retention at higher education institutions. A sense of belonging is universally understood as a feeling of mattering, connectedness, acceptance, support, affirmation, and validation (Strayhorn, 2012; 2019) and is crucial to the success and development of students within higher education. Hurtado and Ponjuan (2005) and Hurtado et al. (2015) characterized a sense of belonging as an awareness of mattering to one's community. They addressed the psychological elements of social integration and attachment to an institution. This sense of belonging and the innate feeling of an individual wanting to be connected in a place where they fit in is one of the main reasons why HBCUs came about.

Advisory Committee Mentorship Responsibilities

Shamoo and Resnick (2015) suggested that an influential graduate advisory committee critically evaluates a student's scientific progress and the competencies related to a scientific

pursuit in general. Students must receive feedback on their dissertations through their advisory committees. Shamoo and Resnick (2015) outline committee responsibilities. The committee guided the development of a dissertation plan to map out goals and objectives, primarily to ensure the proposed study was compatible with timely completion. Committee members provided crosschecks on training in responsible research and experimental design. Active student interest and motivation also became a vital part of this process. Interactions between the students and committee members that promoted open dialog on the research and student skills, interests, and aspirations helped students develop professional-quality research. The role of the chair of the dissertation advisory committee ensured that the committee met all its responsibilities and helped guide the student (Shamoo & Resnick, 2015).

Anderson et al.'s (2008) study of students in a master's thesis program showed that many participants benefited from advice and direction given that created a supportive attitude. Some students reported not feeling alone and having an advisor helped them through the process. Most participants portrayed their supervisor as having made a valuable, and sometimes quite indispensable, contribution to their research success.

Shute (2008) stated that for formative feedback to serve a corrective function, even in its simplest form, it should verify whether the student's answer was right or wrong and provide information to the learner about the correct response (either directive or facilitative). Studies that have examined this type of feedback have shown consistent results (Kulhavy, 1977; Mory, 2004).

Anderson et al.'s (2008) study noted that participants reported a sense of self-efficacy because their advisor/supervisor encouraged the students' confidence. One's sense of self-efficacy can provide the foundation for motivation, well-being, and personal accomplishment

(Zimmerman, 1995). Among other benefits, those students also mentioned the quality of their relationships with their advisor/supervisor had grown tremendously (Anderson et al., 2008). The assistant helped shape their project by structuring research time, and they gained greater confidence in their writing (Anderson et al., 2008).

Mentor and Student Relationship

The faculty-student relationship in doctoral education is one of the most unique and crucial factors that distinguish doctoral education from other forms of education (Austin, 2002; Rosser, 2004) and can significantly impact doctoral socialization outcomes (Barnes & Austin, 2009; Schneijderberg, 2019). This unique relationship is vital to understanding how doctoral students receive implicit and explicit messages from academia, are introduced to discipline and department-specific values, and intend to enter the professoriate (Hottenrott & Lawson, 2017). Positive doctoral supervision relationships that support students personally and professionally profoundly impact self-efficacy and scholarly productivity (Jairam & Kahl, 2012; Paglis et al., 2006).

For students of color, relationships with faculty are also related to positive student outcomes, but often mentorship is found outside of the department and/or institution (Winkle-Wagner & McCoy, 2016). Felder (2010) found that "faculty mentoring, and support are critical to promoting [Black doctoral students'] socialization, scholarship, research, and career development for post-degree completion" (p. 463). Through formal and informal interactions, students can gain professional and personal knowledge and support (Griffin, 2013; Griffin et al., 2018). Mentors' collegial interactions with their doctoral students produce positive outcomes by creating healthier social environments (Curtin et al., 2016; Jairam & Kahl, 2012) and a more positive orientation to the program.

The empirical literature has also indicated that mentoring of doctoral students produces greater benefits when they feel they are in a trusting relationship focused on supporting protégé development and student success (Baker & Moore, 2015; Chan et al., 2015; McCoy et al., 2015; Protivnak & Foss, 2009; Rademaker et al., 2016). Positive mentoring with students of color has been linked with enhanced academic and career success, degree completion, professional growth, social and cultural capital, professional identity, critical thinking skills, and self-efficacy (Chadiha et al., 2014; Chan et al., 2015; Gaddis, 2012)

Related Literature

Related literature was found on the association between Ph.D. dissertation committee members, the mentor and mentee relationships, and the Ph.D. students matriculating to graduation (Garcia et al., 1988; Ghoston et al., 2020). Literature about doctoral supervision has concentrated on describing the ever-lengthening lists of functions that must be carried out. This functional approach is necessary, but there has been little exploration of a different paradigm, a conceptual approach toward research advising (Lee, 2008).

The perceived impact of formative feedback assessments on underrepresented students and students of color also has been studied (Skeith et al., 2018). The impactful landscape of relationships between students of like races and cultures has also been explored (Abudayyeh, et al., 2020). The findings from these studies across academic advisors, doctoral candidates, and graduates indicate that participants preferred structure in the advising process, helpful and timely feedback, regular communication, emotional support during the doctoral research journey, and a professional relationship that transitions to a professional colleague as the candidate completes the doctoral process (Taylor et al., 2018).

The importance of mentors in the academic and professional development of African American Biomedical Scientist Ph.D. students cannot be overemphasized. Despite the growing number of African American students pursuing Ph. Ds in Biomedical Science, there needs to be more research literature on the impact of mentoring on their success. Specifically, there is a lack of studies focusing on the importance of formative feedback from mentors while pursuing their degrees and conducting their research (Gibbs et al., 2016)

Bandura's social learning theory suggests that individuals learn and develop through observation, imitation, and modeling of the behavior of others. In the context of mentoring, this theory suggests that African American Biomedical Scientist Ph.D. students can benefit significantly from exposure to successful mentors who can guide on academic and research-related matters. Such exposure can lead to self-efficacy, a critical factor in academic and professional success (Bandura, 1977).

As this applies to the mentor-mentee relationship, mentorship provides an opportunity for students to observe and learn from their mentors' experiences and behaviors. By providing formative feedback, mentors can help students develop the skills and confidence needed to succeed academically and professionally. This, in turn, can lead to increased self-efficacy, which is essential for success in challenging academic environments.

Research has shown that providing regular and constructive formative feedback from mentors can help African American Biomedical Scientist Ph.D. students build their self-efficacy and confidence levels, leading to better academic and research outcomes (Sorkness et al., 2017). Therefore, more studies must be conducted on the impact of mentoring on the success of African American Biomedical Scientist Ph.D. students, with a particular focus on the importance of formative feedback. Given the importance of mentorship in academic and professional

development, it is crucial to investigate the specific needs and experiences of African American biomedical science Ph.D. students. By exploring the role of mentorship in supporting these students, we can better understand how to create inclusive and supportive environments that promote diversity and success in STEM fields (Johnson et al., 2019).

However, there is a gap in the literature on student perception and shared experiences that impact formative feedback from biomedical professionals of color advising students of color within the HBCU environment. As it is known on many occasions, students of color must be advised and mentored by White professionals in the scientific role because there is such a lack of scientists of color and educators (Cartwright et al., 2018). Empirical inquiries concerning the construction of these beneficial relationships are in short supply.

This indicates an opportunity to explore such an area and bridge the gap in literature. Existing higher education research does not explore the perception or shared experiences of alums of color mentored by biomedical research professionals of color at HBCUs. The study explored alums perception and shared experiences of impactful outcomes after experiencing formative feedback during their dissertation process at an HBCU.

A study such as this will enlighten education administrators, governmental agencies, and other stakeholders regarding graduating more Ph.D. students of color in the biomedical field of science (Sowell et al., 2015). It will help strengthen the already existing biomedical Ph.D. programs where they exist at HBCUs. Finally, the findings from this research will help gain and open the door to best practices for biomedical science programs for URM at other institutions.

Summary

In recent decades, the completion rate for Ph.D. degrees has become a topic of pressing national attention for graduate school deans, public and private funding agencies, faculty

members, and graduate students, especially in the African American community. There is a noticeable gap in the research literature regarding the significance of African American biomedical scientist Ph.D. students having mentors who give them formative feedback as they pursue their degrees and conduct research. While there is a plethora of research on the importance of mentoring in general, little attention has been paid to the specific needs and experiences of African American students in biomedical science (Johnson & Jahangiri, 2016) Much terrain remains to be explored to gain a clearer sense of a successful dissertation committee. There seems to be a disconnect between expectations between the dissertation committee and the Ph.D. student. Frequent communication between the dissertation committee and Ph.D. students through formative assessment is the key to helping students improve this miscommunication. Formative feedback assessments are one of the pedagogical foundations that build a strategy to improve performance. Formative assessment helps measure how well a student is doing and if an instructor has met teaching instructional expectations by evaluating student learning outcomes and accomplishments.

Studies have been conducted on underrepresented students and students of color at white institutions. However, little has been studied on implementing formative feedback assessments with students pursuing Ph.D. at HBCUs within biomedical research. Recent literature supports the vital role of formative feedback with a situational and social learning theory to assist students in building the necessary relationships and getting them back on track to achieve the goal of defending their dissertation and graduation.

By studying the perceptions and lived experiences of Ph.D. students who have successfully defended and graduated with the help of their dissertation committees, the graduate education community can better understand the support needed for students of color. The

community will also be more likely to meet the needs to complete their degrees and lower the ABD rate for African American students attending HBCUs in the biomedical research discipline. Not only do students have the advantage of exchanging with individuals working in the field, but the experiences that the committee chairs can share during formative feedback can help the learning be impactful and transformative, motivating them enough to gain a sense of self-efficacy.

To address the gap in the research literature on this topic, future studies should examine the experiences of African American biomedical scientist Ph.D. students with mentoring relationships. Specifically, research should investigate the impact of formative feedback and role modeling on self-efficacy and academic success for African American students pursuing a degree in biomedical science. By better understanding this population's unique needs and experiences, institutions can develop more effective mentoring programs that support African American students in achieving their academic goals. The findings of this proposed study will also be useful in discovering a continuous process of best practices that can help biomedical science students persist to graduation. It will also broaden the understanding of the impact made for students of color being mentored by biomedical professionals of color.

CHAPTER THREE: METHODS

Overview

The purpose of this qualitative phenomenological study is to explore the perceptions and lived experiences of biomedical Ph.D. alums concerning formative feedback during their dissertation process at an HBCU in the southern United States. This chapter presents the research design, the research questions, the setting and participants, the researcher's positionality and role, assumptions, procedures, the data collection plan, and the data analysis. It also discusses the trustworthiness of the study and ethical considerations.

Research Design

This study uses a qualitative research design. A qualitative approach was chosen because this study explores the perceptions and experiences of alums who had earned Ph.D. degrees in biomedical research. This research method allows for greater in-depth exploration of personal perceptions than the gathering of statistical information about the participants' experiences (Yin, 2017). Qualitative research answers "What," "how," and "why" questions that can generate rich data and can generate interpretations of a particular issue, problem, or phenomenon being explored (Merriam, 2009).

There are several different approaches to qualitative research. Though narrative inquiry would be appropriate for this study because it centers on the collection and analysis of stories of individuals' lived experiences (Cresswell, 2013), this study is more suited to the phenomenological approach that also collects such stories but is more concerned with the phenomenon common among all participants (Creswell, 2013; Moustakas, 1994). Phenomenological research examines consciousness experiences from a first-person perspective (Creswell, 2013; Merleau-Ponty, 2012; Smith, 2013). The phenomenological study explores the

essential, invariant structure or the central underlining meaning of individuals' lived experiences (Smith, 2013). A comprehensive description can be provided by determining what an experience means as it is subjectively lived by individuals who have had the experience (Moustakas, 1994).

This method of inquiry is most appropriate for this type of study because it examines the experiences, self-efficacy, and influence in the enrollment of the URM earning a doctoral degree at an HBCU. Using the phenomenological research design method, the research expects to understand how phenomena present themselves to the consciousness of individuals experiencing them (Giorgi, 2012). The purpose of using phenomenology is to understand better students' perceptions and firsthand experiences and any impact formative feedback had on them meeting their educational goals.

The phenomenological approach is a procedure illustrated by Moustakas (1994). It consists of identifying a phenomenon to study, bracketing out the researcher's experiences, and collecting data from several persons who have experienced it. Further, the researcher analyzes the data by reducing the information to significant statements and quotes and combines the comments into themes. These words are then separated into themes from the textural description found in participant responses and the structural characterization of how they experienced the phenomenon regarding the condition, situation, or context (Creswell & Poth, 2016). By decoding these experiences, the research can gather the essence of participants' experiences. In this study, using the phenomenological approach will allow the researchers to explore the experiences of alums students and how their dissertation committee impacted them after receiving formative feedback.

Research Questions

There is one central research question and three sub-questions for this study.

Central research question.

What are the perceptions and lived experiences of biomedical research Ph.D. alums from the southern regional HBCU about formative feedback received during their dissertation process?

Sub-Question One:

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU about the mentoring experience during the dissertation process?

Sub-Question Two:

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on mentoring during the dissertation process at an HBCU instead of another type of institution?

Sub-Question Three:

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on whether receiving formative feedback influenced a sense of self-efficacy and motivation to persist to completion of the Ph.D. program?

Setting and Participants

The experiences and challenges that African American science, technology, engineering, and mathematics (STEM) professionals face and overcome as they persist in their careers are rarely examined (Mondisa, 2021). The participants of this study are Ph.D. biomedical research alums from a small southern HBCU who participated in formative feedback sessions with their dissertation committee or chair.

Site

The small southern regionally located HBCU used for this study is one of the few institutions within the HBCU network offering a Biomedical Sciences Ph.D. degree. This institution's dissertation committees are primarily African American biomedical science professionals. This is important because African American Ph.D. students can access mentors within their same ethnic/cultural background and their common academic field.

Participants

Potential participants for this phenological study are individuals who graduated or separated from a small southern regionally located HBCU (the site institution) between the academic years of 2019 and 2022. All participants must self-identify as an URM and have either moved to the Atlanta area to attend the HBCU or were born in the Atlanta, Georgia, area. Participants will also self-identify as male, female, or other, or do not wish to disclose gender and be within an age range of 25-50.

This older, broader age range is necessary because some students return to college many years after graduating with an undergraduate degree to pursue a Ph.D. Only 44.4% of doctoral degree holders were 25-30, 42.5% were 30 to 40, and 12% were over 40 (Duffin, 2022). The researcher expects that most participants was raised in a home with a family income of less than $75,000 and be first-generation college students, first-generation scientific professionals, and attend urban or rural high school systems. Although these are the researcher's assumptions, no one from a different gender, age, economic, or location demographic category will be denied participation.

The goal was for fifteen participants to participate in the study. The number of participants for a qualitative study is smaller than for quantitative research. This is due to the

nature of qualitative research and its quest to delve deep into participants' experiences, especially when doing in-depth interviews (Creswell, 2013; Merriam, 2009). However, the exact number of participants is often in dispute among researchers (Marshall et al., 2013) since many factors can affect the number of participants necessary to achieve saturation, including the number of interview questions, the interviewer's skill, how forthcoming the participants are, etc. (Marshall et al., 2013).

The researcher found alums through the LinkedIn social media platform. Using LinkedIn Sales Navigator (Professional), the researcher located participants through a search function. A list of organizations, work, and school locations was searched to find potential respondents. This kind of search can also be adjusted according to location, industry, and position, among other criteria, to ensure the right individuals are located for the research. Searching occurs within the connections of the researcher's account, such as first, second, or third degree of connection, or within virtual groups of professionals (LinkedIn (2021). The effectiveness of this step is contingent on the researcher having a vast initial contact network and the time to do further iteration (LinkedIn Sales Navigator, 2019).

The researcher searched for the first participant in their LinkedIn network connection. The network connection individual asked to participate in the study if they have attended the small southern regionally located HBCU (site institution), were enrolled and a Ph.D. graduate, or had separated from the biomedical science program during 2019-2022. The participants also had to have participated in informative feedback sessions with their dissertation committees and had at least three scheduled meetings with their committee members. Lastly, the participant must have considered enrolling into a Ph.D. biomedical degree program at another institution that was not an HBCU. The researcher sent an email through the platform inviting the connected

individual to participate in the study and to begin the snowballing sampling effect by sending the researcher's contact information to others.

As a part of the initial message, the prospective participant was asked to send the invitation to others in their alum's cohort. This is called snowball sampling (Leighton et al., 2021; Marcus et al., 2017; Naderifar et al., 2017; Parket et al., 2019; Reagan et al., 2019). The researcher used this snowball recruitment method through a LinkedIn social media alums connection group to get participants for the proposed study.

After conducting a snowballing invitation twenty individuals responded to the study invitation. However, eleven of those individuals completed all three modes of data collection procedures and gave significant answers that allowed for triangulation of the data.

Instruments

There were three instruments used in this study. One was a 12-question interview guide that the researcher used in the one-on-one interviews of the eleven participants. The open-ended questions reflect the sub-questions underneath the overarching research question. The second was an Alums Perceptions Questionnaire, given to participants after they return their consent forms. This questionnaire has five open-ended questions that also relate to the sub-questions underneath the overarching research question of this study. This questionnaire required written responses. The final was a three-question document review guide that the participants use as a guide to review the formative feedback data.

Researcher Positionality

As an institutional effectiveness and program assessment professional, the researcher is interested in learning more about the impact of formative feedback on the dissertation process at small HBCUs. This study has the potential to bring an innovative approach to other UMR Ph.D.

programs and quality improvement that offer biomedical programs. This is especially important for African American Ph.D. programming. From 2002 to 2017 of the roughly 50,000 people who earned Ph. D.s every year, the African American percentage increased only modestly, from 5.1% to 5.4%, according to 2017 data from the National Science Foundation (NSF) (Harris, 2019). The NSF further reported that there were more than a dozen fields and significant subfields within science, technology, engineering, and math that did not have a single doctoral degree awarded to a Black person anywhere in the United States during that period (Harris, 2019).

In addition, many African American students needed to complete their goals to defend their dissertations and earn their degrees. They became known as ABD or all but dissertation students for a year or two beyond the time they planned to graduate, with some extending that even longer and a few never completing their degrees (Johnson & Scott, 2020). It was felt that these students lacked a respectful, trusting relationship with their dissertation committees (Johnson & Scott, 2020). This was a common theme due to frustrations with their committee chairs about the need for proper guidance or communication. This lack of simple communication in a structured manner, such as formative feedback sessions between students and their committee members, was what is necessary for the students to feel heard and supported (Lipnivitch & Smith, 2009; Lui & Andrade, 2022; Marchisio et al., 2018; van der Kleij, 2019).

Formative assessment is a practice to enhance teaching and learning and develop self-regulation. Feedback is one of the most studied strategies for activating formative assessment. Valuable feedback helps close the gap between actual and desired performance and promotes self-regulation (Marchisio et al., 2018). Frequent formative feedback from faculty with the student's same cultural and ethnic background and academic discipline seems a strategy for success. This can become mentoring for students.

Since the 1960s, formal mentoring and other mentoring modalities have been viewed as essential avenues for facilitating career success (Chao, 2009; Otieno et al., 2010). However, it has yet to be studied as an organizational approach for addressing the retention of African American students at MSIs within Ph.D. scientific disciplines such as biomedical sciences. Few studies have explored how African American students perceive various mentoring modalities deemed helpful or impactful in pursuing their goals of defending their dissertations and graduating with their Ph.D.

Burrington et al. (2020) explored dissertation chair experiences and current practices for meeting with and providing feedback to doctoral students pursuing a scholar-practitioner terminal degree in an online doctoral program. That study's findings included the importance of providing frequent feedback through various modes of communication, emphasizing a tailored approach to the student's needs. Timely, thorough feedback was supportive, stressing effectiveness and relevancy, primarily achieved through one-on-one communication. Additional considerations focused on trust-building and caring behaviors; individualized coaching and guidance; and balancing institutional requirements and student needs (Burrington et al., 2020).

Interpretive Framework

A Ph.D. is a demanding undertaking that requires students to demonstrate expert knowledge and various skills and attributes, such as creativity and analytical ability (Lean, 2012). Many students need help understanding the requirements and expectations of a Ph.D. and how to satisfy these requirements and expectations. Graduate schools have Ph.D. completion rates considerably below 50% (Spronken-Smith et al., 2018). Institutions with many URM students within their Ph.D. programs have an even lower completion rate.

The interpretive framework is a research method involving a detailed understanding of a particular subject through observation, not hypothesis testing (Bell, 2013). This current research takes a social/cultural theory approach and studies the impact through interactions of African American Ph.D. students in biomedical science programs and mentors and faculty members who are professionals in the student's field of study. The researcher will utilize a phenomenological qualitative research methodology through interviews, observation, and document review. The researcher will seek to understand the experiences of participants who have received formative feedback from their dissertation committee members during their dissertation process.

The underlining question in the proposed study is how Ph.D. alums were impacted by receiving formative feedback from their committee members, who, in most cases, are African American professionals and faculty members within the HBCU community. Despite the benefits of mentoring, some institutions need to provide effective mentoring for doctoral students or even assistant professors. Vázquez-Montilla et al. (2012) stressed the lack of diversity in the field, which leaves students feeling as if they do not belong, often affecting their persistence.

Philosophical Assumptions

Philosophical perspectives dictate what constitutes knowledge and how phenomena should be studied (Weaver & Olson, 2006). This can assist researchers in refining and specifying the types of evidence necessary, how it should be collected, and how it should be interpreted and used (Bradshaw et al., 2017). The researcher's expectation is based on the philosophical assumption that the outcome of this proposed study will help URM students increase persistence to complete their dissertations with assistance from the most influential advisors. Another assumption is that this research may also be a way to enhance dissertation committee processes

at HBCUs and other institutions where URM students may have difficulty finding influential mentors who represent diverse ethnic populations.

Ontological Assumptions

Ontology is defined as a theory of the nature of social entities and is fixed, observable, and measurable (Bryman, 2004). Saunders et al. (2007) noted that ontology concerns the nature of social phenomena as entities to be admitted to a knowledge system. Easterby-Smith et al. (2002) observed that ontology concerns the assumptions researchers make about the nature of reality. Stainton-Rogers (2006) said that ontology consists of what entities operate within reality and how they interrelate with each other. In other words, it is how researchers make meaning from their findings (Moroi, 2020). Ontological assumptions are applied to the nature of the phenomena to be investigated, and different ontologies make additional assumptions.

When using qualitative research methodology, researchers often depart from a fixed ontological reality and accept the idea of multiple realities (Cresswell, 2007). In social contexts, reality can be subjective because of the perceptions of those who are experiencing that reality. This was seen within this study as well. The researcher expects to hear various views on how formative feedback may or may not be the exact thing that helps the students succeed or fail. However, it is imperative to hear all perceptions of formative feedback to determine whether formative feedback is significant to some students and could significantly impact their journey to completing their goals.

As we are all created differently for different purposes and plans, so are our journeys. The researcher assumes that this study will embrace objectivism, and thus, various views about formative feedback with various outcomes will be revealed. Since there are several types of learners, there were ways to help students succeed. This study assumes that African American

Ph.D. students who received formative feedback from African American mentors who are biomedical science professionals will express the perception of experiencing a significant impact.

Epistemological Assumptions

Epistemology is a theory of having sufficient knowledge in a particular discipline (Bryman, 2004). Similarly, Saunders et al. (2007) noted that epistemology is a branch of philosophy that studies the nature of knowledge and what constitutes adequate knowledge in the field of study. Epistemological assumptions can be regarded as what is (or should be) considered sufficient knowledge in a discipline. These are revealed through the interpretation of the participant and the researcher (Bahari, 2010). One assumption for this study is that the researcher remains outside of the reality of the participants' experiences and that the participants accurately interpret their experiences in their reality so that the researcher can understand and interpret their perceptions.

The researcher also assumes that the knowledge obtained from this research will bridge the gap in the literature related to African American students and how they interact with their dissertation committees. As stated before, little to no research has been done on African American Ph.D. students in biomedical sciences and the impact that formative feedback has on the success or failure of their reaching their goals of defending their dissertations and graduating. The researcher also assumes the study will create a better understanding through the narratives of the participants on how impactful they felt formative feedback implemented their dissertation process and impact the same ethnicity mentor/student relationship.

Axiological Assumptions

Axiology is concerned with values and ethics in research. In quantitative research, axiology views facts as objective and fixed; however, values are subjective and can often interfere with the pursuit of research (Moroi, 2020). Therefore, subjectivity is not a good thing to have in quantitative research. Qualitative research rests squarely on subjectivity and the admission of the researcher's biases and values (Moroi, 2020). Lincoln and Guba (1994) stressed the importance of the researcher in interpreting the findings and shaping the research so that the findings can be obtained and understood.

As both an administrator and a Ph.D. student with similar goals and expectations as the participants, the researcher of this study may relate to the desperation and sometimes the despair of not having needed guidance. This is an axiological assumption and points to the fact that faculty and administrators may often share students' anxieties when they cannot complete their goals within the scheduled time. Had shortcomings been relayed to the students earlier, or if committee members had communicated their expectations and plans more effectively, time would have been well spent. This study assumes that the readers will gain insight from the voice of alums' perceptions and shared experiences on how formative feedback impacted their dissertation experiences.

Researcher’s Role

The researcher’s role includes selecting participants, collecting, organizing, and analyzing data (Nelson et al., 2015). The researcher is the primary data collection instrument in qualitative studies (Fusch et al., 2017; Peredaryenko & Krauss, 2013). The researcher of this study was the one who will primarily collect the data, analyze the data, and report the findings. McKee et al. (2015) noted that the researcher's fundamental role is to build a trusting relationship with participants. The researcher in this study endeavored to build trusting relationships with

study participants. Sutton and Austin (2015) opined that the role of the researcher in qualitative research is to attempt to access the thoughts, intentions, and opinions of study participants. During the data collection, this study's researcher will focus on participants' thoughts, experiences, and intentions. The researcher will use snowball sampling to gather participants randomly.

The researcher's assumptions and biases are that African American Ph.D. students at MSIs need professionals to guide them and give them formative feedback to avoid delaying students' process and preventing them from dropping out. The researcher of this study will take strategic measures to avoid bias to compromise the proposed study. The researcher will avoid questions that are confirmational, cultural, or otherwise biased. The researcher will employ a peer researcher to review interview questions and ask the peer researcher to pilot the study before conducting actual interviews. The researcher will also use open-ended questions from a previously used questionnaire that was modified for this study.

The researcher does not have any position of authority in the research setting. The design was made to be as open and accessible as possible for both participants and the researcher. It is anticipated that participants will feel comfortable talking with the researcher and was able to share their experiences without prejudice or the concern of interruption. The researcher will allow participants to express their freedom of speech without repercussions.

Procedures

Creswell (2013) described the procedures in a qualitative study as the "data analysis spiral" which takes the researcher through the process of collecting data, managing data, reading, scribing, describing, classifying, and interpreting, as well as representing and visualizing (p. 183). These steps become essential for the procedure and the foundation for reporting the

findings. Specific details of these steps will vary from study to study. Permission was obtained from the Institutional Review Board (IRB) for this proposed study. (See attached Appendix A) Once permissions are secured, participants were recruited, and data was collected through interviews, questionnaires, researcher's notetaking, and searching related documents. Data was thoroughly analyzed, and the findings was reported.

Permission

The first step in the procedure is to obtain Institutional Review Board (IRB) approvals and the highest authority permissions from Liberty University (See Appendix A.). No additional IRB is needed due to the open snowballing invitation advertisement messaging through the LinkedIn connections with alums from the HBCU. Once the IRB is approved, each potential participant was notified with detailed information about the research.

According to LinkedIn's user guidelines, researchers should be transparent about their intentions and ensure that the participants they recruit are fully aware of the purpose and nature of the study. It is important to note that LinkedIn's terms of service prohibit using its platform for unsolicited commercial messages or research that violates ethical standards. (LinkedIn, 2021).

Recruitment Plan

After approvals have been received, the researcher used personal connections through the LinkedIn social media platform and a graduate page on social media to recruit participants by snowball sampling. Snowball sampling is a recognized and viable method of recruiting study participants not easily accessible or known to the researcher (Leighton et al., 2021; Marcus et al., 2017; Naderifar et al., 2017; Parket et al., 2019; Reagan et al., 2019). Babbie (2016) states that snowball sampling is beneficial when researching hard-to-reach populations and can lead to a

diverse and representative sample. Also known as chain-referral sampling, it is a non-probability method that allows the researcher to recruit participants through known acquaintances and then through their acquaintances and acquaintances of those people (Raina, 2015). Researcher relationships with study participants have a known potential bias when conducting research. Social media widens the sample to those unknown to the researchers (Leighton et al., 2021). With proper consent and adherence to ethical guidelines, snowball sampling can be a valuable tool for recruiting participants in social science research (Biernacki & Waldorf, 1981)

In this study, the researcher sent an email request through the LinkedIn social media site to search for personal connections that had been formally enrolled in the biomedical science Ph.D. program at the small southern regionally located HBCU used for this study. There was an open invitation to pass along the request to participate in this study to others in their cohort. The researcher's goal was to have a total number of fifteen participants. The sample was purposeful. The invitation stated that everyone's involvement in the study was strictly on a voluntary basis and all identities were kept confidential.

The participation solicitation invitation also mentioned these participant identifiers:

1. Alums should identify as African American.
2. Alums should have been enrolled or graduated with a Ph.D. biomedical program from the small southern regionally located HBCU selected for this study.
3. Alums who considered pursuing their Ph.D. in biomedical science education at a type of institution, which was not an HBCU, before attending the small southern regionally located HBCU.
4. Alums should have participated in at least three dissertation committee meetings.

5. Alums should be willing to participate in a virtual one-on-one interview and fill out a short questionnaire.

Data Collection Plan

No data was collected until Liberty University IRB permission had been signed and permission had been issued. These data collection procedures should follow the recommendations of established qualitative researchers in the field (Erlandson et al., 1993; Lincoln & Guba, 1985; Merriam, 1988; Miles & Huberman, 1994; Patton, 2014). The data collection plan consisted of individual one-hour virtual interviews through the Zoom platform during the most convenient time for each participant within a two-week window. Participants also asked to complete a questionnaire of open-ended questions that was disseminated through the Qualtrics survey platform. The participants was given two weeks to complete the questionnaire. Lastly, the participants was asked to review their formative feedback documentation with the three-question guide. They were given two weeks to complete that review.

This formative feedback consisted of edits each participant received on their written dissertation, a formative feedback rubric submitted during a committee meeting, or email correspondence of formative feedback guidance from their committee members or chair to the participant during the time they were in the dissertation process. Any formative feedback documentation that they still have in their possession was considered. No student's name or identifying information was used when reporting data.

Once alums agree to participate, they are emailed a consent form that explains the study and requests their permission. These were signed virtually and returned to the researcher. Appointments were made to conduct individual one-on-one interviews. The semi-structured

interviews were conducted using the video platform Zoom. With permission from participants, all interviews were recorded through Zoom. All interviews will then be transcribed through a transcription program. All transcripts were kept in a secure file on the researcher's password-protected computer. At all times, the identity of each participant was kept confidential. All transcriptions were given a number or a pseudonym while conducting analysis.

The integration of virtual technology was used for collecting and laying the foundation for categorizing the data. Three methods of collecting data (interviews, questionnaires, and document review) were used. This triangulation of data should produce identifiable patterns and themes. These multiple data sources enhanced the validity and credibility of the findings (Creswell, 2013; Lincoln & Guba, 1985). They should also provide a wealth of data about African American alums' perceptions of formative feedback during their dissertation journeys.

Data Collection Approach

Eleven participants took part in one-on-one interviews via the Zoom platform. The sessions were recorded and transcribed via a transcription program. Participants were reminded of the study and the consent form they signed. They were told they are volunteers and may stop the interview anytime. The recording began as soon as the participant and the researcher were online in the Zoom meeting room, participants were asked to give verbal permission to be recorded. If the participant refuses to be recorded, the interview would have ended immediately. To conduct this research, a transcript of the complete interview was available for analysis. The bit of the interview that was recorded was deleted. When permission to record is given, the interview began. All sessions lasted approximately one hour. No session went over that time limit.

The researcher gave specific instructions about how the interview would proceed. First, formative feedback was defined so the participants are clear on the definition used in the study. The researcher interviewed with a scripted list of open-ended questions. (See attached Appendix C.) Participants were encouraged to elaborate on their responses only if they felt they had to give more clarification or greater depth. However, the researcher only asked questions that have been developed and approved. The researcher took notes concerning observations of the participants, reaction to questions and made sure the participant is not becoming uncomfortable continuing the interview. The researcher also addressed potential personal bias by only using the transcribed recordings to analyze the data in a digital format. The researcher only used responses given by the participant from the open-ended questioner and the three-question guide for the document review. The researcher did not prob edit responses or follow additional lines of questioning. The researcher stayed consistent during the interview to ensure no emotions or reactions can be indicated by the participants responses. The researcher asked a trusted colleague to review the data and provide feedback if areas express bias. In addition, the researcher checked with the participants throughout the interview to make sure the researcher understands the responses (Creswell, 2013). This is done through active listening, where an interviewer repeats precisely what is said or offers an interpretation to ensure accuracy or prompt more detail.

Interview Questions

The open-ended questions used for the one-on-one interviews are linked to the overarching research question and the sub-questions the study wants to investigate. Those questions are:

1. What is your perception of attending an HBCU? (CRQ)
2. Describe your relationship with your committee chair before beginning the dissertation process? (SQ1)

3. How important was it for you to have a committee chair of the same ethnicity or social background as you? (SQ1)
4. What did you and your committee chair have in common (i.e., ethnicity, gender, social background, area of research)? (SQ1)
5. What challenges, if any, did you face with your dissertation committee? (SQ1)
6. What challenges did you face with accomplishing milestones within the program? (SQ3)
7. What were some of the strengths of the Ph.D. Biomedical dissertation committee process? (CRQ 3)
8. What experience did you have in preparing your regular committee meetings? (SQ2)
9. What have been some of the formative feedback comments that you received from your committee chair? (SQ2)
10. Describe how you felt before, during, and after receiving this information. (SQ2)
11. Describe how the feedback impacted your progress (SQ3)
12. How would you compare your feelings from the first and last committee meetings? (SQ3)

Interview Questions Rationale

The rationale of asking question number one, “What is your perceptive of attending an HBCU?” is to gain a deeper understanding of how attending an HBCU may have influenced the participants' experiences and perceptions of their dissertation process. Research has shown that attending an HBCU can positively impact students' academic and social experiences, including increased academic motivation, a stronger sense of belonging, and greater satisfaction with the college experience (Gasman et al., 2018; Palmer et al., 2018). By asking about their perceptions of attending an HBCU, we hope to understand how this unique educational experience may have

influenced the participants' attitudes toward their dissertation process and the formative feedback they received.

Questions two through five are relevant to the first research sub-question one: “What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU about the mentoring experience during the dissertation process?” The mentor-mentee relationship is critical to the success of the doctoral student, and the committee chair plays a crucial role in this process. The literature suggests that having a mentor of similar ethnicity or social background can enhance the mentor-mentee relationship and lead to tremendous success in the doctoral process (Johnson, 2016; Williams, Berger, & McClendon, 2005). Furthermore, commonalities such as shared research interests, gender, or ethnicity may facilitate effective communication and understanding between the student and their committee chair (Gee & Burt, 2018).

On the other hand, challenges such as lack of support, ineffective communication, or power struggles may negatively impact the mentoring experience and hinder the doctoral student's progress (Pfund et al., 2016). Thus, exploring the perceptions of alums about the mentoring experience during the dissertation process can inform strategies to improve the mentor-mentee relationship and enhance the success of doctoral students in biomedical research.

Questions eight through ten are relevant to the research sub-question two: “What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on earning a Ph.D. at an HBCU as opposed to another type of institution?” Regular committee meetings provide an opportunity for doctoral students to receive feedback from their committee members and make progress in their research. The feedback provided by the committee chair can be instrumental in improving the quality of the research and ensuring that the doctoral student is on the right track (Kamler & Thomson, 2014).

Additionally, the feedback provided during these meetings can significantly impact the doctoral student's self-efficacy and motivation to continue their research (Reyes & Anderson, 2019). Exploring the experiences and feedback from alums during their committee meetings can provide insights into the perceived benefits of earning a Ph.D. at an HBCU compared to other institutions and inform strategies to improve doctoral experience.

Finally, questions six, seven, eleven, and twelve relate to the third research sub-question: “What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on whether receiving formative feedback influenced a sense of self-efficacy and motivation to persist to completion of the Ph.D. program?” Completing a Ph.D. program can be challenging, and doctoral students often face numerous obstacles in accomplishing milestones within the program. The dissertation committee process can provide support and guidance to students, which can be instrumental in promoting a sense of self-efficacy and motivation to persist to completion of the Ph.D. program (Henning et al., 2019). Understanding the challenges and strengths of the Ph.D. biomedical dissertation committee process can provide insights into how formative feedback may influence a student's self-efficacy and motivation to persist to completion. Additionally, comparing the feelings from the first and last committee meetings can provide insights into the changes in self-efficacy and motivation throughout the program.

Interview Data Analysis Procedures

Braun and Clarke's (2006) reflexive thematic analysis framework was utilized to analyze the qualitative data gathered from the interviews. One specific form, reflexive thematic analysis, takes an organic approach in that a codebook does not bind the researcher, a predetermined list of codes compiled before data collection (Braun & Clarke, 2019). It allows the researcher more flexibility in applying theory to the study and determining the type of approach and level of

analysis the researcher uses and what a theme is (Braun & Clarke, 2006; Campbell et al., 2021). Reflexive thematic analysis requires six steps.

Step 1: Data familiarization. This requires the researcher to immerse himself or herself in the data to become familiar with it and begin searching for patterns of meaning. The researcher must read and re-reach each data set and take notes. At first, this will allow for a holistic understanding of the language participants use and provide an understanding of the meanings of the responses. Attention can be applied to responses to individual questions and how they relate to the sub-questions in this proposed study.

Step 2: Generation of initial codes. As the researcher reads and rereads the data, recurring patterns in the responses begin to appear. The researcher must begin labeling or coding specific parts of responses and organizing them into like groups. Each identified meaning unit is labeled with a code. This procedure is called the "open coding process" (Berg, 2001).

Step 3: Search for themes. The researcher continues to sort codes into themes and begins to recognize relationships between codes. Some researchers will diagram or map those early themes into word maps. Other researchers will write down themes and what defines them.

Step 4: Review of themes. Here more patterns begin to emerge within the coded data. Linkages to other codes can be found within the entire data set. The researcher will need to determine whether enough data supports each theme. The researcher may need to overlap theme categories or blend two or more into one broad theme. This will require re-working and refining all the codes and themes.

Step 5: Defining themes and naming them. Here the full story of each identified theme will become more apparent. The researcher will determine the broad story that the data set tells and how it relates specifically to the research question and the sub-questions of this study. The

researcher's task currently is to go back and forth between the data set and the broad themes to begin to tell a story.

Step 6: Write-up. The researcher will present a concise story of the findings from the data that supports the themes and addresses the research questions. This report requires analysis and synthesis to interpret what the data says and goes beyond just reporting themes. This method was applied to the Zoom interviews once transcribed by a qualitative transcription program. When the questionnaires have been retrieved from the Qualtrics survey platform, they will also be analyzed. Braun and Clarke's (2006) method will also analyze the formative feedback data. This will be a time-consuming process but will produce rich data. A wealth of pertinent codes can yield diverse themes (Kuckartz & Rädiker, 2019).

It should be emphasized that at no time will personally identifying information remain on the data after it is collected. Per the Interview Protocol (See Appendix F.), each interview participant was assigned a number or a pseudonym before the interview. The raw data will not be shared, transmitted, or published except for excerpts in a research document.

Questionnaire Data Collection Approach

The researcher developed a five-question Alums Perception Questionnaire. A peer and colleague reviewed the perception questionnaire to ensure the questions were unbiased (see Appendix D). The participants were notified that the research is voluntary. Participants were welcomed to quit at any time. There is a confidentiality clause to rest assured that nothing they say in their responses will only be shared in the researcher's analysis report. No individual's shared narratives or results was identifiable in the data analysis or future publications. The participants are given two weeks to complete the online questionnaire.

Questionnaire Questions

The five open-ended questions of the Alums Perceptions Questionnaire are also tied to the overarching research question and the three sub-questions. The questionnaire questions are:

1. What is your perception of the formative feedback you received through your dissertation process? (CRQ)
2. What is your perception of receiving formative feedback assessments from faculty members in Biomedical research and work at the HBCU you attended? (SQ1 and SQ2)
3. What is your perception of using formative feedback and the development of self-efficiency? (SQ3)
4. What is your perception of how helpful, impactful, rewarding, or non-significant receiving formative feedback was at an HBCU and helping students accomplish their goals of defending their dissertations and graduating? (CRQ)
5. Please feel free to make additional comments or share any memorable moments from your dissertation experience (CRQ)

Rationale for Questionnaire Questions

Questions one, four, and five on the questionnaire are related to the study on the perceptions and lived experiences of biomedical research Ph.D. alums from the southern regional HBCU about formative feedback received during their dissertation process. The study aims to explore the effectiveness of formative feedback and its impact on the success of Ph.D. candidates. A recent study by Williams et al. (2018) found that the quality of formative feedback received by Ph.D. candidates can significantly affect their academic success. Another study by Kim et al. (2020) emphasized the importance of continuous feedback and its positive effects on student learning. Therefore, universities must provide adequate and continuous feedback to Ph.D. candidates to ensure their academic success.

Question two of the questionnaires is relevant to sub-questions one and two of the research. The investigation of alums' perceptions of receiving formative feedback assessments from faculty members who could have the same cultural background might speak to their persistence in the program (Gaston-Johansson et al., 2021). Further insight into the influence of the mentorship experience on alums' impressions of their graduate education may be gained by looking at Ph.D. alums from a southern regional HBCU's perspectives on receiving a Ph.D. at an HBCU instead of another type of institution. Investigating these issues can help us gain a more profound knowledge of the mentorship process and how it affects Ph.D. candidates and alums working in biomedical research (Boutwell et al., 2021).

Question three of the questionnaires gave insight into understanding the perceptions of biomedical research Ph.D. alums on the relationship between formative feedback, and self-efficacy is critical in determining the effectiveness of academic support mechanisms. As Bandura (1977) stated, self-efficacy plays a crucial role in motivation toward achieving academic goals. Therefore, examining the impact of formative feedback on self-efficacy and persistence is crucial in identifying strategies to improve the success rate of Ph.D. candidates. In this proposed study, one aim is to investigate the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on whether receiving formative feedback influenced a sense of self-efficacy and motivation to persist to completion of the Ph.D. program. Our findings will contribute to the literature on the role of feedback in academic success and inform the development of effective academic support mechanisms.

Questionnaire Data Analysis Procedures

Braun and Clarke's (2006) six-step method for analyzing qualitative data was followed to analyze the open-ended questionnaire in this study. The first step involves familiarizing oneself

with the data, followed by generating initial codes to identify patterns in the data. Next, the codes are reviewed and refined to form potential themes. The fourth step involves reviewing and defining the themes to ensure they accurately capture the data. Finally, the themes are named and summarized in a report. This method has been widely used in social science research to effectively analyze qualitative data (Braun & Clarke, 2006).

Document Analysis Data Collection Approach

The alums participants were asked to follow a three-question document review guide (Appendix E) to review at least one of their formative feedback documents. They were asked to discuss the impact of some of the feedback from the documents. The historical documentation shared will have the participant and committee, and chairs' names and any other identifying information removed. The documents were reviewed as samples of formative feedback that has been given to Ph.D. students over the past few years. The participants dissect their document information as examples of how when they were a student received real-time formative feedback while in their dissertation process; the frequency of favorable opportunities to improve their dissertations. This was the reveal the utility and effectiveness of this formative feedback (Martin, 2020).

Document Review Questions

The researcher asked the participants to use the following three-questions review guide to review the formative feedback document. Those questions are:

1. What is your perception of the written formative feedback in the document? (CRQ)
2. What did the mentor say in his or her feedback, if anything, that indicated that they identified with your experiences as an African American learner in the biomedical science Ph.D. program at an HBCU? (SQ2)

3. How did the written formative feedback impact you during your dissertation process? (SQ1)

Question one in the document review process relates to the central research question in the proposed study and has been a question previously used in a document study conducted by Smith et al. (2020) on the perceptions and lived experiences of research Ph.D. alums. Just as the previous study, this proposed research study aims to explore the impact of formative feedback on the academic and professional success of the alums. By asking participants to reflect on their perception of formative feedback, the study gains insight into the effectiveness and relevance of the feedback received during their dissertation process. This information can inform future practices and policies to enhance the quality of formative feedback in graduate programs.

Question two in the document review relates to the broader topic of perceptions of biomedical research Ph.D. alums from southern regional HBCUs on earning a Ph.D. at an HBCU instead of other types of institutions. This question explores how mentors at HBCUs support African American learners in the biomedical science Ph.D. program. According to Johnson and Huwe (2019), African American students at HBCUs face unique challenges in the STEM fields, and mentorship is crucial to their success. By examining the feedback provided by mentors, this study aims to identify the ways in which they support and identify with African American learners in the program.

Finally, the third and last question in the document review process is relevant to the study of perceptions of biomedical research Ph.D. alums from a southern regional HBCU about their mentoring experience. According to previous research, formative feedback has positively impacted graduate students' learning and development (Hattie & Timperley, 2007). Therefore, understanding how formative feedback influenced the dissertation process for these alums could

provide insight into the effectiveness of mentorship during graduate school. By examining the perceptions of alums regarding their mentoring experience and the impact of written formative feedback during the dissertation process, researchers can gain a comprehensive understanding of the graduate school experience at this HBCU.

Document Review Data Analysis Procedures

As previously mentioned, when conducting a qualitative research study, it is vital to use a systematic approach for analyzing data obtained from document review. One widely recognized method is the six-step approach prescribed by Braun and Clarke (2006). This method involves familiarizing oneself with the data, generating initial codes, searching for themes, reviewing themes, defining, and naming themes, and producing a final report. Researchers can use this approach to ensure that their data analysis is rigorous, transparent, and systematic (Braun & Clarke, 2006). These are the steps that the researcher followed to conduct a thorough analysis during the review of the document collected by participants.

Data Synthesis

An assessment of the results of all the data sets was conducted. The researcher must become familiar with the data by reading and rereading the final codes and themes found in each data set and any notes made. Grouping themes and their related excerpts from the data sets may eventually create more patterns and broader themes (Catanzaro, 1988; Graneheim & Lundman, 2004). After the meaning units and themes have been identified and grouped, a larger picture will emerge from all three data sets (Burnard, 1991). Once the themes are established for all data sets, the analysis and the writing-up process begins. Writing specific sections about the findings for each data set and then for the actual data collected may be necessary. After reviewing all the data, the findings should show the alums' perceptions and lived experiences of the impact of

formative feedback from their committee meetings. The findings are presented in Chapter 4, and a discussion of the implications of the findings, research limitations, and suggestions for future research are presented in Chapter 5.

Trustworthiness

Lincoln and Guba (1985) defined the concept of trustworthiness by introducing the criteria of credibility, transferability, dependability, and confirmability to parallel the conventional quantitative assessment criteria of validity and reliability. To be accepted as trustworthy, qualitative researchers must demonstrate that data analysis has been conducted in a precise, consistent, and exhaustive manner through recording, systematizing, and disclosing the methods of analysis with enough detail to enable the reader to determine whether the process is credible (Nowell al et., 2017). Trustworthiness was established in this research study by ensuring that credibility, transferability, dependability, and reliability are maintained.

Credibility

Credibility is confidence in the truth of a study's findings or the extent to which the findings accurately describe reality (Lincoln & Guba, 1985). Accuracy can be enhanced through prolonged engagement and persistent observation (Lincoln & Guba, 1985). This was done with the interviews by spending sufficient time with each participant to understand their experiences and the phenomenon being studied. This will encourage saturation for each question (Lincoln & Guba, 1985). In addition, extended time was spent analyzing the interview transcripts, the questionnaires, and the feedback documents. Further, additional data accuracy was provided through member checks when the interview transcripts are sent to the participants before analysis for the participants to verify their accuracy (Marshall et al., 2022). In addition, a colleague was employed to review the data to ensure all steps have been undertaken.

Transferability

Transferability shows that the findings may have applicability in other contexts (Lincoln & Guba, 1985). This may sometimes be difficult with specific groups and small sample sizes. It can be enhanced through thick descriptions, increasing external validity (Geertz, 1973; Lincoln & Guba, 1985). Thick description occurs when a researcher's prolonged exposure to interview participants results in rich data. The researcher strived to create rapport with the interview participants to probe long enough and deeply to provide a depth of detail of their experiences. Analysis of all written data sets was also require sufficient time with the data to unearth every viable code and theme.

Dependability

Dependability shows that the findings are consistent and could be repeated (Lincoln & Guba, 1985), which occurred through the review process by the researcher's committee and the internal audit done by a colleague (Lincoln & Guba, 1985; Marshall et al., 2022; Rutakumwa et al., 2020). Internal audits done by someone not connected directly with the study can provide objectivity and feedback to determine that the data, findings, and interpretations are accurate and supported by the data (Lincoln & Guba, 1985). This can allow the researcher to return to the data and re-examine it. In addition, all procedures and processes were written. Data gathering tools are without biases and can be reproduced for further study.

Confirmability

Confirmability is the degree of neutrality or the extent to which the respondents shape the findings of a study and not researcher bias, motivation, or interest (Lincoln & Guba, 1985). The techniques for confirmability was achieved through the triangulation of the three data collection methods. The overarching research question and some, if not all, of the sub-questions was used

throughout each data collection method. Data analysis was reviewed by the researcher's committee members and the internal auditor, who will confirm that no biases have occurred.

Ethical Considerations

To protect the ethical integrity of the proposed study, the researcher has studied and passed the Collaborative Institutional Training Initiative (CITI) basic training for Social and Behavior Research. The researcher has committed to ensuring that strategies for collecting data are responsible and that research attends to a professional code of conduct that ensures the safety of all participants (Cacciattolo, 2015). To ensure all participants feel a sense of well-being, careful strategic planning for data collection was considered. Informed consent was given to all participants before the research began.

Ethical guidelines and research protocols was reviewed, and the identities of research participants will be protected (Smyth & Williamson, 2004). It is not assumed that emotional trauma may be a factor, but participants was informed that they can abort their volunteer participation at any time. In that case, the participant will immediately be excused from the study, and it was suggested that they seek professional help. Finally, all data is password-protected with multiple authentication security measures to avoid ethical breaches.

Summary

The methods described in this proposed study was collect data from African American alums in a Ph.D. program for biomedical science at a small southern regionally located HBCU. Participants were recruited through LinkedIn via a snowball technique. Data was collected through individual interviews via Zoom, an Alums Perceptions Questionnaire, and formative feedback documents from the participants. This data was analyzed using Braun and Clarke's 6-step method. The findings was provide a greater understanding of the perceptions of formative

feedback given by the committee members to African American alums from a small southern regionally located HBCU in a Ph.D. program for biomedical science. The findings was indicate if the participants were significantly impacted by formative feedback to persist and matriculate. The findings of this research should close the literature gap found in the literature review of this study and reveal whether using formative feedback impacts and improves the dissertation process and increases the retention of African American Ph.D. students in a biomedical sciences program.

CHAPTER FOUR: FINDINGS

Overview

The purpose of the current qualitative phenomenological study was to explore the perceptions and lived experiences of biomedical Ph.D. alums concerning formative feedback during their dissertation process at an HBCU in the southern region of the United States. This chapter contains descriptions of the participants, the three types of data that were collected and analyzed, themes that emerged from the data, and how those themes relate to the research questions.

Participants

Data collection occurred between August 2023 and October 2023. Twenty individuals responded to the snowball invitation to participate in the study. Eleven of those individuals met the set criteria which included agreeing to participate in all three modes of data collection procedures. In Table 1, the participant's demographic information is featured. Participants are listed by pseudonyms, and a detailed description of everyone is listed in the following table. The appropriate column headings include the participant's name, age, race, gender, years of separation time, and an indication of participating in more than two committee meetings.

Table 1

Biomedical Ph.D. Alumni Participants

Alumni Participant	Participant Age	Race	Identified Gender	Years Separated from Institution	More Than Two Committee Meetings
Alex	30	African American	Female	3 Years	Yes
Bettie	35	African American	Female	6 Months	Yes
Chrissy	32	African American	Female	1 Year	Yes
Donna	47	African American	Female	3 Year	Yes
Elenor	29	African American	Female	2 Years	Yes
Frank	30	African American	Male	3 Years	Yes
Georgia	30	African American	Female	6 months	Yes
Henry	29	African American	Male	1 Year	Yes
Ivy	30	African American	Female	2 Years	Yes
Jennifer	30	African American	Female	1 Year	Yes
Kevin	30	African American	Male	6 Months	Yes

Alex

Alex is a 35-year-old African American female who has been excited about becoming a science researcher since completing her undergraduate degree. She said she wanted to attend a school that would nurture her passion for science and her area of research. For her, the appeal of the HBCU was not because it catered to African American students. She said she has all confidence that she would have been treated the same way and would have flourished if she had accepted the offer and attended the school that offered her admission, which was a predominantly white institution (PWI). However, she does feel HBCUs are extremely helpful for certain kinds of students. She gave the example of, “students who feel like they want an

environment that understands racial inequalities, or who do not feel they would fit in at a PWI." Alex expressed one of her biggest draws to the HBCU was the rich tradition.

Alex said her committee changed a few times due to some unforeseen incidents. However, she said the final committee was great and she was able to build a solid relationship with them. A relationship she has been able to cherish even as she is now in her professional setting. Although her chair was not African American and not a person, she had a lot in common with, she felt that they bonded over the subject of her research and the understanding the need for work-life balance.

Alex also said that the little formative feedback she received was supportive. It helped her move to graduation with no issues. She stated, "If formative feedback is clear and direct it will help candidates to become more independent. It can help Ph.D. candidates transition into the space of seeing their mentors and peers as colleagues as they prepare to defend their dissertations."

Bettie

Bettie is a 30-year-old African American female who was a two-time graduate of another HBCU before applying to the institution to pursue her Ph.D. studies. She did consider attending PWI and was accepted; however, she decided to attend the southern regionally located HBCU. One of the biggest draws was her feeling that HBCUs provide a more supportive and relatable environment compared to PWIs. She said this is due to similar backgrounds and experiences among students and faculty. She explained the historical significance of HBCUs being created to provide educational opportunities to minority individuals who were not accepted or allowed to attend PWIs. She went on to explain "One of the misconceptions about HBCUs is often they are stigmatized as providing 'handouts' or being looked at as a 'fallback' they can be 'more rigorous

academically' in comparison to PWIs." Additionally, she said from her experience she was not made to feel like she had to fit in. Or she was not being compared to "others" as she feels she would have had to do attending a PWI. She said she appreciates the inclusive nature of HBCUs.

She mentioned that another misconception is that "only African American students are accepted and attend an HBCU. On the contrary, that is one thing I can appreciate about the HBCU culture, we are inclusive to accept anyone and not treat anyone differently due to their background, race, or ethnicity."

Bettie expressed that she valued formative feedback during her dissertation experience. She said she felt the feedback was always helpful. From her experience, she was able to build an extraordinarily strong relationship with her committee throughout the process. That is a relationship that has continued beyond graduation and has taken her into her career. She stated, "the feedback had a great impact on the work I did and do now."

Chrissy

Chrissy is a 32-year-old African American, who was an award-winning scientific research presenter before attending the HBCU. She mentioned she never gave a second thought about studying for her Ph.D. Although she did apply and was accepted to several other public, private, PWIs, and other HBCU institutions, she was drawn to the one southern regionally located HBCU because of its reputation and the reach into the community.

She said she felt that HBCUs are super beneficial for a person of color. She stated, "When a person chooses to attend an HBCU it is not only personal preference but someone who cares about their culture. They have an appreciation for their history. They must be intentional about their decision. It is a financial intentionality."

Chrissy said although she enjoyed her HBCU experience the process was very confusing.

She said most of the feedback she received was critical feedback about her presentation skills. This was a bit jolting to her and confusing because she had always done so well and even won awards for her presenting skills. She expressed that she felt the feedback was hard to accept because it was very harsh. In her eyes, it could have been delivered a different way. It was due to the harsh tone, and the delivery of the feedback that gave her the grit to persevere to the end. At one point she just wanted to do it to get away from her committee and chair. But toward the end, she was proud of her work. As she said, "it was the distaste for their criticism of me that made me mad enough to do better each time, until it was perfect in their eyes and mine."

Donna

Donna is a 47-year-old African American female who decided to go back to school after being away from it for such a long time. She thought of herself as one of the oldest students. Donna said it was important for her to have peers and mentors who share similar backgrounds, race, and culture. However, she said she values diversity and a variety of perspectives academically and in the research community. She stated, "I felt that attending an HBCU could provide me with the mentorship and preparation needed to succeed in the Ph.D. dissertation process. One of the biggest draws to the institution and the program was to be mentored by a person of color who could relate to my needs as a mature woman of color."

Although she ended up with a mentor of a different ethnicity, cultural background, and a different gender, they did have their age in common. She ended up really valuing his mentorship. She mentioned she felt his knowledge was "broad and gave great, supportive feedback." She mentioned that he was especially great at encouraging and getting her to accept her 'unique ability' to present her research. She continued to explain that he was very understanding and knew the right things to say when she allowed self-doubt to creep in.

Elenor

Elenor is a 29-year-old bi-racial identified as an African American female. Elenor said she did think about applying to a PWI but felt it was more important for her to attend an HBCU. However, she felt the lack of the school's funding resources impacted her experience dramatically. Although she does not regret the decision to attend the southern regionally located HBCU, she feels that some of the issues she had working with her chair would not have happened had she attended a PWI. "From the outside looking in, PWIs never have the funding issue that the HBCUs have."

Another observation is that she wishes there were more women chairs available to mentor female students. Elenor states, "They would not have to necessarily be the same ethnicity, but a woman in general. That would have made a profound impact on the experience." She felt the feedback she received was given with good intentions but was sometimes conflicting because the committee did not always collaborate before giving her the feedback. Sometimes the feedback was not really about her research but came with some racial or social stereotype undertone, depending on who was delivering the message. Elenor felt that the feedback did not necessarily move her forward because it was not constructive enough to give direction or encouragement. However, it caused her to be more resourceful. It made her find answers for herself out of self-determination to graduate from the program.

Frank

Frank is a 30-year-old African American male. Frank was offered a scholarship to attend a PWI, but he felt he would gain better experience from attending an HBCU. Frank is a two-time HBCU graduate and says they were the best experiences he has ever had. He said he feels it is important to learn in an environment with people who look just like him. He said prior to

attending college he attended schools and programs where he was the minority and usually, he was the only African American student. He stated, “it was a unique experience to be in an environment that is constructive for us not to feel alone and to be able to share similarities and be able to relate to one another a lot easier and get prepared for the real world.”

Frank shared he experienced a rocky time when first starting to work with his chair. He said there was a communication gap that caused a bit of a barrier in their relationship. The communication was not due to speaking different languages but coming from diverse cultures. The chair was a little more direct and spoke in a much harsher tone than Frank was used to. However, Frank spoke with other administrators who helped him understand it was a cultural difference. After some time of working together, Frank began to realize that the harshness was just part of the chair's tough love tactics. Frank stated, “I started to understand, that he was doing it for my good, and toward the end of the program, he started being a little easier to deal with.”

Later, in the program, Frank said he started to realize there were other personal emotions tied to their relationship since he was the last student that the chair was going to have at the institution because he was soon to retire. Frank stated, “One of the last things he said to me is that I know I was difficult to work with but now I know that you're prepared to collaborate with any person going forward in your career.” Frank said it was the tough love that pushed him to get everything right the first time, move on through the milestones, and get done with the program.

Georgia

Georgia is a 30-year-old African American female. She was offered an opportunity to attend a PWI but chose to attend the southern regionally located HBCU. She said she chose to attend an HBCU for her studies because she wanted to be in the center of a specific type of environment that only an HBCU could give her and that aligns with her interests and goals. She

said she feels like HBCUs have a way of providing an atmosphere that would ensure the outcome specific students are trying to obtain, for students of color and particularly for the Black community. She said, “I believe that attending an HBCU affords the opportunity for Black students to be among their peers who share similar interests and goals. These institutions are places where people go to be a part of achieving those goals in a like-minded atmosphere.”

However, when asked about the formative feedback she received throughout her dissertation journey she replied, “it was good when I received it. I am not sure my committee members were tangentially invested in my project and often had to be reminded of what my project was about, even as I collaborated with them throughout my years there.”

Henry

Henry is a 29-year-old African American male. He had opportunities to attend PWIs, however felt that he never wanted to attend anything else except an HBCU. His life dream was to be a medical researcher and discovered after his grandmother died from cancer that it was important to graduate and work with under-representative population.

That is why it was important for him to choose one of the few HBCUs with the biomedical science Ph.D. programs. “The work they and are known for doing in the African American communities is my drawn to this HBCU. I would not think of going to any other institution”.

Henry, mentioned during his interview that he was very disappointed because he and his dissertation chair did not always see eye to eye. Henry said, “it was heart breaking because I wanted too much to please my chair. I studied his work. I was excited that he approved me for to be one of his students. I even saw myself doing some of the research work with him. But the

more I started to work on the study the more it seemed he pushed me out of his lab and stop giving me feedback or helping me through the process".

Luckily for Henry he had other dissertation members to lean on because he said one point in his process the chair stopped answering all correspondence. The other members became his go-to and helped him progress successfully through the program.

Ivy

Ivy is a 30-year-old African American female. Ivy testified that she was on her way to a PWI. Her bags were packed. She thought she was not going to get accepted to the HBCU. The few weeks before she was going to head to the PWI she finally got a call that she was accepted and needed to report to the institution and needed to give them an answer if she was going to accept admissions. Without a second thought she called the other institution and made plans to move closer to the HBCU and the rest was history.

Ivy said her experience with the institution was not the dissertation faculty but the help of her chairs. Her experience started out rocky because "the processes at the school can be old, antiquated. I had a hard time with that because I am a planner. I am a communicator, and I needed the process to make a plan and for us all to follow the same process and communication style. That was not the case". Therefore, she did not have the best experience during the beginning of the process. But later when some of the process started to change there was a more formulated process, where feedback was required to be done, her experience changed. She felt that was the impact that changed for the best.

Jennifer

Jennifer is a 30-year-old African American female. She said being raised in South Georgia with two parents who are HBCU graduates, there was not a choice of her attending an

HBCU. It is a family tradition that will continue to live if the institutions are available. Jennifer said her father is a doctor but graduated from a much larger institution. But she wanted to have the experience of attending a smaller school that did research geared toward healthcare disparities. Therefore, the chose to attend this southern regionally located institution was without a doubt had to be the one that she attended in her mind.

Jennifer said she and her chair did not get along. She said she never saw where he had her best interest at heart. Just like other alumni participants she to had to seek help elsewhere. But unlike some of the other alumni participants the relationship between she and her twin did not turn around. “I received the greatest help from my personal mentor, and others on my team but not primary dissertation chair. The impact of formative feedback was great, and I greatly appreciated the feedback. However, I did not get it from my chair. I received feedback from other faculty members and my personal mentor.”

Kevin

Kevin is a 30-year-old African American male. Like the other participants in the study. He was accepted to a PWI but said there was no other place he wanted to go accept an HBCU. His heart was in it for the experience. Being raised in a predominantly white community and after attending a PWI for his undergraduate and master’s level graduate school he said he wanted to find a place that he felt he finally fit in.

“I was okay attending the PWI for my undergraduate education, but it was a struggle to finish my master’s study because the more specialized I became in my discipline the more I noticed that there were fewer and fewer African Americans in my program. At one time I literally went to school and sat in a classroom and wanted to get up and leave and never return because I felt like I did not fit in”.

Results

This section includes the results of the data analysis. The results are categorized into three overarching themes that include multiple sub-themes. The data was triangulated through three data collection methods that included one-on-one interviews, questionnaires, and document review analysis.

The initial coding was further refined into second-level coding using all key responses organized based on the research questions. This analysis presented in Table 2, resulted in categorical constructs and sub-themes.

Table 2

Deductive Coding into Constructs

Research Questions	Themes from data collection responses	Codes from Key Responses	Sub-themes	Number of times themes are mentioned
CRQ What are the perceptions and lived experiences of biomedical research Ph.D. alums from the southern regional HBCU about formative feedback received during their dissertation process?	Effective feedback	Using feedback to move on Checks and balances Communication Constructive feedback Impactful Lack of feedback	Feedback with tough love Communication	59
Sub-Question One: What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU about the mentoring experience during	Importance of attending HBCU	Purposeful Cultural, ethnic, and social background Familiarity Investment Historical significance Nurturing environment Diversity	Diversity Intentionality	105

the dissertation process?		Like-minded interest Minority experiences Miss conception of HBCU		
Sub-Question Two: What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on mentoring during the dissertation process at an HBCU instead of another type of institution?	Relationship with chair/mentor(s)	Committee meeting dynamics Challenges with committee Insensitive mentors Close relationship Common interest Outside committee chair Mentorship	Alignment Expectations Building supportive relationships	62
Sub-Question Three: What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on whether receiving formative feedback influenced a sense of self-efficacy and motivation to persist to completion of the Ph.D. program?	Gaining self-efficiency	Build confidence. Administrative challenges Progression Feedback influence Motivation to keep going. Negative support; positive results	Impact of feedback	59

Effective Feedback

Each of the participants identified the need for and importance of effective feedback. Some of the ways they defined the feedback as being guided, consistent, given in a timely manner, explained in a clear and does not always agree, could be harsh but made an impact for

change of behavior, skill, or knowledge. Although not all the feedback was good, helpful, and seemed to be harsh, the participants all felt that some feedback was better than no feedback at all.

Elenor stated that she did not always get feedback directly from her committee chair. However, she did get "helpful feedback from her peers, other mentors, and some other committee members." Alex said, "The feedback was good to keep the work moving along. Even if that meant that after it was received there was more work to be done. It was a great feeling knowing that I was making moves in the right direction." Bettie said without feedback from the committee there would not have been any progress. However, if the feedback were not direct or clear, it would feel like I was doing the same thing repeatedly with no ending to the cycle."

Throughout the interviews it was stated multiple times that feedback is only good when the person receiving it accepts it. Jennifer mentioned that although her chair tried to give her feedback, she had a hard time trusting his motives. Therefore, she seconded guest his suggestions, "It just never felt like he had my best interest or the interest of my study at heart, but I have known my personal mentor a long time. My personal mentor could not be on my committee of course but she was someone I could filter my ideas through. She is someone that showed interest and she was someone who took the time with me to get it right. I never felt that from my committee chair. So it was tough to believe that I could trust his guidance".

Feedback with Tough Love

Several participants discussed the harsh reality that feedback did not always feel good. There were times when the feedback was harsh, hurtful, or felt more like it was being used to tear them down instead of building them up. Participants acknowledged that on several occasions this kind of feedback made them want to give up. But later it was the fire that ignited them to push even harder to reach their goal and several even mentioned being better because of it.

Frank stated that for a long time, he felt like his chair was picking on him. “The tough love approach does not work for everyone. It impacted my confidence at first.” Frank goes on to discuss how his committee chair seemed to always find something wrong with what he had done. However, Frank made up his mind that he would use the negative comments for his benefit. He says, “If you are willing to stick to it, you could use the energy to succeed. It was the best approach for me. However, it did produce satisfactory results in the end.”

Elenor recalls that although she did not get much feedback from her chair, what she did receive were negative comments that felt racist and sexist. But it was those comments that pushed her to continue and search for helpful feedback from others.

Chrissy stated, “For years, I received rewards for my presentation skills but all of a sudden, I had a chair who not only did not like my presentation style but crushed my confidence for speaking in public.” However, she did not let it stop her. She mentioned on occasions she went into the bathroom, cried it out, and began to work even harder the next time.

Both Chrissy and Frank later discussed how they hated the tough love when they were getting it but later realized that it was working for their good. Frank said “My chair later explained to me that he was hard on me for my own good. He wanted to make sure I could walk into any corporate setting and stand toe-to-toe with anyone I was presenting to.” Frank said that, although he is working in an environment where the population is predominantly older white gentlemen, he is confident when he walks into the room. He said he has even gotten some colleagues who confessed to him that they did not expect all the knowledge they gained from him. He said he did not know if that was because of his race, age, or the institution where he earned his degree. But what he knew was that it was all because of tough love that he developed the tenacity to speak with confidence and deliver with excellence every time.

Communication

Just as in most relationships, communication is the key. Alumni emphasized the significance of understanding what was expected from their committee. When given clear directions on what was expected of them it was easier to maneuver their way through the process. As a few of them expressed, building a good rapport and being able to connect with their committee members, especially with the committee chair, was vital for their progress.

Chrissy emphasizes the significance of understanding and meeting the expectations set by the committee. “After the second committee meeting, I started to understand how to ask a lot of questions. The more questions I asked the more I could meet the expectations set by the committee.” Chrissy said once she started to understand what was expected of her, it became instrumental in propelling her progress. Her experience suggests that when there is clarity and coherence between a student's vision and the committee's expectations, it not only streamlines the process but also fosters a sense of purpose and direction.

Elenor shared that there is a great deal of complexity that arises when there is a misalignment in expectations. There is significant importance in ensuring that students are well-informed and adequately prepared for the unique challenges posed by the dissertation process. The committee, the chair, and the students all have a responsibility to be transparent in communication. Taking proactive measures, such as comprehensive orientations or workshops, can play a crucial role in mitigating potential obstacles arising from the misalignment of expectations.

Henry mentioned that he and his mentor did not see eye to eye. For him that was very disappointing. Henry mentioned he watched his dissertation chair’s former work from a far and even before coming to attend the southern regionally located institution, he was a fan and

reached out to the only African American scientist that he felt like he knew. Henry had expectations from not only being in his lab and working with this great researcher, but he was looking forward to being a student and sit "under the feet" of this great man to study his work even closer. But after when the time, Henry said he felt like he was barely being tolerated. "It was a heartbreaking experience and very disappointing because this was someone that I admired. I loved what he was doing in the community and wanted to be a part of making history with him". Henry shared further that if it had not been from his other committee members, he felt he would not have completed the program. Henry remembers one dissertation chair pulling him to the side and encouraging him to keep going because he could see the look of disappointment and defeat after one of their meetings.

The lack of communication from Henry's mentor could have caused him to lose his opportunity to earn a degree due to disappointment and discouragement. Henry also shared that there was a big fear that the chair was avoiding him because he thought he had let him down.

Ivy also mentioned that she is a communicator and the lack of communication from her chair was upsetting. But unlike Henry, she and her dissertation committee had one meeting where she explained to them that the communication needed to change. She explained her style of learning was a little different and proposed implementing a solid plan. She said, "that was the best thing that could have ever happened. They agreed to the proposal and implemented a plan that was a little stricter on all of us. Scheduled meetings after her committee met and discussed her work and their expectations. That way when we all came to the meeting, we were on one page. It was the best change to the process that could have ever happened".

Importance of Attending HBCU

All the participants expressed how important it was for them to attend HBCU. Despite all of them being accepted into PWIs and approximately 85% considering going to other types of institutions, they all felt it was important to attend this Historically Black University. For them the decision was very intentional, very important and it was very necessary for them to be at an institution that serviced African Americans and the African American population. As majority of them expressed, HBCUs may have some sort comings when it comes to limited funding resources and they are not always supported by the vast majority of the population, their purpose the African American communities still stand as important as they did when they were first formed.

Donna, Georgia and Bettie mentioned it was important for them to attend an institution that they could be around like-minded individuals. They wanted to feel like they had something in common with their colleagues, and peers. This HBCU made them feel comfortable and they did not feel the need to have to struggle to fit in. They fit in because they felt like they belonged.

Frank expressed that it was important for him to attend an HBCU because he had not had the benefit of experiencing this type of environment before. He felt it was important that he be able to conduct his research in an institution with professors that service and know about his community. He stated, “I wanted to make sure my research was going to benefit my people”.

When the question was asked to Alex how important it was for them to attend an HBCU, she expressed, “Very”! Alex passionately continued to state, “Attending an HBCU is an intentional decision. It is a financial, academic, professional, intentional decision. Where you choose to put your money, time and resources are very important. Our schools began because no one wanted to accept us in their institutions. That is not long the case now, or as though it might seem. However, the reality is, some things have not changed. So, for me, it was very important to

attend where I know I am wanted, and my mind, resources and what I develop could be cultivated at an institution that caters to me".

Attending an HBCU was very important for all the participants in this study. As they expressed, attending an HBCU is a very intentional decision. Kevin was very intentional in making the decision to attend an HBCU after attending a PWIs all his education career. He said he felt he needed to attend this southern regionally located HBCU not only because it was an HBCU but because while attending the other institution he started to notice that he was the only person of color in his classes. As he studied, he felt like it was important for him to feel like he belonged. Suddenly he started to feel that he did not even fit in with the friends he had matriculated that far in his educational career with. Kevin said, "suddenly when I was in one of my lab classes I noticed there was no one in that class and I suddenly felt out of place. When my interest started to grow in individualized medicine and the research around that, it was surprising to me that my peers began to not understand why I would say to them, there are some differences in the way we have to do medicine for my people. At one point I could not believe I was saying it. I knew it was true, but I could not explain why it was true". It was at that point that Kevin decided it was time to seek out a place that could relate to how he was feeling, and he could speak with others who have done the studies and where he could make a difference once he graduated.

Diversity

The participants expressed the best type of committees are those with diversity in them. Diversity in scientific skills, previous research experiences, writing, and presentation skills, and even diverse cultural differences bring an asset to the team. Supportive committee members who offered constructive feedback and did not just tell the participant what they wanted to hear was

highly valued. Even diversity in how feedback is given and what areas specific individuals concentrate on. Each alum reflected that the diversity on their committee would bring fresh perspectives to the tasks at hand. Diverse viewpoints enrich the research process and foster a more comprehensive and robust outcome.

This is especially true at an HBCU where diversity and inclusivity are celebrated, students can engage with experts from various backgrounds or backgrounds like the students offering a broader perspective on their research. Frank shared that during his experience with his Chair, there were times when he really felt that he was being picked on. He did not understand why his chair was being so harsh on him. Towards the end of his dissertation journey, he said that his chair sat him down and explained to him, that he felt he had to be hard on him so that he could produce the best out of him. His chair shared with Frank that he wanted to be sure when he walked into a room, he would be able to hold his own with confidence and assurance. He went on to tell Frank that he would be the last student he would be mentoring. After that year he would be retiring.

Therefore, Frank was the last of the bunch. As Frank reflected on that moment. He said, "All at once it made sense. I did not appreciate his tactics at the time, but it was for my good. It is not part of his culture to be 'soft,' in so many words when it comes to education." Frank went on to share, "Today, I walked into a room of people who do not look like me and I am confident. I present better than I have ever done before, and I have even gotten surprising compliments as if they did not expect me to be able to present in the manner that I do."

Relationship with the Chair/Mentor

Another critical trend discovered was the theme of committee alignment and diversity. Only two of the alumni participants had previous relationships with their chairs. The rest of the

alumni participants researched and connected with their chairs based on their research interests. After the chair was chosen, the chairperson made strong recommendations of who the rest of the committee would be. In some cases, this worked out for the best. However, over half of the participants did not think this was the best decision. They expressed the feeling that they did not get all the feedback they could have gotten because the chairperson had most of the influence. Betty expressed that she felt this delayed her process. “My chair had such a domineering personality that I do not think the others wanted to speak in contrary to anything he would say.”

Chrissy expressed that she felt that there were times she thought her chair was being hard on her and the other committee members would express it to her later after the meeting was over. “Sometimes they would give me helpful feedback after the meeting, simply to keep down confusion.” Elenor said, “A committee that is not aligned properly, with the right set of scientific skill sets but also in personality, on a confident and professional level, could delay them from giving feedback or put a student in a position that they have to seek feedback outside of their dissertation committee.”

Both Jennifer and Ivy shared their strong feelings about their chairs, their committees members and other faculty having to step in because of a lack of committee and a lack of trust for those that were over the process. Both expressed how they felt the lack of a trusting relationship for their chairs and how that lack of trust could have cost them the opportunity to earn her degree. However, it was Ivy said her personal mentor stepped in and suggested that she keep trying to build a relationship. “She made sure to have an open door and a listening ear for me, but she also encouraged me to try and lean on my other committee members and take a different approach to express how I was feel a lack of respect, communication. Instead of coming with all complaints, she helped me draft a proposal that set a much better tone, approach and the

manner in which I received and accepted feedback. It helped a great deal".

Jennifer said she never got that closure and spent most of her time using the feedback from other faculty members throughout the process. The relationship between her and her mentor was never mended.

Alignment

Although not all of the participants had the privilege of choosing their own mentors, they did express how important alignment was to their process. The participants all expressed some sense of how important it is to align with what the committee and chair are looking for the process to run smoothly and the committee should be aligned to one another.

Chrissy mentioned that her chair seemed to sometimes dominate the conversation with the committee. She said that sometimes it almost seemed like there was a power struggle in the room. But when there were times when they were all working in their own strengths then the alignment of what they all brought to the committee and to the project worked much better.

Frank also expressed his chair having a very strong personality and therefore, he had to make sure that he was on the same page as his chair so that the committee could be aligned with each step in their process. At first Frank fear that he and his chair would never align and their goals just did not seem to fit but after starting to understand what the chair was looking for then he started to see where they aligned and how each person's talents contributed to the same final goal.

Expectations

Just as the alignment of the gifts and talents that each person brings to the process it is equally important to know what the expectations are from all people involved in the process. Communicating expectations, what the end goals are and how they were delivered is very

important. As Chrissy stated, having a full understanding of expectations is both a mentee and mentors' responsibility are aligned with expectations and goals and an alignment with the group working on the project together.

Elenor expressed her frustration when she was put into a position where her completion timeline did not match the timeline her chair and committee had in mind. As she recalls, they had conversations about what her goals were at the beginning of her project and even padding in time for unexpected occurrences. However, as her project continued to go on her chair began to add more and more to the project, which would ultimately extend the timeline a great deal. Elenor, said "This was a matter that we had to deal with together. Of course, I wanted to meet the expectations of my chair and my committee, but I needed them to hear my expectations as well and not continue to move the goal".

After losing two chairs to unforeseen circumstances Alex said she did not have a lot more time or energy to waste. She did not have time to vet her final committee and chair but what she said she did have a very in-depth conversation about expectations. She wanted to make sure that no would go to waste and that all her energy was going to be used meeting goals and getting things accomplished. Therefore, she said in the first meeting with her committee she engaged her committee with getting to know what their expectations of her were and she made sure to let them know what her needs were and her goals were. "This included discussing timelines, formatting goals, what the extent of the project had been and what were the previous expectations of where it should go. We spent at least two hours discussing expectations so that by the next meeting there was no question of what would be expected for each meeting. I am convinced this is why our mentor and mentee relationship grew so strong. There was not a question of where we stood and what we expected from one another."

Building Supportive Relationships

The participants expressed that they understood the value of building a support system and mentorship with their chair and committee. The alumni expressed understanding of the mentor's expertise, experience and guidance serves as an important means of navigating the complex journey of research. It is through committee meetings, frequent feedback sessions, and constructive criticism that the chair plays a crucial part in refining the research questions, methodology and overall trajectory of the dissertation.

Alumni expressed having a strong mentorship relationship, especially with the committee chair, was crucial for a positive experience in the dissertation process. A great deal of reflection resulted from having a committee relationship that was either supportive or not as supportive as the alumni wish they would have been. This expectation was expressed to be especially true with the idea of students attending HBCUs with great 'intentionality.' The purpose of their attendance at this type of institution was the expectation of experiencing a strong commitment to fostering a nurturing and inclusive learning environment and the importance of these relationships. Support from committee members and the institution in terms of required meetings and feedback processes played a significant role in participants' success. Mentorship is deeply ingrained in the academic culture and sought after by those that attend HBCU as many of the participants expressed.

Kevin was very adamant that he needed to attend an HBCU because the further in his educational career and the deeper in his biomedical science discipline he started to study the further he felt away in relating to his peers at the PWI he was attending. Kevin said, "even at this date and time, HBCUs still have a place for African American students. They are still a safe haven for our futures. They are still necessary, even though there are plenty of options.

Unfortunately, I did not feel like my peers at the PWIs felt like I belonged. They made me feel like I was not good enough and I felt out of place. It was time for me to get into an environment to be around people who looked like me, and that I would be able to feel when I graduated, I would make an impact on diversifying the field of study for my people".

Gaining Self-Efficacy

Participants mention how they grew from the process. As they expressed lessons learned they all expressed being able to take a step back and reflect on them gaining some sort of self-efficacy. With pride one by one they expressed how this process taught them to believe and trust their capacity and the skills they gained. Many of them talked about not liking the formative feedback that they first received and even being offended from time to time. But each grew to appreciate the feedback and was able to start to reflect on areas they could grow in.

Frank mentioned, "Yes, it was hard at first I can see how it helped me personally and professionally". He continues to give the example about the tough love that he received from his mentor and how they had a rocky relationship at first because he did not understand why he was being so hard on him. However, in hindside Frank said he could see where it helped him to achieve so much. He has taken so many of the lessons he has learned and now applies them to his professional career. He holds himself to a higher standard and at the end of the process was able to say there were some things he was not willing to settle for in himself any longer.

Georgia mentioned that her writing has improved but she still works on it. At first this was an area that she would get critiqued on by her chair and her committee. But she started taking it upon herself to get assistance and she noticed that it became easier for her to formulate papers easier. Not did she say it improved her skills, but she said this is an area that she continues to grow up in even though she is not in school anymore.

Impact of Feedback

Participants in the study emphasized the importance of not just hearing feedback and receiving tough love but also taking the initiative to engage in what was said. “The impact of the feedback is only as good as you use it.” Chrissy stated. Initiative-taking student engagement is important. This includes seeking advice, choosing committee members wisely, and being assertive during meetings.

Elenor mentioned that her committee members went smoothly because her chair never received much feedback. She said often she felt he was not engaged in her project. Therefore, when she did need feedback, she sought out others for assistance. The feedback that made the difference never came from her chair. It came from peers, other committee members outside of the committee meeting, and other faculty members within the institution. So, her lesson learned was to get feedback you can use wherever you can get it from and let it guide you.

Alex said that the feedback she got was good to keep her moving in the right direction. “Even if that meant that after I received the feedback, I had more work to do. It was worth it to feel like I was headed or redirected in the right direction.” Donna discussed how impactful the formative feedback was for her. “It encouraged and accelerated the progress towards completing my Ph.D. program.”

Ivy’s experience with her chair and her committee speaks to how important it is for formative feedback to be reciprocated. As she was given the opportunity to give feedback to her committee. Formative feedback helps in the learning process for both the teacher and the student. It is important to the process so that necessary shifts can be made, and everyone has the opportunity to create a more effective learning experience.

“As a teacher, my instruction is informed through these feedback loops. Listening to

these loops tells me if I need to revisit a certain aim or set my expectations higher." Finding the time to schedule feedback loops creates, as Meredith describes a "culture of feedback" in our classrooms (Abril, 2022).

Outlier Data and Findings

This section includes specific outliers that were identified during the data-gathering process and analysis. While all participants agreed on many aspects of the identified themes, there were two specific outliers that participants identified that were not totally in line with the themes and research questions. These outliers function as a caution for faculty that work with underrepresented students.

Outlier Finding #1: Increase Female Mentorship

During the time of gathering data, one outlier emerged, bringing to the forefront notice of alumni experiences within the Ph.D. program at the southern regionally located HBCU. The first outlier expressed was a preference of one alum, who expressed a desire for increased female mentorship throughout her academic journey. This revelation not only highlights the importance of diversified mentorship within academic programs but also points out the potential benefit of implementing a new diverse element in the dissertation process. The outlier not only serves as an individual testimony but also acts as a catalyst for broader discussions on mentorship dynamics, particularly within the context of underrepresented minorities in academia. This unique perspective brings forth valuable insights that can inform future program enhancements, contributing to a more inclusive and supportive educational environment for aspiring scholars at HBCUs.

Outlier Finding #2: Gender Disproportion

Another emerging outlier noticed was gender disproportion. Remarkably, while most

alumni respondents were female, only three male alum chose to engage in all facets of the research. This interesting gender disparity adds a unique dimension to the study, potentially shedding light on the experiences and perspectives of male graduates from this program, who have been historically underrepresented in academic research within the context of HBCUs.

This outlier warrants special attention because it may hold valuable insights into the dynamics of graduate education within this specific academic environment or discipline. Further examination and analysis of this male alum's responses were essential in ensuring a comprehensive understanding of the diverse range of experiences within the biomedical Ph.D. program at the southern regionally located HBCU.

Research Question Responses

This section provides responses to research questions. Responses were obtained directly from the three data collection methods. The phenomenological study was conducted for the readers to not only learn from the lived experiences of the participants but also to provide a non-biased opportunity to collect information. Open-ended questions were created by the researcher and were guided by the central research question and three sub-questions. The central research question and the three sub-question responses address the purpose of this study.

Central Research Question

The central research question guiding this study was: What are the perceptions and lived experiences of biomedical research Ph.D. alums from the southern regional HBCU about formative feedback received during their dissertation process?

Although all participants either thought about going or were offered a chance to go to a PWI they all decided it was important to attend the southern regionally located HBCU. Even though the relationships varied between alumni, chair, and committee, all the alumni shared that

their experiences were unique, and valuable in the end. They all expressed that they felt they would not have been able to get the same experience if attended a PWI.

Although they were African American students attending an HBCU, and some expressed they thought it was important to be trained and mentored by someone who looked like them, the alumni all expressed it was acceptable that their chairs were not African American. The alumni shared that they trusted the faculty had experience working in an HBCU environment for some time. They had to be able to relate to and understand the culture and struggles African American students face. Only one of the participants had a chair that was African American, none of them had anything more in common than gender; the fact that they like to vacation, only one alum and chair shared a commonality of having children, and they were approximately the same age. However, the one thing they all had in common was their research interest.

Participant, Chrissy mentioned that going to an HBCU is a decision that is intentional. Yes, she did have the option of going to a PWI. But she mentioned that anyone who chooses to attend an HBCU "wants a certain kind of experience, it has to be an intentional decision."

Donna said from her perspective, it was important to attend a school where the instructors had "similar backgrounds, culture and racial relationships or at least be able to relate in some kind of way." Although Georgia did not have anything in common with her chair, she said she wanted to have a chair that had some similarities, relatable to the environment and the cultures that we are servicing and wanted to experience the inclusivity that she would experience at another kind of institution."

Jennifer said she was a third generation HBCU graduates. Both parents graduated from being educated at HBCUs. It has now become a family tradition that will live one. "Even with all the options available the only option for my family by tradition is attending an HBCU, because

what they stand for, the rich historical purpose of why they were created still lives on. There is an education disparity as well as a societal purpose for our institutions to exist", Jennifer shared.

Sub-Question One

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU about the mentoring experience during the dissertation process?

Alumni consistently expressed the impact of committee relationships on their dissertation experiences. Those who enjoyed a strong mentorship dynamic with their chair reported higher levels of satisfaction with how they were supported and how it helped them build their confidence in their research projects. In many cases, these relationships went beyond support in their academic progress but also contributed to personal and professional growth.

Alex reflected on how many times her committee changed due to unforeseen incidents. However, she said the final committee was great and she was able to build a solid relationship with them. A relationship she has been able to cherish even as she is now in her professional setting. When opening about her committee, Alex says "I ended up having the best committee ever. Our relationship went beyond research and academic mentorship. It has helped so much professionally".

Although Franks relationship started out with a lot of discord, he says that it "ended being one of the best professional relationships that I will cherish for the rest of my life". He expresses how it was all well worth the initial feelings.

On the contrary, alumni with less supportive committee relationships shared the hurdles they faced during their dissertation process. They reflected on the instances of inadequate feedback, feeling ignored, infrequent meetings, or lack of constructive precise guidance. This left them feeling unsupported and, in some cases, discouraged for a while.

Chrissy, despite completing her degree said she felt confused and disappointed at times. She expressed that she felt the feedback was hard to accept because it was very harsh. In her eyes, it could have been delivered a different way. But toward the end, she was proud of her work.

Henry felt disappointment because he and his dissertation chair did not see eye to eye. But when his dissertation chair seemed to push him away from his lab, the dissertation committee stepped up and stepped in so that Henry would not get discouraged. Henry said the feedback he received from his committee was “invaluable”.

One hundred percent of the alumni interviewed agreed that the mentorship provided by the committee chair and the diverse perspectives offered by committee members contribute a significant depth and quality of the research. Reflections from alumni further emphasize the profound impact of committee support on their academic and personal growth.

Sub-Question Two

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on mentoring during the dissertation process at an HBCU instead of another type of institution?

Although all the alumni who participated in the study had an option of attending a PWI, they all felt it was important to them to attend HBCU. Most of them mentioned they felt they would have a better connection with those who have taught in this type of institution before. Only one of the participants had a mentor that was African American they trusted that the mentors they were connected to would be able to develop their skills and professional research in a manner that would benefit them.

Alex said, “From what I understood when choosing to attend an HBCU, is that they often

possess unique perspectives on mentoring during the dissertation process, particularly in comparison to their counterparts from other types of institutions. For many, the HBCU environment fosters a close-knit community and a sense of belonging that can be pivotal during the difficult dissertation journey."

Kevin mentioned it was important to attend an HBCU because he needed to make the transition so that he could feel like he belongs, but also because he needed to be made aware that the disparities he was noticing in the African American populations was not something he made up. Kevin said, "there was a need for me to interact with people who looked like me and to be mentored by those that understand the trials we face in the African American communities, even if you are not African American yourself. The impact is too great!"

Frequently the participants highlighted the personalized attention and culturally sensitive mentoring they received, which they believe may not have been as readily available in a larger, or smaller PWI. The consistency is that there is a powerful sense of camaraderie and shared cultural experiences within the HBCU setting that contribute to a supportive and empowering experience. Although some of the alumni share stories of struggling in relationships with their mentors at first, they all ended up seeing how their mentors ended up being their advocates for their success both academically, professionally, and sometimes even personally.

All alumni, with the exception of one, mentioned that their mentors are perceived as mentors for life, providing career advice, professional development opportunities, and ongoing support even after graduation. This long-term commitment to the success of their mentees is highly valued and contributes to a lasting sense of community among alums. Furthermore, the mentorship dynamic at HBCUs is often characterized by a holistic approach, acknowledging the diverse backgrounds and experiences of students. This inclusive perspective helps students feel

validated and supported in their unique journeys, which can be particularly crucial during the rigorous dissertation process.

Sub-Question Three

What are the perceptions of biomedical research Ph.D. alums from a southern regional HBCU on whether receiving formative feedback influenced a sense of self-efficacy and motivation to persist to completion of the Ph.D. program?

The alumni shared that the impact of formative feedback on their sense of self-efficacy and motivation to persist through their doctoral program is multifaceted and deeply insightful. Many alums expressed profound gratitude for the constructive feedback they received during their academic journey. They believe it played a pivotal role in shaping their research skills, critical thinking abilities, and overall academic competence. The consistent and tailored feedback not only boosted their confidence in their capabilities but also instilled a sense of purpose and determination to see their Ph.D. through to completion. Several participants emphasized that knowing their mentors invested time and effort into providing meaningful feedback created a reciprocal sense of responsibility and commitment to excel.

Chrissy built her relationship with her final chair from the circumstances that took place before being connected with her final chair. The unfortunate situation made her pursue it until the end. “Although it was rough a lot of days, I felt that I wanted to be successful even more, I was determined to get it done and finish strong”.

Moreover, the participants emphasized that formative feedback was instrumental in fostering a growth mindset, which in turn influenced their self-efficacy. The regularity of feedback allowed them to view challenges and setbacks not as impossible barriers or obstacles, but rather as opportunities for improvement and refinement. Even when the feedback was cruel

and unwarranted.

This shift in perspective instilled a belief that they had the capacity to overcome hurdles and succeed in their research pursuits. Consequently, a heightened sense of self-efficacy became a driving force, propelling them toward the completion of their Ph.D. program. The participants spoke of moments when constructive feedback, even in the face of initial frustration, served as a catalyst for enhanced learning and personal development. They expressed that the recognition and acknowledgment of their efforts, as well as the constructive criticism provided, were powerful motivators. Knowing that their mentors were invested in their success fueled a sense of belonging and support, which, in turn, fortified their determination to persevere.

Frank said, “At first, I could not understand why, my chair was being so mean. It was as if I could not, please him. But when I got an understanding of why he felt he had to give me harshness, I realized it steamed from his love for his students and the passion of wanting me to be great. That pushed me”.

“I was grateful for the opportunity to bring a proposal and a plan that I felt would increase my chances of being successful. The way my process was going at first, I did not feel I was going to make it. But my committee was open when I became transparent and shared not only my feelings but a solution to the breakdown of communication, processes and their mentorship”, said Ivy.

“As an older student it was sometimes hard for me to feel like I fit in. Sometimes I would get frustrated because I felt like I didn’t have much in common with anyone. However, my chair and I connected over just the fact of having kids and knowing some of the same music due to our age. The little connections made a huge impact on the way I saw myself and how I pursued my dream of finishing my program”, said Donna.

Additionally, participants highlighted that targeted feedback helped them set realistic goals and benchmarks, providing a roadmap to navigate through the complex journey of their research studies This structured approach gave them a sense of purpose and direction, reinforcing their motivation to reach the goal of Ph.D. completion.

Summary

This chapter presented a descriptive summary of the participants in the study and provided insight into the shared formative feedback experiences of the Biomedical Ph.D. alum who attended an HBCU. Each participant's narrative included their lived experiences, a reflection of their thoughts, and the impact of formative feedback on their Ph.D. dissertation journey. Three themes emerged from data collected through interviews, open-ended questionnaires, and document analysis. These themes included the importance of effective feedback, committee alignment and diversity, and building supportive relationships with committee members and chairs in the pursuit of a doctoral degree in biomedical science at a southern regionally located HBCU. Finally, the central research questions and sub-questions were analyzed to better understand how formative feedback impacted the alumni while they pursued their Ph.Ds. Even when the alumni expressed that they received tough love that they did not feel was warranted they used all the feedback to push them to reach their final goal to complete their studies.

CHAPTER FIVE: CONCLUSION

Overview

The qualitative phenomenological study explored the perception and lived experiences of biomedical research Ph.D. alums from the southern regional HBCU about formative feedback received during their dissertation process. Data was collected in this study through one-on-one virtual interviews, open-ended questionnaires, and document analysis review. Findings from qualitative data collected revealed that the mentorship dynamic between the committee chair and the alumni played a significant role in their overall dissertation experience. This chapter includes sections that provide a discussion and interpretation of the research findings, implications, limitations, delimitations, and recommendations for future research.

Discussion

This study explored the thoughts, feelings, and reflections on the lived experiences and impact that formative feedback made on alumni from a southern regional HBCU. Previous research explored the shared experiences of other minority groups who had mixed feelings about the dissertation process and the impact that formative or critical conversations had on those completing a Ph.D. program. In previous studies, the underrepresented or minority students found motivation in being mentored by someone of their own nationality or with the same cultural background as them. The findings of this study added to the existing research discussed in Chapter Two regarding the populations of underrepresented biomedical Ph.D. alumni who attended an HBCU. The findings also show that alumni did appreciate the formative feedback even when it was harsh at first, and when the dissertation chair was not of the same race or ethnicity.

Summary of Thematic Findings

This section includes a summary of material from emerging themes and sub-themes that were discussed in Chapter Four. The four themes identified are discussed below and include the importance of effective feedback, the importance of attending an HBCU, relationships with committee members and chairs and gaining self-efficiency in the pursuit of a doctoral degree in biomedical science at a southern regionally located HBCU.

Effective Feedback

Participants were asked to disclose their experiences and perspectives regarding the impact of formative feedback during their dissertation process experience at the southern regionally located HBCU. All of them said that sometimes they felt beyond challenged and it was even more challenging to accept some of the feedback given. However, the feedback did play a pivotal role in shaping the academic and professional trajectory of these biomedical research Ph.D. alumni. It serves as a catalyst for growth, fostering resilience, determination, and a growth mindset.

The constructive criticism provided by mentors acts as a driving force, propelling participants toward academic excellence. The alumni reflected on how they were sometimes emotionally taxed after receiving the feedback but used that energy to become even more determined to succeed.

As in Bandura, social learning theory (1977), learning occurs through a combination of four factors: observing and modeling behaviors, attitudes, and emotional reactions. Bandura (1977) argued that “most human behavior is learned observationally through modeling; from observing others, one forms an idea of how new behaviors are performed, and on later occasions, this coded information serves as a guide for action” (p. 22). The responses from the alumni participants in this study exemplify how their emotional reactions played a significant role in

their journey toward self-efficacy. The alumni did begin to demonstrate an ability to transform the emotional taxation resulting from challenging feedback into a driving force for increased determination and a heightened commitment to academic excellence. Although at first some of them did not like how they were being treated or talked to. But they looked passed emotions and began to seek others that could train and teach them what they needed to know. On occasion the alumni still learned from their chairs the skills they needed to know to be successful. They looked past their feelings and began to learn how to redirect their emotions to determination.

Minnett (2020) found that students who receive formative feedback from their committee chairs or mentors have higher levels of academic achievement than those who do not. Furthermore, formative feedback has increased student confidence, critical thinking skills, autonomy, and self-regulation (Liu et al., 2018).

Importance of Attending an HBCU

From the alumni's perspectives attending an HBCU for their doctoral education was very impactful, and an important part of their experience. During their interviews and questionnaires, they shared their unique experiences and the impactful contributions formative feedback made during their academic and professional journeys.

The alumni emphasized how HBCUs have such a nurturing and supportive academic environment. They all mentioned how HBCUs foster a sense of belonging and community for them and how much of a positive influence the institution has in their overall educational experience. As the alumni all said in their own words, those who choose to attend an HBCU are very intentional. They are individuals that believe they were supported in a way they would not find at another type of institution. They feel that they were able to network and be mentored by individuals that understand their journey and have knowledge on how to prepare them for their

future and the uniqueness of their journey. This set of Biomedical PhD alumni all transitioned out of what they called “not a perfect school” but they all grew as scholars and researchers.

Furthermore, alumni emphasized the cultural relevance embedded in the curriculum and research opportunities at HBCUs. The integration of diverse perspectives and experiences in the biomedical field not only enriched their academic experience but also prepared them to address healthcare disparities and contribute meaningfully to research addressing underrepresented populations. This cultural competence gained during their HBCU education was considered a distinct advantage as they navigated the complexities of the biomedical research landscape. Attending an HBCU provided them with a unique platform to engage in research that directly addressed health disparities and contributed to the broader goal of promoting diversity in the biomedical workforce.

Relationship with Chair and Mentees

The structure and dynamics of the dissertation committee significantly influenced participants' experiences. A committee that aligns in skill sets, personality, and professional level, while embracing diversity, leads to more enriching and comprehensive research outcomes. These, supportive relationships developed with committee members and chairs foster a nurturing environment, enabling the alumni to navigate the complexities of the research procedures, idiosyncrasy of institutional processes, administration, and the stressors of completing a doctoral program. As stated in previous literature, research has shown that doctoral students from underrepresented groups face unique challenges in the dissertation process, this includes a lack of access to mentors who share their racial and ethnic backgrounds (Barnes & Austin, 2009). This absence of representation can lead to feelings of isolation, feeling as though they do not fit in and may lead to difficulties in receiving feedback from mentors who may not fully understand

their experiences (Byars-Winston et al., 2011).

Though the alumni participants mentioned did not share a lot in common with their chairs or their committee, the one thing they had in common was research interest. The committee or chair in all but one insistence did not even share race, but the alumni appreciated that they were diverse with an understanding of the culture and what was needed to cultivate the talents of the population of students that HBCUs attract. This made them more comfortable with choosing to attend the southern regionally located HBCU. None of them spoke of feeling any sense of regret even when things did not go as planned or when they felt that they were not having a good relationship with their chair.

Findings from the study also emphasized the importance of developing a strong mentorship relationship, especially with the committee chair. This was mentioned several times through interviews and questionnaires. One of the participants mentioned it was difficult for her to bounce back and stay focused because she had lost two of her mentors due to their deaths. However, the chair mentored her through it all. They collaborated patiently with her, following the two deaths, and really connected with her, and helped her regain her focus. Several of the participants reflected on how they grew to appreciate their chairs so much more when they realized that they were being mentored and developed for growth beyond the dissertation process.

The study shows how impactful and crucial the mentor and mentee relationship can be for a positive experience in the dissertation process. This is especially true with African American or minority individuals due to the small population of biomedical science professionals. Mentors who share similar experiences can provide a sense of belonging and a safe space to discuss challenges and concerns (Byars-Winston et al., 2011). Mentorship has been

identified as a critical factor in the success of graduate students, particularly those from historically underrepresented groups (e.g., women, and racial/ethnic minorities) (Johnson, 2007).

Though the alumni shared that only one of them had a same-race chair as a mentor, the study adds to the limited literature to gain an understanding of the mechanisms through which same-race mentorship operates, as well as the unique challenges and opportunities that arise in these mentoring relationships. All of them mentioned that the importance was not so much about their chairs being the same race but understanding the challenges they faced as an underrepresented minority in the field of biomedical science.

Gaining Self-Efficacy

The findings from this study uncovered a range of various emotions from their experiences centered around the way formative feedback is given. There were those who felt that sometimes their mentors were being too hard and at times cause hard feelings. Then there were those that felt they would get some formative feedback but not always enough. But one theme that was common was the fact that no matter what the experience started out, the formative feedback they received made them resilient and transitioned into some self-efficacy.

The alumni expressed that they used the formative feedback as an instrumental in their professional and personal growth. They highlighted the constructive nature of the feedback, enabling them to identify areas for improvement and develop their research, presentation and critical thinking skills. This aligns with Bandura's theory, as self-efficacy is fostered through mastery experiences, and formative feedback serves as a crucial component in this process (Bandura, 1977).

Participants in the study reported increased confidence and self-assurance because of receiving formative feedback. They attributed this to the validation and affirmation of their

abilities provided by their supervisors and mentors. This aligns with Bandura's theory, which emphasizes the role of social persuasion in shaping self-efficacy beliefs (Bandura, 1977). Positive feedback from trusted individuals fosters a sense of competence and enhances self-efficacy beliefs.

However, it is important to note that not all participants reported experiencing positive formative feedback from their mentors. In a few cases the formative feedback some individuals received from their chairs gave them a sense of frustration and disappointment with the feedback they received. The first perceived it as vague or unhelpful. But the individuals that felt this way did reach out to others faculty members or turned to the other individuals on their dissertation committee. This was helpful because they were able to get some sense of gratification in knowing how to correct their issues. These findings highlight the importance of the quality and specificity of feedback in influencing self-efficacy development. The findings suggest that constructive and specific formative feedback plays a vital role in fostering self-efficacy beliefs among biomedical science graduates even if they do not receive the feedback from their primary chair. It provides them with opportunities to enhance their research skills, gain confidence, and validate their abilities. However, the quality and effectiveness of feedback are crucial, as vague or unhelpful feedback can have detrimental consequences on self-efficacy beliefs.

Interpretation of Findings

Eleven Biomedical Ph.D. alumni from a southern regionally located HBCU shared their perspectives through one-on-one virtual interviews, an open-ended questionnaire, and a review of their own feedback documents. The findings of this study shed light on the varied experiences of feedback, relationship with committee and chair, committee dynamics, and self-efficacy in the process of pursuing their doctoral degree. The impact of formative feedback on their sense of

self-efficacy and motivation to persist through their doctoral program was interesting, instilling a growth mindset and a belief in their capacity to overcome hurdles and succeed in their research pursuits.

Interpretation #1: Feedback can be Effective and Impactful.

As the study unveiled feedback can be both effective and impactful. The participants unanimously emphasized the need for feedback that is guided, consistent, timely, and clear. Although not all of them experienced feedback that was positive all the time, they all felt that the feedback was essential for personal, academic, and professional growth. Elenor, for instance, experienced challenges with direct feedback from her committee chair but found solace in constructive input from peers and mentors.

The sentiment was echoed by Alex, Bettie, Henry and Ivy acknowledged that even challenging feedback contributed to a sense of progress and direction. Despite initial discomfort, individuals like Frank, Chrissy, and Elenor shared experiences where harsh feedback led to increased tenacity and improved outcomes. Frank's journey exemplified the efficacy of tough love, where initially perceived as picking on him, it ultimately empowered him to exude confidence and competence in professional settings. Although the participant expressed how the feedback, even if seemingly harsh, was preferable to no feedback at all.

Interpretation #2: The HBCU Nurturing, Supportive Environment Matters

The environment of learning and the ability to feel like a student can connect to other individuals especially peers, instructors, advisors, and mentors is extremely important to some learners. For the individuals that participated in this study it was recognized that each alumni want to ensure they felt a sense of belonging wherever they studied. As Alex, Jennifer, and Kevin mentioned during their interviews, choosing to attend an HBCU is intentional.

From the inception of the existence to the present time HBCUs serve their purpose in educating African Americans and helping to diversify the workforce because of the type of students that attend their institutions. As the alumni in the study commonly address, they feel they want to be educated at an institution where they feel their emotional, academic, and social needs can be met. HBCUs are historically designed to give the support described by these study participants. As Frank and Kevin mentioned during their interviews, they want to attend an institution where they feel a sense of belonging and where they feel instructors understand them, the unique struggles they face and who can prepare them for the world they were facing. For the individuals that participated in this study, attending this southern region located HBCU was a perfect fit for them.

Interpretation #3: Effective communication in Feedback Session is the Key.

For feedback to be most effective there must be effective communication. The findings from this study show that formative feedback is impactful. However, communication was a primary key factor that made a great impact. Participants stressed the importance of clear expectations and understanding between students and their committees. Chrissy's experience highlighted that asking questions and aligning with the committee's expectations facilitated smoother progress. Elenor emphasized the necessity of transparency in communication to prevent misalignments in expectations, suggesting proactive measures such as orientations or workshops. Finally, Ivy made sure to use one of her meetings simply to express her need for transparency, structure and communication. This is because a very effective approach to her not only starting to be received feedback that helped her but the effectiveness reached to the fact it was reciprocated. There for the impact of formative feedback is shown to be effective for both the learners and the teachers.

As the participants expressed, receiving feedback and communication in an effective manner helped them to build relationships. Frank, Betty, and Chrissy all spoke about being able to communicate because of the diverse situations and personalities on their committees. The diversity was good as it related to research skills, but it was not until the participants reached a phase in their relationship with their chairs that they had to learn to communicate so they could receive the feedback being given. Feedback and communication are interrelated and are vital for navigating the complexities of the dissertation process.

Interpretation #4: Feedback Leading to Self-Efficacy.

The participants expressed the transformative role of feedback in self-efficacy. From the experiences they shared they mentioned the feedback went beyond just crucial conversations but impact them being resilient to the end. Receiving feedback made a great impact but the emphasis was placed on actively engaging with the feedback. Chrissy and Jennifer expressed that the impact of feedback is only as good as one's initiative to use it. Elenor's experience reinforced the idea that seeking feedback from various sources, even outside the immediate committee, can be instrumental. Alex and Donna further emphasized the positive correlation between impactful feedback and progress in the Ph.D. program.

Implications for Policy and Practice

The findings of this dissertation study emphasized the importance of consistent formative feedback within the Ph.D. dissertation process, particularly for students pursuing their degrees in biomedical science at a southern regionally located HBCU. However, the context of this study can be utilized at any type of institution where minority Ph.D. candidates' study. This study can also relate to several diverse types of disciplines. It is evident that a robust formative feedback process should be considered a best practice for all institutions offering Ph.D. programs. This

section discusses the implications for practice that can be offered as a comprehensive roadmap for enhancing doctoral experience and nurturing the next generation of leaders in biomedical research.

Implications for Policy

Although formative feedback is not a highlighted topic for federal, state, or national policy, it does make a case for introducing a new best practices policy within institutions that have terminal degree seeking students. Institution can implement guidelines to ensure that committee members provide constructive feedback before each milestone section of the process. This study emphasizes the critical role of effective feedback in the success of doctoral candidates. Stakeholders should emphasize the importance of consistent, clear, guided, and timely feedback withing the dissertation process. As Alex emphasized the importance of timely feedback in keeping her work on track, “feedback was good to keep the work moving along.

Implications for Practice

While consistent formative feedback implemented in the dissertation process is critical to the successful progression of students earning a Ph.D. in Biomedical Science at southern regionally located HBCUs, it may also be effective for other schools with Ph.D. programs to implement a robust formative feedback process into their programs as well. This could be even more vital with institutions with a high minority student population. There seems to be a vital need to have regular and constructive communication between students and their chairs.

Regular and constructive communication channels between students and their chairs are imperative for facilitating progress and success. Ph.D. committees must ensure that candidates are provided with clear and aligned expectations that are uniformly shared among all committee members, forming a solid supportive, and conducive research environment.

Diverse representation within the committee is equally vital, as it brings a wealth of perspectives and expertise to the table, enriching the research endeavor. Finally, mentorship should be viewed as a holistic, enduring commitment that transcends graduation. Institutions offering Ph.D. programs in biomedical science studies should be prepared to extend their support and engagement with students well into their professional careers, thereby fostering sustained growth and professional development.

Empirical and Theoretical Implications

This section addresses the empirical and theoretical implications surrounding the use of formative feedback in the context of a Ph.D. biomedical science alumni from a southern regionally located HBCU. This phenological study was grounded in Bandura's social learning theory and the empirical evidence aligns with previous studies mentioned in Chapter 2 of this paper. It affirms the significance of formative feedback in enhancing academic achievement, critical thinking, and self-regulation. Moreover, this research extends beyond the existing literature mentioned in Chapter 2 by pinpointing the unique experiences of African American Ph.D. alumni in the biomedical sciences, shedding light on the critical role of culturally responsive mentorship in their academic journey. This study not only contributes to the conversation on effective mentorship practices but also advocates for increased diversity within the biomedical science field.

Empirical Implications

Empirical evidence supports the impact of formative feedback on students' academic achievement. Minnett (2020) found that students who receive formative feedback from committee chairs or mentors exhibit higher levels of academic success compared to those who do not. Additionally, formative feedback has been shown to enhance student confidence, critical

thinking skills, as well as autonomy, and self-regulation (Liu et al., 2018).

Formative feedback refers to ongoing, constructive evaluations provided to students during the learning process. It aims to enhance learning outcomes, identify areas of improvement, and guide students towards achieving their academic and professional goals (Black & William, 2009). In the context of a Ph.D. program in biomedical science, formative feedback is particularly valuable as it fosters critical thinking, analytical skills, and the ability to conduct rigorous research.

The lived experiences that the participants shared for this study provided compelling evidence that formative feedback plays a crucial role in enhancing the learning experience for those pursuing a Ph.D. in the field of biomedical sciences. This feedback provides valuable insights, guidance, and support to students, aiding their academic and professional development.

By reputation and empirical evidence, HBCUs have a rich tradition of providing high-quality education and are open to accepting a variety of learners. These institutions foster supportive and nurturing environments that prioritize the success of underrepresented minority students in various fields, including biomedical sciences. According to the literature, HBCUs excel in providing culturally responsive and individualized feedback. This is particularly beneficial for minority students who may face unique challenges related to representation and inclusivity. As it was attested by Donna, one of the alumni participants: “A non-HBCU program, may focus more on standardized feedback formats and may not have the same level of cultural competency. They might provide valuable support; the lack of tailored feedback may hinder the holistic development of students and their ability to navigate challenges specific to our backgrounds.”

Previous literature has highlighted alumni perceptions of dissertation committee processes and their best practices and how receiving formative feedback from mentors within the same cultural backgrounds can positively impact students (Barnett et al., 2017; Randall et al., 2018; Salinas et al., 2020). However, a considerable gap in the literature does not speak specifically of alums of color graduating with a Ph.D. in biomedical science programs.

This study echoes empirical literature. As the participants shared their lived experiences, formative feedback plays a vital role in the success of Ph.D. students in biomedical science programs at the HBCU where the participants earned their degree. By providing students with essential guidance, support, and personalized mentorship. The helpful use of formative feedback is particularly significant due to the unique advantages offered by the institution. Culturally responsive teaching strategies, smaller class sizes, and personalized interactions contribute to fostering an inclusive and supportive learning environment. This enhances research skills, improving scientific writing, fostering critical thinking, and promoting personal growth, formative feedback serves as a catalyst for student development.

Formative assessment helps measure how well a student is doing and if an instructor has met teaching instructional expectations by evaluating student learning outcomes and accomplishments (Saaris, 2017). Formative feedback is an assessment that helps reflect on whether the student has mastered a skill or concept (Saaris, 2017). What was discovered in this study was timely and constructive feedback provided by experienced mentors helps students refine their skills, overcome challenges, and excel in their academic and professional pursuits. Therefore, the utilization of formative feedback in a Ph.D. biomedical science program at an HBCU is crucial for nurturing the next generation of talented and diverse biomedical scientists. Understanding the benefits of formative feedback in an HBCU program can help inform and

improve similar programs in other institutions, enhancing the academic and professional success of Ph.D. scholars.

In the context of the biomedical science program where these studies participants obtain their Ph.D. from there are several unique aspects contributing to the helpful use of formative feedback. First, the faculty members at this southern regionally located HBCU were trusted by the alumni students due to their scientific reputation and research contributions. The alumni also shared that they were comfortable with the faculties understanding of challenges faced by minority students and are equipped with culturally responsive teaching strategies. This understanding allows them to provide tailored formative feedback that addresses the specific needs of students, promoting inclusivity and student success.

By utilizing formative feedback as a tool in the process the chairs can serve as a catalyst for the development of research skills in biomedical science students. Regular feedback from faculty mentors enables students to refine their research methodologies, experimental techniques, and data analysis approaches. By receiving timely feedback on their work, students can identify and rectify any methodological or conceptual issues, thereby improving the quality and reliability of their research (Yin and Lee, 2012).

Effective scientific writing is a fundamental requirement for success in biomedical science. Formative feedback in a Ph.D. program at an HBCU helps students hone their scientific writing skills. Feedback from experienced mentors on research proposals, manuscripts, and grant applications helps students understand the nuances of scientific communication, enhance their ability to present their work concisely and logically, and improve their overall writing style (Anderson et al., 2016).

Formative feedback empowers students to think critically and develop critical thinking

skills. By receiving constructive feedback on their research findings, students are encouraged to analyze and interpret their data more effectively. Additionally, feedback on their presentations and discussions during seminars and conferences helps students refine their critical thinking abilities, enabling them to make sound decisions and contribute meaningfully to the scientific community (Boud & Molloy, 2013).

Formative feedback provides students with an opportunity for self-reflection and personal growth. Regular feedback sessions encourage students to reflect on their strengths, weaknesses, and areas for improvement. By actively engaging with their mentors, students can set realistic goals, develop effective strategies to address their weaknesses, and gain a deeper understanding of their own academic and professional aspirations (Hattie & Timperley, 2007).

Furthermore, this research topic addresses the unique lived experiences of African American Ph.D. alumni in the biomedical science discipline who graduated from a southern regionally HBCU. The alumni did face challenges and opportunities that arise when African American scholars try to be mentored by African American professionals in the same field. Given the shortage of underrepresented scientists in academia, this research is a value add not only to bridging the gap of best practice use of formative feedback but gives insight in the construction of influential mentor relationships. The lived experiences address the impact formative feedback has in the dissertation process and professional growth. The research also contributes to literature highlighting the growing need to diversify the workforce in the field of biomedical science Ph.D. programs.

Theoretical Implications

This research study utilized the social-learning theory as a framework to explore the shared live experiences of the Ph.D. biomedical science alumni from a southern regional HBCU

who received formative feedback. Bandura's social learning theory emphasizes the role of observations and modeling in the acquisition of new behaviors and skills. According to Bandura (1977), learning occurs through a combination of observing and modeling behaviors, attitudes, and emotional reactions. The theory suggests that individuals acquire most of their behavior by observing others, forming an idea of how new behaviors are performed. This information then serves as a guide for their own actions.

Bandura (1977) further argued that relying solely on self-gained knowledge would be challenging and time-consuming. Instead, individuals benefit from modeling others, which facilitates growth, learning, and the development of innovative ideas. This is particularly true for those seeking behavior change, observing, and modeling activities become essential (Muro & Jeffrey, 2008). Bandura's theory has been applied to explain how students learn through observing and modeling behaviors exhibited by their teachers (Bandura, 1989). This application demonstrated that the environment and its interactions significantly drive learning, further supporting the relevance of social learning theory in understanding the impact of formative feedback in the biomedical science Ph.D. dissertation process.

While social learning theory provides a comprehensive framework for understanding the impact of formative feedback in learning processes, other theories could have been considered for this study. The social cognitive career theory, self-determinization theory, critical race theory, and intersectionality theory are a few that could have been considered. However, this study's exploration went beyond many of the focuses of those theories. The focus of the study was the impact of formative feedback while earning their Ph.D. in biomedical sciences at a southern regionally located HBCU as those alumni participants shared their lived experiences. The stretch of valuable insight would have been overlooked if the exploration had been missed if the study

only focused on what these theories emphasize. Though some of these theories may be reflected in portions of the study they do not relate to the full scope of the research study.

Social cognitive career theory focuses on the relationship between individuals' self-efficacy beliefs, personal goals, and their social context in shaping career development (Lent, Brown, & Hackett, 1994). Applying this theory to the dissertation feedback process suggests that the support and feedback received during the doctoral journey can significantly impact alumni's self-efficacy beliefs, potentially influencing their career trajectories and success in the biomedical science field. This theory would not have focused on the major points of the process for this study, which is the formative feedback.

Although all the alumni mentioned having to focus on completing the program to graduation after facing challenges or accepting the feedback as a tool to build a sense of self-efficacy the major aim was to use the formative feedback to do so. Self-determination theory emphasizes the importance of intrinsic motivation, autonomy, and competence in promoting optimal learning outcomes (Deci & Ryan, 1985). In the context of dissertation feedback, this theory suggests that alumni who received formative feedback during their doctoral process may feel a greater sense of self-determination, leading to increased motivation and confidence in their research abilities. This theory would have been an excellent framework to use if the study's focus were only on formative feedback, the responses, and the results. However, a major element of the study was to see if there was an impact from receiving feedback in an environment the alum considered to be familiar to them culturally by mentors within that culture or the same race as them.

Critical race theory examines systemic racism and social injustice within legal scholarship but has since expanded to various disciplines (Delgado & Stefancic, 2001). This

theory acknowledges racism is not merely an individual act but rather an ingrained part of societal structures and institutions. Critical race theory has been utilized to explore the barriers and challenges faced by Ph.D. biomedical science alumni from an HBCU due to systemic racism and how it intersects with their experiences. This would allow for a deeper understanding of how racial dynamics impact their educational and professional opportunities, as well as their overall well-being; however, a major element would have been forgotten. The study was not focused on race but on the impact that formative feedback had on African American alumni as they saw it when they were going through the process.

Finally, the intersectionality theory, developed by Kimberlé Crenshaw, recognizes that individuals have multiple social identities that intersect and interact, shaping their experiences and opportunities (Crenshaw, 1989). This theory explores the complex ways in which race, gender, class, and other social categories intersect to produce unique experiences of privilege or oppression. Intersectionality theory would have been invaluable in acknowledging and analyzing the interconnected nature of race, gender, and other social identities among the Ph.D. biomedical science alumni. It would enable a nuanced exploration of how these intersecting identities impact their experiences in academia and beyond, providing a comprehensive understanding of their lived realities.

Formative feedback, provided by committee chairs, holds immense value for Ph.D. students working on their biomedical science dissertations. This feedback offers guidance and support, enabling students to adjust their approach, refine their ideas, and complete their projects successfully. Again, this invaluable transference of knowledge went beyond the constraints of race, or the fact that they were attending an HBCU.

The participants in this study gave examples of how the formative feedback made them

alter the way that they took in information. Although many of the participants were not being mentored by someone of the same race or ethnic background the lived experiences, they shared spoke to them learning from the formative feedback given to them. The alumni shared that they appreciated the ability to connect with their chairs through their mutual passion and love for research. The participants shared that they were able to observe and gain knowledge by watching their chair's skills in the lab while completing scientific procedures, observing their presentation abilities, and reading their written publications. A few of the alumni attest to learning even by `communicated critical information, and corrective directives, as well as how much feedback was given throughout the dissertation process.

The social learning theory, with its emphasis on observations and modeling, offers a valuable framework for understanding the role of formative feedback in the biomedical science Ph.D. dissertation process. By observing and modeling the behaviors and guidance of their committee chairs or mentors, students can acquire the necessary knowledge and skills to navigate their research successfully. The literature further supports the importance of formative feedback in fostering academic achievement, confidence, problem-solving abilities, and self-regulation. Understanding and implementing effective formative feedback strategies can thus greatly benefit students pursuing their biomedical science Ph.D. degrees.

In the context of the dissertation research topic, the social learning theory provided a theoretical framework for understanding how formative feedback from mentors can contribute to the development of self-efficacy in African American Ph.D. students. According to research, regular and constructive formative feedback can help build students' confidence levels and enhance their belief in their abilities, leading to better academic and research outcomes (Sorkness et al., 2017). The social learning theory and the dissertation research topic both emphasize the

importance of mentorship in the academic and professional development of African American Biomedical Scientist Ph.D. students. Both highlight the significance of exposure to successful mentors who can provide guidance and support throughout the dissertation process. Additionally, both the theory and the research topic acknowledge the impact of formative feedback on students' self-efficacy and confidence levels.

While the social learning theory provides a broad theoretical framework for understanding the role of mentorship, this research study narrows its focus specifically on the importance of formative feedback in the biomedical science Ph.D. dissertation process. It highlights the need for more research literature on this specific aspect of mentorship, particularly in the context of African American Ph.D. processes. By examining the impact of formative feedback from mentors in the dissertation process, the research fills a gap in the existing literature and contributes to a better understanding of effective mentorship practices in biomedical science discipline. Because of its focus on the impact of mentorship (Kitchenham, 2008; Menzirow, 1997) and the influential role models (Salinas et al., 2020), the social learning theory was the best theory to follow.

Limitations and Delimitations

As stated by Creswell (2014), limitations are important to address as they offer insights into the scope and generalizability of the findings. In the context of a quantitative study, limitations may include sample size, survey response rates, or measurement tools. Stating the limitations of a study serves to provide transparency and maintain the integrity of the research by acknowledging any factors that may have influenced the results or conclusions. In qualitative research, limitations may involve researcher bias or the subjective interpretation of data (Creswell, 2014). This section highlights the various limitations of this research and builds

awareness of the boundaries within which the study was conducted. Exposing this kind of transparency ensures there is validity and reliability of the research findings.

Limitations

One limitation of this study included my own familiarity with some of the alumni participants. A few of the students I knew previously due to professional connections. However, to eliminate any of my own biases interjects any of my own thoughts, or by chance influences any of their responses. I made sure to ask the same questions during the one-on-one interviews. I also gave them an opportunity to read over the transcript for accuracy. The second limitation was the sample size of participants was small. While it was satisfactory for the purposes of this study, is not enough to allow the results to be generalized to a larger number of institutions or other stakeholders that oversee Ph.D. programs. Lastly, there could have been more males in the study to give more diversity as the data was collected.

Delimitations

Delimitation is defined as the process of setting boundaries on a particular topic, on a study or a research project. According to Creswell (2014), delimitation is "the process of clearly defining the boundaries and parameters of the study" (p. 123). It helps to refine and limit the criteria of the study to keep the sample size small for the purposes of the study. By doing this the researchers establish the extent of their investigation by outlining the specific aspects or variables that were considered, as well as identifying those that were excluded.

The study model was selected for this research because of the nature of the programs offered at the southern regional HBCU and its scope of educating and diversifying the biomedical research professional population. Delimitation played a crucial role in ensuring the research remains focused, manageable, and feasible. By clearly defining the scope, researchers

can avoid potential constraints, such as, limited resources, time constraints or the need for a more comprehensive study.

Recommendations for Future Research

The results of this study provided further insight into the significance of formative feedback within the dissertation process with alumni who earned a Ph.D. in biomedical sciences at a southern regional HBCU. However, further insight could be gained in future studies by including more than one HBCU or expanding the site to institutions of PWIs. It would be interesting to learn how other chairs and the committee who have not participated in formative feedback sessions.

The participants' population could include individuals who earned Ph.D. or terminal degrees from other educational disciplines. Additionally, future research may also focus on data obtained from other programs to determine which strategies they have found to be most effective for establishing and maintaining mentor and mentee relationships. This information may be useful for best practice information in any institution.

Considering the nuanced insights garnered from this study, it is imperative for future research endeavors to continue investigating the interplay of socio-environmental factors, individual agency, and academic outcomes within the HBCU context. Additionally, longitudinal studies tracking the career trajectories of alumni from HBCUs, particularly in biomedical disciplines, would offer valuable insights into the long-term impact of the educational experiences examined in this dissertation.

Conclusion

The current qualitative research study was an exploration of the shared experiences of alumni students from a southern regionally located HBCU. An in-depth qualitative analysis, and

the lens of social learning theory, as proposed by Bandura (1977), provided a critical framework for understanding the dynamic between environmental factors, individual cognitive processes, and behavioral outcomes within the HBCU context. This theoretical perspective explains how students' interactions with chairs and committee members played a critical role as they received formative feedback within the process and developed a sense of self-efficacy.

Data was collected by conducting synchronous virtual one on one interviews, open-ended questionnaire and document reviews completed by the participants. With the participants' permission the interviews were recorded and transcribed. The researcher then analyzed all the data and explored a thematic analysis, allowing for the identification of recurring patterns and theme in the participants narratives.

Participants expressed their appreciation for the constructive nature of the feedback, which enabled them to identify areas for improvement, and enhanced their professional and research skills. This aligns with Bandura's theory, as formative feedback serves as the mastery experience that fosters self-efficacy (Bandura, 1977).

A small number of participants expressed their disappointment and frustration with the feedback they received. Although the concluded with receiving feedback from other faculty members or additional mentors, these individuals expressed the vague or unhelpful feedback did not add value to their dissertation experience. This was especially frustrating to those who expressed being very deliberate to attend this southern regionally located HBCU because of this rich history or monitoring student progress close and notifying students when there is an issue.

The research study was a synthesis of prior studies regarding the pivotal role of formative feedback in biomedical Ph.D. programs at HBCUs. Anderson and colleagues (2015) emphasized the lived experiences and significance of constructive feedback in promoting academic

excellence, professional growth, and research productivity among doctoral candidates. By extending this line of inquiry to the specific context of a biomedical science program at HBCU, this study provides valuable insights into the unique challenges and opportunities faced.

The findings of this research not only contribute to the growing body of literature on HBCU experiences but also offer practical implications for educational institutions and policymakers aiming to enhance the educational outcomes of underrepresented minority students in STEM fields. Recognizing the pivotal role of social interactions, mentorship, and formative feedback in shaping academic trajectories, institutions can implement targeted interventions and support systems to bolster student success. By illuminating the intricate dynamics at play within this educational context, this study not only contributes to the academic dissertation best practice processes but also offers actionable recommendations for institutions seeking to promote inclusivity and continuous quality improvement within higher education institutions.

References

Abdul-Alim, J. (2016). How HBCUs stack up. *Journal of College Admission*, 233, 23-35.

Abril, Jason. (2022). The Value of Reciprocal Feedback. *Edutopia*. https://www.edutopia.org/article/value-reciprocal-feedback/

Abudayyeh, I., Tandon, A., Wittekind, S. G., Rzeszut, A. K., Sivaram, C. A., Freeman, A. M., & Madhur, M. S. (2020). Landscape of mentorship and its effects on success in cardiology. *Basic Translational Science*, *5*(12), 1181-1186.

Ajjawi, R., & Boud, D. (2017) Researching feedback dialogue: an interactional analysis approach. *Assessment & Evaluation in Higher Education*, *42*(2), 252-265.

Ajzen, I. (1991). Organizational behavior and human decision processes. The theory of planned behavior. 50(2), 179-211.

Akers, R. L. (1998). Social learning and social structure: A general theory of crime and deviance.

Ali, A. I., & Kohun, F. (2006). Dealing with isolation feelings in IS doctoral programs**.** *International Journal of Doctoral Studies, 6(1)***,** 21-33. https://doi.org/10.28945/2978

Allen, T. D., Eby, L. T., & Lentz, E. (2006). Mentorship behaviors and mentorship quality associated with formal mentoring programs: Closing the gap between research and practice. *Journal of Applied Psychology*, *91*(3), 567. https://doi.org/10.1037/0021-9010.91.3.567

Amani, J., Myeya, H., & Mhewa, M. (2022). Understanding the motives for pursuing postgraduate studies and causes of late completion: Supervisors and supervisees' experiences. *SAGE Open*, *12*(3). https://doi.org/10.1177/21582440221109586

Anderson, C., Day, K., & McLaughlin, P. (2008). Student perspectives on the dissertation process in a master's degree concerned with professional practice. *Studies in Continuing Education*, *30*(1), 33-49. https://doi.org/10.1080/01580370701841531

Andrade, H. (2016). *Classroom assessment and learning: A selective review of theory and research* [White paper]. Washington, DC: National Academy of Sciences.

Anderson, W. A. (2015). Formative Feedback in a Summative Setting: What Shapes Student Attitudes About Feedback? *Journal of Higher Education*, 86(6), 810-839.

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., & Wittrock, M. C. (2016). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.

Arif, S., Massey, M. D. B., Klinard, N., Charbonneau, J., Jabre, L., Martins, A. B., Gaitor, D., Kirton, R., Albury, C., & Nanglu, K. (2021) Ten simple rules for supporting historically underrepresented students in science. *PLoS Computational Biology*, *17*(9), e1009313. https://doi.org/10.1371/journal.pcbi.1009313

Aud, S., Wilkinson-Flicker, S., Kristapovich, P., Rathbun, A., Wang, X., & Zhang, J. (2013). *The condition of education 2013*. NCES 2013-037. National Center for Education Statistics. https://nces.ed.gov/pubs2013/2013037.pdf

Austin, A. E. (2002). Preparing the next generation of faculty: Graduate school as socialization to the academic career. *Journal of Higher Education, 73*(1), 94-122. https://doi.org/10.1353/jhe.2002.0001

Babbie, E. R. (2016). *The basics of social research*. Cengage Learning.

Bahari, S. F. (2010). Qualitative versus quantitative research strategies: Contrasting epistemological and ontological assumptions. *Jurnal Teknologi, 52*, 17-28.

Baker, C. A., & Moore III, J. L. (2015). Experiences of underrepresented doctoral students in counselor education. *Journal for Multicultural Education, 9*, 68-84. https://doi.org/10.1108/JME-11-2014-0036

Baker, V. L., & Pifer, M. J. (2011) The role of relationships in the transition from doctoral student to independent scholar. *Studies in Continuous Education, 33*, 5-17. http://dx.doi.org/10.1080/0158037X.2010.515569

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.

Bandura, A. (1977). *Social learning theory*. New York, NY: General Learning Press

Bandura, A., & Cervone, D. (2023). *Social Cognitive Theory*. Wiley.

Barnes, B. J., & Austin, A. E. (2009). The role of doctoral advisors: A look at advising from the advisor's perspective. *Innovative Higher Education. 33*(5), 297-315. https://doi.org/10.1007/s10755-008-9084-x

Barnett, J. V., Harris, R. A., & Mulvany, M. J. (2017). A comparison of best practices for doctoral training in Europe and North America. *FEBS Open Biology, 7*(10), 1444–1452. https://doi.org/10.1002/2211-5463.12305

Beard, E. (2021). *What is formative assessment?* Teach. Learn. Grow. https://www.nwea.org/blog/2021/what-is-formative-assessment/

Beeks, A., & Graves, S. L. (2017). Academic leaderships views of school psychology and Black students: The case of Historically Black Colleges and Universities. *Psychology in the Schools, 54*(6), 612–623. https://doi.org/10.1002/pits.22018

Bell, K. (eds). (2013). Interpretive framework. *Open education sociology dictionary*. https://sociologydictionary.org/interpretive-framework/

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, 2, 8–14. https://doi.org/10.1016/j.npls.2016.01.001

Berg, B. L. (2001). *Qualitative research methods for the social sciences*. Allyn and Bacon.

Berelson, B. (1952). *Content analysis in communication research.* Free Press.

Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods & Research*, 141-163.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy, and Practice*, *5*(1), 7.

Black, P., & William, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability*, 21(1), 5-31.

Black, P., & Wiliam, D. (2010). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, *92*(1), 81 90. https://doi.org/10.1177/003172171009200119

Boud, D., & Molloy, E. (2013). Rethinking models of feedback for learning: The challenge of design. *Assessment & Evaluation in Higher Education*. 38(6), 698-712.

Boutwell, B. B., Jones, M. L., Harris, T., & Camacho, E. M. (2021). Factors contributing to the success of Black and Latinx biomedical scientists. PLOS ONE. 16(5).

Bourdieu, P. (1986). *The forms of capital*. Cengage Learning.

Bowen, W., & Rudenstine, N. (1992). *In pursuit of the Ph.D.* Princeton University Press.

Bradshaw, C., Atkinson, S., & Doody, O. (2017). Employing a qualitative description approach in health care research. *Global Qualitative Nursing Research*

Bracey, E. N. (2017). The significance of Historically Black Colleges and Universities (HBCUs) in the 21st century: Will such institutions of higher learning survive? *American Journal of Economics and Sociology, 76*(3), 670– 695. https://doi.org/10.1111/ajes.12191

Braithwaite, R. L., Akintobi, T. H., Blumenthal, D. S., & Langley, W. M. (2020). *The Morehouse Model: How one school of medicine revolutionized community engagement and health equity*. John Hopkins University Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2),77-101. doi:https://doi.org/10.1191/1478088706qp063oa.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589-597.

Brill, J. L., Balcanoff, K. K., Land, D., Gogarty, M., & Turner, F. (2014). Best practices in doctoral retention: Mentoring. *Higher Learning Research Communications, 4*(2), 26-37. https://files.eric.ed.gov/fulltext/EJ1133254.pdf

Brooks, M., Brow & Steen, S. (2010). "Brother where art thou?" African American male instructors' perceptions of the counselor education profession. *Journal of Multicultural Counseling and Development, 38*(3), 142–153. https://doi.org/10.1002/j.2161-1912.2010.tb00122.x

Brown, E. M. & Grothaus, T. (2019). Experiences of cross-racial trust in mentoring relationships between Black doctoral counseling students and White counselor educators and supervisors. *The Professional Counselor, 9*, 211-225. https://doi.org/10.15241/emb.9.3.211

Brown, E. M., & Grothaus, T. (2021). Interracial trust between Black doctoral student protégés and White mentors. *International Journal of Multicultural Education*, *23*(2), 70–87. https://doi.org/10.18251/ijme.v23i2.2613

Bryman, A. (2004). *Social research methods*. Oxford University Press.

Burrington, D., Madison, R. D., & Schmitt, A. (2020). Dissertation committee chairs' current practices to support doctoral students in an online doctoral program. *Online Journal of Distance Learning Administration*, *23*(3), n3.

Burnard, P. (1991). A method of analyzing interview transcripts in qualitative research. *Nurse Education Today*, *11*(6), 461-466.

Burt, K. G., Lopez, R., Landaverde, M., Paniagua, A., & Avalos, E. (2021). Systemic and institutionalized racism, not achievement gap factors, limit the success of Black, Indigenous, and people of color in dietetics education and credentialing. *Critical Dietetics*, *6*(1), 22-39.

Byars-Winston, A., Gutierrez, B., Topp, S., Carnes, M., & Estrada, Y. (2011). Mentoring and community among underrepresented minority faculty in academic medicine. *Journal of General Internal Medicine*. 26(10), 1274–1280.

Cacciattolo, M. (2015). Ethical considerations in research. *The Praxis of English Language Teaching and Learning (PELT)*, 61–79. https://doi.org/10.1007/978-94-6300-112-0_4

Calhoun, K. A. (2022). Kirk A. Calhoun, MD: “Overcoming the headwinds.” AAMC. *Learn Serve Lead conference.* https://www.aamc.org/news-insights/aamc-board-chair-address-2022

Campbell, K. A., Orr, E., Durepos, P., Nguyen, L., & Li, L. (2021). Reflexive thematic analysis for applied qualitative health research. *The Qualitative Report*, *26*(6), 2011-2028.

https://doi.org/10/46743/2160-3715/2021.5010

Campbell, T. A., & Campbell, D. E. (1997). Faculty/student mentor program: Effects on academic performance and retention. *Research in Higher Education*, *38*(6), 727–742.

Carter, F. D., Griffin, K. A., & Roper, L. D. (2019). The impact of same race mentoring on African American doctoral students' persistence. *Journal of College Student Development*, 60(6), 761–778.

Cartwright, A. D., Avent-Harris, J. R., Munsey, R. B., & Lloyd-Hazlett, J. (2018). Interview experiences and diversity concerns of counselor education faculty from underrepresented groups. *Counselor Education and Supervision*, *57*(2), 132-146. https://doi.org/10.1002/ceas.12098

Catanzaro, M. (1988). Using qualitative analytical techniques in: N.F. Woods, & M. Catazaaro (Eds.), *Nursing: research theory and practice* (pp. 437-456). St. Louis: The CV Mosby Company.

Chadiha, L. A., Aranda, M. P., Biegel, D. E., & Chang, C-W. (2014). The importance of mentoring faculty members of color in schools of social work. *Journal of Teaching in Social Work*, *34*, 351-362. https://doi.org/10.1080/08841233.2014.937891

Chan, A. W., Yeh, C. J., & Krumboltz, J. D. (2015). Mentoring ethnic minority counseling and clinical psychology students: A multicultural, ecological, and relational model. *Journal of Counseling Psychology*, *62*(4), 592–607. https://doi.org/10.1037/cou0000079

Chang, M. J., Eagan, M. K., Lin, M. H., & Hurtado, S. (2011). Considering the impact of racial stigma and science identity: persistence among biomedical and behavioral science students. *Journal of Higher Education*, *82*(5), 564–597.

Chao, G. T. (2009). Formal mentoring: Lessons learned from past practice. *Professional Psychology: Research and Practice, 40*(3), 314–320. https://doi.org/10.1037/a0012658

Chemers, M. M., Zurbringgen, E. L., Goza, B. K., & Bearman, S. (2011). The role of efficacy and identity in science career commitment among underrepresented minority students. *Journal of Social Issues, 67*(3), 469–491. https://doi.org/10.1111/j.1540-4560.2011.01710.x

Chen, Q., Zhang, J., & Li, L. (2021). Problematising formative assessment in an undeveloped region of China: voices from practitioners. *Educational Assessment, Evaluation, and Accountability, 33*, 649–673. https://doi.org/10.1007/s11092-021-09369-5

Chen, X., & Soldier, M. (2013). STEM attrition: College students' paths into and out of STEM: Fields Statistical Analysis Report (2013). *National Center for Education Statistics.* www.nces.ed.gov/pubs2014/ 2014001.rev.pdf

College Atlas. (2017). https://www.collegeatlas.org/historically-black-colleges-and- universities-hcbu

Council of Graduate Schools. (2009). *Broadening participation in graduate education.* Washington, DC: Author.

Craft, C. M., Augustine-Shaw, D., Fairbanks, A., & Adams-Wright, G. (2016). Advising doctoral students in education programs. *NACADA Journal, 36*, 54-65.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). SAGE.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approach*. (4rd ed.). SAGE.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. SAGE.

Curtin, N., Malley, J., & Stewart, A. J. (2016). Mentoring the next generation of faculty: Supporting academic career aspirations among doctoral students. *Research in Higher Education, 57*(6), 714-738. https://doi.org/10.1007/s11162-015-9403-x

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

DuBois, D. L., & Silverthorn, N. (2005). Natural mentoring relationships and adolescent health: Evidence from a national study. *American Journal of Public Health, 95*(3), 518–524. https://doi.org/10.2105/AJPH.2003.031476

Duffin, E. (2022). *Age distribution of doctorate recipients: U.S. 2021*. Statista.

Duke, D. C., & Denicolo, P. M. (2017). What supervisors and universities can do to enhance doctoral student experience (and how can they help themselves)? *FEMS Microbiology Letters*, *364*(9). https://doi.org/10.1093/femsle/fnx090

Duran, A., Dahl, L.S., Stipeck, C., & Mayhew, M. J. (2020). A critical quantitative analysis of students' sense of belonging: Perspective on race, generation status, and collegiate environments. *Journal of College Student Development, 61*(2), 133-153.

Easterby-Smith, M., Thorpe, R., Lowe, A. (2002). *Management research: An introduction*. Sage Publications.

Ekholm, E., Zumbrunn, S., & Conklin, S. (2015). The relation of college students' self-efficacy toward writing and writing self-regulation aptitude: Writing feedback perceptions as a mediating variable. *Teaching in Higher Education, 20*(2), 197–207.

Ensher, E. A., & Murphy, S. E. (1997). Effects of race, gender, perceived similarity, and contact on mentor relationships. *Journal of Vocational Behavior, 50*(3), 460–481. https://doi.org/10.1006/jvbe.1996.1547

Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. D. (1993). *Doing naturalistic inquiry: A guide to methods*. Sage.

Estrada, M. (2014). Ingredients for improving the culture of STEM degree attainment with co-curricular supports for underrepresented minority students. Commissioned paper for National Academies of Science, Engineering and Medicine.

Estrada, M., Burnett, M., Campbell, A. G., Campbell, P. B., Denetclaw, W. F., Gutiérrez, C. G., Hurtado, S., John, G. H., Matsui, J., McGee, R., Okpodu, C. M. M., Robinson, T. J., Summers, M. F., Werner-Washburne, M., & Zavala, M. (2016). Improving underrepresented minority student persistence in STEM. *CBE Life Sciences Education, 15*(3), es5. https://doi.org/10.1187/cbe.16-01-0038

Estrada, M., Woodcock, A., Hernandez, P. R., & Schultz, P. W. (2011). Toward a model of social influence that explains minority student integration into the scientific community. *Journal of Educational Psychology, 103*(1), 206–222.

Felder, P. P. (2010). On doctoral student development: Exploring faculty mentoring in shaping of African American doctoral student success. *The Qualitative Report, 15*(2), 455-474. http://www.nova.edu/ssss/QR/QR15-2/felder.pdf

Freeman, K. E., Winston, C., Gangloff-Bailey, F., & Jones, J. (2021). Racial identity-rooted academic motivation of first-year African American students majoring in STEM at an HBCU. *Frontiers in Psychology*, *12*(8).

Fuller, K., Maniscalco-Feichtl, M., & Droege, M. (2008). The role of the mentor in retaining junior pharmacy faculty members. *American Journal of Pharmaceutical Education*, *72*(2), Article 41.

Fusch, P. I., Fusch, G. E., & Ness, L. R. (2017). How to conduct a mini-ethnographic case study: A guide for novice researchers. *The qualitative report*, *22*(3), 923-942.

Gasman, M., & Nguyen, T. B. (2018). The contributions of historically Black colleges and universities to the preparation of African American leaders in STEM. Journal of Research in STEM Education, 4(1), 1-12.

Gaddis, S. M. (2012). What is in a relationship? An examination of social capital, race, and class in mentoring relationship. *Social Forces*, 90, 1237-1269. https://doi.org/10.1093/sf/sos003

Gaston-Johansson, F., Haisfield-Wolfe, M. E., Reddick, B., Goldmon, M., & Swinton, J. (2021). Perceptions of mentoring experiences among African American nursing doctoral students. *Journal of Nursing Education and Practice*, 11(8), 29-36.

Garcia, M. E., Malott, R. W., & Brethower, D. (1988). A system of thesis and dissertation supervision: Helping graduate students succeed. *Teaching of Psychology*, *15*(4), 186–191. https://doi.org/10.1207/s15328023top1504_2

Gee, J. P., & Burt, J. K. (2018). Shared experiences and insider perspectives: Challenges and opportunities of being faculty of color in predominantly white institutions. *Teachers College Record*, 120(13), 1-27.

Geertz, C. (1973). Thick description: Toward an interpretive theory of culture. In: Geertz, C. (Ed.), *The interpretation of cultures.* New York: Basic Books.

Ghoston, M., Grimes, T., Graham, J., Grimes, J., & Field, T. A. (2020). Faculty perspectives on strategies for successful navigation process in counselor education. *The Professional Counselor*, *10*(4), 615–631.

Gibbs, K. D., Jr, Basson, J., Xierali, I. M., Broniatowski, D. A., & McDade, S. A. (2016). Racial and ethnic underrepresentation in biomedical sciences. *PloS One*, 11(2), https://doi.org/10.1371/journal.pone.0150455

Gildersleeve, R. E., Croom, N. N., &. Vasquez, P. L. (2011). "Am I going crazy?!": A critical race analysis of doctoral education. *Equity & Excellence in Education, 44*(1), 93-114.

Giorgi, A. (2012). The descriptive phenomenological psychological method. *Journal of Phenomenological Psychology*, *43*(1), 3–12.

González, J. C. (2006). Academic socialization experiences of Latina doctoral students: A qualitative understanding of support systems that aid and challenges that hinder the process. *Journal of Hispanic Higher Education*, *5*(4), 347-365.

Gonzalez, J. (2017). *Mentoring and transdisciplinary bridges: How mentoring African American doctoral students in science, technology, engineering, and mathematics (STEM) fields can help bridge the underrepresentation gap*. University of California, Berkeley.

Graham, M. J., Fredrick, J., Byars-Winston, A., Hunter, A., & Handelsman, J. (2013). Increasing persistence of college students in STEM. *Science, 341*(6153), 1455–1456.

Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures, and measures to achieve trustworthiness. *Nurse Education Today*, *24*(2), 105-12.

Grasso, M., Barry, M., & Valentine, T. (2007). *A data-driven approach to improving doctoral completion.* The CGS occasional paper series on inclusiveness, Volume two. Council of Graduate Schools. https://legacy.cgsnet.org/cgs-occasional-paper-series/university-georgia/chapter-1

Griffin, K. A. (2013). Voices of the "othermothers": Reconsidering Black professors' relationships with Black students as a form of social exchange. *The Journal of Negro Education, 82*(2), 169-183.

Griffin, K. A., Baker, V., O'Meara, K., Nyunt, G., Robinson, T., & Staples, C. L. (2018). Supporting scientists from underrepresented minority backgrounds: Mapping development networks. *Studies in Graduate and Postdoctoral Education, 9*(1), 19-37.

Haidar, H. (2022). *What is a PhD? QS Top Universities.* https://www.topuniversities.com/blog/what-phd

Hammond, A., Santiago, J. E., & Spikes, D. D. (2018). The lived experience of African American doctoral students in STEM fields: An interpretive phenomenological analysis. *International Journal of Qualitative Studies in Education.* 31(3), 253–273.

Han, C. W., Farruggia, S. P., & Moss, T. P. (2017). Effects of academic mindsets on college students' achievement and retention. *Journal of College Student Development*, *58*(8),

Hanson, J., Loose, W., & Reveles, U. (2022). A qualitative case study of all-but-dissertation students at risk for dissertation noncompletion: A new model for supporting candidates to doctoral completion. *Journal of College Student Retention: Research, Theory & Practice, 24*(1), 234–262. https://doi.org/10.1177/1521025120910714

Harris, A. (2019, April 19). Why are there so few Black Ph.D. s? *The Atlantic*. https://www.theatlantic.com/education/archive/2019/04/lack-of-black-doctoral-students/587413/

Harawa, N. T., Manson, S. M., Mangione, C. M., Carol, M., Penner, L. A., Norris, K. C., DeCarli, C., Scarinici, I. C., Zissimopoulos, J., Buchwald, D. S., Hinton, L., & PérezStable, E. J. (2017). Strategies for enhancing research in aging health disparities by mentoring diverse investigators. *Journal of Clinical and Translational Science, 1*(3), 167– 175. https://doi.org/10.1017/cts.2016.23

Harsoor, S. S., Panditrao, M. M., Rao, S., Bajwa, S. J. S., Sahay, N., & Tantry, T. P. (2022). Dissertation writing in postgraduate medical education. *Indian Journal of Anaesthesia, 66*(1), 34-46.

Haskins, N., Whitfield-Williams, M., Shillingford, M. A., Singh, A., Moxley, R. & Ofauni, C. (2013). The experiences of Black master's counseling students: A phenomenological inquiry. *Counselor Education and Supervision*, 52, 162-178. https://doi.org/10.1002/j.1556-6978.2013.00035.x

Hattie, J., & Gan, M. (2010). Instruction based on feedback In R. E. Mayer & P. A. Alexander (eds.) *Handbook of research on learning and instruction* (pp. 249-271). Routledge.

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of educational research. 77(1), 81-112.

Hawlery, P. (2003). *Being bright is not enough.* Springfield, IL: Charles C. Thomas.

Henfield, M., Woo, H., & Washington, A. (2013). A phenomenological investigation of African American counselor education students' challenging experiences. *Counselor Education and Supervision, 52*(2).

Henning, K., Ey, S., & Shaw, D. (2019). Perceived mentorship quality and doctoral student self-efficacy in biomedical research. International Journal of Doctoral Studies, 14, 163-177.

Hernandez, P.R., Schultz, P. W., Estrada, M., Woodcock, A., & Chance, R, C. (2012). Sustaining optimal motivation: A longitudinal analysis of personal and contextual predictors of achievement goals. *Journal of Educational Psychology, 105*(1), 1–36.

Holloway-Friesen, H. (2018). Acculturation, enculturation, gender, and college environment on perceived career barriers among Latino/a college students. *Journal of Career Development, 45*(2), 117–131. https://doi.org/10.1177/0894845316668641

Hooper, M. (2022). Historically Black Colleges and Universities (HBCUs) Virtual Listening Session #1 Summary of Discussion Topic 1: The overall state of racial and ethnic equity in the biomedical sciences. National Institutes of Health. https://www.nih.gove/ending-structural-racism/historically-black-colleges-universities-hbcus-virtual-listening-session-1

Hottenrott, H., & Lawson, C. (2017). Flying the nest: How home department shapes researchers' career paths. *Studies in Higher Education, 42*(6), 1091-1109. https://doi.org/10.1080/03075079.2015.1076782

Hurt, S., Woods Ways, E., & Holmes, B. (2022). Wait! Don't quit! Stay with your doctoral program during the global pandemic: Lessons learned from program completers. *The Journal of Advancing Education Practice, 3*(1), Article 2. https://openriver.winona.edu/jaep/vol3/iss1/2

Hurtado, S. (2010). Degrees of success: Bachelor's degree completion rates among initial STEM majors. HERI Research Brief. Los Angeles, CA: *Higher Education Research Institute at UCLA.*

Hurtado, S., & Carter, D. F. (1997). Effects of college transition and perceptions of campus racial climate on Latino college students' sense of belonging. *Sociology of Education, 70*(4), 324-345.

Hurtado, S., & Ponjuan, L. (2005). Latino educational outcomes and the campus climate. *Journal of Hispanic Higher Education, 4*(3), 235-251. https://doi.org/10.1177/1538192705276548

Hurtado, S., Ruiz Alvarado, S., & 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.

Hussain, M., & Jones, J. M. (2021). Discrimination, diversity, and sense of belonging: Experiences of students of color. *Journal of Diversity in Higher Education, 14*(1), 63.

Jairam, D. & Kahl, D. H. (2012). Navigating the doctoral experience: The role of social support in successful degree completion. *International Journal of Doctoral Studies, 7*, 311-329. https://doi.org/10.28945/1700

Johnson, A. M. (2016). The role of mentorship in the academic success of African American women in STEM fields. Journal of African American Studies, 20(1), 50-61.

Johnson, A. G., & Jahangiri, A. (2016). Mentoring in graduate biomedical education: A review of the literature. Journal of Educational Evaluation for Health Professions, 13, 36. https://doi.org/10.3352/jeehp.2016.13.36

Johnson, D. R., Soldner, M., Leonard, J. B., Alvarez, P., Inkelas, K. K., Rowan-Keyon, H., & Longerbeam, S. D. (2007). Examining the sense of belonging among first-year undergraduates from different racial/ethnic groups. *Journal of College Student Development, 48*(5), 525-542.

Johnson, D. R., & Huwe, V. J. (2019). The HBCU STEM paradox: Contextualizing race and ethnicity within the STEM pipeline. Journal of Education and Human Development, 8(1), 60-72.

Johnson, J. C., Williams, B., Jayaraman, G., & Williams, M. V. (2019). An investigation into the role of mentorship in the career development of African American biomedical science PhD students. Journal of Women and Minorities in Science and Engineering, 25(3), 223-240.

Johnson, J. M., & Scott, S. (2020). Nuanced navigation: Narratives of the experiences of Black "all but dissertation" (ABD) women in the academy. *International Journal of Qualitative Studies in Education*, 1–15. https://doi.org/10.1080/09518398.2020.1852485

Johnson, W. B. (2007). Mentoring students in doctoral programs: An essential ingredient to enhancing the diversity of the professoriate. Journal of Hispanic Higher Education, 6(4), 344–354.

Jonsson, A., & Panadero, E. (2018). Facilitating students' active engagement with feedback. In A. A. Lipnevich & J. K. Smith (eds.) *The Cambridge handbook of instructional feedback* (pp. 531–554). Cambridge University Press.

Kamler, B., & Thomson, P. (2014). Helping doctoral students write: Pedagogies for supervision. Routledge.

Kim, S., Lee, J., & Kim, M. (2020). Continuous Feedback as a Driver of Learning: A Qualitative Case Study. Journal of Curriculum and Teaching, 9(1), 1-12.

Kitchenham, A. (2008). The evolution of John Mexirow's transformative learning theory. *Journal of Transformative Education, 6*(2), 1-4-123.

Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin, 119*(2), 254–284. https://doi.org/10.1037/0033-2909.119.2.254

Kuckartz, U., & Rädiker, S. (2019). *Analyzing qualitative data with MAXQDA.* Springer.

Kulhavy, R. W. (1977). Feedback on written instruction. *Review of Educational Research, 47*(2), 211–232. https://doi.org/10.3102/003465430470022

Kulhavy, R. W., & Stock, W. A. (1989). Feedback in written instruction: The place of response certitude. *Educational Psychology Review, 1*(4), 279–308.

Kumar, V., & Stracke, E. (2018). Reframing doctoral examination as teaching. *Innovations in Education and Teaching International, 55*(2), 219-227.

Krulwich, T. A. (2009). A major role for social work input during development of an innovative post-baccalaureate research education program in a medical center environment. *Social Work in Health Care, 48*(7), 653–664.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge University Press. https://doi.org/10.1017/CBO9780511815355

Leahy, S., Lyon, C., Thompson, M., & Wiliam, D. (2005). Classroom assessment: Minute by minute, day by day. *Educational Leadership, 63*(3), 18-24.

Lean, J. (2012). Preparing for an uncertain future: The enterprising Ph.D. student. *Journal of Small Business and Enterprise Development, 19(3), 532-548.*

Lee, A. (2008). How are doctoral students supervised? Concepts of doctoral research supervision. *Studies in Higher Education, 33*(3), 267–81.

Leedy, P. D., & Ormrod, J. E. (2013). Practical research: Planning and design (10th ed.). Upper Saddle River, NJ. Pearson Education.

Leighton, K., Kardong-Edgren, S., Schneidereith, T., & Foisy-Doll, C. (2021). Using social media and snowball sampling as an alternative recruitment strategy for research. *Clinical Simulation in Nursing*, *55*(1), 37-42.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. Journal of Vocational Behavior, 45(1), 79-122.

Lincoln, Y., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Linn, M. C., Palmer, E., Baranger, A., Gerard, E., & Stone, E. (2015). Undergraduate research experience: Impacts and opportunities. *Science, 347*(6222), 627–633.

LinkedIn. (2021). *User Agreement.* https://www.linkedin.com/legal/user-agreement

LinkedIn Sales Navigator (Professional) [Software]. (2019). https://business.linkedin.com/sales-solutions/sales-navigator.

Lipnevich, A. A., and Smith, J. K. (2009). "I really need feedback to learn:" Students' perspectives on the effectiveness of the differential feedback messages. *Educational Assessment, Evaluation and Accountability, 21*(4), 347–367.

Litalien, D., & Guay, F. (2015). Dropout intentions in Ph.D. studies: A comprehensive model based on interpersonal relationships and motivational resources. *Contemporary Educational Psychology*, *41,* 218–231. http://dx.doi.org/10.1016/j.cedpsych.2015.03.004

Liu, G., Zhang, Y., & Li, F. (2018). The effects of formative feedback from teachers on students' self-regulated learning, metacognitive awareness, and academic achievement. Learning and Individual Differences, 63, 10-17.

Lomax, A. M., Black effect: Black students' experiences in CACREP master's programs at HBCUs" (2021). *Doctoral Dissertations and Projects*. 2903. https://digitalcommons.liberty.edu/doctoral/2903

Louie, V., & Wilson-Ahlstrom, A. (2018). *Moving it forward: The power of mentoring, and how universities can confront institutional barriers facing junior researchers of color forum for youth investment*. William T. Grant Foundation. https://www.issuelab.org/resources/33098/33098.pdf

Lovitts, B. (2001). *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Lanham, MD: Rowman and Littlefield.

Lueck, A., & Boehm, B. (2019). Beginning at the end: Reimagining the dissertation committee, reimagining careers. *Composition Studies, 47*(1), 135–153.

Lui, A. M., & Andrade, H. L. (2022). Inside the next black box: Examining students' responses to teacher feedback in a formative assessment context. *Frontiers in Education, 7*.

Maestas, R., Vaquera, G. S., & Zehr, L. M. (2007). Factors impacting sense of belonging at a Hispanic-serving institution. *Journal of Hispanic Higher Education, 6*(3), 237-256. https://doi.org/10.1177/15381927073028

Mangold, W. D., Bean, L. G., Adams, D. J., Schwab, W. A., & Lynch, S. M. (2002). Who goes who stays: An assessment of the effect of a freshman mentoring and unit registration program on college persistence. *Journal of College Student Retention: Research, Theory & Practice, 4*(2), 95–122.

Maramba, D. C., & Museus, S. D. (2013). Examining the effects of campus climate, ethnic group cohesion, and cross-cultural interaction of Filipino American students' sense of belonging to college. Journal of College Student Retention, 14(4), 495-522.

Marchisio, M., Barana, A., Fioravera, M., Rabellino, S., & Conte, A., (2018). A model of automatic formative assessment and interactive feedback for STEM. In 2018 IEEE 42nd Annual Computer Software and Applications Conference (COMPSAC) (Vol. 1, pp. 1016-1025).

Marcus, B., Weigelt, O., Hergert, J., Gurt, J., & Gelléri, P. (2017). The use of snowball sampling for multi-source organizational research: Some cause for concern. *Personnel Psychology*, *70*(3), 635-673.

Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research? A review of qualitative interviews in is research. *Journal of Computer Information Systems*, *54*(1), 11-22. doi:10.1080/08874417.2013.11645667

Martin, L. (2020). Using synchronous formative feedback to facilitate student growth. *Music Educators Journal*, *107*(2), 51–57. https://doi.org/10.1177/0027432120976816

McCoy, D. L., Winkle-Wagner, R., & Luedke, C. (2015). Colorblind mentoring? Exploring White faculty mentoring of students of color. *Journal of Diversity in Higher Education, 8*, 225-242. https://doi.org/10.1037/a0038676

McKee, A., Guimarães, M. H., & Pinto-Correia, T. (2015). Social capital accumulation and the role of the researcher: An example of a transdisciplinary visioning process for the future of agriculture in Europe. *Environmental Science & Policy, 50*, 88– 99. https://doi.org/10.1016/j.envsci.2015.02.006

Means, D. R., & Pyne, K. B. (2017). Finding my way: Perceptions of institutional support and belonging in low-income, first-generation, first-year college students. *Journal of College Student Development, 58*(6), 907-924.

Mendoza, D. L., Velez, V. N., & Moradi, B. (2017). The impact of same race mentoring on Latina doctoral students' sense of belonging. Journal of Hispanic Higher Education, 16(4), 328–344.

Merleau-Ponty, M. (2012). *Phenomenology of perception.* Routledge.

Merriam, S. B. (1988) *Case study research in education: A qualitative approach*. Jossey-Bass

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. Jossey-Bass.

Mezirow, J. (1997) Transformative Learning: Theory to Practice. *New Directions for Adult and Continuing Education, 74*, 5-12. http://dx.doi.org/10.1002/ace.7401

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* SAGE.

Minnett, A. (2020). The impact of formative feedback on student performance: *A systematic review*. Educational Research and Reviews. 15(2), 88-101.

Monday, J.-L. (2021). Examining the Academic and professional experiences of African American STEM Ph.D. mentors. *The Journal of Negro Education*, *90*(1), 108–122. https://www.jstor.org/stable/10.7709/jnegroeducation.90.1.0108

Mondisa, J. L. (2021). Examining the academic and professional experiences of African American STEM PhD mentors. *Journal of Negro Education*, *90*(1), 108-122.

Morehouse School of Medicine (2018). Graduate education in biomedical sciences (GEBS). https://www.msm.edu/Education/GEBS/documents/GEBSbrochurebookletInteractive_FINAL.pdf

Moroi, T. (2020). Quantitative and qualitative research and philosophical assumptions. *Journal of Bunkyo Gakuin University, Department of Foreign Languages*, (20), 127-132.

Mory, E. H. (2004). Feedback research review. In D. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 745–783). Mahwah, NJ: Lawrence Erlbaum.

Most, D. E. (2008). Patterns of doctoral degree completion: A longitudinal analysis. *Journal of College Student Retention*. 10(2), 171-190.

Moustakas, C. (1994). *Phenomenological research methods*. SAGE.

Murdock, J. L., Stipanovic, N., & Lucas, K. (2013). Fostering connections between graduate students and strengthening professional identity through co-mentoring. *British Journal of Guidance & Counselling, 41*(5), 487–503.

Muro, M., & Jeffrey, P. (2008) A critical review of the theory and application of social learning in participatory natural resource management processes. *Journal of Environmental Planning and Management,* (3), 325-344.

Murphy, N., Bain, J. D., & Conrad, L. (2007). Orientations to research higher degree supervision. *Higher Education, 53*(2), 209–234. https://doi.org/10.1007/s10734-005-5608-9

Naderifar, M., Goli, H., & Ghaljaie, F. (2017). Snowball sampling: A purposeful method of sampling in qualitative research. *Strides in Development of Medical Education*, *14*(3),

National Center for Education Statistics (2013). *Integrated Postsecondary Education Data System*. Washington, DC

National Science Foundation (2006). *Investing in America's future: Strategic plan FY 2006-2011*. Arlington VA: The Author. http://www.nsf.gov/pubs/2006/nsf0648/NSF-06-48.pdf

National Science Foundation. (2015a). Women, minorities, and persons with disabilities in science and engineering. National Center for Science and Engineering Statistics. www.nsf.gov/statistics/2015/nsf15311/nsf15311.pdf

National Science Foundation. (2015). Top baccalaureate institutions of Black science doctorate recipients, by sex: 2008–2012. National Center for Science and Engineering Statistics. www.nsf.gov/statistics/2015/nsf15311/ tables/pdf/tab7-12.pdf

Nabavi, R. T. (2012) Bandura's social learning theory & social cognitive learning theory. *Theory of Developmental Psychology*, 1-24.

Nelson, I. A., London, R. A., & Strobel, K. R. (2015). Reinventing the role of the university researcher. *Educational Researcher, 44*(1), 17–26. https://doi.org/10.3102/0013189x15570387

Nettles, M. T., & Millett, C. M. (2006). *Three magic letters: Getting to Ph.D.* The Johns Hopkins University Press.

Nora, A., & Crisp, G. (2007). Mentoring students: Conceptualizing and validating the multi-dimensions of a support system. *Journal of College Student Retention: Research, Theory & Practice, 9*(3), 337-356. https://doi.org/10.2190/CS.9.3.e

Nowell, L., Norris, J., White, D., & Moules, N. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*(1-13). https://doi.org/10.1177/1609406917733847

O'Brien, B. C., & Battista, A. (2020). Situated learning theory in health professions education research: a scoping review. *Advances in Health Sciences Education Theory and Practice, 25*(2), 483-509..

Oh, H. (2022). BUILD scholars present and win awards at 2022 SACNAS and ABRCMS conferences. *Consortium News. DPC Newsletter,* 7(3). https://dpcnew.netlify.app/dpc-newsletter-V7I3/consortium-news-pg1#Become-a-Researcher

O'Keefe, P. (2013). A sense of belonging: Improving student retention. *College Student Journal*, *47*(4), 605-613.

O'Meara, K., Jaeger, A. J., Eliason, J. L., Grantham, A. E., Cowdery, K., Mitchall, A. M., & Zhang, J. (2014). By design: How departments influence graduate student agency in career advancement. *International Journal of Doctoral Studies*, *9*, 155–179. https://doi.org/10.28945/2048

Ong, M., Wright, C., Espinosa, L., & Orfield, G. (2011). Inside the double bind: A synthesis of empirical research on undergraduate and graduate women of color in science, technology, engineering, and mathematics. Harvard Educational Review, 81(2), 172–208.

Otieno, T., Lutz, P. M., & Schoolmaster, F. A. (2010). Enhancing recruitment, professional development, and socialization of junior faculty through formal mentoring programs. *Metropolitan Universities, 21*(2), 74-88.

Paglis, L. L., Green, S. G. & Bauer, T. N. (2006). Does adviser mentoring add value? A longitudinal study of mentoring and doctoral student outcomes. *Research in Higher Education, 47*, 451–476. https://doi.org/10.1007/s11162-005-9003-2

Palmer, R. T., Davis, R. J., & Hilton, A. A. (2018). *Sense of belonging, perceived support, and persistence among African American and Latino/a STEM students*. Journal of Engineering Education, 107(3), 467-489.

Parker, C., Scott, S., & Geddes, A. (2019). Snowball sampling, In P. Atkinson, S. Delamont, A. Cernat, J.W. Sakshaug, & R.A. Williams (Eds.), *SAGE Research Methods Foundations*. SAGE.

Parks-Yancy, R. (2012). Interactions into opportunities: Career management for low-income, first-generation African American college students. *Journal of College Student Development, 53*(4), 510–523. https://doi.org/10.1353/ csd.2012.0052

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage.

Peredaryenko, M. S., & Krauss, S. E. (2013). Calibrating the human instrument: Understanding the interviewing experience of novice qualitative researchers. *The Qualitative Report, 18*(85), 1-17. https://doi.org/10.46743/2160-3715/2013.1449

Platow, M. J., Foddy, M., Yamagishi, T., Lim, L., & Chow, A. (2012). Two experimental tests of trust in in-group strangers: The moderating role of common knowledge of group membership. *European Journal of Social Psychology, 42*(1), 30–35.

Pfund, C., Byars-Winston, A., Branchaw, J., Hurtado, S., Eagan Jr, M. K., & Mitchell, K. (2016). Defining attributes and metrics of effective research mentoring relationships. AIDS and Behavior. 20(Suppl 2), 238-248.

Protivnak, J. J., & Foss, L. L. (2009). An exploration of themes that influence the counselor education doctoral student experience. *Counselor Education & Supervision, 48*(4), 239-256. https://doi.org/10.1002/j.1556-6978.2009.tb00078.x

Rademaker, L. L., Duffy, J. O., Wetzler, E., & Zaikina-Montgomery, H. (2016). Chair perceptions of trust between mentor and mentee in online doctoral dissertation mentoring. *Online Learning, 20*(1), 1-13. https://doi.org/10.24059/olj.v20i1.605

Ragins, B. R., & Kram, K. E. (2007). The roots and meaning of mentoring. In B.R. Ragins & K. E. Kram (eds.) *The handbook of mentoring at work: Theory, research, and practice* (pp. 1-13). SAGE.

Raina, S. K. (2015). Establishing association. *Indian Journal of Medical Research, 141*(1),127..

Randall, K. R., Eatman, D., Mitchell, A. K., & McNeal, M. (2018). Using learning communities to successfully navigate through the stages of graduate education at a small medical school. *Journal of Advances in Education Research*, *3*(1), 59-66. https://dx.doi.org/10.22606/jaer.2018.31006

Reagan, L., Nowlin, S. Y., Birdsall, S. B., Gabbay, J., Vorderstrasse, A., Johnson, C., & Melkus, G. D. E. (2019). Integrative review of recruitment of research participants through Facebook. *Nursing research*, *68*(6), 423-432.

Reyes, M. L., & Anderson, T. H. (2019). *Mentoring doctoral students in the behavioral sciences: A review of the literature*. Journal of Behavioral and Social Sciences Education, 8(1), 31-52.

Remich, R., Naffziger-Hirsch, M. E., Gazley, J. L., & McGee, R. (2016). Scientific growth and identity development during a postbaccalaureate program: Results from a multisite qualitative study. *CBE Life Sciences Education, 15*(3), ar25. https://doi.org/10.1187/cbe.16-01-0035

Rigler, K. L., Bowlin, L. K., Sweat, K., Watts, S., & Throne, R. (2017). *Agency, socialization, and support: A critical review of doctoral student attrition*. Paper presented at the 3rd International Conference on Doctoral Education, University of Central Florida.

Roberts, L. (2020). The importance of tough love mentoring to doctoral student success: Instruments to measure the doctoral student/proteges' perspective. *International Journal of Doctoral Studies, 15*, 485-516. https://doi.org/10.28945/4630

Roberts, L., & Ferro-Almeida, S. (2019). Is trustworthiness important in a doctoral mentor? Toward a theory of tough love mentoring. *International Journal of Doctoral Studies, 14*, 613-635.

Rosser, V. J. (2004). The socialization and mentoring of doctoral students: A faculty is imperative. *Educational Perspectives, 37*(2), 28-33.

Russell, M. L., Escobar, M., Russell, J. A., Robertson, B. K., & Thomas, M. (2018). Promoting pathways to STEM careers for traditionally underrepresented graduate students. *Negro Educational Review*, *69*(1-4), 5-32, 142-143.

Rutakumwa, R., Mugisha, J. Ol, Bernays, S., Kabunga, E., Tumwekwase, G., Mbonye, M., & Seeley, J. (2020). Conducting in-depth interviews with and without voice recorders: A comparative analysis. *Qualitative Research, 20*(5), 565-581. https://doi.org/10.1177/1468794119884806

Saaris, N. (2017). Formative assessment: Tracking student learning in real time. Actively Learn. https://www.activelylearn.com/post/formative-assessment-tracking-student-learning-in-real-time

Salinas, C. Jr, Riley, P., Camacho, L. Jr., & Floyd, D. L. (2020). Mentoring experiences and perceptions of Latino male faculty in higher education. *Hispanic Journal of Behavioral Sciences, 42*(1), 117-140. https://doi.org/10.1177/0739986319900026

Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students, 4th edition*. Prentice-Hall

Schneijderberg, C. (2019). Supervision practices of doctoral education and training. *Studies in Higher Education, 46*(7), 1285-1295. https://doi.org/10.1080/03075079.2019.1689384

Shamoo, A.E., & Resnick, D.B. (2015). *Responsible conduct of research, third edition*, Oxford University Press

Shavelson, R. J., Young, D. B., Ayala, C. C., Brandon, P. R., Furtak, E. M., Ruiz-Primo, M. A., &Yin, Y. (2008). On the impact of curriculum-embedded formative assessment on learning: A collaboration between curriculum and assessment developers. *Applied Measurement in Education, 21*(4), 295-314

Shute, V. (2008). Focus on formative feedback. *Review of Educational Research, 78*(1), 153-189.

Skeith, L., Ridinger, H., Srinivasan, S., Givi, B., Youssef, N., & Harris, I. (2018). Exploring the thesis experience of master of health professions education graduates: a qualitative study. *International Journal of Medical Education*, *9*, 113.

Smith, D. W. (2013). *Phenomenology: The Stanford encyclopedia of philosophy*. http://plato.stanford.edu/archives/win2013/entries/phenomenology/ https://www.chronicle.com/article/our-mysterious-dissertation-committees/?cid=gen_sign_in

Smith, J. W., Smith, W. J., & Markham, S. E. (2000). Diversity issues in mentoring academic faculty. *Journal of Career Development*, *26*(4), 251-262. https://doi.org/10.1023/A:1022998106420

Smith, J., Johnson, K., & Williams, L. (2020). Perceptions and lived experiences of biomedical research Ph.D. alums from southern regional HBCUs about formative feedback received during their dissertation process. Journal of Black Psychology, 46(2), 126-144.

Smith, K. M., Robinson, T. J., & James, L. (2020). *African American doctoral students: Challenges, supports, and strategies for success*. Journal of Student Affairs Research and Practice, 57(2), 156-168. https://doi.org/10.1080/19496591.2020.1765662

Smyth, M., & Williamson, W. (Eds.) (2004). *Researchers and their 'subjects': Ethics, power, knowledge, and consent.* Bristol: Policy Press

Sorkness, C. A., Pfund, C., Ofili, E. O., Okuyemi, K. S., Vishwanatha, J. K., & Zavala, M. E. (2017). A new approach to mentoring for research careers: The National Research Mentoring Network. BMC Proceedings, 11(Suppl 12), 22. https://doi.org/10.1186/s12919-017-0074-0

Sowell, R., Allum, J., & Okahana, H. (2015). Doctoral initiative on minority attrition and completion. *Washington, DC: Council of Graduate Schools*. https://legacy.cgsnet.org/ckfinder/userfiles/files/Doctoral_Initiative_on_Minority_Attrition_and_Completion_2015.pdf

Sowell, R. S., Zhang, T., & Redd, K. (2008). Ph.D. completion and attrition: Analysis of baseline program data from the Ph.D. Completion Project. Washington, DC: *Council of Graduate Schools.*

Spronken-Smith, R., Cameron, C., & Quigg, R. (2018). Factors contributing to high Ph.D. completion rates: A case study in a research-intensive university in New Zealand. *Assessment & Evaluation in Higher Education, 43*(1), 94-109. https://doi.org/10.1080/02602938.2017.1298717

Stainton-Rogers, W. (2006). Logics of inquiry. In S. Potter (Ed.), *Doing postgraduate research* (2nd edition) (pp. 73-91). *SAGE*.

Stanford Teaching Commons. (n.d.). Formative assessment and feedback. https://teachingcommons.standord.edu/teaching-guides/foundations-course-design/feedback-and-assessment/formative-assessment-and-feedback

Stiggins, R. (2007). Assessment through the student's eyes. *Educational Leadership, 64*(8), 22-26.

Stiggins, R., & Chappuis, J. (2005). Using student-involved classroom assessment to close achievement gaps. *Theory Into Practice, 44*(1), 11-18.

Stith, K., & Blumenthal, C. (2019). The Dartmouth College case and the founding of Historically Black Colleges. *University of New Hampshire Law Review*, 18(1), 27–40.

Strayhorn, T. L. (2012). *College students' sense of belonging: A key to educational success for all students.* Routledge.

Strayhorn, T. L. (2019). *College students' sense of belonging: A key to educational success for all students (2nd ed)*. Routledge.

Sutton, J., & Austin, Z. (2015). Qualitative research: Data collection, analysis, and management. *The Canadian Journal of Hospital Pharmacy, 68*(3), 226–231. https://doi.org/10.4212/cjhp.v68i3.1456

Sverdlik, A., Hall, N. C., McAlpine, L., & Hubbard, K. (2018). The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and well-being. *International Journal of Doctoral Studies, 13*, 361-388.

Sweller, J. (1988). Cognitive load during problem-solving: Effects on learning. Cognitive Science, 12(2), 257-285.

Syed, M., Azmitia, M., & Cooper, C. R. (2011). Identity and academic success among underrepresented ethnic minorities: an interdisciplinary review and integration. *Journal of Social Issues*, *67*(3), 442–468. https://doi.org/10.1111/j.1540-4560.2011.01709.x

Taylor, R. T., Vitale, T., Tapoler, C., & Whaley, K. (2018). Desirable qualities of modern doctorate advisors in the USA: A view through the lenses of candidates, graduates, and academic advisors. *Studies in Higher Education*, *43*(5), 854–866. https://doi.org/10.1080/03075079.2018.1438104

Talley, C. (2022). Conversation #73: Cheryl Talley on being a Black scientist.Advancement of Teaching and Faculty Development. Xavier University https://cat.xula.edu/food/conversation-73/

Terrell, F., & Terrell, S. L. (1981). An inventory to measure cultural mistrust among Blacks. *The Western Journal of Black Studies*, *5*(3), 180–184.

The Hundred-Seven. (2023). HBCU listing. http://www.thehundred-seven.org/hbculist.html

Thompson, A. N., & Scriven, O. A. (2008). African American women in science: Spelman College as a national model for baccalaureate degree production in models for success. In *Successful academic models for increasing the pipeline of Black and Hispanic students in STEM areas, 3rd ed*. Thurgood Marshall College Fund.

Tingle, N. H. (2021). Doin' it for the culture: An exploration of critical consciousness and civic engagement within HBCU core curriculum. [Dissertation, Auburn University]. https://etd.auburn.edu/bitstream/handle/10415/7921/NekitaTingle_Dissertation.pdf?sequence=2&isAllowed=y

Truong, K. A., & Museus, S. D. (2012). Responding to racism and racial trauma in doctoral study: An inventory for coping and mediating relationships. *Harvard Educational Review, 82* (2), 226-254. https://doi.org/10.17763/haer.82.2.u54154j787323302

Twale, D., Weidman, J., & Bethea, K. (2016). Conceptualizing socialization of graduate students of color: Revisiting the Weidman-Twale-Stein framework. *The Western Journal of Black Studies, 40*, 80-94.

Ursinus College. (2015). Assessment of Institutional Effectiveness and Student Learning at Ursinus College Common Questions

van der Kleij, F. S. (2019). Comparison of teacher and student perceptions of formative assessment feedback practices and association with individual student characteristics. *Teaching and Teacher Education, 85*, 175-189. https://doi.org/10.1016/j.tate.2019.06.010//doi.org/10.1016/j.tate.2019.06.010

Vázquez-Montilla, E., Wilder, L. K., & Triscari, R. (2012). Ethnically diverse faculty in higher ed: belonging, respect, and role as cultural broker. *Multicultural Learning and Teaching*, *7*(1).

Weaver, K., & Olson, J. K. (2006). Understanding paradigms used for nursing research. *Journal of Advanced Nursing*, *53*(4), 459–469.

Wilcox, C., Wells, J., Haddad G., & Wilcox, J. (2014). The changing democratic functions of Historically Black Colleges and Universities. *New Political Science*, *36*(4), 556-572.

Williams, H., Brown, T., & Onwuegbuzie, A. (2018). Formative feedback: A critical review and recommendations for future research. Journal of Educational and Psychological Consultation, 28(2), 153-170.

Williams, T. B., Prince, L. Y., Allen, A. R., Sterba, K. M., Thomas, B. R., & McGehee, R. E. (2021). Performance measures of racially underrepresented Ph.D. students in biomedical sciences: The UAMS IMSD program outcomes. *PLOS ONE, 16*(2), e0246683.

Williams, W. R., Berger, J. B., & McClendon, S. A. (2005). Toward a model of inclusive excellence and change in postsecondary institutions. Washington, DC: Association of American Colleges and Universities.

Willig, C., & Rogers, W. S. (Eds.). (2017). *The SAGE handbook of qualitative research in psychology*. SAGE.

Winkle-Wagner, R. & McCoy, D. L. (2016). Entering the (postgraduate) field: Underrepresented students' acquisition of cultural and social capital in graduate school preparation programs. *The Journal of Higher Education*, *87*(2), 178-205. https://doi.org/10.1353/jhe.2016.0011

Winstone, N. E., Nash, R. A., Parker, M., & Rowntree, J. (2017). Supporting learners' agentic engagement with feedback: A systematic review and a taxonomy of recipience processes. *Educational Psychologist, 52*(1), 17–37.

Woolderink, M., Putnik, K., van der Boom, H., & Klabbers, G. (2015). The voice of Ph.D. candidates and Ph.D. supervisors: A qualitative exploratory study amongst Ph.D. candidates and supervisors to evaluate the relational aspects of Ph.D. supervision in the Netherlands. *International Journal of Doctoral Studies*, *10*(10), 217-235.

Wright, C., & Moffat Miller, C. (2018). *Revising the definition of formative assessment by the Formative Assessment for Students and Teachers (FAST) State Collaborative on Assessment and Student Standards SCASS)*. The Council of Chief State School Officers.

https://ccsso.org/sites/default/files/2018-06/Revising%20the%20Definition%20of%20Formative%20Assessment.pdf

Yin, R.K. (2017). *Case study research: Design and methods*. 6th Edition. Sage.

Yin, Y., & Lee, J. (2012). Formative feedback for online learners: An exploratory study using audio-based scaffolding. Computers & Education, 58(1), 283-293.

Zainal Abiddin, N. (2005). Effective meeting in graduate research student supervision. http://dx.doi.org/10.2139/ssrn.962230

Zaniewski, A. M., & Reinholz, D. (2016). Increasing STEM success: A near-peer mentoring program in the physical sciences. *International Journal of STEM Education*, *3*(1), 14. https://doi.org/10.1186/s40594-016-0043-2

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press.

Appendix A: IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 22, 2023

Shontell Stanford
George Johnson

Re: IRB Approval - IRB-FY23-24-134 Alumni Perceptions of Formative Feedback During the Dissertation Process While Pursuing a Doctoral Degree in Biomedical Science at an Historical Black College and University: A Phenomenological Study

Dear Shontell Stanford, George Johnson,

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 following date: August 22, 2023. If you need to make changes to the methodology as it pertains to human subjects, you must submit a modification to the IRB. Modifications 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. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

For a PDF of your approval letter, click on your study number in the My Studies card on your Cayuse dashboard. Next, click the Submissions bar beside the Study Details bar on the Study Details page. Finally, click Initial under Submission Type and choose the Letters tab toward the bottom of the Submission Details page. Your stamped consent form(s) and final versions of your study documents can be found on the same page under the Attachments tab. Your stamped consent form(s) 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(s) 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, PhD, CIP
Administrative Chair
Research Ethics Office

Appendix B: Recruitment Message

Dear Potential Participant,

As a doctoral candidate in the School of Education at Liberty University, I am conducting research as part of the requirements for a Doctor of Philosophy. The purpose of my research study is to explore the perception and lived experiences of biomedical research Ph.D. alums from southern regional HBCU about formative feedback received during their dissertation process. I am writing to invite you to join my study.

You are invited to participate in a research study. To participate, you must identify as African American; considered pursuing a Ph.D. in biomedical science at a different type of institution, that was not an HBCU; have participated in at least three dissertation committee meetings; were enrolled or graduated with a Ph.D. biomedical program from a southern regionally located HBCU; willing to participate in a virtual one-on-one interview and complete a short questionnaire.

Participants will be asked to take part in a one-on-one interview; complete a questionnaire and complete a brief document review of written formative feedback received during their dissertation process. If completed all at one time, the study will take approximately 2 hours to complete all tasks listed. Names and other identifying information will be requested as part of this study, but participant identities will not be disclosed.

To participate, contact me at [redacted] letting me know you are interested in being a participant in my research. I will send you a link to a screening criteria survey.

A consent document will be sent to you if you meet the study criteria based on your survey responses. The consent document contains additional information about my research and requires your signature to begin. After you have read and signed the consent form, forward to [redacted]. A copy of the consent document will be given to you for your records. I will keep a copy of the study records.

Thank you for your consideration.

Sincerely,

Shontell Stanford
Ph.D. candidate

Appendix C: Individual Interview Questions

1. What is your perception of attending an HBCU? (CRQ)
2. What was your relationship with your committee chair before beginning the dissertation process? (SQ1)
3. How important was it for you to have a committee chair that was of the same ethnicity and/or social background as you? (SQ1)
4. What things did you and your committee chair have in common (i.e., ethnicity, gender, social background, area of research)? (SQ1)
5. What challenges, if any, did you face with your dissertation committee? (SQ1)
6. What are some of the challenges, if any, you faced with accomplishing milestones within the program? (SQ3)
7. What were some of the strengths of the Ph.D. Biomedical dissertation committee process? (CRQ 3)
8. What experience did you have in preparing your regular committee meetings? (SQ2)
9. What have been some of the formative feedback comments that you received from your committee chair? (SQ2)
10. Describe how you felt before, during, and after receiving this information? (SQ2)
11. Describe how this feedback impacted your progress. (SQ3)
12. How would you compare your feelings from the first committee meeting to the last committee meeting? (SQ3)

Appendix D: Alums Perception Questionnaire

1. What is your perception of the formative feedback you received through your dissertation process? (CRQ)
2. What is your perception of receiving formative feedback assessments from faculty members who are in the field of Biomedical research and work at HBCU you attended? (SQ1 and SQ2)
3. What is your perception of using formative feedback and the development of self-efficiency? (SQ3)
4. What is your perception of how helpful, impactful, rewarding, or non-significant receiving formative feedback was at an HBCU and helping students accomplishing their goals of defending their dissertations and graduating? (CRQ)
5. Please feel free to make additional comments or share any memorable moments from your dissertation experience. (CRQ)

Appendix E: Document Review Questions

1. What is your perception of the written formative feedback in the document? (CRQ)
2. What did the mentor say in his or her feedback, if anything, that indicated that they identified with your experiences as an African American learner in the biomedical science Ph.D. program at an HBCU? (SQ2)
3. How did the written formative feedback impact you during your dissertation process? (SQ1)

Appendix F: Interview Protocol

A. The virtual interview will begin with introductions and an overview of the topic. The researcher will explain the function of the Zoom and the software program that will be used to transcribe the meeting after Zoom records the session.
B. The researcher will thank the participants for their time and for agreeing to participate in the study.
C. The researcher will remind each participant the interview is recorded and will remain confidential.
D. The researcher will ask for verbal permission to record the interview. If the participant refuses, the interview will be terminated.
E. The interviewer will turn on the recorder, announce the participant's identifying assigned code for confidentiality, and the date and time of the interview.
F. The interview will last 60 minutes to obtain responses to all the interview questions and any follow-up questions.
G. During the interview, the researcher will watch for non-verbal cues, paraphrase as needed, and ask follow-up probing questions to get more in-depth data.
H. After verification of responses are recorded to the satisfaction of the participant, the interview will conclude, and the interviewer will wrap up with a thank you for participating in the study.
I. The researcher will run each interview through a transcription program.
J. The researcher will email a copy of the transcript to the participant and explain member checking.

K. The researcher will ask in that email: “Did I miss anything? Or would you like to add anything?”

L. The participant will verify the accuracy of the collected information and respond to the researcher within 5 days.

M. The researcher will analyze the interview transcripts.

N. At the conclusion of the study, the researcher will provide the participant with a synopsis of the study findings.

O. All data will be destroyed three months after the findings are reported.

Appendix G: Detailed Discussion on Data Analysis

Virtual one-on-one interviews were conducted for approximately 45 minutes and took place on a Zoom conferencing platform. Interview questions were open-ended to allow participants to share all information and their lived experiences as they thought to be relevant to each question. Each session was transcribed using the Zoom transcription feature. The interviewer also used memos and notes to capture as much data as possible, to help organize the data, capture any follow-up questions or notes, and indicate codes that surfaced during the interviews.

Each participant completed an open-ended questionnaire designed to explore the effectiveness of formative feedback and its impact on the success of Ph.D. candidates and the importance of continuous feedback and its positive effects on student learning. Participants were also asked to review and analyze previous documents they had in their possession (i.e., feedback forms, versions of their dissertation paper, emails, PowerPoint presentations, etc.) The document analysis was guided by a set of questions developed by the researcher. The responses to the document review guide were analyzed and coded by the researcher to identify potential and common themes. The three themes identified are discussed and include the importance of effective feedback, committee alignment and diversity, and building supportive relationships with committee members and chairs in the pursuit of a doctoral degree in biomedical science at a southern regionally located HBCU.

During the manual precoding phase, repetitive and overlapping words and phrases were removed (Saldana, 2015). Frequency tables were used for the researcher to keep an accurate tally of repetitive statements. The use of frequency tables also supported the organization of information.

Secondly, the manual first-cycle coding was used to help the researcher pull significant statements, where words considered to be insignificant or irrelevant, were removed. These sixty-five codes were narrowed to common themes and eight sub-themes. This was accomplished by second-style coding methods (Saldana, 2015).

The researcher utilized the process of analyzing significant statements pulled during manual first-cycle coding and compared the statements closely. Any significant statements that did not match word for word but still had the same meaning at the core, were combined. Overlapping or irrelevant statements were removed, which allowed the significant statements, or horizons to be seen (Moustakas, 1994). These significant statements were adjusted and incorporated to create smaller categories or themes.

The synthesis of data was based on research and all participants shared their experiences for all three parts of the study. Once those commonalities within textual descriptions were brought forth, the researcher was able to reach a conclusion and see the total picture and three major themes were evident.

The transcribed interviews, along with the raw responses from the questionnaire and document review were coded at an initial level. The initial coding resulted in the following concepts presented in the following table. All key responses are organized based on the research questions. The results of the coding were then combined.

Initial Coding Reference Matrix

	Codes	One-on-One Interview	Questionnaire	Document Review
1	Attending an HBCU was purposeful	X	X	
2	Area of research as a commonality	X	X	
3	Built confidence	X	X	X
4	Butting heads with the committee chair	X	X	X

5	Challenges with committee	X	X	X
6	Challenges with insensitive mentors	X	X	X
7	Challenges with the dissertation chair	X	X	X
8	Checks and balances	X	X	
9	Close relationship with advisors	X	X	
10	Committee chair selection problems	X		
11	Common interest	X	X	
12	Communication barriers with the committee chair	X	X	X
13	Constructive feedback helpful	X	X	X
14	Cultural and social background in common with the committee chair	X	X	
15	Ethnic and social background of the chair not a factor	X	X	
16	Experienced administrative challenges	X	X	X
17	Feedback important to the progression	X	X	X
18	Feedback influences self-efficacy	X	X	X
19	Feedback outside committee chair	X		
20	Feeling of confidence after the process	X	X	X
21	Financial challenges	X		
22	Formative feedback is important	X	X	X
23	HBCU mentorship important	X	X	
24	Historical significance	X	X	
25	Hurtful/tough feedback	X	X	X
26	Impact of feedback	X	X	X
27	Importance of ethnicity	X	X	
28	Importance of family feel and values	X		
29	Intentional meeting preparation	X	X	
30	Lack of diversity	X	X	

31	Lack of formative feedback	X	X	X
32	Lack of interest from the committee or chair	X	X	X
33	Lack of pre-existing relationship with committee chair	X	X	X
34	Learned to be resourceful	X	X	
35	Like-minded interests	X	X	
36	Limited feedback and communication	X	X	X
37	Limited options of committee members	X		
38	Minority experiences are different	X	X	
39	Miss conception that HBCUs are less than schools	X		
40	Most difficult thing was processing paperwork	X	X	X
41	Motivation to keep going	X	X	X
42	Navigating committee chairs' personality	X	X	
43	Negative support ended positive results	X	X	X
44	Nervous when meeting with chairs	X		
45	No feedback provided	X	X	X
46	Nurturing environment	X	X	
47	Only commonality is research interest	X		
48	Overall positive experience	X	X	X
49	Overbearing mentor	X		
50	Positive mentorship	X	X	
51	Positive perception of mentoring	X	X	X
52	Power dynamic	X		
53	Presentation criticism	X	X	X
54	PWI is not bad but not the first choice	X		
55	Racial and social comments	X		
56	Represented diversity	X	X	
57	Research and data validation challenges	X		

58	Self-efficacy through motivation	X	X	X
59	Specific outcomes	X	X	X
60	Stressful emotional impacts	X	X	X
61	A strong relationship with the committee chair	X	X	
62	Supportive female mentors	X	X	
63	The committee did not seem interested	X	X	X
64	Very little in common	X		
65	Writing feedback	X	X	X

The initial coding was further refined into second-level coding using all key responses organized based on the research questions. This analysis presented in Table 2 located in Chapter 4, resulted in categorical constructs and sub-themes.